Report of the Work of The Rubber Research Board in 1948

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

CHAIRMAN'S REPORT

Board Membership—The period of membership of the following nominated members of the Board terminated; appointments to fill the vacancies were made as indicated below:—

Mr. W. Neal de Alwis, 25th February	—	Mr. Errol A. Jayewickreme nominated.
Mr. A. M. Clement Dias, 21st May	—	Mr. E. R. de Silva nominated.
Mr. W. P. H. Dias, 10th June	—	Renominated.
Mr. George E. de Silva, 27th February	—	Major Montague Jayewickreme, M.P., nominated.
Mr. Thomas Amarasuriya, 14th Oct., 1947	—	Mr. V. G. W. Ratnayake, M.P., nominated.
Mr. F. H. Griffith, M.P., 16th November	—	Renominated.
Mr. F. A. Obeyesekera, 26th November	—	Renominated.

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

Mr. H. E. Peries, C.C.S., Acting Deputy Secretary to the Treasury, was nominated to represent the Minister of Finance in place of Mr. T. D. Perera, C.C.S., from 20th March until 1st June and again from 21st August.

Col. J. T. Young resigned and Mr. E. J. O. Richardson was nominated in his place from 1st January.

Mr. R. C. L. Notley left the Island on leave and Mr. A. D. Layton was nominated to act for him from 16th April. Mr. Notley resumed his seat on 2nd December.

Mr. W. H. Attfield left the Island on leave and Mr. R. Bois was nominated to act for him from 28th May. Mr. Attfield resumed his seat on 6th August.

Mr. V. T. Nanayakkara, M.P., was nominated as a representative of Parliament with effect from 9th June in place of the late Mr. Simon Abeywickreme.

Mr. E. J. O. Richardson resigned and Mr. H. St. J. Cole Bowen was nominated in his place from 22nd October.

The personnel of the Board at the end of 1948 was as follows:—

Ex-Officio Members:

The Director of Agriculture—Mr. D. Rhind, O.B.E.

Representing the Minister of Finance—The Acting Deputy Secretary to the Treasury (Mr. H. E. Peries, C.C.S.).

Unofficial members of Parliament nominated by H. E. the Governor-General:
Major Montague Jayewickreme, M.P.
Mr. V. T. Nanayakkara, M.P.
Mr. V. G. W. Ratnayake, M.P.

Members nominated by the Agency Section of the Planters' Association of Ceylon:
Mr. W. H. Attfield
Mr. H. St. J. Cole Bowen

Members nominated by the Planters' Association of Ceylon:
Mr. F. H. Griffith, M.P.
Mr. R. C. L. Notley.

Members nominated by the Rubber Growers' Association:
Mr. C. A. C. Bowen
Mr. R. J. Hartley

Members nominated by the Low Country Products Association of Ceylon:
Mr. T. C. A. de Soysa
Mr. Noel de Silva
Mr. E. R. de Silva
Mr. Errol A. Jayewickrema.

Members nominated by H. E. the Governor-General to represent smallholders:
Mr. W. P. H. Dias, J.P.
Mr. F. A. Obeyesekera.

Meetings of the Board were held on 26th April, 31st May, 25th October and 20th December.

Committees—

Experimental Committee—Mr. T. C. A. de Soysa acted for Mr. R. C. L. Notley during the latter's absence on leave.

The personnel of the Committee at the end of the year was as follows:—

Mr. F. H. Griffith, M.P., (Chairman)
Mr. W. P. H. Dias, J.P.
Mr. Noel de Silva
Mr. R. C. L. Notley
Mr. F. A. Obeyesekera
The Director (Convener)

Meetings of the Committee were held on 12th April, 24th September and 29th November.

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

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

A meeting of the Committee was held on 17th September.

London Advisory Committee for Rubber Research (Ceylon and Malaya)—The Board contributed jointly with the Rubber Research Institute of Malaya to the cost of research on the quality and utilisation of raw rubber carried out at the Imperial Institute, London, 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 5th March, 2nd July and 5th November.

Future development—Towards the end of the year an amending Ordinance providing for an increased cess at the rate of 55 cts. per 100 lbs. with effect from 1st January 1949 was passed by Parliament. The amending Ordinance also provided for certain changes in the constitution of the Board, with effect from January, 1949.

FINANCE

Income—The Board's main income was derived from the cess on exports of rubber under Section 6(1)*a* of the Rubber Research Ordinance. Income from this source exceeded the estimate for the year by Rs. 86,171.68.

Monthly cess collections were as follows:—

January	Rs.	51,055.78	Brought Forward	Rs.	266,252.71
February	,,	55,788.00	July	,,	35,582.97
March	,,	50,451.47	August	,,	38,734.73
April	,,	41,595.90	September	,,	44,930.60
May	,,	38,752.51	October	,,	37,748.98
June	,,	28,609.05	November	,,	39,253.46
			December	,,	43,668.23
	Rs.	266,252.71		Rs.	506,171.68

A profit of Rs. 5,581/- was derived from the normal working of Dartonfield Estate and Rs. 11,667/- from Nivitigalakele.

Expenditure—Current expenditure amounted to Rs. 434,897/-. The surplus of income over expenditure for the year was therefore Rs. 161,826/-.

Capital expenditure amounting to Rs. 118,315/- was incurred mainly in respect of Agricultural Development Rs. 16,646/- ; Storage Battery and New National Engine Rs. 49,656/-; Buildings Rs. 33,322/-; Hedigalla Cart Road Rs. 12,079/-; Water and Power Supply Rs. 1,763/-; Furniture, Equipment and Laboratory Apparatus Rs. 4, 849/-.

Accounts—The accounts for the year with a Balance Sheet showing the property and liabilities of the Board have been prepared and submitted to the Auditor General for examination.

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.) D. RHIND,
Chairman of the Board,
RUBBER RESEARCH SCHEME (CEYLON)

March, 1949.

DIRECTOR'S REPORT 1948

IT was predicted in the last report that the senior staff situation would probably become desperate during 1948, and this has proved to be the case. During the first half of the year three senior research officers only and during the second half two only including the Director were available and the advisory services and essential field experiments have only been maintained with the greatest difficulty. The period of stress is by no means over and it is unlikely that a satisfactory staff position will be restored until late in 1949.

The report includes a summary of the work of each department prepared where possible by the senior officer concerned.

Staff

Director—The Director gave notice of resignation during December 1948 and will leave Ceylon in June 1949.

Chemical Department—The appointment of Chemist was vacant throughout the year.

Botanical-Mycological Department—Mr. C. G. Hansford, Mycologist, left Ceylon during January 1948 and the vacancy thus created had not been filled by the end of the year.

Mr. C. A. de Silva, Botanist, was on duty throughout the year.

Soils Department—Dr. L. A. Whelan, Soils Chemist, proceeded to England on end-of-contract leave early in June and has decided not to accept re-engagement.

Smallholdings Department—Mr. W. I. Pieris. Smallholdings Propaganda Officer, was on end-of-contract leave from 1st March, 1948 to 1st June, 1948.

Research Assistants—Mr. D. M. Fernando and Mr. W. M. S. Wijeratne were appointed research assistants in the Botanical and Chemical Departments respectively. Both assumed duty during November 1948.

CHEMICAL DEPARTMENT

In the absence of a Chemist, systematic research on chemical problems was not possible until at the end of the year a start was made by the research assistant Mr. Wijeratne on the characterisation and properties of the yellow colouring matter in latex, with the aim of finding simple means of decolorising it. The latex of certain well established clones contains this colouring matter in sufficiently large amounts to interfere with the economical manufacture of sole crepe by necessitating the removal of unduly large first fractions of yellow off-grade rubber. If easy means of decolorisation could be found, so that the proportion of top-grade crepe could be increased, a useful saving would result to the estates concerned. By the end of the year however the investigations had not reached a promising stage.

A number of fungicides were tested in crepe rubber but none were found which would meet the requirement of conferring the same mould resistance as paranitrophenol without its undesirable discolouring effect.

Estates enquiries on the manufacture of sole crepe were numerous during the early months of the year, but more exacting market requirements in the later months coupled with lower prices, deterred interest by potential new producers. The greater incidence of enquiries on defects in sole crepe in the later months, reflected the increased emphasis on quality by buyers.

No new creaming plants appear to have been erected by estates during the year.

Meteorological Observations—

The weather summary for 1948 is given below and is based on data recorded at the Scheme's laboratories for the Colombo Observatory.

	1948	1947
Rainfall (ins.) ..	162·33	172·98
Highest monthly rainfall (ins.) ..	24·12 (June)	26·39 (October)
Highest daily rainfall (ins.) ..	8·41 (21-22, Oct. '48)	6·20 (20-21 Oct. '47)
Highest shade temperature (day)	93·0 °F (25-2-48)	94·4 °F (28-2-47)
Lowest temperature (night) ..	66·8 °F (27-12-48)	62·5 °F (10-2-47)
Number of rainy days ..	247	225

BOTANICAL AND MYCOLOGICAL DEPARTMENT

C. A. DE SILVA

Mycological—

After 3 years of mild Oidium infection since the last severe attack in 1944, the year 1948 produced a somewhat severe attack on both budgrafts and seedlings. Wintering in general commenced early at Dartonfield, clone Glenshiel 1 showing signs of defoliation at the end of December 1947. Refoliation on the whole was rather prolonged and irregular resulting in a sustained attack of Oidium. Sulphur dusting was carried out as usual, and clones which were more heavily infected were given special rounds of dusting. It is interesting to note that most trees finally refoliated satisfactorily after more than one defoliation, especially the mature rubber of 25 to 35 years of age. The set-back from Oidium is generally counteracted in the wet low-country districts by a few years of the more normal refoliation following a mild attack of Oidium. In dry districts and at high elevations the adverse effects of Oidium tend to accumulate owing to poor refoliation following repeated attacks of Oidium from year to year. It is considered uneconomic to plant such areas with rubber in the future.

A short survey of Oidium infected areas outside showed that certain clones which escaped Oidium with a comparatively mild attack in one district were badly affected in another. In our search for Oidium resistant material it is necessary to differentiate between the partial immunity, which arises from the time of wintering, and the inherent immunity of trees in the soft leaf stages of refoliation, irrespective of the time of wintering. Our clone museum on Kepitigalla Estate, Matale, planted in 1941 with over 50 different clones has shown no resistant material. Up to 1948 clone LCB. 870 has not been infected with Oidium, but this is due to the fact that these trees have shown no signs of wintering. This clone will be under special observation in 1949 when it is expected to winter for the first time. It should be noted that clone LCB. 870 has no reputation for high yields.

Leaf fall due to Phytophthora infection was on the whole not serious. In a few isolated sections of Dartonfield Estate leaf-fall was somewhat severe compared with the conditions on the estate in general.

During the year under review Fomes lignosus was the only root disease of economic importance reported to us. Owing to the high costs of replanting the work of felling and uprooting of stumps is not generally carried out with the thoroughness of prewar years, and often the presence of root disease is overlooked at the time of felling. In many cases the old rubber trees carry the disease in a quiescent stage without showing any above ground symptoms; a few hours delay of inspection obscures any signs of the disease on exposed tap-roots especially during dry weather. Diseased laterals then remain in the soil as potential sources of infection. The cleaning up of isolated pockets of infection in replanted land, shown by the death of young rubber plants, is becoming a costly item in replanting work at the present time. The early detection of Fomes and elimination of infected material at the time of felling will prove to be the cheaper and more satisfactory procedure. There are indications that poisoning the old stand with sodium arsenite tends to minimise the risk of early spread of Fomes lignosus, but it is known that the fungus on infected stumps is not destroyed by poisoning.

Brown Bast is still a matter of some concern in young budded and seedling areas. Experiments carried out during the last 5 years on methods of treatment, which included the resting of trees, isolation cuts on diseased patches, and light scraping with the application of disinfectants and growth promoting substances, have on the whole given poor results. A small percentage of apparent cures could not be strictly attributed to any particular treatment, and in most cases 'cured' trees which began to yield normally still showed the characteristic brown marks of the disease.

It is best to look upon the first signs of dryness on tapping cuts as incipient Brown Bast and rest the trees as early as possible. Periodic inspections should then be made by opening the cuts for signs of recovery. The accumulation of trees in the resting stages can be treated with the light scraping method and application of suitable disinfectants during dry weather periods, as there is some indication of a beneficial effect from light scraping on trees, which have been rested on the first signs of dryness. The incidence of Brown Bast can be satisfactorily controlled in young rubber areas by adopting the correct intensity of tapping during the first 3 to 4 years of tapping, which seems to be the most susceptible period. This is particularly applicable to certain high yielding clones like Glenshiel 1 and Tjirandji 1. On many estates Brown Bast has been arrested by a reduction in intensity from 100 to 67% in the 3rd and 4th years of tapping. It is better to adopt the milder system of tapping than be forced to reduce the intensity of tapping on the incidence of Brown Bast, which is essentially a physiological disease due to the over extraction of latex. There is evidence, however, that under normal conditions of good growth in this country most clones can stand up to an initial 100% intensity tapping.

Botanical—

Staff—With the resignation of Mr. C. G. Hansford, Mycologist, in January, 1948 the whole of the agricultural work developed in connection with statistical field experiments by officers in the past 12 years has been supervised by the writer, together with part time work in the Mycological section and Soils Department during the second half year of 1948. Under these circumstances priority in supervision has been given to work in connection with plant breeding work, which is most important for the future development of the rubber industry in this country.

Planting Material—The test-tapping of Prang Besar and Tjikadoe Isolated Garden seedlings planted in 1932 and 1935 was discontinued in 1948, together with the tapping of 3 tree clones established from Prang Besar I.G. seedlings in 1935. On the results of test-tapping in the above areas 40 new clones were established. Most of these will be planted in a large scale clone trial at Hedigalla in 1949. The necesssry budwood of the new clones in the R.R. series has been mutiplied in our nurseries. 4500 trees were test-tapped in the various clearings at Dartonfield and Nivitigalakele in 1949. No new planting or replanting was done during the year under review. Owing to unfavourable weather conditions following on the planting of 3500 hand pollinated seedlings from the 1945 pollination programme in October-November 1947 a considerable number of casualties among these seedlings was reported in 1948. It has been possible to supply most of the vacancies with illegitimate seedlings taken from Dartonfield nurseries. The risk of planting late in 1947 had to be faced in view of the stage of development of the material available, which would have grown far too large for planting in 1948. The accumulation of this material in nurseries was due to the difficulties of opening out the necessary land for planting during the post-war period, and the acute shortage of senior staff.

No. 3 Replanting Experiment, Dartonfield 1936—In this area two year old stumped buddings and budded stumps were planted in May, 1936. Seedlings were planted in September of the same year for budding in the field 12 to 16 months later. The stumped buddings were first tapped in March 1942, and budded stumps in December, 1942. The field buddings came into tapping in December 1943. Girth measurements were taken in June 1947 and 1948. The results are summarised in Table I.

TABLE I

Material	Age June 1948 in years	Mean girth in inches			Yield per tree per tapping in grams 1948
		1947	1948	Increase 1947/48	
Stumped buddings	12	29·74	30·67	0·93	29·0
Budded stumps	12	29·22	30·16	0·94	27·5
Field buddings	10½*	26·13	27·12	0·99	21·9
Sign. diff. (·01)		1·47	1·49		

*Approximate age from time of budding in field.

There is little difference in growth between stumped buddings and budded stumps at 12 years of age. At 8 years of age this difference in girth was about 1·5 inches in favour of stumped buddings.

The experimental yield records are made on 1 sample tapping per month. An approximate calculation of yields per acre from these figures shows a total excess yield of about 800 lbs. per acre from stumped buddings over budded stumps from 1942—1948. The field buddings are behind in growth and yield in comparison due to the fact that these budgrafts are approximately 10 years of age from the time of budding in the field.

As in the previous years a comparison between experimental yields and commercial yields in this area gives the following results:—

	Yields in grams per tree per tapping 1948
Experimental ..	.. 26·1
Commercial ..	.. 22·7

The difference in the yield figures is due to the fact that experimental sample tapping is done on normal tapping days only, while estate figures include yields from partial 'wash-outs' and late tapping; yields from sample tapping are, however, satisfactory as a basis for comparative work. The yield of the 4 clones in this area PB. 25, AV. 49, SR. 9, RUB. 393 for the year 1948 was 819 lbs. per acre of dry rubber from commercial tapping; this is a very satisfactory yield for the class of clones.

Stock Experiment, Dartonfield, 1941—In this experiment there are 5 monoclonal blocks of RRI. '500' series clones and a single seedling tree block. Each of the clones is budded on 5 different illegitimate seedling family stocks and on unselected seedlings. The monoclonal blocks are made up of 16 sub-blocks, each with 6 single budded tree plots, with the relevant clone budded on to the 6 different stocks. In the seedling block the 6 unbudded stocks are replicated 16 times as in the budded areas. Girth measurements were taken in July, 1948, and the results are summarised in table II. The differences shown in growth of scions on the various stocks are of no practical importance. The unbudded seedlings of clone AV. 163 continue to show the best growth.

TABLE II

	Mean girth in inches						Sign. diff.
Stock family	TJ. 1	AV. 163	BD. 10	BS. 3	MK.1/1	Un-selected	P—·01
Scion	18·9	20·0	18·9	19·3	19·7	19·4	Not sign.
Seed families	22·6	25·3	22·9	22·2	22·5	21·8	2·6

1938 **Replanted Area-Dartonfield (No. 2 Manuring Experiment)**—This experiment is essentially for investigating the manure requirements of young budded rubber, and an NPK factorial experiment is replicated 6 times in 6 monoclonal blocks. The yields in the 4th year of tapping of the 6 clones each planted on approximately 3 acres are given under:—

Clone	TJ. 1	PB. 183	W. 259	HS. 28	PB. 86	PB. 186
Yield in lbs. per tree per year of 140 tappings	7·7	5·2	7·5	7·5	9·5	9·3

The above results confirm the high yielding qualities of clone PB. 86, now specially recommended on account of the white colour of its latex.

1939 **Replanted Area, Dartonfield**—Prang Besar fraction clones are tried out in this area of about 2 acres on a small scale, and as a number of estates has bought budwood of these clones the results of 4 years, based on test-tapping once a month, are given under :—

Clone	Tapping commenced	No. of trees tapped	Yield in lbs. per tree per year on 140 tappings			
			1945	1946	1947	1948
PB. 6/9	Mar. 1944	19 to 45	6·5	6·4	8·0	7·8
PB. 5/60	Sep. 1944	17 to 28	5·8	6·3	8·9	10·8
PB. 5/139	Mar. 1945	5 to 29	4·1	4·4	6·3	6·1

We are not in a position to make any recommendations on the planting of these clones until we are able to confirm the results obtained on Dartonfield with yield figures sent to us from outside estates. The yield figures based on test-tapping results are somewhat higher than those which can be expected from commercial tapping.

Stem and Branch Budding Experiment—Hedigalla 1944—This experiment was designed to observe variations of buds taken from the mainstem and branches of the parent plant classified into "stem" and "Branch" budgrafts. A split plot design was adopted as follows:—

Clones	..	10
Types of budwood	..	3
Replications	..	5

Preliminary observations on girth measurements show no significant differences between the budgrafts derived from the various buds in 1947 and 1948.

1939 **Clone Trial, Field 6A, Nivitigalakele**—The 44 clones planted in this area are made up of 37 new local clones and 7 control clones planted on a large scale in Ceylon. The layout consists of 20 polyclone blocks, each with the 44 clones planted in single tree plots. Tapping commenced in 1945 and the mean yields based on two sample tappings per month of the more promising clones are compared with those of control clones growing under the same conditions in Table III. The table also gives the cases of Brown Bast up to date. Clones NAB. 15, 16, 17, 20 and RR. 19 were

first selections for further trial on a semi-commercial scale. A further selection of 4 clones was made early in 1948, clones NAB. 3, 8, 11 and 12. Budwood of all these clones has been multiplied in nurseries. The best of the control clones, PB. 86, has given 9·8 lbs. per tree per year in the 4th tapping year, and clone TJ. 16 has done poorly. 6 of the selected clones show better yields than clone PB. 86, while clone RR. 19 which showed early promise has not come up to expectations.

TABLE III

1939 Clearing Field 6A, Nivitigalakele
Tapping System s/2, d/2, 100%, 2 sample tappings per month

Clone	No. of trees tapped each year	No. of B.B. cases	Yield in lbs. per tree per year, 140 tappings				Mean girth in inches Jan. 1949
			1945/46	1946/47	1947/48	1948/49	
NAB. 2	10·18·19·20	1	1·9	3·7	5·3	7·1	31·0
+NAB. 3	•5·18·17·18	3	2·9	4·1	6·0	10·1	24·1
NAB.4	8·20·20·20	-	2·1	3·7	5·3	7·2	29·0
NAB.5	8·19·19·18	1	2·0	3·8	5·4	7·2	26·6
+NAB.8	8·18·18·17	6	2·9	4·5	7·9	9·1	27·9
+NAB.11	11·20·20·20	-	2·7	4·8	7·2	10·0	26·5
+NAB.12	9·19·18·19	1	3·0	5·0	8·5	12·4	28·3
NAB.15*	9·20·20·20	1	4·4	6·8	11·6	12·8	29·1
NAB.16*	8·18·20·20	-	5·1	6·6	9·4	9·5	24·7
NAB.17*	12·19·20·20	5	5·1	7·9	12·2	13·6	28·3
NAB.18	10·19·19·19	1	1·5	3·1	5·3	8·5	27·3
NAB.19	10·20·19·19	1	2·2	3·5	5·3	7·9	34·4
NAB.20*	10·20·20·20	2	3·4	6·3	10·2	16·6	29·8
NAB.22	10·20·20·19	-	1·9	3·4	6·0	7·8	31·8
RR.19*	2·16·18·20	2	4·3	4·5	5·3	6·5	25·1
Controls							
TJ.1	7·17·19·18	2	2·6	4·7	5·9	9·6	25·7
TJ.16	11·19·20·19	2	3·1	4·5	4·2	4·2	24·0
PB.86	9·20·20·20	1	3·9	6·1	8·4	9·8	27·3
GL.1	2·19·20·19	2	4·0	4·8	7·0	8·1	24·3
WG.6278	5·17·19·19	1	3·4	4·6	6·9	6·9	24·9
MK. 3/2	11·20·18·19	2	2·1	4·0	5·7	7·5	27·9
Mean of all clones tested			2·5	3·8	5·4	6·8	
Sign. diff. (·05)					·1·2		

*5 original selections for large scale trial. +later selections.

1940 Clearing, Field 6B, Nivitigalakele—This experiment was primarily intended to test foreign clones of promise under local conditions. The controls and a few local clones have been included to bring the total to 36 clones. The experimental layout is a quasi-factorial lattice design adopted with 2 replications of 3 arrangements each. 4 tree plots are replicated 6 times giving 24 trees of each clone. The trees were taken into tapping in January 1947. The yield results based on two sample tappings per month on S/2, d/2, 100% tapping are summarised in Table IV, together with girth measurements taken in January 1949. Clones AV. 255 and PR. 107 have given satisfactory results and Lunderston N after a poor start turns out to be promising in the second tapping year. A number of RRI. '500' series clones from Malaya has given satisfactory yields. These clones have been called RRIM.

Clones in this experiment. Clone NAB. 26 is also promising and will require further testing on a large scale together with the other NAB. clones selected in the 1939 clearing at Nivitigalakele. Prang Besar fraction clone PB. 6/50 shows a satisfactory increase in the second tapping year.

TABLE IV

1940 CLEARING, FIELD 6B, NIVITIGALAKELE
TAPPING SYSTEM S/2, D/2, 100%, 2 SAMPLE TAPPINGS PER MONTH

Clone	No. of trees tapped each year	Yield in lbs. per tree per year 140 tappings		Mean girth in inches Jan. 1949
		1947	1948	
NAB. 26	23	6·4	7·8	25·2
RRIM. 511	19	5·9	6·4	21·7
PB. 6/50	22	5·9	7·6	26·7
RRIM. 513	24	5·8	9·9	21·2
RRIM. 500	20—22	5·6	6·7	22·2
AV. 255	23	5·6	8·7	26·5
RRIM. 501	21—22	5·4	8·8	21·8
RRIM. 504	22—23	5·1	7·5	21·4
RRIM. 506	15—19	5·1	7·2	22·1
RRIM. 514	21	4·9	5·8	19·2
PR. 107	24	4·7	7·9	22·5
PR. 106	22	4·5	4·9	22·3
RRIM. 519	20—22	4·5	6·5	20·0
PB. 5/57	18—20	4·4	5·9	22·0
Waringiana 4	23—24	4·2	6·6	23·8
PR. 105	22—23	4·2	6·9	21·6
BD. 17	19	4·1	4·5	21·6
B. 6	21—22	4·0	4·3	23·2
B. 7	21—22	4·0	5·2	21·3
NAB. 24	23	4·0	6·1	22·7
LUN. N.	19—20	3·8	7·5	22·7
B. 1	24	3·9	6·6	26·4
Pil. B. 84	21	3·5	6·6	23·5
KD. 1	20—22	3·5	3·7	21·7
B. 13	24	3·3	3·5	22·9
B. 3	21	3·2	4·5	20·8
RRIM. 518	23—24	3·1	4·1	20·3
Parawatte 1	18—21	3·0	4·5	21·8
MK. 1/3	22	2·8	4·7	24·1
NAB. 25	21—23	2·8	4·5	23·3
AV. 352	23	2·6	5·6	25·1
PIL. D. 65	21—22	2·4	3·5	20·2
CONTROLS				
GL. 1	20—22	5·1	6·9	22·2
HC. 28	22—23	4·3	6·1	27·4
WG. 6278	23—24	3·9	6·1	21·8
TJ. 1	20	3·8	6·6	23·9

1941, **Field 6C, Nivitigalakele**—187 hand pollinated seedlings from the 1939 programme are planted in this area, with a budded plant of clone WG. 6278 after every 5 seedlings in the contour rows as a control. The method of mixing budgrafts and seedlings is not considered satisfactory at the present time. In an adjacent area

5 tree clones established from the hand pollinated seedlings on pricking tests are planted with clone WG. 6278 as a control. This method of establishing clones from seedlings by stumping in the nursery and using the cut stem as budwood for a clone has been tried out in this clearing for the first time. Planting the stumped seedling and the derived clone at the same time saves about 7 years in testing time and enables one to check the yields of a seedling mother tree and the derived clone at the same time at an early age.

Trees were taken into tapping in 1947. Table V (A) gives the average yields of the seedling families and Table V (B) gives the yields of the best individual seedling mother trees and derived clones. Test pricking has been partially successful for spotting out seedlings for high yields in the nursery, but on the whole the method has not been reliable. The best of the clones will be selected for trial on a large scale. Clone RR. 108, RR. 153 and RR. 190 are particularly promising. Yield results in Table V (A) indicate that the local clones MK. 3/2, WG. 6278 and BS. 3 are promising seed parents.

TABLE V (A)

1941 CLEARING, FIELD 6C. NIVITIGALAKELE
YIELD OF LEGITIMATE SEEDLINGS FROM 1939 SERIES
MEAN YIELD IN LBS. PER YEAR ON 140 TAPPINGS
2 SAMPLE TAPPINGS PER MONTH

Family	No. of trees tapped	Mean yield in lbs. per tree per year	
		1947/48	1948/49
1. BS. 3×MK. 3/2	42—49	3·3	6·0
2. MK. 3/2×WG. 6278	3	2·7	6·9
3. BS. 3×PIL.A. 44	21—28	3·2	4·6
4. PIL.A. 44×WG. 6278	10—15	2·9	5·1
5. BS. 3×WG. 6278	40—43	3·6	7·7
6. PIL.A. 44×BS. 3	4—11	2·6	3·8
7. PIL.A. 44×MK. 3/2	5	3·2	5·9
8. WG. 6278×MK. 3/2	3	3·8	8·1
9. BS. 3×TJ. 1	3	2·7	4·7

Tapping Experiment No. 5 Dartonfield, Clones GL. 1, AV. 256, and PB. 25—The budded trees in this area were planted in 1934. A tapping experiment was started in 1941, with 4 tapping systems of 67 and 100 per cent. intensity. After 3 years experimental tapping, owing to a high incidence of Brown Bast in clone GL. 1 the 100 per cent. intensity tapping systems were reduced to 50 per cent. Yields from clones AV. 256 and PB. 25 were poor on all tapping systems and as the clones were vigorous growers the S/2, d/3, 67% tapping was changed to 2S/2, d/3, 133% in the third tapping year. The results for 7 years tapping are summarised in Table VI. The reduction in tapping intensity in Clone GL. 1 had the desired effect of reducing Brown Bast. Clones Av. 256 and PB. 25 are capable of giving very satisfactory yields tapped on 133 per cent. intensity without showing up cases of Brown Bast. Double-cuts in budded rubber can be introduced about the 4th tapping year, when the rate of growth becomes a less important factor compared with the early rate of 3 to 4 inches per year in girth. In the second half year of 1947/48 final changes in tapping systems were made. The 50 per cent. intensity tapping systems were changed to 100 per cent. in Clone GL. 1, and all trees in clones AV. 256 and PB. 25 were tapped commercially on 133 per cent. The results in 1947/48 show that clone GL. 1 can be tapped on 67 per cent. tapping intensity permanently with very satisfactory yield results. From 1947/48 experimental tapping was reduced to one sample tapping per month; in previous years this tapping was done daily by cup-coagulation method.

TABLE V (B)

1941 CLEARING FIELD 60, NIVITIGALAKELE.
YIELD IN LBS. PER TREE PER YEAR ON 140 TAPPINGS 1948/49
(SECOND TAPPING YEAR)

Tapping System : S/2, d/2, 100% 2 sample tappings per month.

Seedling Family	Tree No.	Yield	Derived clones	Yield
BS. 3×MK. 3/2	9	8·0	—	—
	10	8·0	—	—
	12	11·4	RR.104	5·2
	16	8·7	RR.108	11·2
	18	8·5	RR.110	—
	33	8·3	—	—
	41	12·4	RR.126	8·4
	42	8·5	RR.127	6·3
MK. 3/2×WG. 6278	50	9·6	RR.134	6·6
BS. 3×PIL. A. 44	60	8·0	—	—
	74	8·2	RR.144	2·6
	89	8·2	RR.152	3·8
PIL. A. 44×WG. 6278	106	8·7	RR.161	5·2
	109	7·9	—	—
BS. 3×WG. 6278	118	10·3	RR. 168	6·3
	119	11·4	—	—
	124	8·9	—	—
	125	10·1	RR. 171	4·7
	127	7·7	RR. 172	—
	128	9·6	—	—
	130	8·6	—	—
	131	9·4	—	—
	132	9·9	—	—
	133	7·9	RR.174	4·3
	135	10·0	RR.175	4·7
	136	11·0	RR.176	6·0
	137	8·1	—	—
	138	8·0	RR.177	—
	141	12·0	—	—
	142	9·6	RR.178	7·6
	144	8·0	RR.179	—
	145	8·0	—	—
	146	7·7	RR.180	4·7
	147	9·3	RR.181	8·6
	149	8·7	—	—
	154	11·8	—	—
	157	9·2	—	—
	159	8·5	—	—
PIL. A. 44×MK. 3/2	180	7·9	RR.192	5·8
WG. 6278×MK. 3/2	182	8·0	RR.194	6·6
	183	8·9	RR.195	7·9
BS. 3×TJ. 1	185	8·8	RR.197	8·0

Derived clone	Yield	Control clone	Yield	Se	lling Mother Tree	Yield
				No.	Family	
RR. 153	10·0	WG. 6278	4·4	91	IL. A. 44×WG. 6278	4·7
RR. 190	9·4	,,	5·2	177	IL. A44×MK. 3/2	—
RR. 111	8·3	,,	6·2	21	S. 3×MK. 3/2	5·1
RR. 163	8·0	,,	6·0	110	IL. A44×WG. 6278	—
RR. 116	8·3	,,	7·3	28	S. 3×MK. 3/2	6·5

SOILS DEPARTMEN T

C. A. De Silva (Acting Soil Chemist)

Staff—The Soil Chemist left the Island on long vacation leave and the writer took over the supervision of the department. Mr. G. V. S. de Silva, Assistant to the Soil Chemist, carried out the work in connection with Fertiliser Rationing and generally supervised experiments in the field.

Fertiliser Rationing—The basis of the rationing scheme was essentially the same as in previous years:—

(*a*) **Mature Rubber (over 7 years old)**—A maximum allowance for the year of 145 lbs. Sulphate of Ammonia per acre or 200 lbs. of a complete mixture, Sulphate of Ammonia 145 lbs., Saphos phosphate 45 lbs., and Muriate of potash 10 lbs.

(*b*) **Immature Rubber (up to 7 years old)**—Rock phosphate for normal growing trees and an NPK mixture for backward trees. Quotas were based on the R.R.S. general recommendations with the restriction that the NPK mixture was not supplied for more than half the total acreage of young Rubber, except in the case of young Rubber in tapping where a 100 per cent. quota of NPK was allowed. In the 1949 issue, estates were allowed the option of taking the NPK mixture for the full acreage of young Rubber irrespective of growth and tapping conditions.

Most estates preferred the mixtures to the single fertilisers for both young and old Rubber. For the period July 1948—June 1949 Ceylon had been allocated approximately 9370 tons of Nitrogen which represented only about 62% of the quota applied for. Owing to the unsettled conditions in the Middle East, shipments of potash to this Island were suspended. As a result this ingredient was omitted from the NPK mixture as from 3rd quarter.

TABLE VI

Tapping Experiment No. 5, Budded Rubber.

Mean yield in lbs. per tree per year of dry rubber and as per cent. of S/2, d/2,100%

Clone	Original Tapping system	1941/42	1942/43	1943/44	1944/45	1945/46	1946/47	1947/48	New B.B. cases 1948	Total cases 1942-48
GL.1	S/2,d/2,100%	5·47 100%	6·57 100%	8·26 100%	4·28*	10·08	9·45	9·81	1	46
	S/3,d/2,67%	4·44 81%	5·37 82%	6·84 83%	9·29	9·57	8·90	12·55	1	30
	S/2,d/3,67%	4·07 74%	6·02 92%	8·33 101%	5·80	12·31	9·90	10·02	-	25
	2S/2,d/4,100%	5·07 93%	6·30 96%	10·18 123%	5·14**	5·22	5·49	12·15		30
								1st half year / 2nd half year		
AV.256	S/2,d/2,100%	3·13 100%	4·39 100%	5·37 100%	5·25 100%	5·68 100%	6·90 100%	3·03 [redacted]	-	8
	S/3,d/2,67%	2·40 77%	3.39 77%	4·22 79%	4·20 80%	4·45 78%	5·75 83%	2·06 ***	-	2
	S/2,d/3,67%	2·24 72%	3.26 74%	8·93 166%	6·23 119%	7·97 140%	9·15 133%	3·18 4·43	-	17
	2S/2,d/4,100%	3·39 108%	4·96 113%	6·73 125%	5·31 101%	6·70 118%	7·79 113%	2·70	-	12
PB.25	S/2,d/2,100%	3·70 100%	5·56 100%	6·30 100%	4.97 100%	7·60 100%	9·71 100%	4·81	-	13
	S/3,d/2,67%	2·75 75%	4·28 77%	4·69 74%	4.45 90%	5·21 69%	6·81 70%	4·34 ***	-	7
	S/2,d/3,67%	2·66 72%	4·12 74%	0·26 163%	7·65 154%	9·54 127%	12·67133%	5·82 6·39	4	17
	2S/2,d/4,100%	3·50 75%	6·00 108%	7·61 121%	5·95 120%	7·65 102%	11·88122%	4·67	-	10

†Changed to 2S/2,d/3, 133% March 1943
*Changed to S/4,d/2,50% September 1944
**Changed to S/2,d/4, 50% " "
***All trees tapped 2S/2,d/3, 133% commercially.

During the year 180 late returns were attended to for 1948 issue and 535 for the 1949 issue. Since 1946 there has been a gradual falling off in the demand for manure.

Experiment on Manuring Mature Seedling Rubber, Dartonfield 1936—The 12th year of experimental tapping in this area was completed in 1948. The tapping cycle of 10 years came to an end in 1946, and the yields of the last two years have been obtained from bark which has renewed under the full period of manuring of this experiment. A summary of the yields from 1945 to 1948 is given in Table VII. Tapping was on the double four system throughout the year, and the yield results for 1948 are based on one sample tapping per month.

TABLE VII

YIELD IN KILOGRAMS OF DRY RUBBER PER PLOT OF 20 TREES AND AS A PERCENTAGE OF CONTROL

	O	N	NP	NK	NPK	mean	Std. error	Sign. diff. (·65)
Actual yield 1948	5·94	7·30	7·19	6·72	8·73	7·18	—	—
Adjusted yield 1948	6·38	7·27	7·24	6·53	8·47	7·18	0·29	0·85
Adjusted yield as % of control 1948	100	114	113	102	133	113	4·5	13·3
,, ,, 1947	100	114	109	109	128	112	4·8	14·0
,, ,, 1946	100	124	109	119	128	116	4.5	13·2
,, ,, 1945	100	118	106	109	116	109	3·9	11·4

In 1948 treatments N and NPK show significant responses, and NP just fails to reach the required level. NPK, the complete mixture gives significantly greater yields when compared with any of the other treatments. The results for 1947 and 1948 show that an NPK mixture may prove to be the most profitable. The age of the trees in this experiment now range from 31—38 years, and it is considered that further investigations on the manurial requirements of such mature rubber will not be of any practical importance. This experiment will, therefore, be discontinued from 1940.

Experiment on Manuring of Young Budded Rubber, Dartonfield, 1938—Girth measurements were taken at 4 feet above the union in June, 1948, 10 years after planting. A summary is given under :—

MEAN GIRTH IN INCHES

	O	N	P	K	NP	NK	PK	NPK	Com-post	Mean
1947	21·91	21·87	24·12	20·86	25·11	23·34	24·82	25·13	25·41	23·62
1948	23·18	23·31	25·92	22·24	26·16	24·70	25·94	26·43	26·68	24·95
Increment 1947—1948	1·27	1·44	1·80	1·38	1·05	1·36	1·12	1·30	1·27	1·33

The increments do not show any response to manuring and the decrease in rate of girthing is partially due to the fact that the trees have been in tapping since 1945. Yield is obtained at the expense of growth especially in the early years, and as trees come into tapping response to manuring if present is obscured somewhat by this effect.

Owing to the accumulation of biscuits in the factory resulting from field coagulation in cups in experimental rounds the method has been discontinued. In 1948 the total volume according to plots was measured and the dry rubber content was determined by coagulating a sample of 50 c.c. latex from each bulk. One sample tapping on S/2, d/2, 100% system was done each month and the yields are based on these results.

Together with the 8 treatments which make up the factorial combination of N, P and K treatments with a control without manure, an extra plot manured with compost has been introduced into each of the 6 blocks in this experiment. The average yields with Compost treatment are summarised first for 1948:—

YIELD IN GRAMS OF DRY RUBBER PER TREE PER TAPPING

O	N	P	K	NP	NK	PK	NPK	Com-post	Mean	Error	Sign. diff. (·05)
25·1	21·8	28·2	18·9	25·6	25·4	27·8	26·6	27·2	25·2	1·8	5·0

Yields of plots treated with compost have come up to the standard of the best of plots treated with artificials. The cost of handling extra bulk and transport are limiting factors in the use of this organic manure.

Yields of plots excluding the compost treatment give the following results:—

YIELD IN GRAMS OF DRY RUBBER PER TREE PER TAPPING

O	N	P	K	NP	NK	PK	NKP	Mean	Error	Sign. diff. (·05)
25·1	21·8	28·2	18·9	25·6	25·4	27·8	26·6	24·9	1·7	4·7

Treated factorially there is still a strong response to phosphates.

Mean	Total Response			Sign. response (·01)
	N	P	K	
24·92	—0·18	+4·23	—0·49	3·16

This is presumably a reflection of the better growth of trees in the phosphate plots indicated in the first 8 years of growth, which still persists in the girth figures for 1948 given earlier.

The yields converted to pounds on the basis of 105 trees per acre and 145 tappings per year are given under with the cumulative yields from 1944—1948.

Pounds of dry rubber per acre

	O	N	P	K	NP	NK	PK	NPK	Compost
1948	838	736	936	625	863	854	921	859	915
1944—48	1908	1733	2419	1486	2592	2053	2445	2452	2247

Total Response Factorially

	N	P	K
1944—48	+143	+682	—54

The yield results show that there has been a fair response to manuring over the 5 year period, but no response in 1948 indicating that so far the main benefit of manuring has been the bringing of trees into earlier tapping.

No. 16 Manuring Experiment, (Phosphate level) Hedigalla 1944—The experiment was carried out to obtain the maximum level of phosphate for young Rubber. The area was under food production for 2 years after felling of jungle. 4 single tree plots within a clone were used for the 4 treatments, each clone having 5 trees one of which was cast off at random for the experiment. Girth measurements were taken at 3 feet in September 1948, and a summary of the analysis of 111 replications is given under, together with the total rock phosphate quantities in ounces applied up to the time of taking girth measurements.

*Average girth in inches

Phosphate level	Nil	1	2	3	Mean	Error	Sign. diff. (·05)
Total Rock phosphate applied for 5 years in ounces per tree	0	33	66	99			
Girth Sep. 1948	11·3	12·9	13·3	13·7	12·8	0·17	0·49

The phosphate treatment has given increased growth at all 3 levels of application. The most economic dose for growth seems to be between levels 2 and 3 under the conditions of the experiment.

New Experiments, 1948—

The following experiments were started in the second half year of 1948:—

1. 1936 Replanted Area, Dartonfield, Nitrogen Level Experiment.
2. 1941 „ „ „ Placement of Fertilisers.
3. 1946 „ „ „ Nivitigalakele-Green Manure Trial.
4. ' Deniya ' Plantation, Nivitigalakele-Manure Experiment, Young Seedling Rubber.
5. Outside Estate, Dehiowita-Large scale Manure Experiment with Budded Rubber (50 acres).

Laboratory Work—

37 soil samples were analysed. A large number of clay samples were prepared to be taken by the Soil Chemist to England.

SMALLHOLDINGS DEPARTMENT

W. I. PIERIS

An event of major significance during the year was the taking over of the New Rubber Planting Scheme, which was previously administered by the Department of Agriculture.

The giving of free advice and assistance to Rubber smallholders in all matters connected with the planting, maintenance, manufacture and marketing of rubber was continued throughout the year and in this respect the Department has served a very useful purpose in bringing within reach of the smallholder, in simplified form, technical knowledge to which he would otherwise not have access and advice which, if practised, would help him to derive maximum benefit from his plantation.

The writer was away on 3 months' end-of-contract leave from March 1st, during which period Mr. H. H. Peiris, Deputy Smallholdings Propaganda Officer, attended to the work of the Department under the guidance of the Director.

New Rubber Planting Scheme—It was finally decided during the year that the administration of the New Rubber Planting Scheme should be taken over by the writer in his capacity as Smallholdings Propaganda Officer of the Rubber Research Scheme, and his time during the last two quarters was largely taken up by this work.

The staff of the N.R.P.S. consisting in September of 3 Senior Field Officers, 7 District Officers, 46 Range Officers, 4 clerks and 2 peons, who had been given notice of termination of service as from 30th September were requested to apply for re-appointment under the Smallholdings Department of the Rubber Research Scheme and 60 applications were received. Every applicant was invited for an interview and 56 of those who presented themselves were interviewed by the Director and the writer in Colombo during September, and 2 Assistant Propaganda Officers,

2 District Field Officers, 24 Rubber Instructors and 2 clerks were appointed with effect from October 1st. This number, which comprises only about half the former staff of the N.R.P.S., together with the existing staff of the Smallholdings Department, was considered adequate to cope with both new planting and general smallholdings works in future. Although the staff of the S. H. Department was, thereby, nearly quadrupled in number, a considerable over-all saving in expenditure to Government has been effected by the reduction of N.R.P.S. staff.

The complete staff of the S. H. Department after its re-organisation in October to absorb the N.R.P.S. was as follows:—

1 Smallholdings Propaganda Officer
3 Assistant Propaganda Officers
4 District Field Officers
31 Rubber Instructors
5 Clerks (including one at Dartonfield).
2 peons.

The organisation is one where each of the 4 District Field Officers exercises supervision over a group of 7 or 8 range Rubber Instructors and 2 of the 3 Assistant Propaganda Officers each has charge of 2 District Field Officers' groups and operate from the provinces. The third Assistant Propaganda Officer assists the Smallholdings Propaganda Officer at Headquarters.

The 31 Rubber Instructors were allocated to ranges, which had to be enlarged and carved out afresh in view of the reduction in N.R.P.S. staff. Instructors were stationed as far as possible in their former ranges, with whose permit-areas they were familiar. Maps showing the boundaries of each range were prepared and supplied.

It was found that field work could not be started in earnest until complete "Permit Lists" were procured and the greater part of the 4th quarter was devoted to obtaining from the Rubber Controller lists that were missing and checking lists received from the Department of Agriculture which were sometimes found not up to date. As some 20,000 permit-areas comprising over 40,000 acres were involved, in some cases with the acreage etc. amended after the original issue, the work was of an extensive nature, and the field staff had to be called in to assist. "Range Lists," showing the permit-areas in each of the 31 new ranges in alphabetical order according to villages, were prepared in triplicate from the District Permit Lists, as copies had to be held by the Rubber Instructor, District Field Officer and Headquarters respectively. The compilation of these "lists" has contributed a much-needed element in the satisfactory supervision of permit areas in the future and the staff have done well in completing them in so short a time.

Fairly heavy correspondence was received from the Rubber Controller requesting reports on permit areas. Each report necessitates a visit to the holding by a field officer and the recommendations of the writer or his A.P.O. 247 such reports were submitted and 1313 letters dealt with in this connection during the 4th quarter. 2352 advisory visits were also made to N.R.P.S. holdings during the same period.

Arrangements were made with the Rubber Controller that no new permits should be issued for 6 months pending the re-organisation of the N.P.R.S.

A revised form for reporting soil conservation work done in peasant permit-areas was prepared. The form when completed gives all necessary information for the payment of soil conservation grants and also affords a useful record of the condition of holdings. Rs. 453·47 was paid as grants to 7 permit-holders during the 4th quarter. Payments were remitted direct and not through the Rubber Instructor as was the previous practice. The necessity for shaping the sides of contour drains was done away with, as the purpose served did not appear to justify the extra work involved.

Change of Address—Owing to the lack of accommodation at Nivitigalakele resulting from the absorption of the N.R.P.S., the Smallholdings Department Headquarters was transferred to a portion of the Rubber Controller's Office, Eastern Bank Building, Colombo, on September 3rd. Thanks are due to the Rubber Commissioner for the office accommodation provided. The site is a particularly suitable one in view of the frequent interchange of correspondence with the Rubber Controller that has now become necessary. A separate telephone connection for the Smallholdings Department—No. 2462—and a post-box number—P.O. Box 901—were obtained, and future communications should be addressed to these numbers.

Staff—The staff figures given under the heading "New Rubber Planting Scheme," refer to the final staff position of the Department after the absorption of the N.R.P.S. in October. Prior to October, however, the Department functioned with its usual staff of 1 Deputy S.H.P.O., 10 Rubber Instructors, 2 clerks and 1 peon in whose ranks the following changes occurred:—

Mr. L. A. Peiris, R.I., Matugama, resigned in January and Mr. N. D. A. Seneviratne, R.I., Katugastota in April. One of these vacancies was filled by the appointment of Mr. A. Suriyaaratchie by advertisement, and the other by one of the N.R.P.S. appointments made in October. Mr. M. T. Nallawangsa was appointed as S. H. Accounts Clerk at Dartonfield in November. M. W. Albert was appointed as peon at the Colombo Office on October 6th.

Sheet-Making and Smokehouses—Efforts to improve the quality of smallholders' sheets were continued throughout the year chiefly by means of sheet-making demonstrations and the construction of properly-designed, cheap, wattle-and-daub smokehouses. Special "Quality Certificates" were printed for award to smallholders who made good sheets, so that those who succeeded in winning them may obtain good prices by presenting them to the Depot Officers when selling their sheet. Lists of smallholders who made good sheet on the Instructors' advice were received from each range and their holdings were inspected by the writer and the Deputy S.H.P.O. during circuit. Notes on the quality of the sheet seen were kept for the award of certificates after further inspection. 448 sheet-making demonstrations were given by Instructors.

20 demonstration and 76 private smokehouses were started during the year, 18 demonstration and 44 private houses completed and 171 existing houses improved by the introduction of ventilation etc. 1473 advisory visits were made to smokehouse owners. This work is mainly in respect of the 10 Rubber Instructors' ranges that existed before the taking over of the N.R.P.S.

200 sq. ft. of brass mesh for latex strainers was sold to smallholders by Rubber Instructors, at the special rate of Rs. 1·25 per sq. ft. 39 wooden latex pans and strainers were issued free to poor smallholders who followed the Department's instructions.

During inspection in Gampaha it was observed that small producers did not appear to receive fair prices from rubber dealers owing to the absence of a Government Rubber Purchasing Depot in the district. In one case sheet that was of good grade 2 quality had received as much as 10—12 cents per lb. below the current Colombo market price. Representations were made to the Rubber Commissioner regarding the desirability of opening a depot in the area and necessary production figures supplied. After an inspection of possible sites with the writer, the Rubber Commissioner opened a Purchase Depot in Gampaha town on December 1st, which purchased over 30,000 lbs. of rubber during the first month. Government Purchasing Depots are a boon to smallholders and it is hoped that they will be permanently retained.

The Hataraliadda Co-operative Rubber Society continued to be visited by the local Rubber Instructor and produced good sheet. Slight pin-point bubbles appeared on the sheets at one stage but were eliminated by adding a slightly larger dose of coagulant and rolling the sheet the same day instead of the next day. The Society was inspected by the Director in July and its work commended.

A complaint of discoloured sheet at the Goorookoya Rubber Co-operative Society from the A.G.A., Kegalla, was investigated. The trouble was caused by the adulteration of latex by some of the colonists by the addition of some substance which gave a false D.R.C. reading. Necessary steps for stopping this were recommended.

Replanting—Smallholders were reluctant to spend money on replanting in view of the continued decline in the rubber market. A large number of holdings, however, are in a poor state of production due to over-tapping during the war and any well-organised state-aided rehabilitation scheme is likely to have considerable response. 552 advisory visits were paid by Instructors to previously replanted holdings and 12 holdings (21 acres) lined for replanting anew. Wherever a replanted holding had reached tappable girth a demonstration in marking and opening cuts was given.

A small scale experiment to compare budded stumps with clonal seedlings was laid out in opening the Demonstration Replanted Block in the Pitigala range. 41 budded stumps of Tj. 1 and 42 clonal seedlings (poly-clone) from the Egaloya nursery were planted alternately along each row in contour rows in a block slightly over ½ an acre in extent. The planting was done on November 29th according to replanting methods recommended for smallholders and a subsequent inspection showed most of the plants to have shot. The experiment, it is hoped, will supply useful information regarding the respective merits of budded stumps and clonal seedlings under smallholdings' conditions.

Yield records of the demonstration replanted block at Baddegama, clone PB. 86, were kept and the trees which are now (November 1948) 10 years old gave an average monthly yield of 39·51 gms. per tree per tapping for the year. The other 5 range demonstration replanted blocks were maintained in good order and given their annual manuring with cattle manure and green loppings.

Demonstrations—In addition to the sheet making demonstrations previously mentioned 15 budding, 199 tapping, 98 disease-control and 258 other demonstrations were given by Instructors. The demonstrations given were fewer in number owing to Instructors being busy with N.R.P.S. work during the latter part of the year.

Nurseries—Small nurseries were maintained in the 10 ranges (prior to October) for giving budding demonstrations and supplying small quantities of budded stumps to smallholders. 7 demonstration and 3 private nurseries were opened in addition to others which survived from previous years. 49 yds. of bud-wood were issued for budding nurseries, 711 nursery plants budded and 603 budded plants sold. All nurseries were weeded, fenced and maintained satisfactorily.

The larger nurseries maintained by the Dept. of Agriculture at Egaloya, Walpita, Eraminigolla, Weerapana, Horana etc. for supplying planting material to N.R.P.S. permit-holders were not taken over by the R.R.S. They will continue to be maintained by the Dept. of Agriculture, but plants will be issued to permit-holders on the writer's instructions. The nursery at Weerapana, however, was abandoned, as the property was needed by the Forest Department.

Compost—The preparation of compost which is generally useful to the smallholder was popularised by means of demonstration compost pits maintained in the ranges at Departmental expense. 30 demonstration and 27 privately-owned pits were opened and 34 demonstration and 22 private pits which had been opened previously were re-filled.

General—Administrative duties resulting from the absorption of the N.R.P.S. have been greatly increased and personal visits to ranges have unavoidably been curtailed during the 3rd and 4th quarters. Numerous working and administrative instructions were conveyed to the staff in the form of circulars of which 8 were issued during the 4th quarter. Systematic personal visits to ranges will be re-commenced in 1949 after the re-organised Department has been got into smooth working order. The writer feels confident that a greatly improved service is now available both to N.R.P.S. permit-holders and general Rubber smallholders.

Correspondence—Inward	.. .. ..	966
Outward	.. ..	1105

The details of much of the work mentioned in this report as done by Instructors are confined to the period prior to October when the Department functioned with a staff of 10 Instructors as against the subsequently enlarged staff of 31 Instructors.

ESTATE DEPARTMENT

L. WIJEYEGOONEWARDENE

DARTONFIELD

Acreage Statement

	A.	R.	P.
Rubber Mature Seedling Areas ..	101	1	28
Rubber Replanted Areas ..	55	3	22
Buildings and Roads	16	3	08
Scrubs, etc.	2	2	19
Acquired Land	2	1	22
TOTAL ..	179	0	19

Elevation—215 feet.

Rainfall—Rainfall amounting to 162·33 inches spread over 247 days was below average. The South West Monsoon set in rather late without the characteristic storms and heavy rains. A meagre rainfall of 6·00 inches—the lowest since 1940 was recorded in July this year. The highest daily rainfall being 8·41 inches, on the 22nd October.

Rainfall during 1948 and the preceding year appear below:—

	1947	1948	5 Years Average
January ..	12·45 ins.	7·21 ins.	5·14 ins.
February ..	6·02 ,,	5·65 ,,	6·54 ,,
March ..	15·40 ,,	11·52 ,,	12·25 ,,
April ..	7·16 ,,	13·55 ,,	12·15 ,,
May ..	13·92 ,,	17·97 ,,	22·66 ,,
June ..	25·04 ,,	24·12 ,,	19·24 ,,
July ..	12·27 ,,	6·00 ,,	8·79 ,,
August ..	24·04 ,,	9·19 ,,	12·72 ,,
September ..	12·86 ,,	14·94 ,,	13·53 ,,
October ..	26·39 ,,	22·25 ,,	25·06 ,,
November ..	8·65 ,,	19·71 ,,	16·88 ,,
December ..	8·78 ,,	10·22 ,,	12·98 ,,
TOTAL ..	172·98	162·33	167·94

Crop—The crop for the year amounted to 87,387 lbs. which is 110·97% of the estimated crop of 78,750 lbs. and is 19,512 lbs. above that of 1947. The increase is mainly attributed to the following factors:—

(*a*) Weather conditions not unfavourable for harvesting crop.

(*b*) 24 acres of mature seedling rubber due for replanting in 1950 was treated to a more intensive tapping system on a tapping intensity of 200%. This accounts for an appreciable part of the increase.

(*c*) Careful supervision reflected in the higher yields per acre obtained from both the budded and mature seedling areas.

Comparative yield records of individual fields are given below:—

Field No.	Date of Planting	Acreage	Yields (lbs.) 1947	Yields (lbs.) 1948	Yield per acre (lbs.) 1947	Yield per acre (lbs.) 1948
1 ..	1910	28½	12,179	13,909	427	488
2 ..	1913	1	605	607	605	607
3 ..	1917	24	10,744	18,672	447	778
4 ..	1911	1¼	534	942	427	753
5 ..	1934	7¾	6,149	5,717	793	738
6 ..	1913	46⅛	20,364	26,058	438	560
7 ..	1936	9½	6,424	7,912	676	833
8 ..	1938	16¼	9,796	11,289	603	694
9 ..	1939	1¼	773	1,038	618	833
10 ..	1941	6½	307	1,243	47	182
			67,875	87,387		

In the year 1948—560 trees were brought into tapping.

Crop figures for the Forestry Area, which forms part of Field No. 1 are as follows:—

	1947 lbs.	1948 lbs.
1st Quarter ..	1,558	1,588
2nd „ ..	2,184	2,592
3rd „ ..	2,782	2,951
4th „ ..	2,841	3,574
TOTAL ..	9,365	10,705

Tapping—(*a*) A change over from 2 S/2 d/4 to 2 S/2 d/3 without Sunday tapping was effected after the winter rest in the areas under commercial tapping as recommended by the Visiting Adviser. Bark consumption is 4½ inches on each cut—Tapping task 150 trees.

The Mature Seedling Tapping Experimental Area (approximately 26 acres) due for replanting in 1950 was given a more intensive tapping system. In accordance with the requirements of the Botanist, an additional V-cut (upwards tapping) on half circumference was opened at a suitable height above the existing tapping panels. Tapping intensity 200% and tasking at 100 trees per tapper.

Tapping was stopped on the 1st February for resting during refoliation and resumed on the 3rd March. Tapping of the Experimental Areas was under the supervision of the Assistant Estate Superintendent. The Visiting Adviser reported favourably on the standard of tapping in general.

(*b*) TAPPING AVERAGES:—

	Commercial Tapping (Seedling) 2 S/2 d/3 (without Sundays)	Expt. Budded Areas S/2 d/2 (without Sundays)	Upwards Tapping 2 S/2 d/3 x V-cut
Mean for 1st Quarter ..	6·05 lbs.	8·75 lbs.	
„ 2nd „ ..	8·31 „	8·18 „	12·52 lbs.
„ 3rd „ ..	10·33 „	11·43 „	12·70 „
„ 4th „ ..	10·82 „	13·17 „	13·52 „

(*c*) ANALYSIS OF TAPPING ROUNDS FOR 1948
(1947 figures are in bracket)

	Early Tapping	Late Tapping	Very Late Tapping	Wash-outs	Partial Wash-outs	No Tapping Rain	No Tapping H'days	Rest for Winter
1st Quarter	56 (62)	5 (1)	— (—)	— (—)	— (—)	— (—)	8 (3)	33 (34)
2nd „	47 (61)	4 (11)	9 (8)	— (—)	6 (7)	14 (7)	17 (4)	
3rd „	49 (67)	8 (1)	10 (8)	2 (—)	— (4)	9 (14)	14 (—)	
4th „	54	14	7	—	—	2	15	

Manufacture—The crop was prepared in the form of crepe. Sole crepe manufacture ceased in mid June. A summary of the grades is given below:—

	1st Quarter lbs.	2nd Quarter lbs.	3rd Quarter lbs.	4th Quarter lbs.	Total lbs.	Percentage Crop
Sole Crepe No. 1 ..	2,240	1,414	—	—	3,654	4·18
Pale Crepe No. 1 ..	5,201	9,091	15,429	16,542	46,263	52·94
„ No. 2 ..	1,667	4,028	3,324	8,563	17,582	20·12
„ No. 3 ..	1,250	1,670	1,899	1,108	5,927	6·78
Scrap Crepe No. 1 ..	1,166	2,841	4,312	4,849	13,168	15·07
„ No. 2 ..	263	73	224	224	784	0·90
Experimental Latex ..	2	7	—	—	9	0·01
	11,789	19,124	25,188	31,286	87,387	100·00

Machinery—Electrical equipment and machinery were inspected by Messrs. H. W. Hammond & Co., Consulting Engineers, on the 25th and 26th February.

Mill—The 26" × 14" Brown's water cooled smooth mill was fitted in July with a new steel front role from Messrs. Walker Sons, Ltd. This has proved very satisfactory.

52 **H.P. Ruston Hornsby Engine** was overhauled in February. The manifold which needed welding was attended to by Messrs. Brown & Co., Ltd.

90 H.P. National Engine—The installation of this engine by Messrs. Walker Sons Ltd. was begun in April. The Estate commitments with respect to its installation necessitated the excavation for foundation for the engine and sump together with supplying of considerable quantities of broken stone, metal and sand. All parts of the engine were received by the end of May. The extension to the engine room for housing the engine was completed in August. The engine parts were assembled and a trial run given on the 16th September. The generator arrived in December and the wiring of the switch board is in progress.

New Nickel Battery—The new Nickel-Iron Battery made by NIFE Batteries Ltd. which was on order in 1947 was received and the crates assembled in February.

The Motor-Booster required for charging the Battery was rewound at Dartonfield, and the Battery brought into use on the 7th of April. This unit has proved very satisfactory.

Fuel Consumption—Details of fuel consumption for the period January-December are given below:—

	Average per hour
RUSTON HORNSBY—52 H.P.	
Diesoline	2·15 gallons
Lubricating oil	0·11 „
GARDNER 20 H.P.	
Diesel oil	0·64 gallons
Lubricating oil	0·60 „

Factory—Sundry repairs and the painting of machinery was carried out during the resting period.

PESTS AND DISEASES

Oidium—Weather condition in late January and early February seemed inimical to the activity of the fungus, but in mid February with a change in weather, a virulent attack developed and the stages of infection became evident. Refoliation was delayed. The budded areas suffered to a marked degree, with consequent severe leaf-fall. The mature seedling areas were less affected.—Two rounds of Sulphur Dusting at 4 lbs. per acre were carried out over the entire seedling and budded areas, and a third round at 6 lbs. per acre was focussed on the severely attacked areas.

Phytopthora—(*a*) *Leaf-fall*—The secondary leaf fall, usually experienced in July, and particularly marked last year, was conspicuous by its absence.

(*b*) *Stem Disease*—In the 1947 (11 acres), Replanted area, nearly 3% of both the budded and seedling material showed signs of the characteristic dieback of the green stem-tops. The affected tops were cut off.

Fomes Lignosus—*Mature Seedling Rubber*—A complete survey of Fomes patches was undertaken in July. Twelve patches were noted and control measures adopted.

1947 *Replanted Area*—11 *acres*—A total of 24 cases were detected during the year. Routine methods of control were adopted under the supervision of the Botanical Department. The history of this clearing, prior to replanting has on record several scattered Fomes pockets of possible sources of infection and it is not unlikely that further out-breaks would occur. The areas now affected are receiving careful attention.

Disinfectants—Applications of 10% Brunolinum Plantarium and Cargilinium B were made to tapping cuts on wet and dry days respectively.

Loss of Trees—The following trees were uprooted in 1948:

	No. of trees
Damaged by wind	16
For Building Sites	15
Unproductive Trees	13
Diseased trees	28

Manuring—There was considerable delay in receiving the manure quotas for the year. The replanted clearings and mature seedling areas were manured in accordance with the programme detailed for the year, during the third and the fourth quarters. This involved the treatment of the 7½ acres, 1 acre seedlings, 9½ acres

with R. 380 received in place of R. 400. The manure was broadcast. The 1941—6½ acres clearing and the 1947—11 acres clearing were manured by the Soils Department using 24 ozs. and 4 ozs. of saphos per tree respectively in the two clearings.

Cover Crops—Attention was given to the re-establishment of Desmodium Ovalifolium in areas where the cover was sparse. Cuttings of Desmodium were closely planted in all the replanted clearings.

Weeding—Self sown rubber seedlings and indigenous erect covers were lopped. Grass was eradicated from the replanted clearings. Woody plants were cut below ground and soft plants such as Veraniya (hedyotis) and Kenda (macaranga) were pruned to 1 ft.

Roads and Paths—Cart road 486 ft. in length bearing a platform of 9 ft. was constructed at low cost to serve as an approach road to the Junior Staff Bungalows from the main Estate Cart Road. Estate roads and paths were maintained in reasonably good order throughout the year.

Buildings—Maintenance of buildings, which comes within the purview of the estate department, received attention.

The following buildings were repaired during the year:—

1. Coke House,
2. Pump House,
3. Manure Shed
4. Carter's Quarters.

An extension to the estate store room was made and a Timber Shed built. Two double roomed cottages are under construction.

Verification of Stores—The verification of estate stores for the year ending December 1947 was done.

Rejected Articles—Tools rejected after the annual verification of stores were buried according to requirements.

Water Supply—A new pipe line 525 ft. of ½'' piping was laid, thereby extending the pipe borne water service to the Estate Conductor's Bungalow.

Labour—Labour was sufficient and settled.

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

	Residents	Non-residents
Ceylonese	24	36
Non-Ceylonese	58	—
Average daily out-turn ..	108	—
Average daily pay including dearness allowance ..	Rs. 1.54	

Annual Holidays—Holidays pay was given to all labourers entitled to holidays in accordance with Wages Board Ordinance.

Maternity Benefits—8 Ordinary Maternity Benefits and one Alternative payments were made during the year in accordance with the Maternity Benefits Ordinance.

Health—The health of the labourers has been moderately good.

The following cases of diseases have been reported among the Staff and Labourers for the year :—

Influenza	238
Malaria	84
Ulcers	106
Anchylos	41
Worms	84
Others	729
	1282

All resident and non-resident labourers were given Anti-Typhoid injections by the Medical Officer of Health, Agalawatta in August.

NIVITIGALAKELE

Acreage Statement

Rubber Mature Areas	(1926—1935)	68¾ acres
Clearings	(1939—1944)	46¾ „
Replanted Area 1946		21 „
Seedling Nurseries		8 „
Budwood Nurseries		6½ „
Buildings and Roads		2 „
Uncultivated		21¼ „
TOTAL		174¼ „

Rainfall—144·65 inches—No. of wet days 212.

The rainfall for the year was about average and the distribution normal.

Crop—The crop secured for the year was 64,567 lbs. which is 116·3% of the estimated crop of 55,500 lbs. and is 10,606 lbs. above that of the previous year. The older fields in commercial tapping continued to give improved yields, and the younger clearings in tapping gave yields in keeping with their increase in maturity.

Comparative yield records of individual fields are given below:—

		Yields lbs.		Yield per acre	
Clearings	**Acreage**	**1947**	**1948**	**1947**	**1948**
1926	13¾	12,870	13,281	936·0	965·89
1927	10½	8,442	10,157	785·3	967·33
1928	15¾	10,025	12,106	626·5	768·63
1935	28	16,141	18,181	566·4	649·33
1939	10	3,699	4,728	360·8	472·80
1940	9½	1,926	3,460	197·5	364·21
1941	14	858	2,196	171·6	313·71
Deniya	3	—	458	—	152·66
		53,961	64,567		

Tapping:—

(*a*) A change over from 2 S/2 d/4 to 2 S/2 d/3 without Sunday tapping was effected after the winter rest in the 1926, 1927 and 1928 Clearings, as recommended by the Visiting Adviser. Bark consumption of 4½ on each cut—Tapping task—150 trees.

(*b*) Tapping Average .. 11·1 lbs.

Tapping ceased on the 1st February, for resting during refoliation and resumed on 1st March. The Visiting Adviser commented favourably on the standard of tapping.

(*c*) Analysis of tapping rounds for the year 1948:—

	Early Tapping	Late Tapping	Wash-outs	Partial Washouts	No Tapping Rain	No Tapping H'days	Lost for Wintering
1st Quarter	54	7	—	—	3	4	25
2nd Quarter	43	14	1	—	17	17	—
3rd Quarter	51	14	1	—	14	13	—
4th Quarter	43	26	1	—	8	15	—

The following trees were brought into tapping during the year:—

Clearing	In March	In September	Total
1935	3	—	3
1939	16	7	23
1940	40	27	67
1941	55	60	115
Replanted Deniya Area	270	80	350

In December 374 trees were brought into test-tapping in the 1942 clearing.

Manufacture—Rubber coagulam was daily transported to Dartonfield Factory for manufacture into crepe.

The distribution of grades is given below:—

Grade	1st Quarter lbs.	2nd Quarter lbs.	3rd Quarter lbs.	4th Quarter lbs.	Total lbs.	Percentage
Sole Crepe No. 1 ..	1,120	1,440	—	—	2,560	3·96
Pale Crepe No. 1 ..	4,990	6,322	11,886	11,297	34,495	53·43
" No. 2 ..	1,670	2,102	1,687	4,855	10,314	15·97
" No. 3 ..	2,192	608	2,146	1,430	6,376	9·88
Scrap Crepe No. 1 ..	1,300	2,370	3,417	3,321	10,408	16·12
" No. 2 ..	112	—	112	190	414	·64
	11,385	12,842	19,248	21,093	64,567	100·00

An aluminium coagulating tank 6′×3′×15″ of standard Chengai construction with grooved sides, complete with 44 double rim partitions of 150 gallons capacity was installed in September.

Machinery—*The 5 H.P. National Engine*—A break-down occurred early in July when the gudgeon pin, small end bush and cylinder gasket needed attention. Repairs were effected by Messrs. Walker Sons Ltd. The engine was out of commission for nearly two weeks.

In December the engine failed again, and was despatched to the Agents for repair and complete overhaul.

Pests and Diseases—

(*a*) **Oidium**—The uneven wintering of trees on this estate resulted in sporadic outbreak of Oidium in the mature areas with consequent severe-leaf fall. The 1939, 1940, and 1941 clearings at Kosgahahena which wintered fairly evenly were not much affected. Three full rounds of Sulphur Dusting at 5 lbs. per acre were carried out.

(*b*) *Phytopthora—Stem Diseases*—A mild attack was observed in July in the 1946 (21 acres) Replanted Area where seventeen trees were affected. The tree tops were lopped. The Budwood Nursery was also attacked; perenox was sprayed.

(*c*) *Bark Rot*—A few cases of Bark rot were noticed in the 1939 Kosgahahena clearing in mid September. Disinfectant at curative strength of 15% (Brunolinum Plantarium) was used.

Disinfectants—Routine applications of 10% Brunolinum Plantarium and Cargilinium were made to tapping cuts on wet and dry days respectively.

Loss of Trees—The following trees were uprooted in 1948:—

	1926	1927	1928	1932	1935	1936	1939	1941	1942	1946	1940
Brown Root	—	—	—	—	—	—	—	4	3	—	4
Ustulina	—	1	3	—	2	—	—	—	—	—	—
Brown Bast	1	—	—	—	10	2	—	—	—	—	—
Wind Damage	8	—	3	1	1	—	2	—	—	—	1
Fomes	—	—	—	—	—	—	—	—	—	16	—
	9	1	6	1	13	2	2	4	3	16	5

Weeding—Routine weeding was carried out in all the Clearings.

Manuring—The delay in receiving the manure this year prevented the 1948 manuring programme being completed. The 1942, 1944 and 1946 clearings were manured in July. The budwood nurseries and seedling nurseries were manured during the 3rd Quarter. The older clearings 1926, 1928 and 1935 were manured in December. Manuring continues in 1939—1940 and 1941 clearings according to the programme.

1944 Clearing—5 acres—In this clearing where a growth was poor and uneven, 88 trees below 9 inches in girth were ring weeded and manured, envelope forked with R. 215 at 2 lbs. per tree, as recommended by the Visiting Adviser on his visit in September.

Deniya—The replanted Deniya area was manured under the supervision of the Soils Department.

Filling of Trenches—(*a*) **Kosgahahena Clearing**—The filling of trenches in 1940 clearing 10 acres, and the 1942 clearing which needed attention as recommended by the Visiting Adviser in March was completed.

(*b*) **Pinnagoda 1935 Clearing (28 acres)**—The filling of trenches was recommended by the Visiting Adviser on his visit in September and this was completed.

Budwood Nurseries—Pollarding was done in March. Budding of NAB. clones were planted for multiplication purposes. Supplies to the NAB. clones were made in July.

Seedling Nurseries—Vacant parts were sown with crotalaria.

Fencing—125 fence posts transported from Hedigalla Estate were erected and barbed wiring was now complete in the 1935 clearing.

Paths and Roads—Paths were repaired in all the clearings. Surface repairs to the approach road were effected.

Buildings—1. Ramp and drains to Quadruple cottage (Pinnagoda)
2. Repairs to the Bath Room in Junior Staff Bungalow No. 3,
3. Re-guttering of S.H.P.O.'s Bungalow.

Labour—Labour was sufficient and settled.

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

	Residents	Non-Residents
Ceylonese ..	22	35
Non-Ceylonese ..	3	—

Average daily out-turn .. 54
Average daily pay including dearness allowance .. Rs. 1.46

HEDIGALLA

Acreage Statement

1943	Clearing	11 acres
1944	,, ...	14 ,,
1945	,, ...	25 ,,
1946	,, ...	16 ,,
1947	,, ...	60 ,,
	Total	126 ,,

The total acreage available is 1000 acres.

Rainfall—166·51 inches.

No. of wet days—234.

1947 Clearing (60 acres)—The actual effective acreage planted with rubber in this clearing is 45 acres. Three main types of material were used. (*a*) Twinned Seedlings. (*b*) Clones derived from the 1944 Hand Pollinated Seedlings. (*c*) 1945 Hand Pollinated Seedlings and derived clones. At the end of last year a total of 5474 points were planted. The distance of planting was 40′ × 8′ square planting, the rows running East and West. By the end of June 1948, Twinned Seedlings (430) and 500 illegitimate clonal seedlings were planted. In July and August another 525 illegitimate clonal seedlings were planted. Supplies were made in the form of germinated illegitimate clonal seeds using 3 per hole.

Soil Conservation Work—(*a*) The establishment and maintenance of a good growth of legume ground cover was effected in 1948, using Desmodium Ovalifolium cuttings. (*b*) 383 chains of drains were cut during the year.

Inspection Paths—Nearly two miles of path were cut in the clearing, affording opportunity for closer supervision.

Manuring—All clearings were manured in accordance with the programme detailed for the year.

Weeding—Routine weeding was carried out in all the clearings.

Cover Crops—Cuttings of Desmodium Ovalifolium were planted and are spreading well.

1949 Clearing—A large scale clone trial, laid out by the Botanist, necessitated the clearing of thirty acres.

Felling—Of the 15 acres unplanted area in the 1947 clearing, only 7 acres could be used effectively for planting, due to rocky out-crops. Accordingly 24 acres were felled in November and December 1948 employing estate labour.

Planting distance—Rectangular planting 6′ × 45′ giving 161 points to the acre.

Lining—This was completed in the 7 acre block of the 1947 clearing and is in progress in the rest of the clearing.

Holing—This commenced in the 7 acre block of the 1947 clearing. 177 and 378 holes were cut in November and December respectively. Holes were cut 2½' × 2½' × 1' deep to accommodate the lateral root system with a central hole 3' made with a crow bar to take the top-root. An average of 7—9 holes per day was obtained.

Drains—Forty-two chains of silt pitted drains spaced 45' apart in the middle of the rows were cut.

Paths—12 chains of foot paths were cut in the 7 acre block, which forms an integral part of the 1949 clearing of 30 acres.

Timber—Useful trees such as Welipiana, Keena, Milla and Liang felled in the 1949 clearing (30 acres) were sawn into planks, rafters and reepers and transported to Headquarters at Dartonfield.

Maintenance of Buildings—Repairs to roofs of the Quadruple cottages and temporary lines were made. Lines were lime washed and sundry repairs to damaged walls attended to.

New Buildings—The following buildings were completed during the year:—

1. Rice, tool store and Office combined
2. Two Junior Staff Bungalows
3. Two pit latrines for the Junior Staff Bungalows
4. Ramps and drains to the Estate Conductor's Bungalow
5. One iron padlocked Entrance Gate.
6. One set of double room cottages for labourers
7. Two sets of double latrines for labourers' cottages
8. Ramp and drains to Quadruple labourers' cottage.

Maintenance of Cart Road—The maintenance of the first two miles of Cart Road to the estate was both expensive and disturbing. Colonists used bullock carts for the transport of illicit timber and firewood and later resorted to heavy lorry traffic, with impunity causing considerable damage to the road. At one stage, sections of the road were almost impassable.

In August a padlocked iron gate was erected in an effort to stop this heavy traffic. So far it has proved effective. Repairs to the badly churned up sections of the road using 10" broken stone, for paving the wheel tracks is in progress.

3rd Mile—Extension of Cart Road—The fifth half mile of Cart Road was constructed employing estate labour. 8 culverts 2' × 2' ; 1 culvert 3' × 4' ; one 10' span bridge and 2370 cu. ft. of retaining walls of dry masonry were substantially built. The fifth half mile was completed in July.

The sixth half mile was started in August and is nearing completion. The required number of culverts are built, and the final levelling and rolling is in progress.

Food Production:

Areas under cultivation for food crops were as follows:—

NIVITIGALAKELE..	½ acre
HEDIGALLA	35 acres

Crops harvested during the year:—

Paddy	104	measures
Manioc	11,623	lbs.
Pine apples..	2,323	

Visiting Adviser—The Visiting Adviser, Mr. W. A. Paterson, inspected Dartonfield, Nivitigalakele and Hedigalla estates twice during the year and reported favourably on their condition.

ADVISORY SERVICES ETC.

The annual summary is as under:—

	Enquiries	Estate Visits
Chemical Department	181	5
Botanical and Mycological Department ..	362	50
Soils Department :		
General	54	40
Fertiliser Rationing	102	—

The Chemical Department had fewer enquiries on latex preservation and concentration than in the previous year. The bulk of the enquiries concerned the manufacture of and defects in crepe and sole crepe.

Fertiliser rationing was again responsible for most of the correspondence in the Soils Department.

In the Botanical-Mycological Department there have been numerous requests from estates for approval of budded areas as clonal seed gardens. Enquiries on tree poisoning have been frequent and root disease in replanted areas has accounted for most of the enquiries on disease problems.

MEETINGS, COMMITTEES, ETC.

The Director attended all meetings of the Board of Management and served on the Experimental and Smallholdings Committees. He also attended by invitation a number of meetings of the Rubber Co-ordinating Board which considered the implementation of the Report of the Rubber Commission, and he represented the Scheme at meetings of the Fertiliser Rationing Committee. He represented the Scheme at the Annual General Meetings of the Planters' Association of Ceylon and the Low Country Products Association. The meetings of the Kalutara Planters Association were attended by the Director and the Botanist.

CO-OPERATION WITH OTHER RESEARCH ORGANISATIONS

The Scheme has been in constant touch with the London Advisory Committee for Rubber Research (Ceylon and Malaya) throughout the year.

Views have been exchanged on many topics with the Rubber Research Institute of Malaya and with the British Rubber Producers Research Association in England.

The Fertiliser Rationing Scheme has kept us in constant communication with the Tea Research Institute.

The Coconut Research Scheme gave valuable help in testing samples of rubber seed oil.

Publications have been exchanged with research organisations in many parts of the world.

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:—

	1947	1948
Estates and Agencies..	972	987
Subscribers	53	59
Exchange List	65	70

Publications issued during the year were as follows:—

Report of the work of the Rubber Research Board in 1947.
Combined 3rd and 4th Quarterly Circulars for 1947.

(Sgd.) EDGAR RHODES,
Director

Research Laboratories,
Dartonfield, Agalawatta,
21st March, 1949.

REPORT OF THE LONDON ADVISORY COMMITTEE FOR RUBBER RESEARCH (CEYLON & MALAYA) FOR 1948

Mr. P. J. BURGESS, M.A., F.C.S., F.I.R.I. (*Chairman*) SIR ERIC MACFADYEN, M.A. Mr. J. W. M. KENNEDY Mr. G. H. MASEFIELD Mr. E. W. WHITELAW Mr. H. W. HORNER	Nominees of the Rubber Growers' Association
Lt-Col. J. SEALY CLARKE, F.I.R.I.	Nominee of the Research Association of British Rubber Manufacturers.
DR. G. A. C. HERKLOTS, M.SC., F.L.S.	Secretary to the Committee for Colonial Agricultural, Animal Health and Forestry Research.
MR. J. LORNIE, C.M.G., M.A., B.SC.	Nominee of the Malayan Government.
MR. L. LORD, M.A.	Nominee of the Ceylon Government.
SIR HARRY LINDSAY, K.C.I.E., C.B.E.	The Director, Imperial Institute.
DR. S. P. WILTSHIRE, M.A.	,, ,, Imperial Mycological Institute, Kew.
SIR WILLIAM G. OGG, M.A., B.SC.	,, ,, Rothamsted Experimental Station
SIR HAROLD TEMPANY, C.M.G., C.B.E, D.SC., F.R.I.C.	
Professor V. H. BLACKMAN, M.A., SC.D., F.R.S.	
SIR JOHN L. SIMONSEN, D.SC., F.R.S.	Director, Colonial Products Research Council
MR. J. A. NELSON, B.SC. (*Secretary*)	Imperial Institute, London, S.W.7.

TECHNICAL SUB-COMMITTEE

All the members of the London Advisory Committee with the addition of the following co-opted members:—

MR. J. DENSON
MR. G. E. COOMBS, B.SC.
DR. W. C. DAVEY,
DR. S. S. PICKLES, F.R.I.C., F.I.R.I.
DR. J. R. SCOTT, F.R.I.C., F.I.R.I.
DR. G. GEE, SC.D.

STAFF

Superintendent of Rubber Investigations ..	G. MARTIN, B.SC., F.I.R.I.
Senior Scientific Officer ..	H. C. BAKER,* M.SC., A.R.I.C., F.I.R.I.
Senior Scientific Officer ..	W. G. WREN, B.SC., D.I.C., A.R.C.S.
Research Scholar ..	A. S. COOK, B.SC.
Temporary Assistant ..	G. P. R. BIELSTEIN, M.A.
Assistant Experimental Officer ..	R. REDWOOD
" " " ..	MISS R. MORGENSTERN
" " " ..	MISS G. M. LANE
" " ..	P. J. YOUNG
Assistant (Scientific) ..	MISS J. HORNER
" " ..	M. F. WEINEL

CHAPTER III

RUBBER DEPARTMENT

General Administration

DR. G. A. C. HERKLOTS was appointed to the London Advisory Committee by the Secretary of State for the Colonies in the place of Dr. H. H. Storey, whom he succeeded as Secretary for Colonial Agricultural Research. The Committee was also pleased to accept the nomination by the Goodyear Tyre & Rubber Co., Ltd., of Mr. Jack Denson to serve on the Technical Sub-Committee in place of Mr. L. H. Bennett on the return of the latter to the U.S.A.

The Committee and Technical Sub-Committee held three meetings during the year.

The Committee also had the advantage of consultations with Mr. C. E. T. Mann, the Chairman of the Board and Director of the Rubber Research Institute of Malaya, and with two other members of the Board, Mr. A. F. Beith and Sir Sydney Palmer who were on leave in the United Kingdom.

Special Sub-Committees were appointed to discuss with Mr. Mann:

(1) Measures to be taken to prevent the introduction of Dothidella Ulei (South American Leaf Disease) into the East, the desirability of uniform quarantine laws and the possibility of obtaining planting material resistant to this disease.

(2) Proposals for work in Malaya and at the Imperial Institute in conjunction with the scheme prepared for the development and re-orientation of research on plantation rubber arising out of the recommendations of the Malayan Rubber Advisory Committee on Rubber Policy.

The Committee approved the proposals submitted by Mr. Mann to intensify investigations on latex arising out of previous work by that Institute and the Committee, and to initiate new work on the fundamental physical and chemical properties of fresh latex as it emerges from the tree together with a study of the changes that occur in processing and preparation for export. In view of the recommendations in the Benham Report the Committee agreed that the proposals for the expansion of the work of the Rubber Research Institute (and the London Advisory Committee) should be submitted jointly with those of the British Rubber Producers' Research Association and the British Rubber Development Board, and they accepted the offer of the Chairman of the Research Association to co-ordinate the applications from all the organisations financed by contributions from the Malayan Rubber Fund. The

*Seconded to Rubber Research Institute of Malaya

Committee also recorded the opinion that it is desirable for representations to be made with a view to ensuring that the existing balance in the Malayan Rubber Fund is reserved for rubber research in order to provide for any emergency which may arise as a result of a decline in rubber exports from Malaya. In view of the cost of the Scheme the Committee hope that the financing of rubber research by Malaya will not have to depend entirely in future on the fluctuating resources of the Malayan Rubber Fund as at present constituted.

A Sub-Committee examined the possibility of the use of aircraft in dusting and spraying for the control of Oidium disease in Ceylon, but on account of serious doubts as to whether it would be practicable or economic a trial has not been made.

In addition the Selection Sub-Committee met on several occasions to deal with applications received in reply to an advertisement issued for appointments on the European staff in Malaya. They were able to select three officers for posts in the Pathological, Soils and Smallholders Divisions, but the vacancy for an Advisory Officer in the Botanical Division remained unfilled at the end of the year. In view of the difficulty experienced in 1947 in obtaining a suitably qualified geneticist for the Rubber Research Institute the Board agreed to the suggestion of the Committee that a special probationership should be offered in co-operation with the Colonial Office scheme for agricultural probationerships. No applicant with the desired qualifications was forthcoming and the offer is being renewed in 1949. Mr. A. S. Cook, B.Sc., who was awarded a Probationership by the Rubber Research Institute in November, 1947, completed his training in the Committee's Laboratories and will be proceeding to Malaya early in 1949 to take up an appointment in the Chemical Division. Steps are being taken to recruit another young chemist for a further probationership.

At the request of the Rubber Research Scheme, Ceylon (following the Report of the Rubber Commission) an advertisement was issued in November for a qualified and experienced Mycologist as Oidium Research Officer.

Staff in London—As indicated in the report for 1947, arrangements were made for Mr. H. C. Baker, a senior member of the staff in London, to be seconded for service in the Chemical Division of the Rubber Research Institute for a period of one to two years. Mr. Baker left for the East in April, and since then the staff has been further reduced by the resignation of a number of experienced assistants.

Finance.—Owing to the considerable rise in the cost of plant and apparatus and salary increases given to Scientific and Technical Staff to bring their scales in line with the higher rates now paid to similar grades in the United Kingdom Government service, it became obvious during the year that the present contribution of £8,000 p.a. from Ceylon and Malaya would be quite inadequate in future for the efficient conduct of the activities of the Committee on their present basis. The Rubber Research Institute was accordingly approached with regard to the possibility of an increase being made in 1949 in their present contribution of £6,000. The Committee are pleased to record that the Board of the Institute has agreed to contribute the sum of £8,000 for that year, which will enable them not only to fill the vacancies on the staff which remained unfilled owing to the uncertainty as to the future income, but to complete a greatly overdue replanning of the laboratories which had been commenced but had had to be suspended for the same reason.

Research

The work carried out during the year has been chiefly concerned with the following subjects: (1) the properties of rubber and preserved latex from well-known Malayan clones; (2) factors affecting the plasticity and keeping properties of raw rubber; (3) preparation, fractionation and properties of pure rubber hydrocarbon; (4) testing of preserved latex, and analytical work on the distribution of non-rubber substances; (5) further development of the pilot plant for the economic preparation of rubber by a continuous process. The progress made in these investigations is as follows:

(1) *Clonal Rubber and Latex.*—This investigation was undertaken with a view to ensuring that a clone would not be recommended for general planting if it yielded rubber or latex which was likely to be unpopular with manufacturers. It was also hoped that the information obtained would indicate the possibility of developing clones which would yield superior rubber to that now being produced.

The material received for examination consisted of smoked sheet and preserved latex from 12 well-known clones. The unvulcanised samples of rubber were found to display some differences in chemical and physical properties, but there was no clear evidence of general superiority or inferiority in the properties of the vulcanised products. The preserved latices were also satisfactory except that the latex from one clone was very viscous and unstable. A separate investigation showed however that concentrated latex containing 8 per cent. of latex from this clone had a good stability. It may be concluded therefore that as long as this clonal latex is mixed with substantial quantities of latex from other sources, there is no objection to its use. Apart from this reservation and a few other minor points of criticism all the 12 clones have yielded latex and rubber of satisfactory quality. This is a happy conclusion as far as the immediate requirements of producer and consumer are concerned, but is disappointing in the sense that it offers no clue to a substantial improvement, except in subsidiary properties.

Because the investigation was only a preliminary one, partly to gain experience with a new, comprehensive scheme of testing, the samples were not selected and replicated on a statistical plan. No reliable conclusions can be drawn therefore as to whether or not the minor differences in properties observed are characteristic of rubber or latex from these clones.

Amongst the points of subsidiary interest is the fact that smoked sheet from some of the clones had extraordinarily low acid values. Although the deficiency could not be correlated with the physical properties of the vulcanised material, it is likely that manufacturers would have to adjust some of their standard mixing formulae if subsequent experience shows that low acid values are characteristic of rubber from these clones.

The smoked sheet displayed the usual variation in plasticity, comparable with that exhibited by commercial sheet. Manufacturers have frequently complained about variation in plasticity as it makes processing control difficult. It is important to know therefore whether any of these clones consistently yield hard or consistently yield soft rubber, and further work on this subject is desirable.

Artificial ageing tests have indicated that some of the sheets could be stored without deterioration for much longer periods than others, and at the end of the year the two samples which gave the worst results in these tests were showing slight but distinct signs of tackiness. It is unusual to find first grade sheet which does not keep sufficiently well in normal circumstances, and further investigation of the keeping properties of sheet from some of the clones should be undertaken. In some circumstances these properties might be very important.

Most of the tests on the vulcanised samples were made on tyre tread and white side wall mixes, which in any case would not display such extensive variations between rubbers as would a less highly-loaded mix. Nevertheless it was necessary to use these mixes so as to obtain practical information about resilience and resistance to abrasion. In these respects and also in vulcanising properties, the samples were reasonably uniform.

When the investigation was commenced it was not known whether the samples would or would not display a wide variation in properties after vulcanisation, but it was appreciated that an examination of smoked sheet alone would not indicate the cause of any variation found. The natural non-rubber substances are known to be responsible for much variation, but little information is available about the effect,

if any, of differences in rubber hydrocarbons. A portion of the preserved latex from each clone was therefore purified by treatment with soap, and repeated creaming. The purified latex was then coagulated and the dried crepe extracted with acetone-hexane. The properties of the highly-purified rubber were compared with those of crepe from the same preserved latex before purification. Very surprisingly the purified rubber tended to be more variable after vulcanisation than the non-purified rubber, but only in resilience was there evidence of a high degree of correlation between the variation in properties of the two sets of samples, and even the variation in resilience was not parallel to that shown by the smoked sheet from fresh latex. This part of the investigation therefore failed in its primary objective of indicating the cause of variability in clonal smoked sheet prepared from fresh latex, but suggested that resilience in vulcanised rubber may be in an important degree dependent upon variation in the rubber hydrocarbon and that treatment of latex with ammonia produces changes which are of practical importance. It is well known that the carbon black in tread mixes markedly reduces the resilience of vulcanised rubber but, as found previously, carbon black had a smaller adverse effect on purified than on commercial rubber. In the case of the white side wall mix, which naturally does not contain carbon black, the purified rubber was not superior in resilience to smoked sheet. A possible explanation is the difficulty of obtaining a uniform dispersion of carbon black in highly purified rubber. These points are at present somewhat academic, but they doubtfully suggest that the preparation of a rubber hydrocarbon with improved properties is a possibility and the lines along which this improvement should be sought. This is a matter for further development.

(2) *Plasticity*—The prospect of making rubber harder or softer according to requirements and of controlling plasticity has greatly improved during recent years. The practical applications affecting the largest volume of rubber occur in the manufacturing industry, but the possibility of hardening sole crepe is of direct interest to the grower. Any improved control of plastic properties is clearly an advantage in maintaining the market for natural rubber.

The particular aspects of softening and hardening of rubber which have been studied during the year are: (1) the chemical and physical nature of the phenomena; (2) the relation between the chemical constitution of added substances and the effects obtained; and (3) the importance of oxygen.

The results indicate that the effect of chemical softeners is in some circumstances reversible, *i.e.* when the peptiser is removed the rubber regains its original hardness. If, however, the peptised rubber is heated or kept for some time, an irreversible change occurs and extraction does not cause hardening. More evidence in favour of the partial physical nature of peptisation is that peptisers reduce the viscosity of a benzene solution but have little effect on a benzene-alcohol solution of rubber. The lower viscosity of the latter is generally attributed to a coiling of the rubber molecules, and it is possible that peptisers have a similar effect, but plausible alternative explanations may be offered. A further illustration of the partial physical nature of peptisation is the curious discovery that peptised rubber can be hardened by mastication in the presence of agents which have no effect on mastication in the absence of peptisers.

The most effective hardening agents so far known contain two amino groups substituted in different positions in one or more benzene rings. No hardening is produced when the sole substituent is a single amino group or when it is associated with a chloro or nitro group as a second substituent, but the *m*- and *p*-phenylene-diamines are good hardening agents. The ortho derivative tends to be a softening agent. A well-known hardening agent is benzidine in which the two amino groups occur in different benzene rings, and one of the best hardening agents found is diamino diphenyl methane in which the two substituted benzene rings are separated by a methylene group. On introducing two polar groups between the rings hardening

is inhibited as in 1·5 diamino anthraquinone and phenosafranine. The introduction of side groups into the benzene rings, as in the case of *o*-tolidine and *o*-anisidine reduces the amount of hardening, although it still occurs. This short review by no means exhausts the subject and investigations are still proceeding. Amino phenols have not been studied in such detail as the diamino compounds, but the *o*-, *m*- and *p*-compounds have similar effects to the corresponding diamino compounds.

Certain polyhydroxy compounds have also been found to be good hardening agents. In some other cases they are chiefly effective in preventing the softening of rubber on heating in air or on treatment with peptising agents before irreversible changes set in. Amongst the polyhydroxy compounds studied was one which was more effective than well-known proprietary antioxidants in preventing softening on heating in air.

When natural rubber is divided into fractions by partial solution, the sol fraction is somewhat soft and the gel distinctly hard. It was found that sol rubber was much more sensitive than gel rubber to the effect of hardening and softening agents. The original sample from which the fractions were prepared had been partially purified, but unfortunately the insoluble, natural impurities remaining in the rubber tend to concentrate in the gel fraction and may be responsible, therefore, for the differences observed. Further work is in progress, however, with more highly purified fractions to determine whether the effect of hardening and softening agents is dependent upon molecular fractions connected with the rubber hydrocarbon.

Experiments on heating rubber in air showed that many of the substances referred to in this section of the report had antioxidant properties and preliminary experiments indicated that oxygen plays an important part in the softening and hardening of rubber. A special apparatus has therefore been constructed for a more detailed study of this problem.

(3) *Pure Caoutchouc.*—The chief purpose of preparing pure rubber hydrocarbon is to evaluate the technological properties of material from different sources free from complications due to differences in non-rubber substances, with a view to ascertaining whether any differences which exist in rubber hydrocarbons are of technical importance.

Attempts have been made to improve the purification process referred to in previous reports because it involves the addition of ammonium alginate which is subsequently converted into alginic acid, traces of which remain in the rubber and are difficult to remove. Experiments were therefore made in which latex treated with soap was creamed by the electro-decantation process in a series of perspex cells separated by cellulose acetate films. Various combinations of current, latex and ammonia were tried. The latex could be creamed fairly satisfactorily, and after repeated creaming highly purified rubber was obtained, but on the whole the process was tedious, and there was some loss of rubber. It is not a process which can be recommended for routine work.

A further disadvantage of purification processes so far described in previous reports is that purified rubber quickly oxidises particularly when exposed to light. Plans are being made to carry out at least one purification experiment in the complete absence of oxygen and light, but in the meantime experiments have been made to determine the effect of purifying latex in the presence of different antioxidants. The first one tried was pyrogallol, but alkaline pyrogallol was found to have a marked hardening effect on rubber. It also retarded vulcanisation. Experiments with other antioxidants are not yet complete but it has been shown that rubber which is deliberately oxidised has markedly poor resilience after vulcanisation. The samples of purified rubber so far examined have had superior resilience after vulcanisation in a tyre tread mix.

A preliminary study has also been made of the fractionation of purified rubber by rate of solution in the absence of air and light. It was found that the amount extracted over a period of months is proportional to "log time" after the first few hours. This confirms results obtained some years before the war. The viscosity molecular weight of the fractions as determined by viscosity measurements covered a wide range but further work is required to obtain improved sharpness of separation for a comparison of the technical properties of different fractions. Preliminary tests suggest that gel and sol rubbers tend to retain their differences after mastication and vulcanisation.

(4) *Latex*—Owing to loss of staff it was not possible to continue throughout the year the study of the distribution of non-rubber substances in preserved latex, but the comparative examination of latex preserved with ammonia, with ammonia-sodium pentachlorphenate mixture and with sodium pentachlorphenate alone was completed. The conclusions reached about the distribution of non-rubber substances were indicated in last year's report, and the further information obtained does not require their modification.

The stability of preserved latex obviously depends partly upon the non-rubber substances which form a surface film around the rubber particles and protect them from coagulation, but there is strong evidence that differences in the stability of commercial latices are not so much dependent upon differences in surface films as upon the chemical composition of the aqueous serum. For example, latex preserved wholly with sodium pentachlorphenate is protected from coagulation by much more protein and fatty acid than latex containing ammonia, but it is less mechanically stable. Ammonia-preserved latex from which the aqueous serum substances have been partly removed is found to increase markedly in mechanical stability in accordance with the degree of purification, although highly purified latex is not very stable. It is probable, therefore, that good mechanical stability is associated with high *p*H and low concentration of coagulating ions in the aqueous serum. No information is as yet available about these ions except that phosphorus compounds and potassium are not indicated by the results so far obtained.

The determination of the mechanical stability of latex has been handicapped by the absence of a method free from possible personal bias. It is found, however, that, when preserved latex is rapidly stirred, no coagulum which can be removed by normal straining is formed for some minutes, but that once coagulation has started it increases very rapidly. A method has been devised, therefore, which involves the measurement of the maximum time for which latex can be stirred without forming more than a fixed amount of coagulum. A summary of a similar method has since been published in the American technical press. The coagulum test has been applied to a wide range of estate samples and has already given much useful information.

During the year some work was carried out on the determination of "d.r.c.," "total solids," and "KOH No." to settle queries raised at meetings of the British Standards Institution. A few routine tests on current deliveries were also made for the Rubber Trades Association.

(5) *Continuous Process*—Last year a pilot plant was erected to explore the possibility of preparing dry rubber from latex by a continuous process. The plant was modified as experience was gained and the design had to be suited to the available space and to the various components which could be obtained reasonably quickly and without undue expense. In spite of the large element of improvisation and restriction, successful demonstrations were given on about a dozen occasions to groups of interested spectators. The process appears to be promising but it would be premature to draw definite conclusions until experience has been gained with fresh latex. It is known that the latter coagulates much more slowly than preserved

latex. The economical drying of the coagulum and the method of "winding up" the dry rubber also require further study, Methods of overcoming these difficulties are envisaged but require further experimental work, some of which can only be carried out in the East.

The Committee have had several preliminary discussions with a firm of engineers interested in the process and have suggested to the Rubber Research Institute of Malaya that they should consider the possibility of carrying out trials at the Institute's Experimental Station with a pilot plant in association with the firm in question.

Co-operation—An outline of the post-war arrangements for discussions and collaboration between the Committee's staff and other rubber research organisations in Great Britain was given two years ago. Since then the spirit of co-operation and mutual help has continued to grow. The Research Association of British Rubber Manufacturers, for example, have on several occasions voluntarily carried out certain investigations for the grower which fitted in with their own work and which discussions indicated were desirable.

The last meeting of the year between the staffs of the two organisations was also attended by representatives of the British Rubber Producers' Research Association who contributed valuable suggestions and comments. They have also made proposals, which are under consideration, for further improvements in the arrangements for co-operation.

The Committee's staff have continued to take an active part in the work of the British Standards Institution on the standardisation of methods of testing latex and raw rubber. The latex sub-committee under the chairmanship of Mr. Martin have suggested that the Rubber Research Institute should sponsor the formation of a Liaison Committee for an official exchange of views on latex testing. It is also hoped to arrange for a regular exchange of information between the British organisation and the Committee on latex of the American Society for Testing Materials.

The British Standards Institution is acting as Secretariat for the International Organisation for Standardisation and the British Latex Sub-Committee is preparing a statement on latex standards for international consideration. A similar statement on raw rubber testing and classification is being submitted for comment by the French organisation.

The Committee's staff continue to serve various Committees of the Institution of the Rubber Industry. They have not, however, been so closely associated with the activities of the London Section since Mr. Baker was seconded to the staff of the Rubber Research Institute of Malaya.

At the Institution's International Rubber Technology Conference in London Mr. Martin contributed a paper on "The Preparation and Properties of Highly Purified Rubber." He also introduced a paper on "The Mechanism of the Creaming of Latex" by the late W. S. Davey and K. S. Sekar, submitted by the Rubber Research Institute of Malaya. Mr. Martin wrote the section on "Recent advances in the chemistry of natural rubber" for the Institution's Annual Report.

The International Rheological Congress in Holland was attended by Messrs. Martin and Wren. The latter contributed a paper on "Hardening and Softening of Raw Rubber." During and at the end of the Conference visits were made to the laboratories of the Rubber Institute T.N.O. and Rubber Foundation when discussions on general topics were held with Dr. van Rossen and Dr. Salomon respectively.

(6) *Miscellaneous Investigations*—Of the minor *ad hoc* investigations completed during the year, the most interesting was a preliminary study of low temperature synthetic rubber, which, according to American reports, represents a marked advance on previous production. The results of tests were not quite as good as was to be expected from published statements and the material had the usual faults of snythetic rubber, but it was in some circumstances outstanding in resistance to abrasion. At tyre-running temperatures, however, it was not superior to old type snythetic rubber. Laboratory abrasion tests can be very misleading, particularly when carried out on new material. They are only given prominence in this Report because of American claims that practical experience shows that this new synthetic rubber is markedly resistant to abrasion.

ESTIMATES FOR 1949

(Adopted by the Board, October 25th, 1948)

NCOME

1.	Cess Collections	Rs.	420,000	
2.	Govt. Grant for Smallholdings Work	„	156,500	
3.	Interest	„	10,700	
4.	Sale of Publications	„	1,000	
5.	Profit from Dartonfield	„	1,757	(Loss)
6.	Profit from Nivitigalakele	„	5,550	(„)
7.	Sundry Receipts	„	2,460	
		Rs.	583,353	

REVENUE EXPENDITURE

				Rs.
1.	ADMINISTRATION OF THE BOARD:			
	Travelling expenses of Board Members			3,000
2.	PERSONAL EMOLUMENTS:			
	Senior Scientific Staff	Rs.	102,010	
	Junior Scientific Staff	„	24,820	126,830
3.	LIBRARY AND PUBLICATIONS:			
	Library	„	1,500	
	Publications	„	3,500	5,000
4.	SMALLHOLDINGS DEPARTMENT:			
	Salaries and Allowances	„	78,500	
	Travelling and General Expenses	„	121,300	199,800
5.	LABORATORY:			
	Equipment and Working Expenses	„	6,000	
	Furniture Replacements	„	50	6,050

6.	FIELD AND FACTORY EXPERIMENTS:			
	Field Experiments	„	5,260	
	Factory Experiments	„	3,820	9,080
7.	OFFICE:			
	Salaries of Office Staff	„	18,620	
	Stationery and Office Equipment ..	„	3,500	
	Postage and Telegrams	„	3,000	
	Advertising	„	800	
	Telephone	„	1,200	
	Audit	„	900	28,020
8.	TRAVELLING EXPENSES OF STAFF:			
	Officers' expenses	„	7,000	7,000
9.	MAINTENANCE OF BUILDINGS, WATER AND POWER SUPPLY:			
	General Buildings	„	500	
	Bungalows	„	5,000	
	Water and Power Supply	„	3,000	
	Furniture Replacements	„	600	9,100
10.	MISCELLANEOUS ITEMS SHARED WITH ESTATE:			
	Dartonfield GeneralCharges	Rs.	28,370	
	Nivitigalakele General Charges ..	„	13,512	
	Hedigalla General Charges	„	9,874	
	Upkeep of Roads and Grounds ..	„	1,125	
	Factory Upkeep	„	2,100	
	Power Supply	„	10,559	65,540
11.	CONTINGENCIES:			
	Contribution to London Advisory Committee	Rs.	27,000	
	General Charges	„	1,000	
	Insurance Charges	„	5,500	
	Staff Provident Fund	„	29,000	
	Passages	„	15,000	
	Entertainment Allowance	„	150	
	War Allowance to Staff	„	50,100	
	Special Allowance to Junior Staff ..	„	5,900	
	Contribution to Medical Fund ..	„	3,300	136,950
12.	DEPRECIATION:			30,350
13.	PLANTING FOOD CROPS AT HEDIGALLA: ..		..	750
			Rs.	627,470

CAPITAL EXPENDITURE

			Rs.
IMMATURE AREAS :			
Dartonfield	Rs.	2,068	
Nivitigalakele	,,	4,148	
Hedigalla	,,	26,631	32,847
BUILDINGS :			
Dartonfield—			
1 Junior Staff Bungalow	Rs.	11,000	
Alterations to J. S. Bungalow No. 12	,,	300	
Electric light for J. S. Bungalows	,,	8,500	
Tennis Court (renovation)	,,	200	
1 Single latrine for school	,,	125	20,125
Hedigalla—			
Smokehouse	,,	5,000	5,000
EQUIPMENT :			
Hedigalla—			
1 pair hand rollers	Rs.	2,000	
Coagulating pans	,,	150	2,150
Dartonfield—			
Filing Cabinet for Bot. Office	Rs.	350	350
CART ROAD :			
Hedigalla—			
Extension ½ mile			7,500
			67,972

SUMMARY

INCOME		Rs.	583,353
EXPENDITURE :			
Revenue	Rs. 627,470		
Capital	,, 67,972	Rs.	695,442
EXCESS OF EXPENDITURE OVER INCOME		Rs.	112,089

RUBBER RESEARCH SCHEME (CEYLON)

AUDITOR GENERAL'S REPORT FOR 1948

Audit Office,
Colombo, 11th August, 1949.

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

The accounts of the Rubber Research Scheme, Agalawatta (Ceylon) for the year ended December 31, 1948, were audited under my direction. 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. 585,762/98. It exceeded the estimate by Rs. 132,268/98.

3. A comparison between the approved Estimates and the actual income under the different accounts is shown in Statement 'A' attached. The reasons for the variations between the Estimates and the actual income as furnished by the Director are shown against the respective items in the statement.

4. **Profit from Dartonfield Estate**—The profit for the year under review was Rs. 5,581/19 as against a loss of Rs. 4,433/80 in the previous year.

5. **Profit from Nivitigalakele Experiment Station**—The working of the experiment station for the year under review showed a profit of Rs. 11,667/02 as against a loss of Rs. 2,622/22 in the previous year.

II—EXPENDITURE

6. **Revenue Expenditure**—The total expenditure on revenue account exclusive of the amount allowed for depreciation of fixed assets and Audit Fee Reserve amounted to Rs. 411,099/12 as compared with Rs. 420,933/79 for the previous year. The details of this expenditure are fully set forth in the Revenue 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. 118,315/30 as compared with Rs. 118,885/99 for the previous year. The details of this expenditure are shown in the Capital Account.

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

III—CAPITAL ACCOUNT

9. The total expenditure on Capital Account at 31-12-1947 was Rs. 1,119,824/10. During the year under review capital expenditure amounted to Rs. 118,315/30. A sum of Rs. 57,749/42 being value of assets sold and scrapped during the year was deducted leaving the total capital cost at 31-12-1948 as Rs. 1,180,389/98.

IV—BALANCE SHEET

(*a*) Liabilities

10. **Creditors—Rs. 45,133/05**—This amount represents the sums due to creditors for goods purchased or services rendered during the year and also the amount received in advance from Government on account of its grant of Rs. 155,000/- for 1948—49 for small holdings work.

11. **Passage Fund Reserve Rs. 25,913/92**—The balance on 31st December, 1947 was Rs. 12,787/09 and a sum of Rs. 15,000/- was transferred to this fund during the year. A sum of Rs. 1,873/17 was utilised during the year in connection with the sea and air passages of the members of the senior staff. This reduced the total to the credit of the Fund to Rs. 25,913/92.

12. **Depreciation Reserve Rs. 232,076/38**—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. 22,898/39 made up as follows :—

DARTONFIELD—		
Buildings at 3½% on Rs. 273,551/65	Rs.	9,574.30
Furniture and Fixed Equipment at 7½% on Rs. 31,675/23 ..	,,	2,374.29
Water and Power Supply at 7½% on Rs. 33,244/88 ..	,,	2,493.37
Machinery and Tools at 7½% on Rs. 46,196/48 ..	,,	3,464.74
NIVITIGALAKELE—		
Buildings at 3½% on Rs. 48,946/87	,,	1,713.14
Furniture and Fixed Equipment at 7½% on Rs. 2,652/38 ..	,,	198.93
Water and Power Supply at 7½% on Rs. 3,149/78 ..	,,	236.23
Machinery and Tools at 7½% on Rs. 3,146/93 ..	,,	236.02
HEDIGALLA—		
Buildings at 3½% on Rs. 27,196/64	,,	951.88
Furniture and Fixed Equipment at 7½% on Rs. 449/92 ..	,,	33.74
Water and Power Supply at 7½% on Rs. 289/71 ..	,,	21.73
Laboratory Apparatus at 7½% on Rs. 21,333/61 ..	,,	1,600.02
	Rs.	22,898.39

13. **Provident Fund Reserve Rs. 136,131/46**—The balance to the credit of the Fund at the end of 1947 was Rs. 188,374/89 and additions during the year under review amounted to Rs. 43,226/21. A sum of Rs. 75,669/73 was paid out to officers who retired during the year and another sum of Rs. 19,799/91 payable to officers was transferred to Sundry Creditors Account.

14. **Medical Fund Rs. 10,140/56**—The balance to the credit of this Fund at the end of 1947 was Rs. 8,997/54 and additions during the year under review amounted to Rs. 3,851/35. A sum of Rs. 2,708/33 was paid out to the officers during the year.

15. **Audit Fee Reserve Rs. 1,164/39**—The amount to the credit of this account at the beginning of the year was Rs. 1,171/45 and the amount provided for the year 1948 was Rs. 900/-. Payments during the year in respect of service for 1947 amounted to Rs. 907/06.

16. **Reserve for Stabilisation of Income—Rs. 191,798/54**—No additions to this reserve were made during the year.

17. **Appreciation of Investments Rs. 13,350/—**Represents the amount by which the investments had appreciated in value as at 31-12-1948.

18. **Surplus Account Rs. 112,257/45**—There was no balance to the credit of this account at the beginning of the year. The excess of income over expenditure during the year amounted to Rs. 150,865/47. To this amount has been added the net value of certain assets sold and scrapped (Rs. 55,016/40) and the amount of the depreciation that had been set apart from time to time in respect of these assets (Rs. 24,690/88). From the total a sum of Rs. 118,315/30 has been deducted being the contribution during the year to Capital Outlay.

(b) Assets

19. **Debtors Rs. 105,349/35**—This represents cess collections for December 1948 amounting to Rs. 82,921/69 and sundries amounting to Rs. 22,427/66 which were outstanding at 31st December, 1948. The former has since been received in full.

20. **Advance Account Rs. 22,675/68**—Of this amount Rs. 3,038/28 and Rs. 15,262/35 represent advances to the Superintendent of Dartonfield, Nivitigalakele, Hedigalla Estate and Smallholdings Propaganda Officer respectively and Rs. 4,215/05 to the London Advisory Committee for sundry expenses. The amounts shown are the balances with them at 31-12-1948. The amount of Rs. 160/- shown against the Postmaster-General represents the sum deposited with him in respect of trunk-call and telephone services.

21. **Accrued Interest on Investments Rs. 524/68**—This sum represents the amount of interest accrued for the year on the investments, but not received during the year. This has since been recovered.

22. **Payments in Advance Rs. 2,131/63**—This represents certain expenditure incurred in respect of the year 1949 during 1948.

23. **Stocks Rs. 9,197/86**—The balances of the Estate Stocks and Rubber Chemicals at the end of the year were Rs. 6,189/46 and Rs. 3,008/40 respectively. The balance of the estate stocks was made up as follows :—

DARTONFIELD—			
Rice and Foodstuffs	.. .. ..	Rs.	946.11
Stock of materials	.. .. ..	,,	4,201.85
Export of latex stock account	.. .. ..	,,	639.32
NIVITIGALAKELE—			
Rice and Foodstuffs	.. .. ..	,,	153.70
Manure	.. ..	,,	248.48
		Rs.	6,189.46

The balances have, however, not been verified by a Board of Survey at the end of the year.

24. **Loan to Hataraliyadda Co-operative Society Rs. 1,000/-**. Of the sum of Rs. 1,300/- outstanding at the beginning of the year a sum of Rs. 300/- was repaid during the year.

25. **Loans to Officers Rs. 1,677/78**—This represents the total amount outstanding on 31-12-1948 from officers to whom loans were granted for the purchase of means of transport.

26. **Investments Rs. 313,350/-**—Details of this amount are shown in the Balance Sheet in terms of the Middle Market Value at 31-12-1948. The certificates in support of the investments were seen.

27. **Cash Balances Rs. 312,058/77**—Details of this figure are shown in the Balance Sheet. Fixed Deposit Receipts and the pass books in respect of the Savings Bank Accounts were seen. The balances in current account Nos. 1 and 2 were verified by reference to Bank Certificates and Reconciliation Statements. The balance of cash in hand at December 31st 1948 was not verified, but a surprise verification of the cash in hand was made on 21-7-1949.

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 cash in hand verified.

(Sgd.) P. W. KAULE,
for Auditor-General

RUBBER RESEARCH SCHEME (CEYLON)

REVENUE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1948

Dr. **Cr.**

			Rs.	C.				Rs.	C.
To Personal Emoluments :					By Balances of Estate Working Accounts :				
Senior Scientific Staff	..	Rs.	74,756.84		Dartonfield	..	Rs.	5,581.19	
Junior Scientific Staff	..	,,	18,889.75		Nivitigalakele	..	,,	11,667.02	
Office Staff	..	,,	17,443.97					17,248	21
			111,090	56	,, Cess Collections	..	..	506,171	68
,, Library & Publications :					,, Interest	..	..	11,718	45
Library	..	Rs.	697.04		,, Sale of publications	..	..	1,477	02
Publications	..	,,	3,232.97		,, Sundry Receipts	..	..	10,397	62
			3,930	01	,, Government grant for Smallholdings Work	..	..	38,750	00
,, Smallholdings Work :									
Salaries & Allowances	..	Rs.	51,878.75						
Travelling & General Expenses	..	,,	18,821.89						
			70,700	64					
,, Laboratory :									
Equipment and Working Expenses	..	Rs.	4,753.69						
Furniture Replacements	..	,,	61.28						
			4,814	97					
,, Field & Factory Experiments :									
Field Experiments	..	Rs.	2,002.57						
Factory Experiments	..	,,	1,038.49						
			3,041	06					
,, Office :									
Stationery & Office Equipment		Rs.	1,527.55						
Postages and Telegrams	..	,,	1,361.24						
Advertising	..	,,	879.64						
Telephones	..	,,	1,216.84						
Audit	..	,,	900.00						
			5,885	27					
,, Travellling :									
Expenses of Board Members		Rs.	2,155.55						
Expenses of Staff	..	,,	6,800.69						
			8,956	24					
,, Maintenance of Buildings, Power and Water Supply :									
General Buildings	..	Rs.	321.01						
Bungalows	..	,,	3,638.77						
Power and Water Supply	..	,,	2,835.13						
Bungalow Furniture Replacements		,,	585.74						
			7,380	65					
,, Miscellaneous Items Shared with Estates :									
Dartonfield General Charges		Rs.	25,204.41						
Nivitigalakele ,, ,,		,,	11,960.79						
Hedigalla ,, ,,		,,	12,283.38						
Upkeep of Roads and Grounds		,,	500.02						
Factory Upkeep	..	,,	4,960.28						
Power Supply	..	,,	11,474.14						
			66,383	02					
,, Contingencies :									
Contribution to London Advisory Committee		,,	26,713.04						
General Charges	..	,,	1,777.78						
Insurances	..	,,	4,435.81						
Staff Provident Fund	..	,,	26,251.23						
Passages	..	,,	15,000.00						
Entertainment Allowance	..	,,	132.50						
War Allowances to all Staff and Special Allowance to Junior Staff		,,	53,415.66						
Contribution to Medical Fund		,,	1,918.50						
Planting Food Crops at Hedigalla		,,	172.18						
			129,816	70					
,, Depreciation	..	..	..	22,898	39				
,, Balance, being excess of Income over Expenditure for the year, carried forward to Balance Sheet			..	150,865	47				
			Rs.	585,762	98			Rs.	585,762	98

RUBBER RESEARCH SCHEME (CEYLON)

CAPITAL ACCOUNT AS AT 31ST DECEMBER, 1948

EXPENDITURE

	To December 31st 1947	Transfers between Accounts	Additions in 1948	Total
	Rs. C.	Rs. C.	Rs. C.	Rs. C.
To LAND INCLUDING DEVELOPMENT :				
Dartonfield ..	133,081.44		2,111.29	135,192.73
Nivitigalakele ..	149,629.46		2,392.35	152,021.81
Hedigalla ..	102,029.83		24,220.87	126,250.70
„ BUILDINGS AND LINES :				
DARTONFIELD				
Estate ..	85,054.58		1,858.86	86,913.44
Headquarters ..	267,717.30		—	267,717.30
NIVITIGALAKELE :				
Estate ..	40,044.84		211.17	40,256.01
Headquarters ..	21,993.03		—	21,993.03
HEDIGALLA :				
Estate ..	28,119.67		12,961.43	41,081.10
Headquarters ..	564.64		17,108.52	17,673.16
„ FURNITURE AND FIXED EQUIPMENT :				
Dartonfield ..	54,183.79	425.00	3,246.53	57,005.32
Nivitigalakele ..	5,733.70		—	5,733.70
Hedigalla ..	555.88		867.75	1,423.63
„ POWER & WATER SUPPLY :				
Dartonfield ..	55,681.81		14,888.55	70,570.36
Nivitigalakele ..	6,128.09	1,000.000	—	5,128.09
Hedigalla ..	324.50		283.50	608.00
„ MACHINERY & TOOLS :				
Dartonfield ..	109,198.70	39,716.69	36,642.87	106,124.88
Nivitigalakele ..	3,783.22		971.01	4,754.23
„ LABORATORY APPARATUS	44,666.28	16,607.73	550.60	28,609.15
„ LONDON PLANT ..	11,333.34		—	11,333.34
Rs.	1,119,824.10	57,749.42	118,315.30	1,180,389.98

RECEIPTS

			Rs. C.
By Revenue applied for Capital purposes			
At 31st December 1947 ..	.. Rs.	1,119,824.10	
In 1948	.. „	118,315.30	
	Rs.	1,238,139.40	
Less value of assets sold and scrapped	.. Rs.	57,749.42	
			1,180,389 98
		Rs.	1,180,389 98

GENERAL BALANCE SHEET AS AT 31ST DECEMBER, 1948

LIABILITIES

			Rs.	Cts.
CREDITORS :				
Sundries	..	Rs.	33,883.05	
Government Grant for Smallholdings work received in advance	..	,,	11,250.00	
			45,133	05
PASSAGE FUND RESERVE :				
At December 31, 1947	..	,,	12,787.09	
Additions during 1948	..	,,	15,000.00	
		Rs.	27,787.09	
Less Payments in 1948	..	,,	1,873.17	
			25,913	92
DEPRECIATION RESERVE :				
At December 31, 1947	..	Rs.	233,868.87	
Add Reserve for 1948	..	,,	22,898.39	
		Rs.	256,767.26	
Less amount written off on assets sold and scrapped during the year	..	,,	24,690.88	
			232,076	38
PROVIDENT FUND RESERVE :				
At December 31, 1947	..	Rs.	188,374.89	
Additions during 1948	..	,,	43,226.21	
		Rs.	231,601.10	
Less Payments in 1948 Rs. 75,669.73				
,, Amount transferred to Sundry Creditors .. ,, 19,799.91			95,469.64	
			136,131	46
MEDICAL FUND :				
At December 31, 1947	..	Rs.	8,997.54	
Additions during 1948	..	,,	3,851.35	
		Rs.	12,848.89	
Less Payments in 1948	..	,,	2,708.33	
			10,140	56
AUDIT FEE RESERVE :				
At December 31, 1947	..	Rs.	1,171.45	
Add Reserve for 1948	..	,,	900.00	
		Rs.	2,071.45	
Less Payments in 1948	..	,,	907.06	
			1,164	39
RESERVE FOR STABILISATION OF INCOME :				
At December 31, 1947	..	..	191,798	54
APPRECIATION OF INVESTMENTS	..	..	13,350	00
SURPLUS ACCOUNT :				
Excess of Income over expenditure for 1948	..	Rs.	150,865.47	
Add net value of assets sold and scrapped during the year	..	,,	76,358.70	
Add gain on sale of Vulcanizing and Laboratory Equipment	..	,,	3,348.58	
		Rs.	230,572.75	
Less Contribution to Capital Outlay	..	Rs.	118,315.30	
			112,257	45
		Rs.	767,965	75

ASSETS

			Rs.	Cts.
DEBTORS :				
Cess Collections for December 1948 & arrears	..	Rs.	82,921.69	
Sundries	..	,,	22,427.66	
			105,349	35
ADVANCE ACCOUNTS :				
Estate Superintendent—				
Dartonfield	..	Rs.	965.31	
Nivitigalakele	..	,,	956.03	
Hedigalla	..	,,	1,116.94	
		,,	3,038.28	
London Advisory Committee	..	,,	4,215.05	
SMALLHOLDINGS PROPAGANDA OFFICER—				
General Account	..	Rs.	10,236.62	
Soil Conservation A/c	..	,,	5,025.73	
		,,	15,262.35	
Postmaster-General	..	,,	160.00	
			22,675	68
ACCRUED INTEREST ON INVESTMENTS	..	..	524	68
PAYMENTS IN ADVANCE	..	..	2,131	63
STOCKS :				
Estate Stocks	..	Rs.	6,189.46	
Rubber Chemicals	..	,,	3,008.40	
			9,197	86
LOAN TO HATARALIYADDA CO-OPERATIVE RUBBER CURING & SALES SOCIETY LTD.—				
At 31st December, 1947	..	Rs.	1,300.00	
Less amount repaid	..	,,	300.00	
			1,000	00
LOAN TO OFFICERS	..	..	1,677	78

INVESTMENTS :	Face Value	Middle Market value at 31-12-48
In Ceylon Govt. 3½% Loan 1957/62 .. Rs.	25,000.00	26,250 00
do 3 % War Loan 1956/60 .. ,,	20,000.00	20,650 00
do 3½% Home Defence Loan 1952/53 ,,	65,000.00	67,600 00
do 3½% National Loan 1964/69 .. ,,	70,000.00	74,200 00
do 3¼% National Loan 1956 .. ,,	100,000.00	104,500 00
do 3 % National Loan 1954 .. ,,	5,000.00	5,150 00
do 3 % Defence Loan (10 year) .. ,,	15,000.00	15,000 00
Rs.	300,000.00	

			Rs.	Cts.
CASH BALANCES :				
On Fixed Deposit	..	..	100,000	00
At Ceylon Savings Bank	..	..	816	17
On Savings Deposit (Bank of Ceylon)	..	..	1,172	90
In Current Account No. 1	..	..	199,810	25
In Current Account No. 2	..	..	9,961	22
In Hand	..	..	298	23
		Rs.	767,965	75

The Accounts of the Rubber Research Scheme above set forth have been audited under my direction. I have obtained all the information and explanations that I have required and I certify as a result of this audit that, in my opinion, the Balance Sheet is properly drawn up so as to exhibit a correct view of the affairs of the Scheme.

(Sgd.) P. W. KAULE,
for Auditor-General.

Audit Office,
Colombo, 11th August, 1949.

DARTONFIELD ESTATE

WORKING ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1948

Dr.

			Rs.	C.
To EXPENDITURE :				
General Charges	..	Rs.	23,944.20	
Upkeep, Manufacture & Distribution	..	,,	25,199.34	
			49,143	54
,, Loss on Carting Account	..	..	273	24
,, Loss on sale of 1947 rubber stock	..	..	117	31
,, Balance being excess of income over expenditure transferred to Revenue Account	..	..	5,581	19
		Rs.	55,115	28

Cr.

			Rs.	C.
BY SALES :				
Manufactured rubber (87,387 lbs.)	..	..	52,579	89
,, LATEX CREAMING :				
Creaming 36,523.40 gls. Latex	..	Rs.	18,261.70	
Recreaming 1,954.78 gls. Latex	..	,,	1,954.78	
Creping 1,296 lbs. sediment and washings	..	,,	129.60	
			20,346.08	
Less expenditure	..	,,	17,810.69	
			2,535	39
		Rs.	55,115	28

NIVITIGALAKELE EXPERIMENT STATION

WORKING ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1948

Dr.

			Rs.	C.
To EXPENDITURE .				
General Charges	..	Rs.	10,764.70	
Upkeep, Manufacture & Distribution	..	,,	14,987.01	
			25,751	71
,, Upkeep of Nurseries	..	..	1,899	44
,, Handling and distribution of budwood and budded stumps	..	..	82	98
,, Balance being excess of Income over expenditure transferred to Revenue Account	..	..	11,667	02
		Rs.	39,401	15

Cr.

			Rs.	C.
BY SALE OF PRODUCE .				
Manufactured rubber (64,567 lbs.)	..	Rs.	39,035.10	
Planting Material	..	Rs.	357.15	
			39,392	25
,, Sale of Food Crops	..	,,	32.68	
Less expenditure	..	,,	23.78	
			8	90
		Rs.	39,401	15

PROVIDENT FUND

WORKING ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1948

Dr.

			Rs.	C.
To Payment to 6 retiring officers	..	Rs.	75,669.73	
,, Balance amount due to 2 retiring officers transferred to their credit	..	,,	19,799.91	
			95,469	64
,, Balance carried forward to 1949	..	..	136,131	46
		Rs.	231,601	10

Cr.

			Rs.	C.
By Balance brought forward from 1947	..	..	188,374	89
,, Board's Bonus for 1948	..	Rs.	15,516.96	
,, Interest on Officers' Contributions	..	,,	2,153.68	
,, Interest on Board's Bonus Account	..	,,	2,655.90	
			20,326	54
,, Bonus paid to 2 retiring officers	..	..	4,768	33
,, Interest for 1948 paid to 6 retiring officers	..	..	1,156	36
,, Members' contributions during 1948	..	..	16,974	98
		Rs.	231,601	1

STATEMENT "A"

INCOME FOR 1948

	Estimate	Actual Income	Excess	Deficit	
Cess Collections	Rs. 420,000.00	Rs. 506,171.68	Rs. 86,171.68	Rs. —	Increased rate of cess.
Interest	„ 14,400.00	„ 11,718.45	„ —	„ 2,681.55	Sale of one investment.
Sale of Publications	„ 800.00	„ 1,477.02	„ 677.02	„ —	More publications sold.
Profit from Dartonfield	„ 10,603.00	„ 5,581.19	„ —	„ 5,021.18	Lace crepe manufactured instead of sole crepe.
Profit from Nivitigalakele	„ 6,041.00(loss)	„ 11,667.02	„ 17,708.02	„ —	Increased crop; crepe manufactured instead of smoked sheet.
Sundry Receipts	„ 1,650.00	„ 10,397.62	„ 8,747.62	„ —	Appreciated value of one investment sold, rent of bungalows and forfeiture of one officer's Provident Fund.
Government Grant for Smallholdings Work	„ —	„ 38,750.00	„ —		

STATEMENT "B"

STATEMENT OF EXCESSES AND SAVINGS ON VOTES

Expenditure

Head of Estimate	ACCOUNT	Estimate Rs. C.	Capital Rs. C.	Revenue Rs. C.	Excess Rs. C.	Saving Rs. C.	REMARKS
1.	ADMINISTRATION OF THE BOARD: Travelling expenses of members	3,500 00	—	2,155 55	—	1,344 45	Fewer meetings held.
2.	Emoluments of Senior Scientific Staff	106,330 00	—	74,756 84	—	31,573 16	Non employment of full staff.
3.	Emoluments of Junior Scientific Staff	22,995 00	—	18,889 75	—	4,105 25	New appointments not made owing to above.
4.	LIBRARY & PUBLICATIONS:						
A.	Library	1,500 00	—	697 04	—	802 96	Economies.
B.	Publications	3,500 00	—	3,232 97	—	267 03	Fewer publications issued.
5.	SMALLHOLDINGS WORK:						
A—D.	Emoluments of Staff	31,411 00	—	51,878 75	20,467 75	—	Absorption of New Rubber Planting Scheme Staff.
E—F.	Travelling & General Expenses	19,140 00	—	18,821 89	—	318 11	Economies
6.	LABORATORY:						
A.	Equipment & Working Expenses	6,000 00	550 60	4,753 69	—	695 71	Payments not complete.
B.	Furniture Replacements	50 00	—	61 28	11 28	—	
7.	FIELD & FACTORY EXPERIMENTS:						
A.	Field Experiments	5,710 00	—	2,002 57	—	3,707 43	All experiments not undertaken and non-employment of Field Watcher.
B.	Factory Experiments	3,823 00	—	1,038 49	—	2,784 51	Experiments not undertaken owing to non-employment of Chemist.
8.	OFFICE:						
A—C.	Emoluments of Office Staff	17,690 00	—	17,443 97	—	246 03	Non-employment of one peon.
D.	Stationery & Office Equipment	3,500 00	890 45	1,527 55	—	1,082 00	Economies.
E.	Postage & Telegrams	3,000 00	—	1,361 24	—	1,638 76	Over-estimate.
F.	Advertising	500 00	—	879 64	379 64	—	More vacancies advertized.
G.	Telephone	1,200 00	—	1,216 84	16 84	—	
H.	Audit	900 00	—	900 00	—	—	
9.	TRAVELLING EXPENSES OF STAFF	7,000 00	—	6,800 69	—	199 31	Less travelling owing to shortage of staff.
10.	MAINTENANCE OF BUILDINGS, WATER & POWER SUPPLY:						
A.	General Buildings	500 00	—	321 01	—	178 99	Less work undertaken.
B.	Bungalows	5,000 00	—	3,638 77	—	1,361 23	do do
C.	Water & Power Supply	3,000 00	—	2,835 13	—	164 87	Economies.
D.	Furniture Replacements	500 00	—	585 74	85 74	—	More replacements necessary.
11.	MISCELLANEOUS ITEMS SHARED WITH ESTATE:						
A.	Dartonfield General Charges	28,920 00	—	25,204 41	—	3,715 59	Changes in estate staff.
B.	Nivitigalakele General Charges	14,216 00	—	11,960 79	—	2,255 21	do do
C.	Hedigalla General Charges	12,706 00	—	12,283 38	—	422 62	do do
D.	Upkeep of Roads & Grounds	1,125 00	—	500 02	—	624 98	Less work undertaken.
E.	Factory Upkeep	1,650 00	—	4,960 28	3,310 28	—	Purchase of new smooth mill.
F.	Power Supply	9,682 00	—	11,474 14	1,792 14	—	Increased cost of oils.
12.	CONTINGENCIES:						
A.	Contribution to London Advisory Committee	27,000 00	—	26,713 04	—	286 96	Difference in exchange.
B.	General Charges	1,000 00	—	1,777 78	777 78	—	Loss on Rubber chemicals.
C.	Insurance Charges	5,300 00	—	4,435 81	—	864 19	Non completion of building programme.
D.	Staff Provident Fund	29,000 00	—	26,251 23	—	2,748 77	Non employment of complete staff.
E.	Passages	15,000 00	—	15,000 00	—	—	—
F.	Entertainment Allowance	150 00	—	132 50	—	17 50	—
G—H.	War Allowance to Staff and Special Allowance to Junior Staff	56,650 00	—	53,415 66	—	3,234 34	Non employment of complete staff.
I.	Contribution to Medical Fund	2,100 00	—	1,918 50	—	181 50	do do
13.	DEPRECIATION	27,000 00	—	22,898 39	—	4,101 61	Due to non completion of building programme and delay in getting equipment.
14.	PLANTING FOOD CROPS AT HEDIGALLA	750 00	—	172 18	—	577 82	Larger crop harvested.
15.	CAPITAL ACCOUNT:						
A.	Upkeep of Dartonfield Immature Areas	1,871 00	2,111 29	—	240 29	—	Extra cost of weeding.
B.	Upkeep of Nivitigalakele Immature Areas	3,769 00	2,392 35	—	—	1,376 65	Over estimate.
C.	Upkeep of Hedigalla Immature Areas	14,253 00	12,142 19	—	—	2,110 81	do do
D.	Hedigalla New Planting (Nursery)	2,842 00	—	—	—	2,842 00	Work postponed.
E.	2 Double Labourers' Cottages (Dartonfield)	8,000 00	573 47	—	—	7,426 53	Work not completed.
F.	2 Double Labourers' Cottages (Hedigalla)	15,683 00	7,275 75	—	—	8,407 25	do do
G.	Hedigalla Coagulating Shed & Store	4,000 00	—	—	—	4,000 00	Work not undertaken.
H.	1 set of Double Latrines (Hedigalla)	260 00	—	—	—	260 00	do do
I	1 pair hand rollers and Coagulating tank (Nivitigalakele)	2,000 00	971 01	—	—	1,028 99	Hand Rollers not purchased.
J.	Hedigalla Cart Road Extension	15,500 00	12,078 68	—	—	3,421 32	Work not completed.
K.	Rice and Tool Store and Office (Hedigalla)	5,492 00	5,643 90	—	151 90	—	Under-estimate.
L.	Junior Staff Bungalows (Hedigalla)	21,435 00	17,613 65	—	—	3,821 35	Work not completed.
M.	Secretary-Accountant's Bungalow (Dartonfield)	15,748 00	242 12	—	—	15,505 88	Payment not completed.
N.	Hedigalla K.P's Quarters	—	—	—	—	—	—
O.	Schoolmaster's Quarters & Creche (Dartonfield)	433 00	66 54	—	—	366 46	Work not completed.
P.	Hedigalla Conductor's Bungalow	327 00	290 20	—	—	36 80	Economies.
Q.	Hedigalla Quadruple Cottages for Labourers	498 00	397 70	—	—	100 30	do do
R.	Dartonfield Carpenter's Shed	298 00	—	—	—	298 00	Work not undertaken.
S.	Nivitigalakele Quadruple Cottages for Labourers	498 00	211 17	—	—	286 83	Work not completed.
T.	Water and Power Supply (Dartonfield)	430 00	1,762 99	—	1,332 99	—	Increased cost of piping.
U.	New Storage Battery (Dartonfield)	12,340 00	13,013 44	—	673 44	—	Under estimate.
V.	New National Engine for Dartonfield Factory	62,716 00	36,917 87	—	—	25,798 13	Installation not complete.
W.	Repairs to Dartonfield Manure Shed	585 00	943 85	—	358 85	—	Further repairs undertaken.
X.	Purchase of a Station Waggon	14,000 00	—	—	—	14,000 00	Waggon not purchased until 1949.
Y.	Furniture and Fixed Equipment	3,611 00	2,226 08	—	—	1,384 92	Purchase of equipment not complete.