

**THE  
RUBBER RESEARCH INSTITUTE OF CEYLON**

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ANNUAL REVIEW FOR 1968

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# THE RUBBER RESEARCH INSTITUTE OF CEYLON

BOARD OF MANAGEMENT  
(As at 31st December, 1968)

## *Ex-Officio Members*

The Director of Agriculture—Mr. M. S. Perera, B.A. (Lond.), C.A.S.

The Additional Deputy Secretary to the Treasury—Mr. P. D. Uduwela, B.A.  
(Lond.), C.A.S.

The Rubber Controller—Mr. C. Chanmugam, B.Sc. (Cey.), A.R.I.C., C.A.S.

\*The Director, Rubber Research Institute of Ceylon—Dr. R. T. Wijewantha, B.Sc.  
(Cey.), B.Sc. (Special) Hons. (Lond.), M.Sc. (Lond.), Ph.D. (Calif.), M.Sig.Xi,  
M.I.Biol. (*Vice-Chairman*)

## *Members of Parliament Nominated by the Hon'ble Minister of Agriculture & Food*

Senator S. D. S. Somaratne, J.P., U.M.  
Mr. D. P. Attygalle, M.P.

## *Members Nominated by the Planters' Association of Ceylon*

Mr. G. W. Davies  
Mr. H. G. R. de Mel

## *Members Nominated by the Low-Country Products Association of Ceylon*

Mr. D. B. Ellepola, B.Sc., C.B.E. (*Chairman*)  
Mr. Rajah Salgado, B.Sc. Agric. (Cey.)

## *Member Nominated by the Hon'ble Minister of Agriculture & Food to Represent Smallholders*

Mr. S. Randeny, J.P.

## STANDING COMMITTEES

### *Administrative Committee :*

Mr. D. B. Ellepola  
Mr. C. Chanmugam  
Mr. P. D. Uduwela  
Mr. Rajah Salgado  
Mr. H. G. R. de Mel  
Senator S. D. S. Somaratne  
Dr. O. S. Peries

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\*Dr. Wijewantha relinquished duties as Director with effect from 31-12-68 and Dr. O. S. Peries, the Additional Director, replaced him on the Board.

*Estate and Experimental Committee :*

Mr. D. B. Ellepola  
Mr. G. W. Davies  
Mr. H. G. R. de Mel  
Mr. Rajah Salgado  
Mr. L. C. de Mel (co-opted)  
Mr. E. D. de Alwis (co-opted)  
Dr. O. S. Peries

*Selection Committee :*

Mr. D. B. Ellepola  
Mr. C. Chanmugam  
Mr. H. G. R. de Mel  
Senator S. D. S. Somaratne  
Dr. O. S. Peries

*Scientific Committee :*

Mr. D. B. Ellepola  
Mr. C. Chanmugam  
Mr. H. G. R. de Mel  
Mr. S. Randeny, J.P.  
Dr. O. S. Peries  
Heads of Scientific Departments (co-opted)

*Advisory Services Committee :*

Mr. D. B. Ellepola  
Mr. C. Chanmugam  
Mr. S. Randeny, J.P.  
G. W. Davies  
Mr. C. Ludekens (co-opted)  
Dr. O. S. Peries

**Secretary to the Board**  
B. C. Moldrich, B.A. (Cey.)

**Lawyers**

F. J. & G. de Saram,  
Proctors, P. O. Box 212, Colombo.

**Auditors**

Cecil Arseculeratne & Co.,  
Chartered Accountants,  
Hemas Building, York Street, Colombo 1.

**Bankers**

Bank of Ceylon, York Street, Colombo 1.  
People's Bank, Matugama.

**Registered Office and Laboratories**  
Dartonfield, Agalawatta.

**Smallholdings Department and Board Office**  
74, Davidson Road, Colombo 4.

# THE RUBBER RESEARCH INSTITUTE OF CEYLON

## STAFF

(As at 31st December, 1968)

**Director** ... R. T. Wijewantha, B.Sc. (Cey.), B.Sc. (Special)  
Hons. (Lond.), M.Sc. (Lond.), Ph.D. (Calif.),  
M. Sig. Xi, M.I.Biol.

**Additional Director** ... O. S. Peries, B.Ag.Sci. (Melb.), Ph.D. (Bristol),  
M.I.Biol.

## RESEARCH DEPARTMENTS

### Botany

*Head of Department* ... L. B. Chandrasekera, B.Sc. (Cey.), Dip. Ag. Sci.  
(Cantab.)

*Botanist* ... R. Satchuthananthavale, B.Sc. (Madras), M.A.  
(Madras), Ph.D. (Sheffield)

*Assistant Botanists* ... Miss A. C. I. Yahampath, B.Sc. (Cey.)  
U. P. de S. Waidyanatha, B.Sc. (Cey.), M.Sc.  
(Cey.)

*Senior Technical Assistant* ... W. G. V. Fernando

*Technical Assistant* ... C. Amaracone

*Field Assistants* ... D. A. Brahakmana  
D. R. Colonne  
U. K. D. Lewis  
W. T. Silva

### Genetics & Plant Breeding

*Head of Department* ... D. M. Fernando, B.Sc. (Cey.), M.Sc. (Mc-Gill)  
*Geneticist* ... Y. D. A. Senanayake, B.Sc. Agric. (Cey.), M.S.  
(Louisiana), Ph.D. (Calif.)

*Technical Assistant* ... P. Samaranyake

*Senior Field Assistant* ... H. B. H. de Silva

*Field Assistants* ... D. S. Gamage  
A. K. M. S. Senaratne  
W. A. C. Wijesinghe

### Plant Pathology

*Actg. Head of Department  
and Plant Pathologist* ... Mrs. V. Satchuthananthavale, B.A. (Madras),  
M.Sc. (Madras), Ph.D. (Sheffield)

*Senior Technical Assistant* ... H. L. Munasinghe, L. I. Biol.

*Technical Assistants* ... D. M. Dantanarayana  
W. C. Dayaratne  
T. M. Fernando  
Z. E. Irugalbandara  
E. G. Mendis  
S. K. Samaraweera

### **Soils Chemistry**

*Actg. Head of Department  
and Soils Chemist* ... C. G. Silva, B.Sc. (Cey.), M.S. (Hawaii)

*Assistant Soils Chemist* ... \*R. S. John, B.Sc. Ag. (Cey.)

*Senior Technical Assistant* ... T. Kanthasamy

*Technical Assistants* ... H. A. Seemon  
F. P. W. Silva

*Field Assistants* ... W. M. Abeysinghe  
M. A. Mendis  
J. T. K. V. Nageswaran

### **Rubber Chemistry**

*Actg. Head of Department  
and Rubber Chemist* ... S. W. Karunaratne, B.Sc. (Cey.), A.R.I.C.  
A.I.R.I., A.N.C.R.T., M.Sc. (Aston)

*Assistant Rubber Chemists* ... P. A. J. Yapa, B.Sc. (Vidyodaya)  
R. Tharmalingam, B.Sc. (Cey.)

*Senior Technical Assistant* ... M. T. Veerabangsa

*Technical Assistants* ... A. S. Dekumpitiya  
W. D. Dharmasena  
G. G. Gnanasegaram  
D. D. Medagama

### **Statistical Section**

*Assistant Statistician* ... Vacant

### **EXTENSION SERVICES**

### **Estates Advisory Department**

*Head of Department* ... A. B. Dissanayake, B.Sc.Ag. (Cey.), B.A. (Cey.)

*Estates Advisory Officer* ... K. W. de Silva

*Assistant Advisory Officers* ... A. Dahanayake, B.Sc.Ag. (Cey.)  
D. S. Muthukuda  
H. T. Wickremasekera, B.Sc.Ag. (Cey.)

### **Smallholdings Department**

*Chief Advisory Officer  
(Smallholdings)* ... H. H. Peiris

*Deputy Chief Advisory  
Officer (Smallholdings)* ... Vacant

|   |     |  |
|---|-----|--|
| <i>Divisional Advisory Officers</i><br><i>(Smallholdings)</i> | ... | P. S. G. Cooray<br>M. B. Dissanayake<br>B. D. Pedrick<br>D. R. Ranwala<br>K. P. Siriwardena<br>D. B. Weligodapola<br>J. D. S. Wickremaratne<br>L. A. Wijesinghe  |
| <i>Office Assistant</i>                                       | ... | R. A. Somadasa   |
| <i>Chief Clerk</i>  | ... | C. Jayasinghe  |
| <i>Accounts Clerk</i>   | ... | K. J. L. Perera, F.S.A.A., A.C.B.I.  |
| <i>Clerk-Translators</i>                                      | ... | W. A. A. Perera<br>I. L. Sirisena  |
| <i>Artist Clerk</i>   | ... | M. J. P. Lusena  |
| <i>Clerks</i>   | ... | M. Jayasuriya<br>G. P. A. I. G. Pathirana<br>R. E. Perera<br>A. Wijesinghe   |
| <i>Rubber Instructors</i>                                     | ... | W. D. Abeysena<br>D. L. Abeyasinghe<br>M. D. Albert<br>H. A. D. Ariyaratne<br>K. I. Ariyaratne<br>S. D. Athukorale<br>W. S. Dassanayake<br>P. W. David<br>W. E. W. de Mel<br>A. J. L. de Silva<br>H. R. Dias<br>J. M. E. Dissanayake<br>K. Ekanayake<br>P. B. Fernando<br>P. I. N. Fernando<br>P. T. S. Fernando<br>R. Gunadasa<br>L. L. C. Gunasekera<br>W. W. Gunasekera<br>U. D. V. Gunasinghe<br>A. P. Gunatilake<br>R. K. Gunatilake<br>W. A. J. de S. Gunatilleke<br>G. Gunawardane<br>B. A. Gurusinghe<br>G. P. G. S. Hapugoda<br>R. B. Heendeniya<br>T. B. Herath<br>D. Hettiarachchi<br>S. D. Hidellearachchi<br>T. W. Jayalath |

|                           |     |  |
|---------------------------|-----|--|
| <i>Rubber Instructors</i> | ... | A. K. Jayatissa<br>W. D. Jayawardena<br>N. C. Katukurunda<br>K. S. Kodikara<br>D. D. Kotalawala<br>E. N. Liyanage<br>R. B. Madawala<br>P. R. Nonis<br>D. Palihakkara<br>M. P. V. P. S. Perera<br>U. L. C. Perera<br>S. C. Rajasinghe<br>R. M. B. Ranasinghe<br>D. J. Ratnayake<br>W. D. D. Rupasinghe<br>M. C. Samarasekera<br>G. Senarath<br>R. G. Siripala<br>U. S. Somapala<br>J. H. Suaris<br>J. Sumanasekera<br>O. M. W. Tilekeratnc<br>G. Weeratunga<br>C. Wickrematilake<br>W. A. S. Wijsekera<br>D. U. Wijesinghe<br>V. Wijesinghe<br>D. R. Wijesooriya<br>W. M. D. Wijesundera<br>R. P. D. J. Wijewardena |
|---------------------------|-----|--|

|  |     |                                       |
|--|-----|---------------------------------------|
| <i>Rubber Instructors (Publicity Unit)</i> | ... | A. Suriyaarachchi<br>U. S. Wijeyapala |
|--|-----|---------------------------------------|

|                 |     |                |
|-----------------|-----|----------------|
| <i>Mechanic</i> | ... | K. A. Siripala |
|-----------------|-----|----------------|

#### ADMINISTRATION

#### Correspondence and Accounts Sections

|  |     |                                       |
|--|-----|---------------------------------------|
| <i>Chief Administrative Officer &amp; Secretary to the Board</i> | ... | B. C. Moldrich, B.A. (Cey.)           |
| <i>Assistant Administrative Officer</i>                          | ... | S. M. J. Neangoda, B. A. Econ. (Cey.) |
| <i>Office Assistant</i>  | ... | J. A. Attygalle                       |
| <i>Accounting Assistant</i>                                      | ... | H. Kulasena, A.C.C.S.                 |
| <i>Personal Assistant to the Director</i>                        | ... | P. Samarasinghe                       |
| <i>Confidential Clerk</i>  | ... | W. D. Jayawansa                       |
| <i>Record Clerk</i>  | ... | D. G. Udawatta                        |

|  |     |  |
|--|-----|--|
| <i>Clerk/Typists</i>                             | ... | M. J. Abeyasinghe<br>K. G. A. K. Dharmawardene<br>T. H. Wijesena<br>B. H. Withanachchi |
| <i>Accounts Clerks</i>                           | ... | A. K. D. Amaradasa<br>A. L. Gunawardene<br>P. S. P. Wijesiriwardene                    |
| <i>Junior Clerks</i>                             | ... | J. D. Gunaratne<br>Miss N. K. Sencviratne  |
| <i>Junior Accounts Clerk</i>                     | ... | J. H. C. S. Perera   |
| <i>Translator cum Typist</i>                     | ... | J. A. A. R. I. St. R. Perera   |
| <i>Book-keeper</i>                               | ... | E. P. D. Roberts, F.C.B.I. (Lond.)   |
| <i>Store-keeper</i>                              | ... | D. P. W. Goonesekera   |
| <i>Stores Assistant</i>                          | ... | M. H. C. Ariyaratne  |
| <i>Clerk cum Steno/Typist<br/>(Board Office)</i> | ... | P. H. Seneviratne  |

#### **Library**

|   |     |                  |
|---|-----|------------------|
| <i>Librarian &amp; Publications<br/>Officer</i> | ... | Vacant           |
| <i>Library Assistant</i>                        | ... | W. Ranasinghe    |
| <i>Clerk</i>                                    | ... | D. C. Thambawita |

#### **Works Section**

|                                   |     |                           |
|-----------------------------------|-----|---------------------------|
| <i>Works Engineer</i>             | ... | P. C. J. F. Keerthisinghe |
| <i>Electrical Foreman</i>         | ... | K. C. L. Fernando         |
| <i>Mechanical Foreman</i>         | ... | M. M. Anderson            |
| <i>Building Foreman</i>           | ... | W. S. J. Benjamin         |
| <i>Clerk</i>                      | ... | D. D. D. Adikaram         |
| <i>Transport/Stores Assistant</i> | ... | B. D. Ponnampereuma       |

#### **ESTATES**

#### **Dartonfield Group**

|  |     |                       |
|--|-----|-----------------------|
| <i>Estate Superintendent</i>                 | ... | L. Wijeyagoonewardena |
| <i>Assistant Estate Superin-<br/>tendent</i> | ... | M. R. T. Mendis       |
| <i>Office Assistant</i>                      | ... | T. S. J. Peiris       |

|                                  |     |  |
|----------------------------------|-----|--|
| <i>Senior Accounts Clerk</i>     | ... | A. C. Swaris   |
| <i>Accounts Clerks</i>           | ... | C. Jeyaraj<br>B. H. Rodrigo                                |
| <i>Junior Clerk</i>              | ... | A. L. Ratnayake  |
| <i>Chief Field Assistant</i>     | ... | H. M. Buultjens  |
| <i>Senior Field Assistants</i>   | ... | L. P. de Mel<br>D. C. Kannangara                           |
| <i>Factory Assistant</i>         | ... | O. de Alwis  |
| <i>Apothecary</i>                | ... | P. H. A. Perera  |
| <i>Dispenser</i>                 | ... | G. J. A. Silva   |
| <i>Field Assistant</i>           | ... | H. A. Haramanis  |
| <i>Assistant Rubber Maker</i>    | ... | S. Hettiarachchi   |
| <i>School Teachers</i>           | ... | Mrs. K. P. Goonewardene<br>D. L. W. Lionel<br>S. Nadarajah |
| <i>Assistant Nursery Manager</i> |     | L. H. Samaranayake   |

**Kuruwita Sub-station**

|                                |     |              |
|--------------------------------|-----|--------------|
| <i>Visiting Superintendent</i> | ... | W. L. Scott  |
| <i>Senior Field Assistant</i>  | ... | M. C. Perera |

**Note:** Names of officers of a single group under each department have been alphabetically listed.

\* on study leave overseas.

# THE RUBBER RESEARCH INSTITUTE OF CEYLON

ACTING DIRECTOR'S REVIEW FOR 1968

By

O. S. PERIES

## General

At present the position of natural rubber (NR) is very encouraging. Due to various factors operating in the last quarter of 1968, the prices of NR have been pushed up to their highest levels for 2½ years, on the London market. The supply of NR has fallen short by a greater margin than has been predicted, and this is reflected in a scarcity of all forms of NR — including standard grades, new forms and latex. A contributory factor in America is the high production growth in the manufacturing industry. The "Big Four" tyre manufacturers in America themselves operate 265,000 acres of plantations NR, chiefly in Malaysia, Liberia and Indonesia. There is also a gradual movement by the "Big Four" towards Standard Malaysian Rubber, the new process block rubber. A recent report by the World Bank on Malaysia's agriculture, indicated good long-term prospects for NR, because of expected rapid expansion in world demand and improvements in production technology. Therefore, the prospects for NR are bright, and new planting of high-yielding rubber is still an attractive investment possibility in Ceylon.

In view of the above, the record crop of approximately 146,370 tons of rubber produced in Ceylon in 1968, an increase of 3.85%, is very encouraging. This increase in production is mainly due to the acreage replanted under the Rubber Replanting Subsidy Scheme coming into production. Since the commencement of this scheme in 1953, there has been an increase of 53,000 tons in Ceylon's rubber production, an increase of approximately 56.5%, over the previous figures. This trend towards increased production is expected to continue for some time, as more and more of the replanted areas come into production.

## Staff

The Institute worked with a depleted staff throughout 1968. The writer assumed duties as Additional Director, in charge of research, on 1st October, 1968. His first duty was to recruit suitable staff to fill the vacancies created by the spate of resignations during 1967 and 1968. These resignations indicated that there were defects in the personnel management policy in the Institute and the necessity for the Board to make a new approach to personnel matters. It is, in fact, now universally accepted that the management of research scientists is a science in itself.

Difficulties encountered in recruiting suitable staff to fill vacancies in the scientific departments highlighted the dearth of qualified scientific personnel in this country at present. Co-ordination among the universities and the various scientific and research institutes in the island with due regard to the aspects on which research studies should be undertaken and the requirements of the country would remedy the situation to a large extent.

It is a pleasure to record that the staff situation at the Institute improved by the end of 1968, and that a continuing programme of research work had been initiated in each of the departments by the end of the year.

The Additional Director, Dr. O. S. Peries, and the Acting Head of the Rubber Chemistry Department, Mr. S. W. Karunaratne, organised a symposium on new process rubbers with special reference to Ceylon. The symposium was held on 31st October 1968, at the C.I.S.I.R. auditorium, and was extremely well attended. All the papers read at this symposium have already been published in a special issue of the Institute's Bulletin.

Dr. O. S. Peries assumed duties as Additional Director with effect from 1-10-68.

Mr. S. W. Karunaratne continued as Acting Head of Rubber Chemistry Department and Mr. C. G. Silva as Acting Head of Soils Chemistry Department.

Mr. S. M. J. Neangoda assumed duties as Assistant Administrative Officer with effect from 1-11-68.

Messrs. P. A. J. Yapa and R. Tharmalingam assumed duties as Assistant Rubber Chemists in the Rubber Chemistry Department with effect from 1-11-68.

Mr. U. P. de S. Waidyanatha assumed duties as Assistant Botanist with effect from 1-12-68.

Messrs. L. B. Chandrasekera, Head of Botany Department; A. B. Dissanayake, Head of Estates Advisory Department; D. M. Fernando, Head of Genetics & Plant Breeding Department; H. H. Peiris, Chief Advisory Officer Smallholdings; B. C. Moldrich, Chief Administrative Officer and L. Wijeyagunawardena, Estate Superintendent were on duty throughout the year.

Dr. Y. D. A. Senanayake, Geneticist was on duty throughout the year.

Mr. R. S. John, Assistant Soils Chemist continued his post-graduate studies at the University of Aberdeen ; he is expected back at the Institute in mid 1969.

Dr. R. Satchuthanathavale, Assistant Botanist; Dr. (Mrs.) V. Satchuthanathavale, Assistant Plant Pathologist; Messrs. P. C. J. F. Keerthisinghe, Works Engineer; M. R. T. Mendis, Assistant Estate Superintendent, and Miss A. C. I. Yahampath, Assistant Botanist, were on duty throughout the year.

Mr. N. Nadarajapillai, Assistant Statistician, resigned with effect from 31-5-68. Mrs. Sivabalasunderam, Assistant Rubber Chemist resigned with effect from 31-5-1968.

The Director, Dr. R. T. Wijewantha, left the services of the Institute with effect from 31st December 1968, and the writer assumed duties as Acting Director with effect from the same date. The Rubber Research Board has made several changes in the administrative organisation of the Institute, all of which has helped to increase the efficiency of this department.

Assistant and Minor Staff changes in the various departments have been reported on by the respective departmental heads.

The salaried staff at the end of the year was as follows :—

|   |     |     |       |
|---|-----|-----|-------|
| Senior Staff (Heads of Departments)     | ... | ... | 8     |
| Senior Staff (non Heads of Departments) | ... | ... | 3     |
| Intermediate Staff                      | ... | ... | 14    |
| Assistant Staff                         | ... | ... | 156   |
| Minor Staff                             | ... | ... | 59    |
|   |     |     | <hr/> |
|   |     |     | 240   |
|   |     |     | <hr/> |

## Visitors

Visitors to the Institute included :—

Dr. C. G. Manuel, Regional Advisor, Industrial Relations, United Nations  
 Dr. L. C. Bateman, Chairman, Malayan Rubber Fund Board  
 Mr. P. F. C. Siggers, Agronomist, Shaw Wallace, Madras  
 Mr. T. M. Abdulla, Chairman, Smallholdings Economic Inquiry Committee  
 appointed by the Government of India  
 Mr. Chujiro Ozaki, Asian Productivity Organisation, Tokyo, Japan  
 Mr. Susumu Vishigaki, National Institute of Agricultural Science, Nishigahara,  
 Kitaku, Tokyo, Japan  
 Messrs. Igor Manassewitch, Chief Economist, Igor Sharov, Chief Blast Furnace  
 Engineer of Moscow, U.S.S.R.

Mr. Perkowski, Manager of Rubber Department, Warsaw, Poland  
 Mr. C. G. Akhurst, World Bank  
 Mr. J. C. Moomaw, International Rice Research Institute, Philippines  
 Professor D. M. Newett, Imperial College, London  
 Dr. G. Kemmles, Bunteleof Research Station VDK, Hannover, Germany  
 Mr. W. G. Bovt, Amsterdam.

## Meetings, Conferences and Seminars etc.

The Director and the research officers of the Institute attended the following meetings, seminars and conferences :—

1. The 2nd Natural Rubber Conference held in Kuala Lumpur, Malaysia
2. Ceylon Association for the Advancement of Science Annual Sessions
3. Planters' Association
4. Low-Country Products Association
5. District Planters' Associations
6. Bureau of Ceylon Standards
7. Meetings of the Rubber Replanting Advisory Board
8. Meetings of the panels convened by the Industrial Development Board
9. Ad hoc meetings convened by the Ministry of Agriculture & Food

10. Ad hoc meetings convened by the Ministry of Trade & Commerce
11. Symposium on "Recent developments in natural rubber production and presentation with special reference to Ceylon" organised by the Institute.

### Visits by Scientific Staff

| <i>Department</i>         | <i>Advisory</i> | <i>Experimental</i> | <i>Others</i> | <i>Total</i> |
|---------------------------|-----------------|---------------------|---------------|--------------|
| Botany                    | 10              | 26                  | —             | 36           |
| Plant Pathology           | 28              | 152                 | 13            | 193          |
| Genetics & Plant Breeding | —               | 349                 | —             | 349          |
| Rubber Chemistry          | 66              | 106                 | 10            | 182          |
| Soils Chemistry           | 7               | 57                  | 19            | 83           |
| Estates Advisory          | 535             | —                   | —             | 535          |

The Director, Dr. R. T. Wijewantha; the Head of Botany Department, Mr. L. B. Chandrasekera; the Head of Genetics & Plant Breeding Department, Mr. D. M. Fernando, and the Acting Head of the Rubber Chemistry Department, Mr. S. W. Karunaratne attended the second Natural Rubber Conference, held in Kuala Lumpur, Malaysia in August — September, 1968.

### Summaries of Research Work Carried out by Departments

*Botany* : At the end of the third year, yield stimulation trials, using a R.R.I.C. mixture, have shown that increases in the region of 70% can be achieved on renewed bark, tapped at 67% intensity, as compared to unstimulated bark tapped at 100% intensity. Arrangements are now being made to obtain patent rights over this stimulant mixture and to produce it on a commercial scale.

Experimental studies have shown that yield responses to the application of stimulants on virgin bark are poor and also that the rate of girdling of trees tapped with and without a winter rest is not significantly different. The Institute does not recommend the application of yield stimulants on virgin bark, but is not opposed to the continuation of tapping during the wintering period.

On the results of field experiments, clones IRCI 7, PB 28/59 and RRIC 90, 91 and 99 are now recommended for small-scale planting on estates. Many commercial plantings have now confirmed the high-yielding capacity of clone RRIC 36. This clone is now recommended for planting on a large scale in districts with an average annual rainfall of around 100 in. per year, as it is extremely susceptible to Bark Rot.

Clones RRIC 13, 40, 41, 50 and 55 are now recommended for small-scale commercial planting. The high-yielding potential of AVROS 427 has been confirmed in field trials. However, this clone is a relatively poor grower with a tendency to develop Bark Rot in wet districts. Clones WR 101 and IRCI 2 are now recommended for small-scale commercial planting. Experimental evidence to date seems to indicate that clone GT 1 would not be a high-yielding clone under Ceylon conditions. Clone AVROS 1734 has good vegetative characters and should be suitable for planting, particularly in the wet districts.

*Genetics & Plant Breeding* : The yields of RRIC 100 at Kuruwita Sub-station have been remarkable, so much so that the Institute advocates tapping at lower intensities on large-scale planting, at least till the results of field experiments, now in progress, are available. The yields of RRIC 101 dropped when the intensity was increased in 1968. More plants of RRIC 100 and 101 were established, in the Hedigalla nurseries, for distribution to estates.

The *Oidium*-resistant clone 1103 showed favourable growth, yield and response to early tapping at both Nivitigalakele and Kuruwita.

Populations of Tjir 1, which has been the principal source of seed for rootstocks, are decreasing rapidly, and the possibility of using seed from our recommended high-yielding clones is being investigated by the Institute. Plant Breeders have recognized the tendency for low seeding in vigorous high-yielding plants of all varieties. Low seeding can reduce the availability of seeds of certain clones in the future. Therefore, cytological studies on pollen production were undertaken to establish whether there were any abnormalities in some of our clones, which may lead to poor seeding. These studies have shown that there are meiotic abnormalities in three of our reputed low seed bearers *viz.* RRIC 41, 45 and 88, which may contribute to their poor seeding.

Studies on the sex ratios of *Hevea brasiliensis* cultivars, have shown that there are obvious variations in the ratio of male and female flowers in inflorescences of 10 cultivars that have been studied so far. More extensive studies on this problem will be undertaken during the 1969 flowering season.

Colchicine treatment of germinating seedlings of RRIC 52 gave a high frequency of polyploids. Swollen shoots, slow growth and abnormal foliage characteristics in the first set of leaves were common. However, beyond the first node growth was stabilized and the shoots appear to revert to the normal condition. This work is being continued.

A survey of the seedling populations at Egal-Oya and Hedigalla nurseries was conducted in order to establish the frequency of natural mutations for chlorophyll abnormalities. The Hedigalla population and a fraction of the Egal-Oya population had an abnormally high frequency of chlorophyll deficient plants. This frequency should serve as a useful guide for differentiating poor seed sources, and this study is therefore being pursued.

*Plant Pathology* : The Plant Pathology Department functioned without any graduate staff officers throughout a major part of 1968.

The incidence of *Oidium* and *Phytophthora* leaf diseases was generally light during 1968. The indications are that 5 — 6 lb of sulphur per acre per round may not be effective during heavy leaf-fall. However, a majority of the clones currently recommended by the Institute are tolerant to this disease and can be adequately protected with about 30 lb of sulphur.

The incidence of Bark Rot was so low in the experimental areas that no useful conclusions could be drawn from the results of these experiments. It appears now that no useful purpose is served by the application of waterproof fungicides to the tapping panel. Theoretically too, the protection of callused bark with fungicides appears to be futile. On the basis of these observations a review of the treatment of Bark Rot, both preventive and curative, is necessary.

Ten species of fungi were isolated from sheet rubber stored at the Torbay Stores belonging to the Department of Commodity Purchase. Species of *Aspergillus* and *Penicillium* were the most common contaminants, and the moisture and temperature requirements of these fungi are being studied in order to establish whether their growth can be retarded in these stores, by controlling these factors.

*Soils Chemistry* : On the basis of the present methods of analysis, it has been found that long-term experiments have not clearly indicated the benefits of fertilization in the early mature phase. However, it appears that more critical analyses of data with more realistic corrections, made for residual effects of fertilizer application in the immature phase, are necessary before this is accepted unequivocally.

A trial laid down in 1961 has indicated that the optimum level of nitrogen and phosphorus for *Hevea* is approximately 21 oz of sulphate of ammonia and 21 oz of saphos phosphate per plant, per annum, in the presence of a basal dosage of potassium and magnesium. In areas where nitrogen and phosphorus are basal, there is no response to potassium but magnesium showed a depressant effect.

A comparison of the more vigorous clones RRIC 7, 45 and 52 with PB 86, has shown that PB 86 will respond on par with the others to the application of NPK + Mg mixtures at higher rates, than those recommended at present by the Institute. Therefore the vigour of the clone does not appear to enhance its capacity to utilize fertilizers.

The trials on the application of one or more fertilizer elements on the basis of foliar analyses, as compared to standard NPK + Mg mixtures, have so far indicated that partial mixtures are more beneficial. Studies on this subject are in progress.

The results of the trial on the use of different forms of nitrogenous fertilizers have shown that urea is superior to the other two forms tested. However, these results must be considered inconclusive until it is established whether there is a response to nitrogen in the experimental area.

Studies with granular fertilizers have shown their superiority over standard fertilizer mixtures.

A provisional soil map of the rubber lands is now available. This will be supplemented with detailed surveys of each area and will form the basis of the envisaged soil and foliar survey programme.

*Rubber Chemistry* : The Rubber Chemistry Department was seriously understaffed during the period under review.

The department continued to provide advisory services to the large estates on problems connected with the manufacture of raw rubber. It also handled many inquiries on the manufacture of new forms of rubber. The estate experimenting on the production of Heveacrumb with the assistance of the Institute, completed production of a trial batch of 5 tons of this form of block rubber from a mixture of cup lump and tree lace.

Very little technological research was carried out, other than routine technological testing, and this was mainly due to lack of emphasis on such work. With the recruitment of additional staff and the provision of adequate funds, both of which have already been budgeted for, the department will be expected to carry out technological research in the future.



Papers :

- CHANDRASEKERA, L. B. Performance of clones. *R.R.I.C. Bulletin* (New Series) **3**, 17 - 19
- CHANDRASEKERA, L. B. Recommended planting material 1969. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)
- DISSANAYAKE, A. B. The economic life span of the rubber tree in smallholdings. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, parts 3 - 4 (in press)
- DISSANAYAKE, A. B. and W. RANASINGHE. The development of the rubber plantation industry in Ceylon. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)
- FERNANDO, D. M. and P. SAMARANAYAKE. The deterioration of rubber samples in *Hevea* tissues. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 31 - 33.
- KALPAGE, F. S. C. P. and C. G. SILVA. Studies of the manganese status of the rubber soils of Ceylon. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 8 - 15.
- KARUNARATNE, S. W. Rejuvenation of the natural rubber industry in Ceylon. *R.R.I.C. Bulletin* (New Series) **3**, 46 - 52.
- KARUNARATNE, S. W. Report on a fortnight's visit to Malaysia (14th—29th November 1967). *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)
- KARUNARATNE, S. W. and P. A. J. YAPA. Production of viscosity stabilised rubber with improved PRI from low grades. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, parts 3 - 4 (in press)
- PEIRIS, H. H. Some observations on the crash programme (1966) for the improvement of smallholders' rubber smoked sheet to Grade 1 quality. *R.R.I.C. Bulletin* (New Series) **3**, 1 - 7
- PEIRIS, H. H. Sulphur dusting of smallholdings in 1967. *R.R.I.C. Bulletin* (New Series) **3**, 20 - 24.
- PEIRIS, H. H. New designs for smallholders' smokehouses. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)
- PERIES, O. S. and R. L. DE SILVA. Problems of crop disease control with chemicals. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, parts 3 - 4 (in press)
- SENANAYAKE, Y. D. A. Cytogenetics of *Hevea*. I — a leaf squash technique for chromosome counts and its importance in *Hevea* breeding. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 1 - 7.
- SENANAYAKE, Y. D. A. and R. T. WIJEWANTHA. Synthesis of *Hevea* cultivars: a new approach. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 16 - 26.
- SENANAYAKE, Y. D. A. Intercropping, supplementary cropping and crop substitution on rubber land—a viewpoint. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

WIJEWANTHA, R. T. Rubber research — the challenge of the seventies. *R.R.I.C. Bulletin* (New Series) **3**, 8 - 14.

WIJEWANTHA, R. T. New rubbers — a different approach. *R.R.I.C. Bulletin* (New Series) **3**, 63 - 66.

WIJEWANTHA, R. T. The oil palm industry in Malaysia (with special reference to oil palm breeding). *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

YAHAMPATH, C. Growth rate of PB 86 on different *Hevea* rootstocks. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 27 - 28.

*Short Notes :*

Questions and answers on :—

Brown Bast — by L. B. Chandrasekera. *R.R.I.C. Bulletin* (New Series) **3**, 25 - 26.

Performance of certain clones — by L. B. Chandrasekera. *R.R.I.C. Bulletin* (New Series) **3**, 27 - 29.

High level tapping — by L. B. Chandrasekera. *R.R.I.C. Bulletin* (New series) **3**, 29.

Test tapping — by D. M. Fernando. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

Replanting on higher elevations — by D. M. Fernando. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

Double-four tapping system — by L. B. Chandrasekera. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

Reducing tapping costs — by L. B. Chandrasekera. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

Symptoms of Brown Bast — by L. B. Chandrasekera. *R.R.I.C. Bulletin* (New Series) **3**, No. 4 (in press)

**Note :** Unless otherwise stated all publications listed above have been issued in English.

# REVIEW OF THE BOTANY DEPARTMENT

By

L. B. CHANDRASEKERA

## Summary

Yield stimulation trials have shown that substantial increases in yield can be obtained by the application of a stimulant mixture developed by this department. Response to the application of stimulants on virgin bark has been poor.

There was no significant difference in the increase of the girth of trees tapped with and without a winter rest. Therefore, the Institute does not discourage the continuation of tapping during the wintering period.

On the basis of the yields recorded up to the end of 1968, the following clones are recommended for planting : RRIC 36 for large-scale planting in dry districts only, as it is extremely susceptible to Bark Rot ; IRCI 2, 7, PB 28/59, RRIC 13, 40, 41, 50, 55, 90 and WR 101 for small-scale planting on estates.

The high-yielding potential of AVROS 427 has been confirmed in field trials. However, this clone is a relatively poor grower with a tendency to develop Bark Rot in wet districts.

Clone AVROS 1734 has good vegetative characters and should be suitable for planting, particularly in the wet districts.

## Staff

The Head of Botany Department, Mr. L. B. Chandrasekera and the Assistant Botanists, Dr. R. Satchuthananthavale and Miss A. C. I. Yahampath were on duty throughout the year.

Mr. U. P. de S. Waidyanatha assumed duties as Assistant Botanist with effect from 1-12-1968.

## Correspondence

|           | <u>Inward</u> | <u>Outward</u> |
|-----------|---------------|----------------|
| General   | 18            | 38             |
| Technical | 488           | 278            |

## Publications

1. Brief Annual Report of the Botany Department for 1967
2. Annual Review of the Botany Department for 1967
3. Growth rate of PB 86 on different *Hevea* rootstocks

The following notes were submitted for publication in the R.R.I.C. Bulletin :—

1. Performance of clones
2. Recommended planting material 1969
3. Sale of budwood — Advisory Circular No. 79 (in press)
4. Questions and answers on :—
  - (a) Brown Bast
  - (b) Performance of certain clones
  - (c) High level tapping
  - (d) Tapping systems
  - (e) Reducing tapping costs
  - (f) Symptoms of Brown Bast

### Advisory Work

Advisory visits and correspondence involving special botanical problems in estates were attended to by the technical staff of the Botany Department. The Head of the Department addressed Planters' Association meetings held at Galle, Kalutara and Kelani Valley districts on tapping, and at Ratnapura on nursery practice.

Assistance was given to the Estate Department by technical staff of the Botany Department on establishment and maintenance of the commercial budwood nursery at Hedigalla.

### Yield Stimulation Experiments

#### *Field Experiment No. 2 — Yield Stimulation and Tapping — Clone Tjir 16*

This experiment was set down to investigate the long-term effects of the use of yield stimulants on renewed bark at a reduced tapping intensity of 67 per cent.

Each of the following treatments are applied to 3 tapping tasks :—

- (1) Tapped S/2, d/3, 67% and stimulated at 6 months intervals.
- (2) Tapped S/2, d/2, 100% but not stimulated.

In the stimulated blocks, RRIC Mixture I is applied to a 1-inch strip of scraped bark below the tapping cut. The experiment was initiated in September 1965 and the yields recorded for the first 3 years are summarised in Table 1.

TABLE 1  
Yield in lb dry rubber

|                       | Stimulated and<br>tapped on<br>S/2, d/3, 67% |                             | Unstimulated and<br>tapped on<br>S/2, d/2, 100% |                             |
|-----------------------|--|-----------------------------|---|-----------------------------|
|                       | Total crop<br>in lb for<br>3 tasks           | Average yield<br>per tapper | Total crop<br>in lb for<br>3 tasks              | Average yield<br>per tapper |
| Dec. 1965 — Nov. 1966 | 5,095.0                                      | 18.5                        | 4,159.0   | 10.1                        |
| Dec. 1966 — Nov. 1967 | 6,541.0                                      | 19.3                        | 4,713.0   | 9.7                         |
| Dec. 1967 — Nov. 1968 | 5,976.0                                      | 18.7                        | 5,237.0   | 11.3                        |

## Tapping Experiments

### Field Experiment No. 4 — 1964 “ Winter ” Tapping cum Yield Stimulation Trial

In this experiment each of the following treatments are applied to 20 trees of each of the clones Nab 12 and PB 86 and replicated 3 times :—

- (A) Yield stimulation on virgin bark/tapping without “ winter ” rest
- (B) Yield stimulation on virgin bark/tapping with a “ winter ” rest
- (C) No stimulation and tapped without “ winter ” rest
- (D) No stimulation and tapped with a “ winter ” rest.

The girth and yield data for the first 5 years are presented in Table 2.

TABLE 2  
WINTER TAPPING AND YIELD STIMULATION EXPERIMENT — DARTONFIELD  
Yield in grammes dry rubber per tree per tapping  
Test tapped from March 1964

|                                |        |     | A    | B    | C    | D    |
|--------------------------------|--------|-----|------|------|------|------|
| (Nab 12)                       |        |     |      |      |      |      |
| Average girth in inches        | (1964) | ... | 27.5 | 27.9 | 27.5 | 27.4 |
| Average girth in inches        | (1965) | ... | 28.7 | 29.2 | 28.6 | 28.3 |
| Average girth in inches        | (1966) | ... | 29.0 | 29.9 | 28.8 | 28.9 |
| Average girth in inches        | (1967) | ... | 30.0 | 30.9 | 29.8 | 30.0 |
| Average girth in inches        | (1968) | ... | 30.8 | 31.7 | 30.5 | 30.7 |
| Average yield before treatment |        | ... | 41.9 | 41.5 | 39.2 | 41.0 |
| Average adjusted yield*        | (1964) | ... | 58.0 | 55.2 | 56.4 | 50.2 |
| Average adjusted yield         | (1965) | ... | 44.3 | 43.6 | 43.4 | 41.2 |
| Average adjusted yield         | (1966) | ... | 39.0 | 39.5 | 43.2 | 35.0 |
| Average adjusted yield         | (1967) | ... | 40.3 | 39.1 | 38.9 | 36.6 |
| Average adjusted yield         | (1968) | ... | 42.2 | 41.2 | 37.9 | 32.6 |
| (PB 86)                        |        |     |      |      |      |      |
| Average girth in inches        | (1964) | ... | 27.0 | 27.1 | 27.0 | 27.9 |
| Average girth in inches        | (1965) | ... | 28.2 | 28.4 | 28.6 | 29.6 |
| Average girth in inches        | (1966) | ... | 28.5 | 28.8 | 28.7 | 29.9 |
| Average girth in inches        | (1967) | ... | 29.7 | 29.9 | 30.4 | 31.1 |
| Average girth in inches        | (1968) | ... | 30.5 | 30.6 | 30.9 | 32.0 |
| Average yield before treatment |        | ... | 31.7 | 35.0 | 32.8 | 39.1 |
| Average adjusted yield*        | (1964) | ... | 44.7 | 46.3 | 42.1 | 41.4 |
| Average adjusted yield         | (1965) | ... | 41.9 | 39.7 | 40.1 | 36.7 |
| Average adjusted yield         | (1966) | ... | 37.4 | 36.2 | 37.5 | 37.7 |
| Average adjusted yield         | (1967) | ... | 38.4 | 40.2 | 37.8 | 38.5 |
| Average adjusted yield         | (1968) | ... | 36.7 | 34.2 | 30.6 | 42.8 |

\* Yield results for 5 months

- A — Yield stimulation of virgin bark/tapping without winter rest
- B — Yield stimulation of virgin bark/tapping with winter rest
- C — No stimulation and tapped without winter rest
- D — No stimulation and tapped with winter rest

The yield response to application of stimulants on virgin bark has been poor. The rate of girthing of trees tapped with and without a winter rest period has not been significant.

### Clone Evaluation Trials

#### *Field Experiment No. 5 — 1946 Replanted Area — Nivitigalakele*

The test tapping results of the original 25-tree plots are presented in Table 3.

TABLE 3  
LARGE-SCALE CLONE TRIAL — 1946 REPLANTED AREA — NIVITIGALAKELE  
Yield in lb dry rubber per tree per year

|                                   | RRIC 88 | RRIC 89 |
|-----------------------------------|---------|---------|
| No. of trees tapped in 1968       | 19—22   | 18—19   |
| Yield — 1960                      | 22.3    | 21.2    |
| „ — 1961                          | 25.2    | 21.7    |
| „ — 1962                          | 23.1    | 22.4    |
| „ — 1963                          | 20.3    | 20.0    |
| „ — 1964                          | 24.1    | 22.1    |
| „ — 1965                          | 24.6    | 26.0    |
| „ — 1966                          | 26.6    | 23.9    |
| „ — 1967                          | 31.1    | 25.4    |
| „ — 1968                          | 25.8    | 21.5    |
| Brown Bast cases in 1968          | 5       | 8       |
| Canker and Bark Rot cases in 1968 | —       | 1       |
| Wind damage cases in 1968         | 1       | —       |
| Girth in inches, 1968             | 41.5    | 39.3    |
| Bark measurement in mm            |         |         |
| Virgin bark                       | 12.8    | 12.0    |
| Renewed bark                      | 10.4    | 9.0     |

There have been no major outbreaks of leaf or panel diseases in these two clones.

#### *Field Experiment No. 6 — 1952 Small-Scale Clone Trial — Hedigalla*

Test tapping results of the two final clone selections planted originally in 5-tree unreplicated plots are presented in Table 4.

TABLE 4  
1952 CLEARING — HEDIGALLA  
Tapped on S/2, d/2, 100% from July 1960  
Yield in lb dry rubber per tree per year

| Year of tapping              | RRIC 90 | RRIC 91 |
|------------------------------|---------|---------|
| 1961                         | 22.9    | 20.5    |
| 1962                         | 25.3    | 21.1    |
| 1963                         | 22.3    | 26.0    |
| 1964                         | 25.3    | 26.5    |
| 1965                         | 24.6    | 26.4    |
| 1966                         | 31.4    | 36.5    |
| 1967                         | 25.6    | 30.3    |
| 1968                         | 26.5    | 34.5    |
| Girth in inches, 1968        | 34.5    | 38.2    |
| No. of trees tapped in 1968  | 5       | 3       |
| Bark thickness in mm — *V.b. | 10.4    | 10.2    |
| *R.b.                        | 9.1     | 9.4     |
| Wind damage cases            | —       | 2       |

\* V.b. = Virgin bark  
\* R.b. = Renewed bark

The clones RRIC 90 and 91 are now recommended for small-scale planting on estates.

*Field Experiment No. 7 — 1954 Clone Trial — Nivitigalakele*

In this trial the clones IRCI 7, 10, PBT—207, PB 6/5, 24/3, 28/59, 24/51 and RRIM 501 are planted in 40-tree plots replicated 5 times. The test tapping results of IRCI 7 and PB 28/59 which are the most promising yielders along with that of clone RRIM 501 are presented in Table 5.

TABLE 5  
1954 CLONE TRIAL — NIVITIGALAKELE  
Tapped on S/2, d/2, 100% from March 1960  
Yield in lb dry rubber per tree per year

| Year of tapping             | IRCI 7  | PB 28/59 | RRIM 501 |
|-----------------------------|---------|----------|----------|
| Yield in 1961               | 10.2    | 14.2     | 9.7      |
| „ „ 1962                    | 9.2     | 15.3     | 11.9     |
| „ „ 1963                    | 8.8     | 14.2     | 12.6     |
| „ „ 1964                    | 9.5     | 15.1     | 13.6     |
| „ „ 1965                    | 10.6    | 16.3     | 13.1     |
| „ „ 1966                    | 13.1    | 19.5     | 13.9     |
| „ „ 1967                    | 15.4    | 18.6     | 13.3     |
| „ „ 1968                    | 14.8    | 17.2     | 12.5     |
| No. of trees tapped in 1968 | 129—137 | 111      | 96—90    |
| Canker and Bark Rot cases   | 3       | 5        | 4        |
| Brown Bast cases            | 24      | 22       | 16       |
| Wind damage cases           | 41      | 34       | 66       |
| Total casualties to date    | 68      | 61       | 86       |
| Mean girth in inches        | 29.3    | 30.3     | 26.7     |
| Virgin bark thickness in mm | 10.3    | 11.1     | 10.1     |

The clones IRCI 7 and PB 28/59 are now recommended for small-scale planting in estates.

*Field Experiment No. 11 — 1951 Clone Trial — Hedigalla*

A total of 10 clones with clone PB 86 serving as a control was originally planted in this trial. Each clone is planted in 25-tree plots replicated 3 times. The test tapping results of the best selection clone RRIC 99 are presented in Table 6.

TABLE 6

## SMALL-SCALE CLONE TRIAL — HEDIGALLA

Tapped on S/2, d/3, 67% from 1958

Tapped on S/2, d/2, 100% from 1960

Yield in lb dry rubber per tree per year

| Year of tapping             | RRIC 99 | PB 86 |
|-----------------------------|---------|-------|
| 1961                        | 14.2    | 13.3  |
| 1962                        | 19.4    | 16.3  |
| 1963                        | 17.7    | 15.9  |
| 1964                        | 20.4    | 17.0  |
| 1965                        | 17.9    | 16.9  |
| 1966                        | 18.2    | 17.7  |
| 1967                        | 15.7    | 19.4  |
| 1968                        | 15.0    | 18.9  |
| Girth in inches 1968        | 32.4    | 31.7  |
| No. of trees tapped in 1968 | 57—52   | 59—54 |
| Brown Bast cases            | 5       | 5     |

The clone RRIC 99 is recommended for small-scale planting on estates.

*Field Experiment No. 12 — 1949 Clone Trial — Hedigalla*

Each clone in this trial is planted in 25-tree plots replicated 6 times. Out of 31 clones originally planted RRIC 86 proved to be the best yielder. Test tapping results of this clone as compared with clone PB 86 are presented in Table 7.

TABLE 7

## 1949 LARGE-SCALE CLONE TRIAL — HEDIGALLA

Tapped on S/2, d/2, 100%

Yield in lb dry rubber per tree per year

| Year of tapping      | RRIC 86 | PB 86 |
|----------------------|---------|-------|
| 1962                 | 21.0    | 15.6  |
| 1963                 | 19.3    | 15.7  |
| 1964                 | 20.9    | 18.1  |
| 1965                 | 22.0    | 20.9  |
| 1966                 | 19.8    | 16.9  |
| 1967                 | 18.2    | 17.3  |
| 1968                 | 15.8    | 15.2  |
| Girth in inches 1968 | 31.2    | 33.5  |
| Trees tapped in 1968 | 61      | 99—92 |

*Field Experiment No. 13 — 1954 Clone Trial — Hedigalla*

The clones are planted in unreplicated monoclonal blocks of 800 to 1,000 trees per clone. Tapping commenced as individual trees reached tappable girth as follows:—

- First tapped in 1961 — RRIC 16, 18, 22, 26, 35, 36, RRIM 501  
 " " " 1962 — " 19, 21, 24, 25, 29, 31, 34, 37 and AVROS 255  
 " " " 1963 — " 17, 23, 32, 33, PR 107 and PB 86  
 " " " 1964 — IRCI 10, NL 1 and one block of PR 107.

The yields of the more promising clone selections are summarised in Table 8.

TABLE 8

1954 LARGE-SCALE CLONE TRIAL — HEDIGALLA  
 First tapped in July 1961 on S/2, d/2, 100%  
 Yield in grammes dry rubber per tree per tapping

| Clone            | No. of trees tapped in 1968 | Girth in inches 1968 | Yield |      |      |      |      |      |      |
|------------------|-----------------------------|----------------------|-------|------|------|------|------|------|------|
|                  |                             |                      | 1962  | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
| RRIC 36          | 406—368                     | 29.6                 | 33.0  | 44.1 | 41.8 | 37.9 | 41.8 | 52.9 | 44.8 |
| RRIC 35          | 546—517                     | 28.6                 | 33.5  | 32.2 | 30.6 | 32.5 | 39.5 | 41.3 | 40.8 |
| PB 86            | 538—537                     | 27.2                 | —     | 32.9 | 31.0 | 28.0 | 37.2 | 43.6 | 39.8 |
| RRIC 37          | 481—395                     | 26.4                 | 28.8  | 23.0 | 28.4 | 25.3 | 36.4 | 42.1 | 38.2 |
| RRIC 32          | 576—567                     | 26.6                 | —     | 21.4 | 23.6 | 25.7 | 30.7 | 33.2 | 37.3 |
| RRIC 22          | 568—429                     | 29.2                 | 25.1  | 21.7 | 26.8 | 27.9 | 36.9 | 37.3 | 35.5 |
| RRIM 501         | 530—493                     | 26.7                 | 28.2  | 39.6 | 39.7 | 42.9 | 34.7 | 40.1 | 34.8 |
| PR 107 'K' block | 115—96                      | 22.6                 | —     | —    | 10.3 | 15.5 | 18.7 | 28.3 | 33.9 |
| RRIC 18          | 581—521                     | 28.0                 | 24.1  | 27.7 | 26.8 | 29.3 | 32.3 | 32.2 | 31.5 |
| PR 107 'H' block | 692—672                     | 25.8                 | —     | 31.8 | 25.6 | 24.0 | 24.7 | 25.1 | 29.2 |

Many commercial plantings have now confirmed the high-yielding capacity of clone RRIC 36. This clone is now recommended for large-scale planting in districts receiving an average annual rainfall of around 100 inches a year.

*Field Experiment No. 14 — 1955 Clone Trial — Hedigalla*

The clones in this trial are planted in unreplicated mono-clonal blocks of 750 trees per clone. Out of 12 RRIC clones originally planted the test tapping results of the better yielders are presented in Table 9.

TABLE 9

1955 LARGE-SCALE CLONE TRIAL — HEDIGALLA  
 Yield in grammes dry rubber per tree per tapping

| Year of tapping             | RRIC 40 | RRIC 50 | RRIC 41 | RRIC 13 | RRIC 46 | Mean |
|-----------------------------|---------|---------|---------|---------|---------|------|
| 1962                        | 28.5    | 17.7    | 30.3    | 30.3    | 31.1    | 27.6 |
| 1963                        | 32.4    | 33.2    | 31.3    | 33.1    | 36.0    | 33.2 |
| 1964                        | 42.0    | 38.4    | 35.0    | 34.8    | 36.2    | 37.3 |
| 1965                        | 45.4    | 40.3    | 40.1    | 45.5    | 45.8    | 43.4 |
| 1966                        | 46.2    | 59.5    | 46.2    | 48.3    | 55.9    | 51.2 |
| 1967                        | 58.5    | 58.5    | 45.4    | 54.1    | 54.8    | 54.3 |
| 1968                        | 44.7    | 49.9    | 47.6    | 59.1    | 45.6    | 49.4 |
| No. of trees tapped in 1968 | 404—369 | 458—449 | 510—495 | 561—534 | 188—156 |      |
| Girth in inches in 1968     | 29.0    | 27.0    | 26.5    | 26.5    | 24.9    |      |
| Bark Rot and canker cases   | 3       | —       | —       | —       | —       |      |
| Brown Bast cases            | 16      | —       | 2       | 3       | 4       |      |
| Wind damage cases           | 16      | 9       | 13      | 24      | 28      |      |

In this trial RRIC 13 has so far remained the best all round clone. Clones RRIC 13, 40, 41 and 50 are now recommended for small-scale commercial planting.

*Field Experiment No. 15 — 1953 Clone Trial — Nivitigalakele*

The clones RRIC 44 and 45 were originally planted in monoclonal blocks of 700 trees per clone. The clone RRIC 44 was later discarded owing to its undesirable secondary characters. The test tapping results of clone RRIC 45 for the first 7 years in tapping are given in Table 10.

TABLE 10  
1963 LARGE-SCALE CLONE TRIAL — NIVITIGALAKELE

Tapped on S/2, d/2, 100%  
Yield in lb dry rubber per tree per year

|                                | RRIC 45 |
|--------------------------------|---------|
| No. of trees tapped in 1968    | 554—538 |
| Yield in 1962                  | 8.9     |
| „ „ 1963                       | 10.2    |
| „ „ 1964                       | 10.6    |
| „ „ 1965                       | 10.5    |
| „ „ 1966                       | 11.0    |
| „ „ 1967                       | 12.1    |
| „ „ 1968                       | 13.2    |
| Brown Bast cases in 1968       | 39      |
| Bark Rot and canker cases 1968 | 3       |
| Wind damage cases 1968         | 44      |
| Mean girth in inches 1968      | 26.8    |
| Thickness of virgin bark in mm | 8.9     |

*Field Experiment No. 16 — 1956 Clone Trial — Hedigalla*

All clones are planted in monoclonal blocks of 300 trees per clone. Tapping commenced as individual trees reached tappable girth as follows:—

First tapped in July 1963 — RRIC 55, PB 86, IRCI, 5, 9, RRIM 603, 605, 612, 618, PR 228, 252, 257, AVROS 1191  
 „ „ „ March 1964 — RRIC 39, 48, 54, 59, PR 253, 258, RRIM 617, AVROS 1447  
 „ „ „ „ 1965 — PR 247  
 „ „ „ „ 1966 — TR 1406, RRIC 42, AVROS 1328 and 1851  
 „ „ „ Sept. 1966 — IRCI 1, 3, 6, PR 256.

The test tapping results are presented in Table 11.

TABLE 11

## 1956 LARGE-SCALE CLONE TRIAL — HEDIGALLA

Yield in grammes dry rubber per tree per tapping

| Clone       | No. of trees tapped in 1968 | Mean girth in inches | Yield |      |      |      |      |
|-------------|-----------------------------|----------------------|-------|------|------|------|------|
|             |                             |                      | 1964  | 1965 | 1966 | 1967 | 1968 |
| IRCI 9      | 189—192                     | 26.7                 | 23.7  | 31.7 | 38.8 | 36.5 | 38.0 |
| RRIC 55     | 191—196                     | 24.0                 | 22.2  | 29.7 | 35.1 | 43.7 | 37.6 |
| PR 247      | 174—179                     | 24.9                 | —     | 28.1 | 30.6 | 24.4 | 35.1 |
| RRIC 48     | 227—234                     | 23.1                 | 26.0  | 28.4 | 39.7 | 41.5 | 35.0 |
| PR 252      | 208—213                     | 25.1                 | 24.5  | 35.3 | 33.0 | 34.5 | 32.3 |
| AVROS 1447  | 136—153                     | 25.0                 | 17.3  | 22.8 | 35.2 | 35.3 | 31.9 |
| AVROS 1191  | 160—196                     | 23.6                 | 19.5  | 23.4 | 26.8 | 24.5 | 31.4 |
| RRIM 618    | 173—181                     | 25.6                 | 29.7  | 26.0 | 30.1 | 29.7 | 30.8 |
| RRIC 54     | 226                         | 24.0                 | 15.8  | 23.6 | 24.7 | 34.7 | 30.1 |
| PR 256**    | 144—154                     | 21.1                 | —     | —    | 20.8 | 20.4 | 30.0 |
| PR 228      | 255—258                     | 24.5                 | 18.8  | 22.8 | 29.7 | 32.0 | 29.0 |
| PR 257      | 193—196                     | 24.0                 | 29.5  | 29.4 | 29.2 | 28.4 | 28.5 |
| RRIC 59     | 171—210                     | 24.7                 | 13.9  | 19.2 | 24.2 | 26.0 | 28.2 |
| PR 253      | 205—247                     | 23.0                 | 25.7  | 20.3 | 28.1 | 28.7 | 27.8 |
| TR 1406     | 162—166                     | 21.9                 | —     | —    | 28.8 | 27.8 | 26.5 |
| AVROS 1851* | 193—206                     | 24.7                 | —     | —    | 21.2 | 22.0 | 26.4 |
| RRIC 39     | 201—208                     | 23.9                 | 21.7  | 25.3 | 30.7 | 31.1 | 26.1 |
| RRIC 42*    | 201—203                     | 24.5                 | —     | —    | 25.4 | 26.0 | 26.1 |
| PR 258      | 209—239                     | 23.0                 | 15.5  | 19.3 | 26.8 | 30.3 | 25.9 |
| PB 86       | 232—233                     | 27.8                 | 20.6  | 23.1 | 28.1 | 29.5 | 25.8 |
| IRCI 6**    | 160—164                     | 21.9                 | —     | —    | 16.5 | 19.3 | 25.2 |
| IRCI 1**    | 169—171                     | 21.9                 | —     | —    | 22.9 | 24.2 | 25.0 |
| IRCI 3**    | 195—199                     | 20.2                 | —     | —    | 21.8 | 22.0 | 23.4 |
| RRIM 605    | 203—208                     | 24.6                 | 14.7  | 15.7 | 22.4 | 28.1 | 22.0 |
| RRIM 612    | 247                         | 29.0                 | 9.8   | 17.7 | 21.7 | 24.8 | 21.9 |
| AVROS 1328* | 247—253                     | 22.5                 | —     | —    | 23.5 | 22.6 | 21.4 |
| IRCI 5      | 238                         | 23.3                 | 19.6  | 23.1 | 33.7 | 29.1 | 21.2 |
| RRIM 603    | 226—231                     | 24.8                 | 15.9  | 21.3 | 21.4 | 22.3 | 18.5 |
| RRIM 617    | 220—227                     | 25.8                 | 20.3  | 24.3 | 25.6 | 23.2 | 17.4 |

\* From March 1966

\*\* From Sept. 1966

Clones of particular interest in this trial are RRIC 48, 55, PR 252 and IRCI 9.

*Field Experiment No. 17 — 1956 Clone Trial — Dartonfield*

The clones GT 1, WR 101, AVROS 427 and 385 are planted at 300 trees per clone. 48 points of RRIC 52 are planted along the boundaries.

Clone RRIC 52 was first tapped in 1962. All other clones were first tapped in 1963.

Test tapping results are summarised in Table 12.

TABLE 12

1956 CLONE TRIAL — DARTONFIELD  
Yield in grammes dry rubber per tree per tapping

|                             | WR 101 | GT 1 | AVROS 385 | AVROS 427 | RRIC 52 |
|-----------------------------|--------|------|-----------|-----------|---------|
| No. of trees tapped in 1968 | 283    | 280  | 254       | 239       | 45      |
| Yield in 1963               | 22.7   | 15.6 | 7.5       | —         | 22.3    |
| „ „ 1964                    | 26.0   | 19.9 | 17.9      | 32.9      | 22.9    |
| „ „ 1965                    | 28.2   | 18.1 | 15.5      | 23.3      | 23.6    |
| „ „ 1966                    | 20.9   | 21.6 | 14.2      | 22.4      | 27.5    |
| „ „ 1967                    | 21.1   | 17.7 | 17.0      | 24.3      | 28.2    |
| „ „ 1968                    | 19.4   | 19.2 | 15.4      | 28.6      | 27.8    |

The high yield potential of AVROS 427 has been confirmed in other trials as well. However, this clone has been a relatively poor grower with a tendency to develop Bark Rot in the wet districts. Clone WR 101 is now recommended for small-scale commercial planting as this clone has been yielding well in another large-scale trial in the Kalutara District. Experimental evidence so far does not seem to indicate that clone GT 1 would yield well under Ceylon conditions.

*Field Experiment No. 18 — 1961 Large-Scale Clone Trial — Dartonfield*

This trial is sited in an area that had been replanted for the second time. All clones are planted in unreplicated mono-clonal blocks of 500 to 600 trees per clone. Tapping commenced in March 1968 and the yields for the first year in tapping are presented in Table 13.

TABLE 13

1961 LARGE-SCALE CLONE TRIAL — DARTONFIELD  
Tapped S/2, d/2, 100% from March 1968  
Yield in grammes per tree per tapping

|                               | RRIC 52 | RRIC 7 | RRIM 513 | RRIC 45 | PB 86 | RRIC 88 | PB 28/59 | RRIC 89 |
|-------------------------------|---------|--------|----------|---------|-------|---------|----------|---------|
| Girth in inches in 1968       | 24.9    | 20.3   | 20.3     | 20.3    | 18.1  | 22.7    | 18.7     | 18.4    |
| Trees tapped in 1968          | 407     | 280    | 342      | 307     | 207   | 374     | 251      | 170     |
| Yield in grammes tree/tapping | 10.9    | 27.3   | 21.3     | 17.6    | 21.5  | 15.4    | 29.1     | 26.7    |

*Field Experiment No. 25 — 1957 Clone Trial — Estate A — Kalutara District*

All clones are planted in mono-clonal blocks of 300 trees per clone. Test tapping results are presented in Table 14.

TABLE 14

SMALL-SCALE CLONE TRIAL — ESTATE A — KALUTARA DISTRICT

Test-tapped from March 1964

Yield in grammes dry rubber per tree per tapping

| Clone     | Girth in inches 1968 | No. of trees tapped in 1968 | Yield |      |      |      |      |
|-----------|----------------------|-----------------------------|-------|------|------|------|------|
|           |                      |                             | 1964  | 1965 | 1966 | 1967 | 1968 |
| IRCI 2    | 25.3                 | 248—250                     | 21.0  | 27.1 | 26.8 | 40.2 | 40.8 |
| TR 1406   | 26.9                 | 260—265                     | 26.5  | 28.2 | 28.7 | 38.5 | 33.3 |
| IRCI 3    | 23.0                 | 202—205                     | 23.8  | 23.7 | 31.0 | 38.3 | 31.9 |
| RRIM 607  | 25.7                 | 270                         | 25.2  | 24.8 | 22.1 | 29.3 | 30.1 |
| AVROS 529 | 24.6                 | 294—290                     | 16.7  | 19.0 | 20.4 | 23.7 | 27.3 |
| PB 86     | 23.9                 | 250—255                     | 17.5  | 17.3 | 16.4 | 23.1 | 25.8 |
| Mean      | 24.9                 | —                           | 21.8  | 23.4 | 24.2 | 32.1 | 31.5 |

*Field Experiment No. 26 — 1957 Clone Trial — Estate B — Kalutara District*

- (a) 10 acres — Five clones planted at 300 trees per clone  
 (b) 20 acres — Eleven clones planted at 300 trees per clone

The yields of clones under test compared with that of clone PB 86 are presented in Tables 15 and 16.

TABLE 15

1957 CLONE TRIAL — ESTATE B — KALUTARA DISTRICT (10 ACRES)

Tapped from April 1964

Yield in grammes dry rubber per tree per tapping

| Clone      | Average girth in inches 1968 | No. of trees tapped in 1968 | Yield |      |      |      |      |
|------------|------------------------------|-----------------------------|-------|------|------|------|------|
|            |                              |                             | 1964  | 1965 | 1966 | 1967 | 1968 |
| AVROS 1734 | 28.0                         | 200—201                     | 35.6  | 40.5 | 39.7 | 36.7 | 46.6 |
| AVROS 2037 | 28.9                         | 204—206                     | 21.1  | 20.6 | 23.6 | 36.1 | 36.2 |
| PB 86      | 25.0                         | 213—210                     | 23.9  | 23.6 | 29.1 | 33.6 | 32.1 |
| PR 254     | 25.9                         | 252—249                     | 19.0  | 19.6 | 28.4 | 33.5 | 31.0 |
| TR 1548    | 29.1                         | 204—200                     | 22.0  | 23.9 | 24.1 | 23.2 | 27.0 |
| RRIM 612   | 30.6                         | 212—226                     | 19.8  | 24.8 | 28.2 | 28.6 | 26.0 |
| Mean       | 27.9                         | —                           | 23.6  | 25.5 | 28.8 | 32.0 | 33.2 |

TABLE 16

1957 CLONE TRIAL — ESTATE B — KALUTARA DISTRICT (20 ACRES)

Tapped on S/2, d/2, 100%

(First tapped in March 1966)

Yield in grammes dry rubber per tree per tapping

| Clone     | Average girth in inches 1968 | No. of trees tapped in 1968 | Yield  |        |        |        |        |
|-----------|------------------------------|-----------------------------|--------|--------|--------|--------|--------|
|           |                              |                             | 1964   | 1965   | 1966   | 1967   | 1968   |
| RRIC 61*  | 25.4                         | 232—218                     | 19.9   | 23.3   | 33.5   | 49.4   | 51.9   |
| RRIM 623  | 27.4                         | 248—502                     | 29.8   | 33.3   | 39.3   | 32.1   | 38.9   |
| RRIC 75   | 29.8                         | 185—175                     | 21.7   | 18.4   | 26.7   | 26.8   | 35.7   |
| WR 101    | 26.3                         | 196—213                     | 22.0   | 19.1   | 28.2   | 37.0   | 32.4   |
| RRIM 603  | 27.7                         | 205—188                     | 19.6   | 19.1   | 25.9   | 29.2   | 31.5   |
| RRIC 76   | 25.2                         | 265—257                     | 17.8   | 20.4   | 27.2   | 33.1   | 31.3   |
| TR 1542*  | 24.7                         | 221                         | 16.8   | 15.7   | 19.2   | 27.5   | 30.6   |
| RRIM 622  | 25.3                         | 189—192                     | 21.3   | 19.1   | 19.6   | 26.1   | 30.2   |
| PR 248    | 26.8                         | 228—234                     | 17.2   | 18.0   | 20.1   | 21.5   | 26.9   |
| RRIM 602  | 26.3                         | 263—266                     | 15.4   | 14.4   | 21.2   | 19.9   | 24.9   |
| RRIC 60   | 25.9                         | 245—251                     | 12.4   | 15.3   | 19.9   | 22.9   | 17.6   |
| PB 86 (1) | } 24.9                       | 265—267                     | } 18.0 | } 19.9 | } 23.4 | } 25.7 | } 27.2 |
| „ (2)     |                              | 261—260                     |        |        |        |        |        |
| „ (3)     |                              | 228—233                     |        |        |        |        |        |
| Mean      | 26.3                         |                             | 19.3   | 19.7   | 25.4   | 29.3   | 31.6   |

\* Tapped on S/2, d/3, 67% from March 1967.

Clone AVROS 1734 has good vegetative characters and should be suitable for planting particularly in the wet districts.

Clone RRIC 61 has been very susceptible to Bark Rot. Clone WR 101 is now recommended for small-scale planting in estates.

*Field Experiment No. 27 — 1958 Clone Trial — Estate B — Kalutara District*

All clones in this trial are planted at 300 trees per clone. Test tapping results for the first 4 years in tapping are presented in Table 17.

TABLE 17

1958 CLONE TRIAL — ESTATE B — KALUTARA DISTRICT (30½ ACRES)

Tapped on S/2, d/2, 100% from April 1965

Yield in grammes dry rubber per tree per tapping

| Clone     | Average girth in inches 1968 | No. of trees tapped in 1968 | Yield  |        |        |        |
|-----------|------------------------------|-----------------------------|--------|--------|--------|--------|
|           |                              |                             | 1965   | 1966   | 1967   | 1968   |
| RRIC 36   | 26.5                         | 205                         | 24.1   | 27.9   | 27.6   | 29.4   |
| IRCI 6    | 26.3                         | 208—210                     | 16.2   | 19.2   | 24.5   | 29.1   |
| RRIC 45   | 23.4                         | 257—260                     | 17.1   | 22.1   | 28.1   | 28.3   |
| IRCI 2    | 22.6                         | 263—265                     | 19.0   | 21.7   | 26.2   | 27.9   |
| RRIC 55   | 23.3                         | 178—182                     | —      | 32.7   | 31.7   | 27.4   |
| RRIC 39   | 26.1                         | 215—210                     | 20.4   | 19.9   | 22.2   | 27.1   |
| AVROS 427 | 21.1                         | 261—268                     | 29.6   | 37.1   | 40.1   | 26.8   |
| RRIM 605  | 23.0                         | 268—270                     | 21.7   | 22.5   | 27.9   | 23.9   |
| RRIC 28   | 23.3                         | 215                         | 19.5   | 19.9   | 22.1   | 23.7   |
| RRIC 41   | 25.5                         | 255—252                     | 18.2   | 19.5   | 22.1   | 23.3   |
| RRIC 22   | 25.5                         | 255                         | 17.4   | 19.7   | 20.7   | 22.2   |
| RRIM 607  | 26.6                         | 288—232                     | 20.3   | 19.5   | 21.9   | 21.9   |
| WJ 1      | 24.7                         | 221—228                     | 17.7   | 21.9   | 21.3   | 21.5   |
| GT 1      | 24.0                         | 295—296                     | 13.3   | 16.6   | 21.0   | 19.6   |
| RRIC 37   | 23.1                         | 218—224                     | 16.3   | 20.2   | 19.4   | 18.8   |
| RRIC 54   | 25.0                         | 213—215                     | 17.3   | 20.1   | 19.4   | 18.8   |
| RRIC 52   | 28.4                         | 263—257                     | 13.8   | 15.0   | 15.1   | 16.0   |
| AVROS 385 | 26.9                         | 272                         | 11.1   | 11.6   | 13.4   | 13.6   |
| PB 86 (1) | } 23.7                       | 212—215                     | } 17.6 | } 22.9 | } 22.9 | } 22.6 |
| „ (2)     |                              | 243—245                     |        |        |        |        |
| „ (3)     |                              | 237—235                     |        |        |        |        |
| „ (4)     |                              | 231—240                     |        |        |        |        |
| Mean      | 24.7                         |                             | 18.4   | 21.6   | 23.6   | 23.8   |

Clones RRIC 55 and IRCI 2 are among the newer selections from this trial that are recommended for small-scale planting in estates.

*Field Experiment No. 28 — 1957/58 Clone Trial — Estate C — Kalutara District*

Test tapping results of a selection of clones in a commercial plantation in the Kalutara District are presented in Table 18.

TABLE 18

CLONE TRIAL — COMMERCIAL ESTATES—KALUTARA DISTRICT — ESTATE C

Tapped on S/2, d/2, 100% from September 1963

Yield in grammes dry rubber per tree per tapping

| Clone                                | No. of trees tapped in 1968 | Yield |      |      |      |      | Girth in inches | Remarks                 |
|--------------------------------------|-----------------------------|-------|------|------|------|------|-----------------|-------------------------|
|                                      |                             | 1964  | 1965 | 1966 | 1967 | 1968 |                 |                         |
| <i>Division 1</i><br>(1957 clearing) |                             |       |      |      |      |      |                 |                         |
| RRIC 36                              | 185—182                     | 31.9  | 34.5 | 36.6 | 44.6 | 52.5 | 26.0            | Tapped on S/2, d/3, 67% |
| IRCI 7                               | 215—210                     | 28.1  | 33.8 | 35.7 | 40.9 | 38.3 | 26.9            |                         |
| RRIC 7                               | 181—178                     | 29.7  | 27.1 | 38.4 | 39.4 | 35.5 | 24.9            |                         |
| RRIC 37                              | 195—194                     | 28.4  | 28.8 | 30.5 | 37.0 | 32.9 | 23.0            | Tapped on S/2, d/3, 67% |
| RRIC 45                              | 275—260                     | 23.6  | 24.5 | 29.5 | 34.0 | 31.8 | 23.7            |                         |
| RRIC 41                              | 243—240                     | 28.6  | 24.2 | 29.5 | 34.0 | 29.7 | 24.8            |                         |
| RRIC 5                               | 215—212                     | 22.8  | 26.1 | 28.7 | 40.8 | 27.9 | 25.3            |                         |

**Immature Areas**

*Field Experiment No. 19 — 1962 Large-Scale Clone Trial — Nivitigalakele*

The clones IAN 45-717, PB 86, RRIC 5, 39, 51, 86, 90, 91, 92, 93, 94, 95, 96, 97, RRIM 623, 628 and 701 are planted in plots of 150 trees per clone.

Within a 150-tree plot the following clones are planted at approximately 10 trees per clone:—

Clone Nos. 82, 566, 759, 815, 1009, 1103, 1317, 1458, Harbel 1, IAN 6497, PB 28/59, RRIC 7, 36, 45, 52, RRIM 607 and 707.

The average girth figures of the various clones in the 6th and 7th years of growth are summarised in Tables 19 and 20.

TABLE 19

## 1962 LARGE-SCALE CLONE TRIAL — NIVITIGALAKELE

Average girth in inches

| Clone      | No. of trees<br>1968 | Average girth |      | Girth increase |         |
|------------|----------------------|---------------|------|----------------|---------|
|            |                      | 1967          | 1968 | 1966/67        | 1967/68 |
| RRIC 95    | 115                  | 20.5          | 23.4 | 3.6            | 2.9     |
| RRIC 91    | 128                  | 20.3          | 23.0 | 3.5            | 2.7     |
| RRIC 39    | 125                  | 18.7          | 22.1 | 3.2            | 3.4     |
| RRIC 5     | 118                  | 18.9          | 22.0 | 3.0            | 3.1     |
| IAN 45—717 | 137                  | 17.7          | 21.0 | 3.4            | 3.3     |
| RRIC 86    | 129                  | 17.9          | 20.4 | 2.9            | 2.5     |
| RRIM 701   | 138                  | 17.9          | 20.2 | 2.9            | 2.3     |
| RRIM 623   | 100                  | 17.6          | 20.0 | 2.5            | 2.4     |
| RRIC 96    | 133                  | 17.4          | 20.0 | 3.1            | 2.6     |
| RRIC 94    | 141                  | 16.8          | 19.2 | 2.8            | 2.4     |
| RRIC 93    | 136                  | 16.6          | 19.2 | 2.7            | 2.6     |
| RRIC 92    | 125                  | 16.3          | 19.1 | 2.8            | 2.8     |
| RRIM 628   | 129                  | 16.0          | 18.9 | 2.6            | 2.9     |
| PB 86      | 134                  | 15.5          | 18.6 | 2.6            | 3.1     |
| RRIC 51    | 133                  | 15.6          | 18.3 | 3.0            | 2.7     |
| RRIC 97    | 143                  | 14.1          | 17.1 | 3.1            | 3.0     |
| RRIC 90    | 140                  | 14.1          | 16.9 | 2.8            | 2.8     |

TABLE 20

## 1962 SMALL-SCALE CLONE TRIAL — NIVITIGALAKELE

Average girth in inches

| Clone      | No. of trees | Average girth |      | Girth increase |         |
|------------|--------------|---------------|------|----------------|---------|
|            |              | 1967          | 1968 | 1966/67        | 1967/68 |
| No. 82     | 8            | 22.5          | 23.0 | 4.2            | 0.5     |
| RRIC 52    | 8            | 20.7          | 22.0 | 4.1            | 1.3     |
| No. 759    | 10           | 20.2          | 21.8 | 4.7            | 1.6     |
| No. 1317   | 10           | 20.3          | 21.5 | 4.0            | 1.2     |
| PB 28/59   | 6            | 20.5          | 21.0 | 3.2            | 0.5     |
| No. 1009   | 10           | 20.1          | 20.8 | 3.4            | 0.7     |
| No. 815    | 10           | 19.2          | 20.8 | 3.9            | 1.6     |
| RRIM 607   | 8            | 17.6          | 20.8 | 4.7            | 3.2     |
| RRIM 707   | 10           | 18.6          | 20.8 | 3.0            | 2.2     |
| No. 566    | 10           | 18.7          | 20.6 | 4.1            | 1.9     |
| RRIC 45    | 10           | 18.9          | 20.4 | 4.0            | 1.5     |
| No. 1103   | 10           | 20.1          | 20.4 | 3.2            | 0.3     |
| No. 1458   | 9            | 19.4          | 20.0 | 2.7            | 0.6     |
| RRIM 628   | 10           | 16.1          | 19.8 | 3.1            | 3.7     |
| RRIC 7     | 8            | 17.3          | 19.1 | 3.0            | 1.8     |
| RRIM 707   | 9            | 17.2          | 18.6 | 3.4            | 1.4     |
| AVROS 6497 | 8            | 15.9          | 18.2 | 3.1            | 2.3     |
| RRIC 36    | 10           | 16.3          | 17.7 | 2.8            | 1.4     |
| Harbel 1   | 9            | 14.9          | 16.5 | 3.0            | 1.6     |

*Field Experiment No. 20 — 1963 Clone Trial — Nivitigalakele*

The clones RRIC 59, 60, 64, 75 and PB 86 were planted at 300 trees per clone while clones RRIC 6, 39, 41 and 98 were planted at 150 trees per clone. The average girth of clones at 4 and 5 years of age are summarised in Table 21.

TABLE 21  
1963 LARGE-SCALE CLONE TRIAL — NIVITIGALAKELE  
Average girth in inches

| Clone   | Girth |      | Girth increase in inches |         |
|---------|-------|------|--------------------------|---------|
|         | 1967  | 1968 | 1966/67                  | 1967/68 |
| RRIC 41 | 13.9  | 18.4 | 4.5                      | 4.5     |
| RRIC 60 | 10.9  | 14.7 | 3.7                      | 3.8     |
| RRIC 39 | 10.9  | 14.2 | 3.6                      | 3.3     |
| RRIC 6  | 10.9  | 14.1 | 3.5                      | 3.2     |
| RRIC 64 | 10.1  | 14.0 | 3.3                      | 3.9     |
| RRIC 75 | 10.3  | 12.1 | 3.6                      | 1.8     |
| PB 86   | 9.2   | 12.1 | 2.6                      | 2.9     |
| RRIC 98 | 8.5   | 11.2 | 2.8                      | 2.7     |
| RRIC 59 | 7.0   | 10.2 | 1.1                      | 3.2     |

*Field Experiment No. 21 — 1964 Yield Trial — Nivitigalakele*

In this trial, established in 1964, the clones RRIC 41, 45, 52 and 86 are planted in plots of 106 trees per clone replicated 3 times. The average rate of girthing of clones at the end of the 3rd and 4th years of growth are summarised in Table 22.

TABLE 22  
1964 LARGE-SCALE CLONE TRIAL — NIVITIGALAKELE  
Average girth in inches

| Clone   | No. of trees in 1968 | Girth |      | Girth increase 1967/68 |
|---------|----------------------|-------|------|------------------------|
|         |                      | 1967  | 1968 |                        |
| RRIC 41 | 230                  | 9.8   | 14.2 | 4.4                    |
| RRIC 86 | 233                  | 9.3   | 13.7 | 4.4                    |
| RRIC 52 | 269                  | 10.3  | 15.6 | 5.3                    |
| RRIC 45 | 262                  | 9.6   | 13.9 | 4.3                    |

*Field Experiment No. 22 — 1965 Clearing — Nivitigalakele*

10 acres of clone RRIC 45 were planted in 1965 to be used in tapping experiments. The trees have reached an average girth of 10.5 inches in 1968.

*Field Experiment No. 23 — 1965 Small-Scale Clone Trial — Dartonfield*

Clones RRIC 45, 88, 89, 90, 91 and RRIM 600 are planted in plots of 50 trees per clone replicated 3 times.

The average girth measurements of clones in the 3rd year of growth are presented in Table 23.

TABLE 23  
1965 REPLANTED AREA — DARTONFIELD  
Average girth in inches

| Clone    | No. of trees 1968 | Girth    |         |         | Mean |
|----------|-------------------|----------|---------|---------|------|
|          |                   | Block 1  | Block 2 | Block 3 |      |
| RRIC 91  | 121               | 8.8      | 9.3     | 9.2     | 9.1  |
| RRIC 45  | 135               | 9.5      | 9.5     | 7.6     | 8.9  |
| RRIC 89  | 124               | 8.1      | 9.0     | 7.5     | 8.2  |
| RRIC 88  | 140               | 8.4      | 8.8     | 7.8     | 8.3  |
| RRIM 600 | 139               | 7.9      | 8.0     | 7.1     | 7.7  |
| RRIC 90  | 138               | 6.8      | 7.6     | 5.9     | 6.8  |
|          | 797               | Mean 8.2 | 8.7     | 7.5     | 8.1  |

*Field Experiment No. 24 — 1965 Spacing Trial — Kuruwita*

The 3 clones RRIC 41, 45 and 52 were planted in 1965 at spacings of 8' × 30' and 12' × 20' for each clone. Each plot consists of 150 trees replicated 3 times. The average girth of trees in 1968 for the two spacings are summarised in Table 24.

TABLE 24  
1965 SPACING TRIAL — KURUWITA  
Average girth in inches in 1968

| Clone   | Spacing  |           |
|---------|----------|-----------|
|         | 8' × 30' | 12' × 20' |
| RRIC 45 | 10.8     | 10.7      |
| RRIC 52 | 9.9      | 10.5      |
| RRIC 41 | 10.7     | 10.9      |
| Total   | 31.4     | 32.1      |
| Mean    | 10.5     | 10.7      |

The incidence of wind damage in RRIC 52 has so far been 4.2 per cent in plots spaced at 12' × 20' as compared with 1.9 per cent in plots spaced at 8' × 30'.

*Field Experiment No. 29 — 1964 Yield Trial — Salawa Estate*

The clones RRIC 45, 88, 86 and Nab 15 are planted in 150-tree plots replicated 3 times. The girth measurements of clones in 1967 and 1968 are summarised in Table 25.

TABLE 25  
1964 YIELD TRIAL — COMMERCIAL ESTATES (SALAWA ESTATE)

Average girth in inches

|                           | Nab 15 |      | RRIC 45 |      | RRIC 86 |      | RRIC 88 |      |
|---------------------------|--------|------|---------|------|---------|------|---------|------|
|                           | 1967   | 1968 | 1967    | 1968 | 1967    | 1968 | 1967    | 1968 |
| Block 1                   | 11.4   | 16.7 | 12.0    | 16.1 | 8.9     | 13.3 | 10.4    | 14.3 |
| Block 2                   | 12.2   | 15.5 | 11.2    | 15.2 | 11.5    | 15.3 | 10.7    | 14.3 |
| Block 3                   | 9.9    | 14.5 | 11.9    | 15.4 | 11.0    | 14.8 | 10.0    | 13.8 |
| Mean                      | 11.2   | 15.6 | 11.7    | 15.6 | 10.5    | 14.5 | 10.4    | 14.1 |
| Girth increase<br>1967/68 | 4.4    |      | 3.9     |      | 4.0     |      | 3.7     |      |

*Field Experiment No. 33 — 1962 Clone Trial — Estate D — Kalutara District*

The clones RRIC 7, 45, 52 and IRCI 7 are planted in monoclonal blocks of 1,800 trees per clone. The girth measurements of clones in this trial are summarised in Table 26.

TABLE 26  
1962 LARGE-SCALE CLONE TRIAL — KALUTARA DISTRICT

Average girth in inches

|              | RRIC<br>52<br>girth | Girth<br>increase | RRIC<br>45<br>girth | Girth<br>increase | RRIC<br>7<br>girth | Girth<br>increase | IRCI<br>7<br>girth | Girth<br>increase |
|--------------|---------------------|-------------------|---------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| 1964 (Sept.) | 7.1                 | —                 | 4.9                 | —                 | 3.6                | —                 | 5.4                | —                 |
| 1965 ( „ )   | 10.0                | 2.9               | 8.0                 | 3.1               | 5.8                | 2.2               | 9.1                | 3.7               |
| 1966 ( „ )   | 14.9                | 4.9               | 11.1                | 3.1               | 8.0                | 2.2               | 13.0               | 3.9               |
| 1967 ( „ )   | 19.2                | 4.3               | 15.2                | 4.1               | 12.0               | 4.0               | 17.2               | 4.2               |
| 1968 ( „ )   | 21.8                | 2.6               | 17.6                | 2.4               | 14.5               | 2.5               | 19.7               | 2.5               |

*Field Experiment No. 36 — 1966 Yield Trial — 10 Acres — Malaboda Estate — Matugama*

Clones RRIC 45, 86, 88 and RRIM 701 are planted at 135 trees per plot replicated 3 times.

*Field Experiment No. 37 — 1966 Yield Trial — 10 Acres — Udapolla Group — Deraniyagala*

Clones RRIC 5, 45, Nab 15 and RRIM 701 are planted at 150 trees per plot replicated 3 times.

*Field Experiment No. 38 — 1966 Yield Trial — 10 Acres — Kiribatgalla Group — Nivitigala*

Clones RRIC 45, 88, 91 and AVROS 427 are planted at 134 trees per plot replicated 3 times.

*Field Experiment No. 39 — 1966 Yield Trial — 15 Acres — Halgolle Group — Yatiyantota*

Clones RRIC 45, RRIM 605 and 701 are planted at 250 trees per plot replicated 3 times.

*Field Experiment No. 40 — 1966 Yield Trial — 10 Acres — Biddescar Group — Kegalla*

Clones RRIC 36, 41, 45 and RRIM 605 are planted at 150 trees per plot replicated 3 times.

*Field Experiment No. 41 — 1966 Yield Trial — 20 Acres — Yatawatta Estate — Matale*

Clones RRIC 36, 41, 86 and PB 86 are planted at 265 trees per plot replicated 3 times.

*Field Experiment No. 42 — 1966 Yield Trial — 34 Acres — Kumarawatta Group — Moneragala*

Clones PB 86, RRIC 5, 45, 36 and 88 are planted at 290 trees per plot replicated 4 times.

*Field Experiment No. 44 — 1967 Yield Trial — 10 Acres — Biddescar Group — Polgahawela*

Clones RRIC 36, 45, 89 and RRIM 600 are planted in 135-tree plots replicated 3 times.

*Field Experiment No. 45 — 1967 Yield Trial — 10 Acres — Zion Estate — Rattota*

Clones RRIC 36, 45, 89 and PB 86 are planted in 175-tree plots replicated 3 times.

*Field Experiment No. 46 — 1967 Polyclone Trial — 2½ Acres — Hedigalla*

Approximately 2½ acres are planted with clones RRIC 41, 45, 86, 88 and 89. The buddings are planted at random in order to study the effects of clonal competition on growth and yield.

**Intercropping Trials**

Two intercropping trials were set down in 1964 and 1965 in order to investigate the economics of interplanting rubber with cacao in the drier districts where climatic conditions are not very favourable for high yields in rubber.

*Field Experiment No. 30 — 1964 Trial — 15 Acres — Rosebury Estate — Koslanda*

Clones RRIC 45, 52 and PR 107 were planted in plots of 300 trees per clone replicated 3 times. Half of each plot was interplanted with cacao seedlings in 1967. The average girth measurements of clones at the end of 4 years from planting are presented in Table 27.

TABLE 27

1964 INTERCROPPING TRIAL — ROSEBURY ESTATE

| Clone   | Number of trees | Average girth (inches) |
|---------|-----------------|------------------------|
| RRIC 52 | 825             | 7.3                    |
| RRIC 45 | 795             | 6.0                    |
| PR 107  | 808             | 6.0                    |

There has so far been no wind damage in clone RRIC 52 in this trial, probably due to the relatively slower rate of growth of rubber in these parts of the island.

*Field Experiment No. 31 — 1965 Trial — 15 Acres — Redegama Estate — Rambodagalla*

Clones RRIC 36, 45 and PB 86 are planted at 300 trees per plot replicated 3 times. Half of each plot will be interplanted with cacao at a later stage.

**Stock Experiments**

*Field Experiment No. 34 — Small-Scale Stock Experiment — Nivitigalakele*

In this first small-scale trial planted in 1966, clone PB 86 was budded on seedling stocks of clones RRIC 7, 41, 52, 86, 88, 89 and *Hevea spruceana*. The buddings were planted at random in the field. The average girth of these buddings at the end of 2½ years growth are presented in Table 28.

TABLE 28

SMALL-SCALE STOCK EXPERIMENT — NIVITIGALAKELE

| Type of stock       | Average girth (inches) |
|---------------------|------------------------|
| Tjir 1              | 8.4                    |
| RRIC 7              | 9.5                    |
| RRIC 41             | 9.0                    |
| RRIC 52             | 8.8                    |
| RRIC 86             | 8.1                    |
| RRIC 88             | 8.5                    |
| RRIC 89             | 8.4                    |
| <i>H. spruceana</i> | 7.0                    |

*Field Experiment No. 47 — Small-Scale Stock Experiment — Nivitigalakele*

In this trial, seedling stocks of clones RRIC 7, 41, 52, 86, G1 1, Wagga 6278 and Tjir 1 were budgrafted with clone RRIC 45. The buddings were planted at random in the field in 1968.

### Other Investigations

*Field Establishment of Buddings in the Dry Planting Districts*

A small-scale experiment was carried out at Rosebury Estate, Koslanda in order to assess the growth rate under field conditions of the following two types of planting material:—

- (a) Brown buddings grown in polythene bags for 6 months before planting
- (b) Bare root budded stumps

The growth rate of these buddings was measured during the first year as height above the graft union. At the end of 10 months growth the average height of buddings planted as bare root budded stumps was 46.1 inches as compared with 42.0 inches for those transplanted from polythene bags. This was observed to be mainly due to the greater set back to growth of buddings transplanted from polythene bags, during the long dry intermonsoon period.

*Green Buddings*

In an experiment to compare green buddings with the conventional type of brown buddings that are most commonly planted in Ceylon, the following types of buddings were planted in groups of five distributed at random in nursery beds at Dartonfield.

- (A) Green buddings grown in polythene bags for 2 months
- (B) Green buddings planted in soil cores
- (C) Green buddings planted bare root
- (D) Brown buddings grown in polythene bags for 4 months
- (E) Brown buddings planted bare root

Although these were planted at the beginning of the S.W. monsoon period the survival in the field was only 54 per cent for green buddings transplanted in soil cores as compared with 100 per cent for types A, D and E and 88 per cent for C. Under the particular weather conditions that prevailed during the S. W. monsoon period in the Kalutara District, green buddings planted bare root had a higher survival rate than those planted in soil cores. The rather poor establishment of green buddings in soil cores in this instance may partly be attributed to the relatively low clay content in the soil. Green buddings planted bare root were observed to sprout earlier than brown buddings.

#### *Regeneration of Roots in Budded Stumps*

In brown buddings planted bare root in the field, regeneration of new roots was observed to occur about 4 to 5 weeks after sprouting. It should therefore be possible to grow budded stumps in a narrower type of polythene bag for a period of about 2 months before transplanting in the field. In dry districts where the rainy season is relatively short the use of sprouted budded stumps could reduce deaths due to dormancy and delayed sprouting, after field planting, of brown buddings.

#### **Index to Field Experiments**

##### *Field Experiment No.*

- (2) Yield Stimulation and Tapping Experiment — Clone Tjir 16
- (4) Winter Tapping cum Yield Stimulation Trial — Dartonfield
- (5) Large-Scale Clone Trial — 1946 Replanted Area — Nivitigalakele
- (6) 1952 Small-Scale Clone Trial — Hedigalla
- (7) 1954 Clone Trial — Nivitigalakele
- (11) 1951 Small-Scale Clone Trial — Hedigalla
- (12) 1949 Large-Scale Clone Trial — Hedigalla
- (13) 1954 Large-Scale Clone Trial — Hedigalla
- (14) 1955 Large-Scale Clone Trial — Hedigalla
- (15) 1953 Large-Scale Clone Trial — Nivitigalakele
- (16) 1956 Large-Scale Clone Trial — Hedigalla
- (17) 1956 Clone Trial — Dartonfield
- (18) 1961 Large-Scale Clone Trial — Dartonfield
- (19) 1962 Large-Scale Clone Trial — Nivitigalakele
- (20) 1963 Large-Scale Clone Trial — Nivitigalakele
- (21) 1964 Yield Trial — Nivitigalakele
- (22) 1965 Ten-Acre Monoclonal Block of RRIC 45 — Nivitigalakele
- (23) 1965 Small-Scale Clone Trial — Dartonfield
- (24) 1965 Spacing Trial — Kuruwita Sub-station
- (25) 1957 Clone Trial — Estate A — Kalutara District
- (26) 1957 Clone Trial — Estate B — Kalutara District
- (27) 1958 Clone Trial — Estate B — Kalutara District
- (28) 1957/58 Clone Trial — Estate C — Kalutara District
- (29) 1964 Yield Trial — Salawa Estate

- (30) 1964 Yield/Intercropping Trial — Rosebury Estate — Koslanda
  - (31) 1965 Yield/Intercropping Trial — Redegama Estate — Rambodagalla
  - (33) 1962 Large-Scale Clone Trial — Estate D — Kalutara District
  - (34) 1966 Small-Scale Stock Experiment — Nivitigalakele
  - (36) 1966 Yield Trial — 10 Acres — Malaboda Estate — Matugama
  - (37) 1966 Yield Trial — 10 Acres — Udapolla Group — Deraniyagala
  - (38) 1966 Yield Trial — 10 Acres — Kiribatgalla Group — Nivitigala
  - (39) 1966 Yield Trial — 15 Acres — Halgolle Group — Yatiyantota
  - (40) 1966 Yield Trial — 10 Acres — Biddescar Group — Kegalla
  - (41) 1966 Yield Trial — 20 Acres — Yatawatta Estate — Matale
  - (42) 1966 Yield Trial — 34 Acres — Kumarawatta Group — Moneragala
  - (44) 1967 Yield Trial — 10 Acres — Biddescar Group — Polgahawela
  - (45) 1967 Yield Trial — 10 Acres — Zion Estate — Rattota
  - (46) 1967 Polyclone Trial — 2½ Acres — Hedigalla
  - (47) 1968 Small-Scale Stock Experiment — Nivitigalakele.
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# REVIEW OF THE GENETICS & PLANT BREEDING DEPARTMENT

By

D. M. FERNANDO

## SUMMARY

Cytological studies on microsporogenesis of RRIC 45, 88 and 89 were completed by the Geneticist. Other studies included the sex ratios of *H. brasiliensis* cultivars, cytological studies of interspecific hybrids of *Hevea* and the colchicine treatment of *H. brasiliensis* seedlings. Anatomical studies revealed epidermal characteristics which could differentiate three *Hevea* species.

The hand pollination programme recorded a very low percentage of success following an attempt to test the oil content of cotyledons at an early stage. More plants of RRIC 100 and RRIC 101 were established in the Hedigalla nursery for distribution to estates. The yields of RRIC 100 at Kuruwita were remarkable and lowered tapping intensity appears advisable on large-scale plantings of this clone. The yields of RRIC 101 dropped when the intensity was increased in 1968. The *Oidium*-resistant clone 1103 showed favourable growth, yield and response to early tapping at both Nivitigalakele and Kuruwita. Five more trials were planted at Kuruwita, Tummodera, Hedigalla, Bibile and Matala.

## DETAILED REVIEW

### Staff

Mr. D. M. Fernando, Head of Department, was on duty throughout the year and was in Malaysia for one month in August where a paper was read at the 1968 Natural Rubber Conference sponsored by the Rubber Research Institute of Malaya. Dr. Y. D. A. Senanayake, Geneticist, was on duty throughout the year.

### Buildings and Facilities

No progress was made in extending the buildings. A continuous electricity supply at Nivitigalakele was maintained at the beginning of the year but was interrupted towards the end of the year by the failure of one engine.

### Visits

The Head of the Department made 28 visits in connection with experimental work. The Geneticist made 24 visits and 297 visits were made by the rest of the staff during the year in connection with experimental work.

## Meetings

The writer attended two Kalutara District Planters' Association meetings, two Kelani Valley District Planters' Association meetings and two Sabaragamuwa District Planters' Association meetings. The Geneticist addressed the officers of the Smallholdings Department on their Field Day on the breeding of *Hevea*.

## Publications

The following publications were prepared by the staff of the department in 1968.

- (1) Annual Review of the Department for 1967
- (2) Annual Report of the Department for 1967
- (3) Fernando, D. M. Breeding for multiple characters of economic importance in *Hevea* — preliminary assessments of recent selections. *J. Rubb. Res. Inst. Malaya* **21**, 27 - 37.
- (4) Senanayake, Y.D.A. Cytogenetics of *Hevea*. I—A leaf squash technique for chromosome counts and its importance in *Hevea* breeding. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 1 - 7.
- (5) Senanayake, Y. D. A. and R. T. Wijewantha. Synthesis of *Hevea* cultivars : a new approach. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 16 - 26.
- (6) Fernando, D. M. and P. Samaranayake. The deterioration of rubber in samples of *Hevea* tissues. *Rubb. Res. Inst. Ceylon Quart. J.* **44**, 31 - 33.

The Geneticist also collaborated in editing the following publications of the Institute in 1968.

*Rubb. Res. Inst. Ceylon Quart. J.* **44**, (Parts 1 & 2); 1968.  
*R.R.I.C. Bulletin* (New Series) **3**, (1 & 2); 1968.

## Laboratory Investigations

These investigations were handled by the Geneticist and were as follows :—

### *Microsporogenesis of Hevea brasiliensis Cultivars*

Since senile populations of the clone Tjir 1 (which has been the principal source of seed for rootstocks) are decreasing rapidly, the possibility of using seed from existing recommended clones is being investigated by the Botany Department. Certain clones like RRIC 41, 45, 88 and 89 are reputed to be poor seed bearers. Breeders have also recognized the tendency for low seeding in vigorous high-yielding cultivars. Low seeding could reduce the availability of seeds of certain cultivars in the future. The possibility of exploiting rubber seed for future, industrial needs is also evident. Since seed set and the frequency of seeds are determined by numerous genetical, morphological, cytological and physiological factors, a programme of work was initiated to study some of these factors in order to identify any abnormalities if present.

Cytological studies on microsporogenesis were completed on three of the four reputed low seeders, viz. RRIC 45, 41 and 88. They have revealed hitherto unreported meiotic abnormalities which may contribute to poor seeding. Studies on RRIC 89 and other cultivars of interest will be continued in 1969.

#### *Sex Ratios of H. brasiliensis Cultivars*

The ratio of male and female flowers of *Hevea* inflorescences would be a morphological variable which could be identified. It could cause seeding differences in cultivars and the proportion of each type of illegitimate seed (clonal seed) obtained from mixed seed gardens. A preliminary study was made on trees of 10 cultivars which flowered during the off season. Obvious variations were evident. A more extensive study is planned for the flowering season in early 1969.

#### *Cytological Studies of Interspecific Hybrids of Hevea*

*Dothidella*-resistant *H. benthamiana* selections, first generation hybrids with *H. brasiliensis* cultivars, backcrosses and outcrosses form part of the breeding material in our collection. These two species are known to cross easily to yield fertile hybrids. A programme of research was initiated in 1968 to study the pairing relationships of the genomes of the two species to determine if there are any indications of reduced chromosome pairing which could reduce genetic recombination. Time permitted the examination of only one hybrid FX 4037 (*H. benthamiana* × BP 86). In this hybrid the two genomes were homologous. A low frequency of meiotic abnormalities was evident which may not hinder breeding objectives. The abnormalities could yield useful information on phylogenetic studies. These investigations will be continued with additional experimental material.

#### *Colchicine Treatment of H. brasiliensis Seedlings*

An attempt was made to induce polyploids using 3 concentrations of colchicine (0.5%, 0.1% and 0.2% with and without 5% glycerol). Germinating seedlings of RRIC 52 were treated for 8 hours, 24 hours and 48 hours. All treatments gave a high frequency of positive effects when scored visually. The 48-hour treatment retarded growth appreciably and in a few instances induced dormancy. A 24-hour treatment was found to be the most effective. Swollen shoots, slow growth and abnormal foliage characteristics in the first set of leaves were common. However beyond the first node growth was stabilized and the shoots appeared to have reverted to the normal condition. The few doubtful plants will be cytologically screened using the leaf squash technique for chromosome counts.

#### *Anatomical Studies*

These studies were originally begun to determine the normal size range of the stomata of *Hevea* cultivars in order to use stomatal size as an indicator for rapid screening to isolate euploids of *H. brasiliensis* from natural and experimental populations. However, epidermal characteristics which could differentiate three *Hevea* species were soon recognized. The study was extended to *H. brasiliensis* cultivars and interspecific hybrids. It is hoped to complete this study in early 1969.

#### *Survey of Rootstock Nursery Populations*

The Geneticist conducted a survey of the seedling populations at Egal-Oya and Hedigalla. The objectives are described in a paper in the Quarterly Journal

of 1968. As permanent assistance was not forthcoming in 1968 the hope of training a person for field surveys of this nature did not materialize. The few unusual plants which were screened had the normal chromosome complement.

During these surveys the natural mutation frequency for chlorophyll mutations was determined. The frequency should serve as a useful guide for differentiating poor seed sources which yield a high frequency of yellow seedlings. The Hedigalla population and a fraction of the Egal-Oya population had an abnormally high frequency of chlorophyll deficient plants which simulated the typical natural albino (white) and the xantha (yellow) mutants. The root cause of the abnormally high frequencies of chlorophyll deficient seedlings which were observed in 1968 is not yet clear.

Large populations of seedlings also show a high frequency of chimaeras confined to certain nursery beds. This was observed at Egal-Oya both in 1967 and 1968 and it normally manifests during a certain stage of growth. A possible cytological cause for its occurrence has been recognized. The Geneticist also initiated studies on individual tree variability of *Hevea* budlings during the year on an estate in Peenkande Group assisted by the Senior Field Assistant of this department.

### Hand Pollination Programmes

Some of the young trees of selfed origin were used this year in an effort to investigate heterosis. The set obtained was very poor. In an effort to establish an additional parameter the cotyledons of the seedlings were assayed for oil content. However wet weather following abscission of the cotyledons resulted in an attack of *Fusarium* which could not be checked. Adequate preventive methods to be used in 1969 were worked out in the course of this attack. All the seedlings were lost except for the following few which however have been assayed for rubber seed oil content per gram dry weight of cotyledons.

| Cross   | No. of surviving seedlings |
|---|----------------------------|
| Ch 26 (BR 2 × BR 2) × PB 5/51                           | 21                         |
| IAN 45—873 (PB 86 × FA 1717) × PB 5/51                  | 3                          |
| PB 5/51 × IAN 45—873                                    | 12                         |
| RRIC 100 (RRIC 52 × PB 86) × 1458 (LCB 1320 × RRIC 7)   | 7                          |
| RRIC 100 (RRIC 52 × PB 86) × 3148 (LCB 1320 × LCB 1320) | 2                          |
| 1103 (RRIC 52 × RRIC 7) × 3148 (LCB 1320 × LCB 1320)    | 3                          |
| 1458 (LCB 1320 × RRIC 7) × RRIC 100                     | 1                          |
| 1458 (LCB 1320 × RRIC 7) × 4008 (RRIC 52 × RRIC 52)     | 10                         |
| 1458 (LCB 1320 × RRIC 7) × PB 5/51                      | 6                          |
| 4008 (RRIC 52 × RRIC 52) × 1458 (LCB 1320 × RRIC 7)     | 5                          |
| 4008 (RRIC 52 × RRIC 52) × PB 5/51                      | 7                          |

### Releases for Commercial Plantings

A number of demands for nucleus budwood of RRIC 100 and RRIC 101 by estates were met from the experimental nurseries. Two 500-plant nurseries of each clone were established during the year at Hedigalla for quantity distribution commencing in 1969.

## Epiphytotic Induction

A simple method of field testing was developed using polythene-bagged plants at the higher elevations.

## Disease Resistance

### Oidium Leaf Disease

- *Matale* : The foliage in all the clones was satisfactory. With the change in ownership of Clodagh Group arrangements for continuing the upkeep of the two experimental areas had to be made.

*Gampola* : Clones 1103 and 784 showed very satisfactory growth and leaf.

### Gloeosporium Leaf Disease

*Udugama* : The test clones showed considerably better growth than PB 86. Clone 3221 showed some susceptibility to *Gloeosporium* infection.

TABLE 1  
GLOEOSPORIUM TEST AREA — 1964 CLEARING  
Average girth at 36" height

| Clone    | Trees | Girth inches<br>1967 | Girth inches<br>1968 |
|----------|-------|----------------------|----------------------|
| 815      | 18    | 14.9                 | 19.8                 |
| 2018     | 27    | 13.9                 | 18.4                 |
| 759      | 20    | 13.7                 | 18.4                 |
| 3202     | 20    | 13.7                 | 18.5                 |
| 79       | 30    | 13.2                 | 17.3                 |
| 2040     | 19    | 13.1                 | 16.9                 |
| 815      | 9     | 13.1                 | 18.1                 |
| 3189     | 8     | 12.8                 | 17.0                 |
| 815      | 16    | 12.8                 | 18.2                 |
| 3229     | 6     | 12.1                 | 15.6                 |
| 1923     | 27    | 12.0                 | 16.4                 |
| IAN 6585 | 28    | 11.9                 | 15.8                 |
| 3221     | 11    | 11.9                 | 16.2                 |
| 1108     | 33    | 11.7                 | 16.3                 |
| 1108     | 241   | 11.2                 | 15.4                 |
| IAN 6505 | 12    | 11.0                 | 14.2                 |
| 864      | 18    | 11.0                 | 14.8                 |
| 6338     | 12    | 10.8                 | 14.4                 |
| 1108     | 17    | 10.7                 | 15.0                 |
| 687      | 7     | 9.9                  | 13.5                 |
| PB 86    | 10    | 9.7                  | 12.1                 |
| RRIC 50  | 98    | 9.3                  | 12.3                 |
| PB 86    | 25    | 9.3                  | 10.8                 |
| PB 86    | 8     | 7.5                  | 9.6                  |

### *Phytophthora*

Clone 4008 from the 1963 clearing at Kuruwita showed some promise as a low fruit setting clone of selfed parentage.

## *Dothidella*

*1960 Clone Trial — Peenkande Group:* Of the *Dothidella*-resistant clones, IAN 45—873 showed very satisfactory yields. IRCI 7 was the highest-yielding clone but was subject to attack by *Oidium heveae*.

TABLE 2  
1960 CLONE TRIAL AT MAHAVALA DIVISION OF PEENKANDE GROUP  
Tapped 2s/2, d/4, 100% intensity

| Clone      | Trees tapped | Girth at 5 feet 1968 | Yield in gms/tree/tapping average of 2 cuts |      |
|------------|--------------|----------------------|---|------|
|            |              |                      | 1967  | 1968 |
| IAN 45—710 | 35           | 24.6                 | 23.4  | 25.9 |
| IAN 45—717 | 32           | 24.3                 | 23.6  | 30.2 |
| IAN 45—873 | 35           | 27.0                 | 33.2  | 38.5 |
| FX 2261    | 33           | 24.0                 | 22.4  | 36.3 |
| FX 3810    | 34           | 25.8                 | 19.1  | 22.2 |
| AVROS 427  | 19           | 21.2                 | 47.3  | 34.6 |
| AVROS 385  | 23           | 24.8                 | 19.2  | 24.0 |
| TR 1548    | 29           | 24.4                 | 21.3  | 22.9 |
| ST 71      | 21           | 22.5                 | 21.6  | 23.2 |
| IRCI 7     | 36           | 25.9                 | 32.1  | 46.4 |
| OY 1       | 8            | 21.8                 | 8.7   | 12.0 |
| IRCI 10    | 20           | 21.6                 | 15.5  | 21.9 |
| Harbel 1   | 17           | 21.7                 | 24.2  | 15.3 |
| RRIC 86    | 14           | 23.2                 | 16.2  | 22.7 |
| C 695      | 31           | 23.6                 | 27.2  | 29.9 |
| PR 228     | 32           | 23.8                 | 35.5  | 33.7 |
| PB 86      | 35           | 23.7                 | 26.1  | 28.3 |

### *Hevea Trials in the Moneragala District*

The servicing of clone trials was slowed down by the incidence of malaria in this district. The necessary routine attention was given however and the vigour of clone RRIC 101 in this area (1965 clone trial) was confirmed.

### *Kuruwita Sub-Station*

*1961 Small-Scale Clone Trial — South West Planting:* As shown in Table 3 the yields obtained in the 3rd year of tapping were very satisfactory. The yields

of RRIC 100 showed a sharp increase even though the tapping was intensified in 1968. The yields of RRIC 101 dropped as the effects of removal of budwood were felt more acutely on this clone. Considering that the control PB 86 trees were the best 63 from 500 trees, the yields of the experimental clones are very promising.

TABLE 3

1961 S. W. SMALL-SCALE CLONE TRIAL

Average girth in centimeters and yields in grams per tree per tapping of some selections from the 1961 clone trial at Kuruwita. (Girth at 190 cm from union; tapped S/2, d/3, 67% in 1966 and 1967, and S/2, d/2, 100% in 1968)

| Clone    | Parentage         | Trees tapped | Girth |      |      | Girth        | Yield |      |      |
|----------|-------------------|--------------|-------|------|------|--------------|-------|------|------|
|          |                   |              | 1966  | 1967 | 1968 | 1968 in ins. | 1966  | 1967 | 1968 |
| RRIC 100 | RRIC 52 × PB 86   | 10           | 49.3  | 55.1 | 59.0 | 23.2         | 34.0  | 66.5 | 91.1 |
| RRIC 100 | RRIC 52 × PB 86   | 3            | 49.7  | 55.1 | 58.5 | 23.0         | 39.5  | 73.5 | 87.3 |
| 266      | Mil 3/2 × Tjir 1  | 4            | 52.2  | 54.3 | 61.1 | 26.1         | 47.7  | 60.8 | 81.8 |
| 266      | Mil 3/2 × Tjir 1  | 8            | 53.7  | 60.0 | 61.0 | 25.9         | 30.3  | 55.3 | 63.7 |
| 1152     | RRIC 45 × RRIC 13 | 7            | 49.2  | 57.6 | 60.8 | 23.9         | 35.8  | 61.9 | 67.4 |
| 1152     | RRIC 45 × RRIC 13 | 4            | 49.8  | 57.6 | 59.1 | 23.3         | 33.3  | 61.8 | 47.8 |
| 1305     | RRIC 41 × Ch 26   | 5            | 51.3  | 60.3 | 67.4 | 26.5         | 44.2  | 48.6 | 64.7 |
| 1305     | RRIC 41 × Ch 26   | 3            | 59.2  | 69.1 | 75.4 | 29.7         | 57.5  | 70.9 | 62.6 |
| 734      | RRIC 52 × Tjir 1  | 9            | 55.6  | 62.7 | 69.0 | 27.2         | 28.8  | 42.9 | 58.7 |
| 1290     | RRIC 52 × RRIC 86 | 4            | 59.9  | 69.0 | 76.6 | 30.2         | 28.9  | 38.4 | 56.6 |
| 1290     | RRIC 52 × RRIC 86 | 3            | 59.9  | 71.4 | 73.0 | 28.7         | 33.6  | 54.7 | 53.8 |
| 1222     | Ch 26 × RRIC 36   | 4            | 51.3  | 58.4 | 62.5 | 24.6         | 41.4  | 47.1 | 56.0 |
| 1173     | Ch 26 × RRIC 7    | 10           | 54.8  | 61.1 | 65.2 | 25.7         | 47.1  | 51.8 | 50.1 |
| RRIC 101 | Ch 26 × RRIC 7    | 6            | 57.9  | 60.2 | 61.6 | 24.3         | 64.4  | 76.3 | 47.9 |
| 82       | RRIC 41 × RRIC 10 | 6            | 53.9  | 61.9 | 64.8 | 25.5         | 27.5  | 45.9 | 46.3 |
| PB 86    | —                 | 63           | 47.3  | 54.8 | 60.0 | 23.6         | 26.0  | 30.1 | 35.0 |

1962 Clone Trial — Kuruwita: The growth of Harbel 1 was very disappointing. RRIM 623 again showed even more vigour than RRIC 52.

TABLE 4  
1962 CLONE TRIAL — KURUWITA

| Clone      | Trees | Girth in cm at 60 cm height |      |
|------------|-------|-----------------------------|------|
|            |       | 1967                        | 1968 |
| AVROS 529  | 118   | 48.0                        | 54.4 |
| AVROS 2037 | 236   | 42.9                        | 53.4 |
| Harbel 1   | 251   | 32.7                        | 43.1 |
| IAN 45—717 | 236   | 39.6                        | 50.9 |
| IAN 6497   | 120   | 35.0                        | 43.8 |
| IRCI 7     | 126   | 43.1                        | 51.4 |
| IRCI 9     | 122   | 37.8                        | 47.2 |
| PB 86      | 211   | 39.3                        | 47.1 |
| PR 228     | 125   | 40.1                        | 50.3 |
| PR 251     | 125   | 40.3                        | 49.6 |
| PR 259     | 132   | 35.5                        | 44.9 |
| RRIC 7     | 139   | 38.1                        | 47.7 |
| „ 14       | 221   | 49.5                        | 57.9 |
| „ 36       | 240   | 38.8                        | 48.8 |
| „ 37       | 130   | 42.6                        | 52.2 |
| „ 41       | 121   | 50.0                        | 57.7 |
| „ 45       | 253   | 43.1                        | 51.4 |
| „ 51       | 239   | 42.6                        | 49.4 |
| „ 52       | 276   | 47.4                        | 57.4 |
| RRIM 607   | 234   | 39.8                        | 49.2 |
| „ 623      | 253   | 51.0                        | 58.8 |
| „ 628      | 181   | 31.7                        | 39.5 |
| „ 701      | 244   | 47.4                        | 57.2 |
| „ 707      | 241   | 42.9                        | 52.2 |
| WR 101     | 113   | 46.4                        | 55.8 |
| TR 3702    | 254   | 39.8                        | 50.7 |
| TR 1548    | 251   | 38.3                        | 50.8 |

1962 S. W. Small-Scale Clone Trials at Kuruwita and Nivitigalakele : Both trials were tapped on S/2, d/3, 67% intensity during 1967 and 1968. The yields of the *Oidium*-tolerant selection 1103 continue to be very satisfactory on both locations.

TABLE 5  
1962 SOUTH WEST CLONE TRIALS AT NIVITIGALAKELE AND KURUWITA  
(Both tapped S/2, d/2, 67% both years)

| Clone   | Parentage            | Trees tapped |        | Girth in cm at 190 cm height |        | Yield in grams/tree/tapping |        |        |        |
|---------|----------------------|--------------|--------|------------------------------|--------|-----------------------------|--------|--------|--------|
|         |                      | N'kele       | K'wita | N'kele                       | K'wita | 1967                        |        | 1968   |        |
|         |                      |              |        |                              |        | N'kele                      | K'wita | N'kele | K'wita |
| 1103    | RRIC 52 × RRIC 7     | 7            | 6      | 52.0                         | 53.7   | 40.1                        | 40.7   | 40.1   | 58.3   |
| 1018    | T 170 × RRIC 52      | —            | 5      | —                            | 58.3   | —                           | 19.6   | —      | 34.3   |
| 1009    | T 170 × RRIC 52      | 5            | 2      | 54.2                         | 54.7   | 21.3                        | 14.0   | 28.5   | 22.1   |
| 1317    | RRIC 45 × LCB 1320   | 10           | 1      | 53.4                         | 56.7   | 36.1                        | 30.3   | 31.2   | 30.4   |
| 1458    | LCB1320 × RRIC 7     | 7            | 9      | 51.5                         | 55.0   | 42.3                        | 50.6   | 38.6   | 48.6   |
| 2005    | PR 107 × LCB 1320    | —            | 3      | —                            | 54.3   | —                           | 32.0   | —      | 51.7   |
| 2028    | RRIC 52 × RRIC 7     | —            | 3      | —                            | 58.9   | —                           | 18.3   | —      | 37.1   |
| 2031    | RRIC 52 × RRIC 7     | —            | 6      | —                            | 57.6   | —                           | 19.2   | —      | 36.5   |
| 2002    | LCB1320 × GPM 1      | —            | 8      | —                            | 59.5   | —                           | 28.2   | —      | 34.0   |
| 2124    | RRIC 52 × Wagga 6273 | —            | 8      | —                            | 57.3   | —                           | 11.4   | —      | 22.6   |
| RRIC 91 | PB 86 × RRIC 5       | —            | 6      | —                            | 56.2   | —                           | 22.1   | —      | 29.6   |
| RRIC 92 | PB 5/139 × RRIM 520  | —            | 2      | —                            | 54.3   | —                           | 40.3   | —      | 35.4   |
| 815     | PB 5/139 × RRIC 52   | 5            | 6      | 56.2                         | 59.4   | 23.6                        | 18.9   | 28.3   | 28.0   |
| 784     | PB 5/139 × RRIC 52   | —            | 5      | —                            | 54.7   | —                           | 16.7   | —      | 20.7   |
| 1108    | RRIC 52 × RRIC 7     | —            | 4      | —                            | 57.1   | —                           | 19.2   | —      | 22.6   |
| RRIC 52 | —                    | 7            | —      | 56.9                         | —      | 20.7                        | —      | 20.5   | —      |
| 82      | RRIC 91 × RRIC 10    | 8            | —      | 58.1                         | —      | 39.0                        | —      | 45.4   | —      |
| RRIC 45 | RRIC 8 × Tjir 1      | 4            | —      | 54.5                         | —      | —                           | —      | 36.3   | —      |

1963 Small-Scale Clone Trial : These clones were also taken into tapping at 5 years of age. The yields of some selections were particularly satisfactory. Of the selfed progeny for control of *Phytophthora* through reduced fruit set only 4008 showed some promise.

TABLE 6

## 1963 SMALL-SCALE CLONE TRIAL — KURUWITA

| Clone  | Parentage            | Trees tapped | Girth in inches at 5 feet ht. | Yield in grams/tree/tapping 1968 |
|--------|----------------------|--------------|-------------------------------|----------------------------------|
| 739    | RRIC 52 × Tjir 1     | 5            | 23.0                          | 21.0                             |
| 1501   | RRIC 45 × GPM 1      | 8            | 18.8                          | 19.4                             |
| 1330   | RRIC 52 × PB 86      | 7            | 22.8                          | 24.8                             |
| 2228   | RRIM 513 × LCB 1320  | 10           | 23.3                          | 20.8                             |
| 1831   | RRIC 45 × LCB 1320   | 5            | 20.1                          | 24.3                             |
| 2231   | RRIM 513 × LCB 1320  | 10           | 20.8                          | 25.2                             |
| 2053   | RRIC 52 × RRIC 7     | 7            | 20.9                          | 33.5                             |
| 2044   | RRIC 52 × RRIC 7     | 8            | 20.3                          | 21.4                             |
| 2164   | RRIC 45 × RRIC 36    | 3            | 21.50                         | 24.8                             |
| 2284   | RRIM 513 × RRIC 36   | 8            | 20.9                          | 28.2                             |
| 2276   | RRIM 513 × RRIC 36   | 7            | 19.6                          | 27.5                             |
| 2286   | RRIM 513 × RRIC 36   | 5            | 21.6                          | 25.8                             |
| 2992   | RRIC 36 × Ch 26      | 6            | 20.8                          | 32.4                             |
| 3060   | Ch 26 × Wagga 6278   | 6            | 21.9                          | 33.1                             |
| 3059   | Ch 26 × Wagga 6278   | 8            | 21.3                          | 25.1                             |
| 2994   | RRIC 36 × Ch 26      | 7            | 21.5                          | 32.7                             |
| 4008   | RRIC 52 × RRIC 52    | 8            | 22.06                         | 20.8                             |
| T 132  | RRIC 37 × Wagga 6278 | 7            | 20.6                          | 31.7                             |
| GT 711 | —                    | 6            | 19.7                          | 28.5                             |
| 1620   | Tjir 1 × LCB 1320    | 4            | 21.6                          | 29.9                             |
| PB 86  | —                    | 15           | 20.1                          | 24.24                            |

*1964 Clone Trials at Kuruwita* : The growth in these areas was satisfactory.

*1965 Small-Scale Clone Trial — Dartonfield* : The growth in this clearing was satisfactory.

*1965 Clone Trial — Matale* : Satisfactory growth and leaf was maintained in this trial.

*1966 Clone Trials at Kuruwita, Nivitigalakele, Moneragala* : Routine attention was given to these trials consisting of 100 plants of each clone replicated three times in each experiment.

*1967 Small-Scale Clone Trial — Kuruwita* : Growth and survival was very satisfactory in this trial.

The growth in six other clone trials set down in 1967 with three replications of each clone planted in Nivitigalakele, Hedigalla, Neboda, Bibile and Gampola was found to be very satisfactory.

The following experiments were established in 1968:—

| Trial No. | Extent   | Site      | Design  | Clones tested   |
|-----------|----------|-----------|---|---|
| 21        | 10 acres | Kuruwita  | 3 replications of 10 plants each                | Selections from hand pollinated progeny                     |
| 22        | 42 acres | Tummodera | 4 replications of 300 plants each               | 451, 1173, C 695, 82, RRIC 45                               |
| 23        | 8 acres  | Hedigalla | 3 replications of 100 plants each               | 451, 815, RRIC 101, RRIC 45                                 |
| 24        | 12 acres | Bibile    | 4 replications of 100 plants each               | 451, 1103, 1305, RRIC 101, RRIC 45                          |
| 25        | 10 acres | Matale    | One or two observation plots of 100 plants each | IAN 45—710, 1103, RRIC 100, RRIC 101, 451, 1004 and RRIC 45 |

#### Index to field experiments

- Trial 1 : 1961 Small-Scale Clone Trial — Kuruwita*
- Trial 2 : 1961 Medium and Small-Scale Clone Trial — Kuruwita*
- Trial 3 : 1962 Large-Scale Clone Trial — Kuruwita*
- Trial 4 : 1962 Small-Scale Clone Trial — Kuruwita*
- Trial 5 : 1962 Small-Scale Clone Trial — Nivitigalakele*
- Trial 6 : 1963 Small-Scale Clone Trial — Kuruwita*
- Trial 7 : 1964 Clone Trial (S. W. and N. E.) — Kuruwita*
- Trial 8 : 1965 Small-Scale Clone Trial — Dartonfield*
- Trial 9 : 1965 Small-Scale Clone Trial — Moneragala*
- Trial 10 : 1965 Medium-Scale Clone Trial — Matale*
- Trial 11 : 1966 Clone Trial — Kuruwita*
- Trial 12 : 1966 Clone Trial — Nivitigalakele*
- Trial 13 : 1966 Clone Trial — Moneragala*
- Trial 14 : 1967 Clone Trial — Nivitigalakele*

- Trial 15 : 1967 Small-Scale Clone Trial — Kuruwita*
- Trial 16 : 1967 Clone Trial — Gikiyanakande*
- Trial 17 : 1967 Clone Trial — Peenkande*
- Trial 18 : 1967 Clone Trial — Gampola*
- Trial 19 : 1967 Clone Trial — Hedigalla*
- Trial 20 : 1967 Clone Trial — Bibile*
- Trial 21 : 1968 Small-Scale Clone Trial — Kuruwita*
- Trial 22 : 1968 Clone Trial — Tummodera*
- Trial 23 : 1968 Clone Trial — Hedigalla*
- Trial 24 : 1968 Clone Trial — Bibile*
- Trial 25 : 1968 Clone Trial — Matale*
-

# REVIEW OF THE PLANT PATHOLOGY DEPARTMENT

BY

(MRS.) V. SATCHUTHANANTHAVALA

## SUMMARY

The incidence of *Oidium* and *Phytophthora* leaf diseases was generally light during 1969.

Two *Oidium* leaf disease experiments were conducted during the *Oidium* season. As disease incidence was light, no useful evaluation of the results was possible. The indications are that 5 or 6 lb of sulphur per acre per round may not be effective during heavy leaf fall.

Two long-term fungicidal trials for control of Bark Rot were given routine attention. The incidence of the disease was so low that no useful conclusion would be drawn from these results.

Two long-term root disease control experiments were given routine attention to. White Root disease is on the decline in all treatments at Galawatte Estate.

*Xylaria* root disease was detected at Hatbawe Group, Rambukkana, Kegalle District. A small-scale field experiment was laid out for the control of this disease.

In October 1968 *Phytophthora* spp occurring on *Hevea* were isolated from soil taken from locations where there had been leaf fall in June 1968.

Ten species of fungi were isolated from sheet rubber stored at the Department of Commodity Purchase stores, Colombo. *Aspergillus* and *Penicillium* spp were the most common contaminants and were chosen for further study in the laboratory.

## DETAILED REVIEW

### Staff

The Plant Pathology Department functioned without any graduate staff officers for the major part 1968.

Messrs. H. L. Munasinghe (Senior Technical Assistant), E. G. Mendis, T. M. Fernando, S. K. Samarawera, D. M. Dantanarayana, W. C. Dayaratne and Z. E. Irugalbandara (Technical Assistants) were on duty throughout the year.

### Correspondence

|              | Inward | Outward |
|--------------|--------|---------|
| General      | 16     | 01      |
| Technical    | 192    | 67      |
| Visits       |        |         |
| Advisory     | 28     |         |
| Experimental | 152    |         |
| Others       | 13     |         |

## Advisory Work

Advisory work was mainly confined to special pathological problems of *Hevea*.

## Laboratory and Field Work

The full programme envisaged for 1968 was not carried out because of lack of supervisory staff.

## Laboratory Work

*Diseased Specimens* : The following diseases and pests were identified on specimens received in this department in connection with advisory work in 1968.

| (a) <i>Fungi</i>     | No. of cases |
|----------------------|--------------|
| <i>Oidium heveae</i> | 3            |
| <i>Fomes noxius</i>  | 1            |
| <i>Xylaria</i> spp   | 1            |

| (b) <i>Pests</i>                             |   |
|--|---|
| Mealy bugs                                   | 2 |
| Mites  | 1 |
| <i>Xyloborus</i> spp                         | 1 |
| Blister beetle ( <i>Mylabris pustulata</i> ) | 1 |

| (c) <i>Other causes</i> |   |
|-------------------------|---|
| Lightning damage        | 3 |

*Phytophthora spp in Soil* : Attempts were made to isolate *Phytophthora* spp occurring on rubber from soil samples collected from 5 different locations in Dartonfield where there had been leaf fall in June 1968. The fungus was readily isolated from 3 soil samples collected from these locations in October 1968, but not from any of the soil samples taken in November 1968. It is probable that the fungus is washed down by rain and it perennates in the soil in some form of resting stage until the next season (D. M. Dantanarayana).

*Biology and Host-Parasite Relationship of Xylaria spp* : Studies on the biology and host-parasite relationship of *Xylaria* spp isolated from a diseased mature rubber tree were initiated and are in progress (H. L. Munasinghe).

*Mould on Sheet Rubber* : Ten species of fungi were isolated from sheet rubber stored at the Department of Commodity Purchase stores, Colombo. Two species of *Aspergillus* and one of *Penicillium* were found to be the most common contaminants. Studies on the conditions favourable for germination and growth of these three moulds were initiated. Results so far show that germination of these moulds occur only above 90% relative humidity at 25°C (H. L. Munasinghe & W. C. Dayaratne).

## Diseases

### Leaf Diseases

*Oidium Leaf Disease* : The incidence of *Oidium* leaf disease was generally light during the refoliation season in 1968.

*Phytophthora Leaf Disease* : The incidence of *Phytophthora* leaf fall was light except for one or two estates in the Kelani Valley District which had reported rather heavy leaf fall.

*Gloeosporium Leaf Disease* : *Gloeosporium* was prevalent on tender foliage during the 1968 refoliation season.

### Bark Disease

No heavy incidence of Bark Rot was reported in 1968.

### Root Diseases

*White Root Disease* (*Fomes lignosus*) : The incidence of White Root disease was relatively high in young replanted areas in 1968.

*Xylaria Root Disease* : *Xylaria* root disease was detected in Hatbawe Group, Rambukkana in the Kegalle District. This disease has not been reported from any of the rubber growing areas in Ceylon since 1921. It is caused by the slow growing fungus *Xylaria* spp and the symptoms are similar to that of Brown Root disease (*Fomes noxius*).

## Field Experiments

### *Oidium Leaf Disease Control Experiments*

Two experiments were carried out on outside estates :—Eladuwa Estate — PB 86 area — rate of dusting (W. C. Dayaratne); Culloden Estate—PB 86 area— rate of dusting (E. G. Mendis).

The incidence of *Oidium* leaf disease was light. Indications are that 5 or 6 lb of sulphur per acre per round will not be effective, when the incidence of leaf fall due to this disease is heavy.

### *Yield/Leaf Disease Control Experiments*

Most of the leaf disease control experiments were not carried out. Yield data from 3 estates were maintained throughout the year (Z. E. Irugalbandara).

### *Bark Rot Control Experiments*

*Fungicidal Trial on Clone PB 86* : Fungicides Antimucin, Brunolinum Plantarium and Fylomac are being tested at 4 strengths at Malaboda Estate (T. M. Fernando).

*Fungicidal Trial on Clone Gl 1* : Fungicides Antimucin and Brunolinum Plantarium were tested at 4 strengths at Sirinivasa Estate. This experiment was terminated in August 1968 (W. C. Dayaratne).

These two long-term experiments were attended to. The incidence of Bark Rot was so low in all treatments, including the control, that no useful evaluation can be made from these experiments.

#### *Root Disease Control Experiment*

The following long-term experiments were attended to :—

(1) *Methods of Identification of Fomes Infection and the Treatment of Soil With Sulphur on Disease Incidence*

Results of the root disease survey carried out in October 1968 show that White Root disease is on the decline in all the treatments. Trees are now over five years old and have passed the susceptible stage to infection (S. K. Samaraweera).

(2) *Methods of Clearing and Incidence of White Root Disease*

Results of the root disease survey carried out in June 1968 show that the disease incidence is low in all treatments (S. K. Samaraweera & T. M. Fernando).

(3) *Xylaria Root Disease Control Experiment*

A field experiment on a small-scale was laid out for the control of *Xylaria* root disease in December 1968 at Hatbawe Group, Rambukkana, based on the methods used in *Fomes* root disease control (H. L. Munasinghe).

#### *Oidium and Phytophthora Leaf Disease Questionnaires*

These questionnaires were sent out as usual ; the response was very poor, and under 50 replies were received in each case.

# REVIEW OF THE SOILS CHEMISTRY DEPARTMENT

By

C. G. SILVA

## SUMMARY

The results of a field trial that has been in progress for the last sixteen years do not show any significant benefits which could be definitely attributed to the effect of the application of NPK fertilizers during the early mature phase. It appears that more realistic corrections due to the residual effects of manuring during the immature phase, on the early period of maturity would be necessary before it could be established conclusively that there are no responses to manuring during the mature phase.

The trial laid down in 1961 to assess the response to nitrogen, phosphorus, cultivation and their interaction at a basal dosage of potassium and magnesium showed a significant positive response to nitrogen and phosphorus and indicated that the optimum level of these two nutrients was around 21 oz of sulphate of ammonia and 21 oz of saphos phosphate per plant per year.

In the same area where nitrogen and phosphorus was basal there was no response to potassium; magnesium however showed a depressing effect. This is being investigated further. The trial laid down in an area which has not been manured before, shows that the response to each of the nutrients nitrogen, phosphorus and potassium is dependent on the other two.

The trial with three of the vigorous clones RRIC 7, 45 and 52 with the control clone PB 86 has shown that the application of a NPK + Mg mixture at rates higher than our present recommendations will not increase the rate of growth of the more vigorous clones any more than it would of the control clone PB 86.

There are four trials in progress out of the five, because one was discontinued in 1967. In all these trials the treatment differences do not show any significant differences in girth. However in one trial there was a significant response to the treatments. When the four treatments in this trial are considered the treatment DP (partial) gives the maximum yield. The DP (complete) treatment gives yields very close to that of DP (partial) treatment.

The results obtained from the trial on the use of different forms of nitrogenous fertilizers show that urea is superior to the other two forms. Yet in the absence of information on whether there is a response to nitrogen in this area these results should be considered inconclusive.

With respect to the two trials at Gallewatta and Kuruwita on the use of different forms of magnesium fertilizers the indications are that dolomite is superior to common epsom salts and kieserite. If the result of the trial at Kuruwita where magnesium showed a significant depressing effect could be applied to the efficiency of dolomite as a magnesium fertilizer, then it would be reasonable to conclude that if magnesium depresses growth, dolomite would do so least.

In the results of a trial laid down to study the effect of one brand of granular compound fertilizer and two brands of granular concentrated compound fertilizers as against the standard mixture of inorganic fertilizers it has been shown that all the three granular compound fertilizers are significantly superior to the standard mixture.

For the first time a provisional soil map of the rubber lands is now available. This will be refined and with detailed surveys of each one of the areas, will form the basis of the envisaged soil and foliar survey programme.

#### DETAILED REVIEW

##### Staff

The Soils Chemist, Mr. C. G. Silva was in charge as Acting Head of the Department throughout the year.

Mr. R. S. John, the Assistant Soils Chemist continued his post-graduate studies at the University of Aberdeen.

One Field Assistant was interdicted in July and a Field Attendant left the department on being appointed as a Rubber Instructor from October.

Vacancies for four Technical Assistants and two Field Attendants were not filled till the end of the year.

##### Meetings, Conferences, Seminars etc.

1. Meetings of the Standing Committee on Agro-chemicals and fertilizers
2. Meetings of the Industrial Development Board Sub-panel for Agro-chemicals and fertilizers
3. Meetings of the Scientific Committee
4. Annual Symposium of the Soil Conservation Society
5. Meetings of the District Planters' Associations of Kalutara, Kelani Valley and Sabaragamuwa
6. Annual Sessions of the Ceylon Association for the Advancement of Science

The Acting Head of the Department was away in Malaysia from 10th February to 2nd March with a Government delegation to study the feasibility of oil palm cultivation in Ceylon.

##### Visits

|                           | <i>Advisory</i> | <i>Experimental</i> | <i>Others</i> | <i>Total</i> |
|---------------------------|-----------------|---------------------|---------------|--------------|
| Acting Head of Department | 7               | 15                  | 10            | 32           |
| S. T. A.                  | —               | 34                  | 8             | 42           |
| Technical Assistants*     | —               | 8                   | 1             | 9            |

\*The field trips done by the Technical Assistants in connection with soil survey work and the visits done by the Field Assistants in connection with field experiments are not included.

## Correspondence

|           | <i>Inward</i> | <i>Outward</i> |
|-----------|---------------|----------------|
| Technical | * 334         | 171            |
| General   | 50            | 41             |

## Publications

### (a) *For Restricted Circulation*

1. Annual report of the Soils Chemistry Department for 1967
2. Progress reports of the Soils Chemistry Department for the 1st, 2nd and 3rd quarters of 1968
3. Feasibility study on oil palm cultivation in Ceylon

### (b) *Papers*

1. A provisional classification of the rubber soils of Ceylon and their comparison with the Malaysian soils (Paper read at the Natural Rubber Conference, Kuala Lumpur, 1963)
2. Studies on the manganese status of the rubber soils of Ceylon

## Advisory Work

### *Generalised Recommendations*

- (1) Work on the revision of the advisory circular on manuring, incorporating the use of urea instead of ammonium sulphate was under way.
- (2) Correspondence on subjects such as weed control where no advisory circulars are available continued to be handled by the department.
- (3) Many requests were received as to the usefulness of using unconventional sources of fertilizer such as poultry deep litter manure and rubber wood ash as sources of the major nutrients.

### *Specialised Advisory Work*

Visits were made to seven estates for the purpose of giving specialised advice. Three samples of fertilizers were analysed on special requests. Soil and leaf samples were collected on these visits and reports embodying specific recommendations have been submitted.

Numerous visits were made to Nakiadeniya Group in order to advise this estate on the nursery care of oil palm seedlings in polybags and also in connection with the collection of data for the recommendation of a balanced fertilizer mixture based on soil and leaf analysis for oil palm in this area.

## Research Investigations

### *Studies on Fertilizer Requirements*

(a) *Soil Map for Rubber Land* : A soil map of the rubber lands in Ceylon was prepared where the area has been demarcated into seven soil series based mainly on the nature of the parent material. This map is given in Fig. 1

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\* includes returns on wind damage losses from estates.

Soil samples were removed from each of these soil series and the particle size distribution and organic carbon contents of a part of these profiles were determined.

The total available and exchangeable manganese of each of these soil series was determined and was the subject of the paper entitled "Studies on the manganese status of the rubber soils of Ceylon".

Colour transparencies of these soil profiles were removed for projection at the Natural Rubber Conference held in Malaysia to illustrate the paper entitled "A provisional classification of the rubber soils of Ceylon and their comparison with the Malaysian soils".

(b) *Leaf Nutrient Status* : A greater part of the work in the laboratory was connected with the analysis of leaf samples received towards the end of 1967. These leaves were removed from the field trials maintained by the department and were analysed for nitrogen, phosphorus, potassium, calcium and magnesium.

The following determinations were carried out on leaf samples collected from the experimental areas :—

|            |     |     |
|------------|-----|-----|
| Nitrogen   | ... | 757 |
| Phosphorus | ... | 782 |
| Potassium  | ... | 697 |
| Calcium    | ... | 737 |
| Magnesium  | ... | 712 |

### Cultivation and Ground Covers

#### \*Field Experiment No. 1

*NPK Interactions* : It has been reported earlier that in this trial manuring during the immature phase has contributed significantly to the subsequent yield performance of trees in respect of all four clones AVROS 255, PB 86, LCB 870 and PB 86 × LCB 870.

Analysis of the yield and girth data for 1968 does not show significant results which could indicate any responses to manuring during the mature phase. A more detailed examination of the data is necessary whereby the validity of the assumption made in earlier reports "that the interaction between fertilizer treatments applied during the immature phase and those applied during the early mature phase affected the experimental blocks equally" could be tested. It is reasonable to expect that both the response to manuring and the increment in girth in the natural process of growth, will be dependent on the initial growth level. Therefore more realistic corrections for initial growth due to manuring during the immature phase are necessary to enable one to separate the true effects of manuring during the mature phase from the residual effects of the benefits from manuring during the immature phase.

#### Field Experiment No. 2

*Four Levels of K : Constant N.P.* : Analysis of the yield data for 1968 indicate that increasing the amount of potassium in the fertilizer from R. 4 : 6 : 2+Mg to R. 4 : 6 : 8+Mg does not give any significant differences in girth or yield. The summarised girth and yield data are as follows :—

\*See index to field experiments for details.



| <i>Manure mixture</i> | <i>Mean girth</i> | <i>Mean yield</i> |
|-----------------------|-------------------|-------------------|
| R. 4 : 6 : 2 + Mg     | 22.09"            | 24.48 gms         |
| R. 4 : 6 : 3 + Mg     | 22.32"            | 25.55 "           |
| R. 4 : 6 : 5 + Mg     | 22.71"            | 27.00 "           |
| R. 4 : 6 : 8 + Mg     | 22.11"            | 25.78 "           |

*Field Experiments Nos. 4, 5, 12 and 13*

• *Nutrients cum Cultivation* : Field trials 4 and 5 carried out at Parambe Group are now in their fourth year of tapping. Girth measurements recorded in 1968 failed to show any significant treatment effects.

Field trial Nos. 12 and 13 at Kuruwita Sub-station were originally intended to assess the response to NP cultivation and their interactions at a basal dosage of K and Mg.

In the 8th year of growth the girths at 5 ft showed a significant positive response to N and P. Both these responses showed significant curvilinearity indicating that the optimum level is somewhere at N<sub>1</sub> and P<sub>1</sub> (namely 21 oz of sulphate of ammonia and 21 oz of saphos phosphate per plant per year). The interaction of NP was not significant.

In the experiment where NP was basal and the response to K and Mg was investigated there was no response to K ; Mg however had a significant depressing effect.

*Field Experiments Nos. 6 to 9*

*Physiological Diagnosis* : In these experiments, the response to applications of fertilizer requirements on the basis of physiological diagnosis is being assessed.

- Field experiment No. 6 — 1959 replanting, PB 86 — Nakiadeniya Group, Galle District  
 Field experiment No. 7 — 1960 replanting, PB 86 — Gallewatte Estate, Kalutara District  
 Field experiment No. 8 — 1951 replanting, Gl 1 — Parambe Group, Kegalle District  
 Field experiment No. 9 — 1949 replanting, PB 86 — Eladuwa Estate, Kalutara District.

The manuring in these trials in 1968 according to DP leaf analysis was same as in 1967. The yield records from trial No. 7 and the girth and yield records from the other trials have not shown any significant differences due to treatments. The mean girth for the different treatments and the critical differences are given below :—

|                         | <i>No. 6</i> | <i>No. 7</i> | <i>No. 8</i> | <i>No. 9</i> |
|-------------------------|--------------|--------------|--------------|--------------|
| DP (complete) ...       | 25.89        | 20.82        | 32.19        | 30.91        |
| DP (partial) ...        | 26.18        | 20.73        | 33.98        | 31.87        |
| Control ...             | 25.24        | 20.63        | 33.20        | 31.59        |
| Standard ...            | 25.83        | 21.21        | 34.35        | 31.89        |
| Critical difference ... | 2.09         | 0.75         | 2.42         | 2.42         |

The yield data of trial No. 6 show a significant response to treatments. The yield in grams per tree per test tapping for this trial with the separate treatments is given below :—

| Treatment     | Mean yield in grams per tree per test tapping | Critical difference |
|---------------|---|---------------------|
| DP (complete) | 30·10   | +1·098              |
| DP (partial)  | 30·37   |                     |
| Standard      | 27·28   |                     |
| Control       | 27·80   |                     |

#### Field Experiment No. 11

*Sources of Magnesium :* The main purpose of this trial was to ascertain whether the use of crushed dolomite as a source of magnesium depresses the growth of rubber plants. The responses to different levels of N,P,K and Mg (the Mg treatment being allotted to the sub-plots in a split plot design) being incidental.

The difference between the two forms of magnesium were on the border line of significance in favour of dolomite.

As far as the incidental treatments N,P,K were concerned, there was a significant response to potassium and no responses to nitrogen and phosphorus.

The mean girths per tree in inches for the main plot and sub-plot treatment as recorded in December 1968 were as follows :—

Mean girth per tree in inches in December 1968

| Treatment                 | Mean grith | Critical difference |
|---------------------------|------------|---------------------|
| Main plots N <sub>0</sub> | 19·68      | 0·74                |
| N <sub>1</sub>            | 19·91      |                     |
| P <sub>0</sub>            | 19·56      |                     |
| P <sub>1</sub>            | 20·03      |                     |
| K <sub>0</sub>            | 19·26      |                     |
| K <sub>1</sub>            | 20·33      |                     |
| Sub-plots                 |            |                     |
| Mg as common epsom salt   | 19·45      | 0·72                |
| Mg as dolomite            | 20·14      |                     |

#### Field Experiment No. 14

*Assessment of Different Fertilizers :* This experiment which is designed to assess the growth response to N, P and Mg, each from three different fertilizer

materials, is being carried out at Gallowatta Estate, on clone PB 86 in an area replanted in 1961. The experiment is laid down on a  $3 \times 3 \times 3$  factorial design.

|   |                 |
|---|-----------------|
| Nitrogen as nitrate from ammonium nitrate   | N <sub>0</sub>  |
| Nitrogen as ammonium from ammonium sulphate | N <sub>1</sub>  |
| Nitrogen from urea                          | N <sub>2</sub>  |
| Phosphate from super phosphate              | P <sub>0</sub>  |
| Phosphate from rock phosphate               | P <sub>1</sub>  |
| Phosphate from ammonium phosphate           | P <sub>2</sub>  |
| Magnesium from common epsom salts           | Mg <sub>0</sub> |
| Magnesium from dolomite                     | Mg <sub>1</sub> |
| Magnesium from kieserite                    | Mg <sub>2</sub> |

The mean girths in inches recorded in November 1968 are reported below :—

| Treatment       | Mean girth difference | Critical difference |
|-----------------|-----------------------|---------------------|
| N <sub>0</sub>  | 17.54                 |                     |
| N <sub>1</sub>  | 18.50                 |                     |
| N <sub>2</sub>  | 19.04                 |                     |
| P <sub>0</sub>  | 18.68                 | 1.42                |
| P <sub>1</sub>  | 18.70                 |                     |
| P <sub>2</sub>  | 17.71                 |                     |
| Mg <sub>0</sub> | 18.29                 |                     |
| Mg <sub>1</sub> | 18.96                 |                     |
| Mg <sub>2</sub> | 17.84                 |                     |

The girth increases recorded for the different forms of fertilizer are not statistically significant which strictly directs one to feel that the different forms are interchangeable without deleterious effects on growth provided they are economically acceptable.

However the indications are that dolomite is superior to common epsom salts and kieserite; rock phosphate and super phosphate are superior to ammonium phosphate. In the case of the forms of nitrogen urea appears to be superior to the other two forms, reaching a significant level of nearly 10%.

Yet these results should be considered as inconclusive, since it has not been established whether there is a response to N,P and Mg in any one of these forms.

#### Field Experiment No. 15

*Granulated Compound Fertilizers* : The girth measurements recorded in 1968 indicate that the treatment effects are statistically significant. The mean girths are given below :—

| Type of fertilizer | Mean girth | Critical difference |
|--------------------|------------|---------------------|
| Sincat             | 19.02      |                     |
| Granumix           | 19.29      | 1.14                |
| Dam Trio           | 19.25      |                     |
| R. 4 : 6 : 2 + Mg  | 17.66      |                     |

All the three granular compound fertilizers are significantly superior to the standard mixture. There are no significant differences between the three compound fertilizers.

#### Field Experiment No. 16

**Fertilizers and Wind Damage :** The main purpose of this experiment which was started in 1962 was to study the effect of reduced levels of nitrogen and potassium (*viz.* normal rate, half rate and nil) and of reduced levels of phosphorus (*viz.* normal rate and half rate) on the incidence of wind damage losses on clone LCB 1320 — a clone susceptible to wind damage.

The losses due to wind damage in 1968 being few it was not possible to assess the effect of the different levels of N, P and K on wind damage.

The study of the effect of the different levels of N, P and K on girthing and yield do not show any significant differences as due to the treatment.

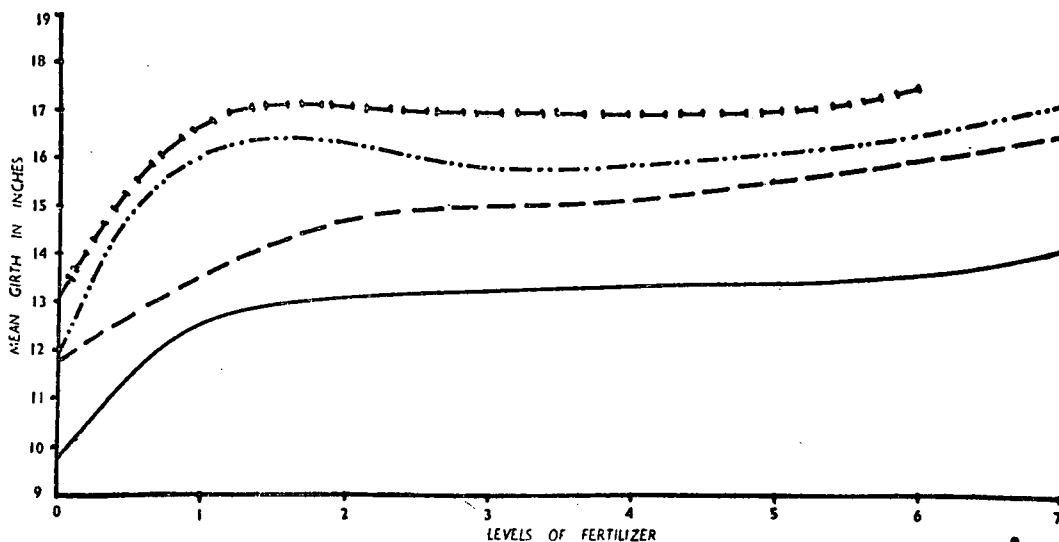
All the  $K_0$  plots showed symptoms of potassium deficiency and the analysis of leaf samples from these plots gave rather low values for leaf potassium.

#### Field Experiment No. 18

**Clonal Response to Fertilizers :** The girth measurements recorded in 1968 indicate that the fertilizer treatments at all levels were better than the control.

In respect of the four clones, the three more vigorous clones girthed better than the control clone PB 86. But the pattern of growth as indicated in Fig. 2 is the same for all four clones.

- - - - - RRIC 52  
 ······ RRIC 45  
 - - - - - RRIC 7  
 ———— PB 86



From these results it is reasonable to believe that there is no justification for applying higher levels of fertilizer for the more vigorous clones.

### *Field Experiment No. 20*

*Effect of Fertilizers on Unmanured Mature Rubber* : This is a manurial experiment with three levels (including zero) of N, P, K and Mg applied basal.

The analysis of variance of girth measurements indicates a significant NPK interaction showing that the response to each element is dependent on the other two.

The mixture  $N_2P_1K_0$  appears to give the maximum growth.

These data will be examined later in more detail using the concept of response surfaces in order to determine the most economic dosage for different cost situations.

### **Investigations on Wind Damage**

The data received from commercial estates during the years 1967 and 1968 have not been processed yet. The two years data will be processed and studied in detail in order to ascertain any definite reasons that could be attributed to the frequent incidence of wind damage in these areas. This work will be reported in the course of 1969.

### **Use of Herbicides for Weed Control**

A small area at Nivitigalakele has been blocked out for a simple weedicide trial where mixtures of MSMA, 2, 4-D and sodium chlorate and other new weedicides are to be tested out.

The statistical analysis of all the field trials was done by Mr. V. Abeyawardene, the Biometrician of the Coconut Research Institute to whom we are most grateful.

### **Soil Surveys**

For the first time a provisional soil map of the rubber lands is now available. This will be refined and with detailed surveys of each one of the areas will form the basis of the envisaged soil and foliar survey programme.

### **Index to Field Experiments**

1. Trial of nitrogen and potassium in the presence of phosphorus on four clonal materials — 1952 clearing — Hedigalla
2. Effect of four levels of potassium in the presence of N & P (six clones) 1958 replanting — Eladuwa Estate
3.  $2^3$  NPK trial — Tjir 1 clonal seedlings — area considered marginal for rubber — 1958 replanting — Kumarawatte Group
4.  $3^3$  N×P×cultivation treatments trial in the presence of K & Mg on clone PB 86 — 1959 replanting — Parambe Group, Kegalle District
5.  $3^3$  K×Mg×cultivation treatments trial in the presence of N & P on clone PB 86 — 1959 replanting — Parambe Group, Kegalle District

*Trials on Fertilizer Application According to Physiological Diagnosis*

6. Galle District — clone PB 86 — immature/mature phase — 1959 replanting — Nakiadeniya Group
7. Kalutara District — clone PB 86 — immature phase — 1960 replanting — Gallewatte Estate
8. Kegalle District — clone Gl 1 — mature phase — 1951 replanting — Parambe Group
9. Kalutara District — clone PB 86 — mature phase — 1949 replanting — Eladuwa Estate
11.  $2^3$  NPK trial in the presence of Mg from two sources on clone PB 86 — 1961 replanting — RRIC Sub-station — Kuruwita
12.  $3^3$  N×P×cultivation treatments trial in the presence of K & Mg on clone PB 86 — 1961 replanting — RRIC Sub-station — Kuruwita
13.  $3^3$  K×Mg×cultivation treatments trial in the presence of N & P on clone PB 86 — 1961 replanting — RRIC Sub-station — Kuruwita
- (N.B. — Same as experiments 4 and 5; but with the difference that loppings of Guatemala grass used for one of the cultivation treatments obtained from within and from outside the experimental plots)
14. Growth response to the three major nutrients N, P & K each from three different fertilizer materials — 1961 replanting — Gallewatte Estate
15. Growth response to three brands of complete concentrated fertilizers — 1961 replanting — Gallewatte Estate
16. Trial with different levels of N, P & K on clone susceptible to wind damage *viz.* clone LCB 1320 — 1959 replanting — Mirishena Estate
17. Time of fertilizer application trial — mature phase — clone PB 86 — 1951 replanting — Dewalakande Estate
18. Effect of 8 levels of standard fertilizer mixture R. 4 : 6 : 3+Mg on 4 clones — 1963 replanting — RRIC Sub-station — Kuruwita
19. Trial on leguminous ground covers vs. natural ground cover kept under control by herbicide spraying — 1963 replanting — RRIC Sub-station — Kuruwita
20. Trials with different levels of N, P, K and Mg on clonal rubber that had not been manured for a long period (ten years or more).

# REVIEW OF THE RUBBER CHEMISTRY DEPARTMENT

By

S. W. KARUNARATNE

## SUMMARY

The Rubber Chemistry Department was seriously understaffed during the period under review. At the beginning of the year there were only two graduate officers in the department and one left the services of the Institute in the middle of the year. Towards the end of the year two graduate assistants were recruited to serve in the department.

The department continued to give advisory services to the large estates on problems connected with the manufacture of raw rubber. The department also handled many inquiries on the manufacture of new forms of rubber. One estate which was experimenting on the production of Heveacrumb completed a trial batch of 5 tons of this form of block rubber from a cup lump/tree lace mixture. Other than routine technological testing very little technological research was carried out, mainly due to lack of emphasis on such work. With the recruitment of additional staff and the provision of adequate funds the department will be expected to carry out technological research in the future. Further expansion and re-organisation of the department is also envisaged. A large part of the time of the staff was devoted to carrying out routine tests for technical specification of crumb rubber as well as scrap grades. It is strongly felt that a separate specification unit should be set up to handle specification testing.

A survey of PRI of the various grades of estate and smallholders' RSS and estate brown crepe has been launched. Sampling for this purpose is being continued from 6 estates in the Kalutara District.

The department also helped to organise a symposium on the appraisal of new developments in natural rubber processing and presentation.

## Staff

The Acting Head of the Rubber Chemistry Department, Mr. S. W. Karunaratne, was on duty throughout the year. Mrs. J. Sivabalasunderam, Assistant Rubber Chemist, left the services of the Institute in July. Messrs. P. A. J. Yapa and R. Tharmalingam joined the department as Research Assistants on 1-11-68.

The Senior Technical Assistant, Mr. M. T. Veerabangsa, and the Technical Assistants, Messrs. A. S. Dekumpitiya, W. D. Dharmasena and D. D. Medagama were on duty throughout the year.

## DETAILED REVIEW

### Advisory Work

#### *Latex*

*Determination of D.R.C. of Latex* : Assistance continued to be given to estates to draw up corrected ready reckoners by comparing metrolac readings based on

the O'Brien scale with values obtained from trial coagulations. A quick method of trial coagulation was tried out but the results so far obtained indicate that there is a 1% discrepancy in the weights of dry rubber obtained by the standard method and the quick method of trial coagulation. A significant cause of trouble during the 1st quarter of the year was the tendency to pre-coagulation of latices of certain clones during the period immediately after wintering and of latices obtained from tapping high cuts. These latices when inadequately preserved in the field most often gave rise to bubbles in sheets and to yellow streaks in crepe due to non-homogeneous bleaching. Further, the estimates of field weights were rendered inaccurate as the metrolac readings were affected in latex with a tendency to incipient pre-coagulation.

*Adulteration of Latex :* Samples of latex and coagula suspected to be adulterated by tappers have been received for analyses and reports on them were submitted.

*Latex Concentrate :* Requests have been received for the supply of concentrated latex from both firms and individuals and these have been complied with where possible. A number of centrifuged latex samples were received for testing and reports on their quality were submitted.

#### *Sheet Rubber*

*Development of a 1500 lb Capacity Ground-floor Type Smokehouse :* Consequent on requests made by smallholders to the C.A.O.S., this department had been asked to design a suitable smokehouse of the above capacity and type to be built as a prototype.

*Milling of Sheet Rubber Using Hoare's Multiple Roller :* It is imperative that the preparation of the coagulum should be such that it suits the rolls of this machine. Therefore careful consideration should be given to (1) the dilution of the latex and/or the thickness of the coagulum, (2) dosage of acid. It is sometimes necessary to obtain a rapid coagulation of latex by the use of a slightly higher dosage of acid in order to control the incidence of bubbles. In order to minimise difficulties with the Hoare's multiple roller this problem of bubble formation on sheets should be tackled at the field stage, thereby eliminating any arbitrary usage of excess acid for coagulation.

#### *Crepe Rubber*

*Use of Electrical Heat for Crepe Drying :* The question of assisted drying of laces in factory lofts during wet weather has been posed. In this connection the use of electrical heaters in conjunction with expeller fans has been suggested. Since we are aware that delayed drying in factory lofts during wet weather is a problem on estates under similar circumstances and which is further aggravated by increasing crop, it was felt that an investigation into this form of drying should be undertaken. Pursuant to this, steps have been taken to install four 2-kilowatt electrical heaters in the Dartonfield factory loft, to be worked in conjunction with the existing expeller fan. A further reduction in the speed of the fan is also being considered. The heaters are provided with thermostatic controls for temperature and other safety devices. Watt-hour meters will be installed for the measurement of current consumed. A flame proof, 3 H.P. motor (completely enclosed) will be used to run the fan.

*Tensile Properties of Thin Lace Crepe* : There was a complaint from one of the buyers of inadequency of tensile properties in respect of thin pale crepe. Buyers of thin crepe in the market require a very high standard of texture which can only be produced by very much more milling than is required for a lace which would normally be converted to a blanket. The result is a product which not only undergoes rougher treatment but by its nature a larger portion of its surface is exposed to the atmosphere. The combination of these factors, which are not common to the thick crepe, must provide the inadequency in tensile strength. This problem may be overcome to a large extent if buyers in the market are less insistent on so high a standard of texture and colour in their thin crepe deliveries.

### **Manufacture of New Forms of Rubber**

The pilot plant for the manufacture of Heveacrumb set up by the Institute at Peenkande Estate, Uda Karawita, went into operation in December 1967 and continued to function throughout the year. The initial teething problems were overcome to a large extent and a five-ton trial batch of 75% cup lump and 25% tree lace mixture was completed towards the end of the year. A feature of this process is the adoption of existing machinery such as scrap washers and crepe macerators for the crumbling of these types of material. Only two creping rollers have been regrooved and used for crumbling purposes. The aim has been to blend the cup lump and tree lace material before processing the mixture and to obtain a grade equivalent to SMR 20. The test data on the production of the 1st trial lot of Heveacrumb is given in Table 1.

### *Crumbling of Low Grades of RSS on Grooved Macerators*

The background to this work was the question of the feasibility of recovering low grades of RSS for presentation as a new form of specified rubber. Samples have been submitted to the Commissioner of Commodity Purchase for market evaluation. Consequent to this, requests for larger samples of standard bale size were received from foreign consumer interests and complied with.

### **Studies on PRI**

Small-scale experiments have been started to test the effect of maturation, soaking and sun ageing of cup lump and tree lace material on PRI. Preliminary results indicate that the maturation in air and soaking in water do not necessarily indicate a downward trend in PRI values. A survey of the PRI of the various grades of estates' and smallholders' RSS and estate brown crepe has been launched. Sampling for this purpose is being continued from 6 estates in the Kalutara District. The work was somewhat restricted as estates have not always informed us in time of the date of despatch of their consignments.

### **Viscosity Stabilised Rubber**

The viscosity of solid rubber changes continuously from the time it is prepared to the time it is used by the consumer. Considerable work has been carried out in the past to study this reaction with a view to controlling or inhibiting it.

It is now a well accepted fact that aldehydic groups present as an integral part of the rubber molecules are responsible for storage hardening. Experiments

were carried out to evolve a satisfactory method to control or inhibit storage hardening. The previous work done in Malaysia shows that hydroxylamine hydrochloride could be used to block up the aldehydic groups which by their cross-linking initiate storage hardening.

The action of hydroxylamine hydrochloride towards cup lump was studied in detail and the results obtained show that the viscosity could be kept constant.

A series of soakings of cup lump in hydroxylamine hydrochloride solutions of different concentrations were carried out to find the minimum and suitable concentration of hydroxylamine hydrochloride to maintain a constant viscosity. Taking other factors like PRI also into consideration the results show that 0.4% is the most suitable concentration.

With this knowledge another series of soaking experiments were carried out with a solution of 0.4% hydroxylamine hydrochloride to find out the minimum and most suitable soaking period.

The effect of phosphoric acid on PRI of cup lump treated with hydroxylamine hydrochloride was studied. It was noticed that phosphoric acid tends to give a poor PRI with cup lump treated with hydroxylamine hydrochloride.

Wallace plasticity, initial and after accelerated storage hardening, of a few clones namely PB 86, PB 89, RRIC 7, RRIC 45 and RRIC 52 were determined. This work on clonal basis is expected to be extended to the other popular clones too.

Clonal mixing which is also supposed to have an effect on viscosity was studied with a view to producing rubber with a pre-determined viscosity.

TABLE 1

## TEST DATA ON PRODUCTION OF BEVEACRUMB

FROM 75% CUP LUMP AND 25% TREE LACE MIXTURE — PEENKANDE ESTATE

| Date     | Lot size pounds | Dirt on 325 mesh % wt. |       |       | Volatile matter % wt. |        |        | P. R. I. |      |      | Nitrogen % wt. |       |       | Ash % wt. |       |       | Copper (ppm) | Manganese (ppm) |
|----------|-----------------|------------------------|-------|-------|-----------------------|--------|--------|----------|------|------|----------------|-------|-------|-----------|-------|-------|--------------|-----------------|
|          |                 | Max.                   | Min.  | Mean  | Max.                  | Min.   | Mean   | Max.     | Min. | Mean | Max.           | Min.  | Mean  | Max.      | Min.  | Mean  | Mean         | Mean            |
| 17- 8-68 | 350             | 0.107                  | 0.101 | 0.104 | 0.4223                | 0.2185 | 0.2936 | 57.9     | 41.2 | 49.7 | 0.504          | 0.476 | 0.495 | 0.400     | 0.380 | 0.387 | <8           | <10             |
| 25- 8-68 | 550             | 0.056                  | 0.053 | 0.055 | 0.6073                | 0.4751 | 0.5594 | 70.0     | 52.4 | 60.4 | 0.532          | 0.476 | 0.504 | 0.320     | 0.304 | 0.315 | <8           | <10             |
| 29- 8-68 | 575             | 0.147                  | 0.141 | 0.143 | 0.7681                | 0.7056 | 0.7274 | 82.6     | 78.3 | 79.7 | 0.532          | 0.448 | 0.485 | 0.340     | 0.340 | 0.340 | <8           | <10             |
| 31- 8-68 | 600             | 0.129                  | 0.118 | 0.123 | 0.3587                | 0.3164 | 0.3443 | 73.9     | 70.8 | 72.9 | 0.560          | 0.476 | 0.504 | 0.380     | 0.380 | 0.380 | <8           | <10             |
| 8- 9-68  | 700             | 0.086                  | 0.074 | 0.082 | 0.7429                | 0.6221 | 0.6687 | 73.9     | 63.2 | 66.8 | 0.588          | 0.504 | 0.551 | 0.450     | 0.416 | 0.435 | <8           | <10             |
| 10-10-68 | 600             | 0.090                  | 0.073 | 0.081 | 0.3070                | 0.2060 | 0.2444 | 65.2     | 54.2 | 61.4 | 0.588          | 0.532 | 0.568 | 0.320     | 0.300 | 0.303 | <8           | <10             |
| 12-10-68 | 650             | 0.113                  | 0.083 | 0.101 | 0.5739                | 0.3976 | 0.4549 | 76.0     | 58.3 | 63.8 | 0.532          | 0.392 | 0.485 | 0.320     | 0.280 | 0.297 | <8           | <10             |
| 13-10-68 | 600             | 0.119                  | 0.105 | 0.113 | 0.4254                | 0.3731 | 0.4059 | 70.8     | 50.0 | 59.2 | 0.532          | 0.448 | 0.490 | 0.360     | 0.320 | 0.343 | <8           | <10             |
| 14-10-68 | 560             | 0.098                  | 0.089 | 0.093 | 0.9666                | 0.8124 | 0.8774 | 81.0     | 73.9 | 78.0 | 0.448          | 0.308 | 0.387 | 0.380     | 0.340 | 0.354 | <8           | <10             |
| 16-10-68 | 650             | 0.098                  | 0.092 | 0.096 | 0.8730                | 0.7362 | 0.8120 | 69.2     | 52.3 | 58.1 | 0.448          | 0.364 | 0.406 | 0.392     | 0.360 | 0.379 | <8           | <10             |
| 17-10-68 | 500             | 0.133                  | 0.121 | 0.129 | 0.8544                | 0.7488 | 0.7973 | 75.0     | 69.6 | 62.5 | 0.448          | 0.364 | 0.397 | 0.460     | 0.440 | 0.453 | <8           | <10             |
| 19-10-68 | 560             | 0.117                  | 0.104 | 0.109 | 0.7401                | 0.5699 | 0.6671 | 72.7     | 59.1 | 66.4 | 0.448          | 0.336 | 0.387 | 0.340     | 0.300 | 0.323 | <8           | <10             |
| 21-10-68 | 500             | 0.127                  | 0.116 | 0.122 | 0.6622                | 0.4888 | 0.6085 | 66.7     | 50.0 | 60.4 | 0.476          | 0.392 | 0.443 | 0.460     | 0.300 | 0.350 | <8           | <10             |
| 27-10-68 | 620             | 0.125                  | 0.111 | 0.121 | 0.6128                | 0.4420 | 0.5002 | 57.9     | 40.0 | 50.0 | 0.392          | 0.308 | 0.345 | 0.340     | 0.308 | 0.330 | <8           | <10             |
| 29-10-68 | 620             | 0.108                  | 0.096 | 0.102 | 0.7515                | 0.5204 | 0.5956 | 65.2     | 50.0 | 58.1 | 0.420          | 0.308 | 0.364 | 0.340     | 0.300 | 0.321 | <8           | <10             |
| 31-10-68 | 575             | 0.095                  | 0.083 | 0.089 | 0.8516                | 0.6535 | 0.7244 | 55.6     | 44.4 | 49.6 | 0.308          | 0.224 | 0.266 | 0.508     | 0.320 | 0.374 | <8           | <10             |
| 7-11-68  | 475             | 0.079                  | 0.073 | 0.076 | 0.7791                | 0.6247 | 0.7049 | 63.6     | 57.1 | 59.2 | 0.364          | 0.252 | 0.308 | 0.300     | 0.260 | 0.277 | <8           | <10             |
| 13-11-68 | 550             | 0.085                  | 0.078 | 0.082 | 0.8190                | 0.4744 | 0.5841 | 75.0     | 68.2 | 72.4 | 0.364          | 0.252 | 0.308 | 0.360     | 0.300 | 0.329 | <8           | <10             |
| 15-11-68 | 500             | 0.094                  | 0.087 | 0.092 | 0.7225                | 0.6325 | 0.6730 | 68.0     | 62.5 | 64.8 | 0.308          | 0.224 | 0.266 | 0.280     | 0.240 | 0.260 | <8           | <10             |
| 17-11-68 | 400             | 0.080                  | 0.072 | 0.077 | 0.8559                | 0.4331 | 0.5521 | 72.7     | 63.6 | 69.3 | 0.308          | 0.224 | 0.263 | 0.340     | 0.240 | 0.281 | <8           | <10             |
| 18-11-68 | 450             | 0.080                  | 0.073 | 0.077 | 0.5448                | 0.3422 | 0.4795 | 66.7     | 56.5 | 60.3 | 0.392          | 0.336 | 0.373 | 0.384     | 0.354 | 0.368 | <8           | <10             |
| Extremes |                 | 0.147                  | 0.058 |       | 0.9666                | 0.2060 |        | 32.6     | 40.0 |      | 0.588          | 0.224 |       | 0.460     | 0.240 |       |              |                 |
| Average  |                 |                        |       | 0.098 |                       |        | 0.5845 |          |      | 63.0 |                |       | 0.409 |           |       | 0.343 | <8           | <10             |

# REVIEW OF THE ESTATES ADVISORY DEPARTMENT

By

A. B. DISSANAYAKE

## Staff

The Head of the Estates Advisory Department, the Estates Advisory Officer and the 3 Assistant Advisory Officers were on duty throughout the year.

## Categories of Estates

The total area under rubber is 673,378 acres. This can be classified according to the size of the estates as follows :—

| Category          | Size      | Number of holdings | Extent in acres | % of total |
|-------------------|-----------|--------------------|-----------------|------------|
| 1. Smallholdings  | 0 — 10    | 147,585            | 206,509         | 30.7       |
| 2. Small estates  | 10 — 100  | 6,052              | 154,259         | 22.0       |
| 3. Medium estates | 100 — 500 | 665                | 147,308         | 21.9       |
| 4. Large estates  | > 500     | 181                | 165,212         | 24.5       |
| Total             |           | 154,483            | 673,378         | 100.0      |

Of the above 4 categories, the smallholdings which comprise 30.7% of the island's acreage are looked after by the team of officers attached to the Smallholdings Department.

The large estates generally seek advice on specific problems and are therefore generally visited on request by research staff by prior appointment. It is therefore to cater to the medium and small estates comprising of 44.8% of the island's acreage that routine visits were made to estates to advise them on all aspects from cultivation, maintenance and extraction to manufacture and curing.

## Routine Visits

A total of 535 such visits were made to medium and small estates during the year under review. In the case of routine visits the visiting officer looks into all aspects of the industry from planting to manufacture and smokehouse and gives advice. The visit is always followed by a report to the Superintendent or Conductor-in-charge of the estate with a copy to the owner, so that they may have on record the advice given and act on it as and when necessary. Along with these reports the necessary Advisory Circulars are sent for their information. Wherever

the Conductors and caretakers of the small estates are not conversant in English, the reports are sent in Sinhala. A break-up of the visits to the different categories would be as follows :—

| Category       | No. of visits. |
|----------------|----------------|
| Medium estates | 89             |
| Small estates  | 446            |
| Total          | 535            |

### Visits on Request

A total of 223 visits were made on request to small, medium and large estates. These visits were made in connection with specific problems referred to the Institute by the estates. All such visits too were followed by reports to the Superintendents and or the Agents giving the nature of the problem, the causes and the recommendations made.

In a number of cases, after looking into the problem for which the request was made, other little difficulties were discussed and helpful suggestions made to overcome them. A break-up of such visits would be as follows :—

| Category       | No. of visits |
|----------------|---------------|
| Large estates  | 66            |
| Medium estates | 94            |
| Small estates  | 63            |
| Total          | 223           |

### Other Visits

In addition to these the officers of this department have taken part in seminars and scientific conferences, given talks at different associations and taken visitors round etc. In addition, a number of visits have been made to rubber depots and stores of shippers in connection with sampling different grades of rubber for technical specifications. A total of 82 such visits were done.

A break-up of these visits would be as follows :—

| Purpose of visit                    | No. of visits |
|-------------------------------------|---------------|
| Seminars and scientific conferences | 9             |
| Talks                               | 4             |
| Visitors                            | 10            |
| Others                              | 59            |
| Total                               | 82            |

It can therefore be seen that a total of 840 visits have been made by the officers of this department during 1968. This is in addition to discussions with Superintendents and other guests visiting the Institute as well as discussions with scientific staff on specific problems.

### Follow-up Visits

No regular follow-up visits have been done due to insufficiency of staff. However a few follow-up visits have been done on request by the authorities of estates which had been visited on a routine basis earlier. This shows the interest taken to improve the standard of maintenance and manufacture as a direct result of the earlier routine visits. In all such cases the response has been good and a definite improvement specially in the standard of manufacture has been achieved. It is therefore necessary that a system of routine visits, once a year at least, is made to small estates. With this end in view definite proposals are being made for consideration in the ensuing year.

### Observations

As most owners of small estates appear to be absentee landlords, their estates are looked after by Conductors or family retainers who are accustomed to running the estate in a set pattern and who resist change. This resistance is being broken down gradually by getting the owner interested in his land. This is achieved by sending copies of reports, Advisory Circulars etc. to the owner also.

### Cost of Production

The cost of production of rubber can be broken up into 4 main headings, viz.

- (a) Maintenance
- (b) Extraction
- (c) Manufacture
- (d) Overhead charges.

(a) The cost of maintenance includes all items that go to maintain a rubber plantation such as :

(i) weeding, (ii) manuring, (iii) pest and disease control, (iv) repairs to soil conservation measures, and (v) repairs to fences etc.

(b) The cost of extraction includes (i) tapping and transport to the factory, and (ii) other expenses on anticoagulants etc.

(c) The cost of manufacture includes (i) straining the latex and coagulating it, (ii) milling the coagulum, (iii) drying or smoking the manufactured rubber, (iv) grading, packing and transport to market.

All expenses in the factory such as fuels, oils, maintaining machinery etc. are included under manufacture.

(d) Overhead charges include expenses on all items that do not come under the above 3 categories such as :

- (i) Wages of monthly paid staff whose wages cannot be charged to any specific jobs in the industry *i.e.* wages of Superintendents, Assistants, Clerks etc.
- (ii) Maintenance of buildings, roads etc.
- (iii) Medical and recreational facilities, etc.
- (iv) Agency commission, Visiting Agents' fees etc.

A study of the cost of production of medium and large estates under these 4 headings was made by collecting information on cost, by means of a questionnaire sent to almost all estates. The response can only be regarded as poor as only 47 estates had sent in the complete information asked for.

With this data the average cost of production has been calculated after grouping the estates among the different categories according to the size of the estate and the type of rubber produced.

*Sole Crepe Production of Very Large Estates (over 1,000 acres)*

Only 3 estates in this category sent in information. The average cost of production is given in Table 1.

TABLE 1  
AVERAGE COST OF PRODUCTION OF SOLE CREPE OF ESTATES OVER 1000 ACRES IN EXTENT IN CENTS/POUND

|   | Item             | cents/lb |
|---|------------------|----------|
| a | Maintenance      | 14.64    |
| b | Extraction       | 27.92    |
| c | Manufacture      | 14.00    |
| d | Overhead charges | 25.35    |
|   | Total cost       | 81.91    |

*Blanket and Thin Lace Production of Very Large Estates (Over 1,000 acres)*

Only 7 estates in this category had sent in information. The average cost of production is given in Table 2.

TABLE 2  
AVERAGE COST OF PRODUCTION OF BLANKET AND THIN LACE OF ESTATES OVER 1000 ACRES IN EXTENT IN CENTS PER POUND

|   | Item             | cents/lb |
|---|------------------|----------|
| a | Maintenance      | 12.21    |
| b | Extraction       | 26.29    |
| c | Manufacture      | 8.52     |
| d | Overhead charges | 21.54    |
|   | Total cost       | 68.56    |

*Blanket and Thin Lace Production of Large Estates (500 — 1,000 acres)*

A total of 16 estates in this category had sent in information. The average cost of production is given in Table 3.

TABLE 3  
AVERAGE COST OF PRODUCTION OF BLANKET AND THIN LACE OF ESTATES  
BETWEEN 500 AND 1000 ACRES IN EXTENT IN CENTS/POUND

|   | Item             | cents/lb |
|---|------------------|----------|
| a | Maintenance      | 9.95     |
| b | Extraction       | 28.02    |
| c | Manufacture      | 9.61     |
| d | Overhead charges | 22.09    |
|   | Total cost       | 69.67    |

*Blanket and Thin Lace Production of Medium Estates (100 — 500 acres)*

Only 7 estates in this category had sent in information. The average cost of production is given in Table 4.

TABLE 4  
AVERAGE COST OF PRODUCTION OF BLANKET AND THIN LACE OF ESTATES  
BETWEEN 100 AND 500 ACRES IN EXTENT IN CENTS/POUND

|   | Item             | cents/lb |
|---|------------------|----------|
| a | Maintenance      | 10.83    |
| b | Extraction       | 27.52    |
| c | Manufacture      | 12.81    |
| d | Overhead charges | 16.66    |
|   | Total cost       | 67.82    |

*Ribbed Smoked Sheet (RSS) Production of Medium Estates (100 — 500 acres)*

A total of 14 estates had sent in information. The average cost of production is given in Table 5.

TABLE 5

AVERAGE COST OF PRODUCTION OF RIBBED SMOKED SHEET OF ESTATES  
BETWEEN 100 AND 500 ACRES IN EXTENT IN CENTS PER POUND

|   | Item             | cents/lb |
|---|------------------|----------|
| a | Maintenance      | 12·89    |
| b | Extraction       | 29·96    |
| c | Manufacture      | 6·78     |
| d | Overhead charges | 18·64    |
|   | Total cost       | 68·27    |

From these data it can be clearly seen that the cost of production of rubber per pound does not vary very much with the size of the estate. The cost of production of sole crepe is much higher and is rightly so as cleanliness and colour are much more important in sole crepe. The cost of production of RSS is almost equal to that of blanket crepe which is surprising, considering the less complicated nature of processing adopted in RSS.

However, it is necessary that detailed studies of the cost of production are made as early as possible in relation to world market prices.

### Appreciation

Lastly I wish to place on record our thanks for the willing co-operation extended to this department by owners of estates and their Superintendents and Conductors.

# REVIEW OF THE SMALLHOLDINGS DEPARTMENT

By

H. H. PEIRIS

## SUMMARY

The work of the Smallholdings Department increased this year. The staff of the department was again busy during the year with the issue of a large number of subsidy replanting and new planting permits by the Rubber Controller. The rubber market prices increased slightly. Instructors' time was mainly spent on replanting and new planting work. Every effort was made and all possible advice given by field staff to smallholders in improving their sheets to grade 1 RSS. The sulphur dusting scheme was successfully carried out, and the scheme for training smallholders in correct methods of tapping was organised. Both publicity units functioned during the year.

A considerable amount of Instructors' time was taken up for new planting work in addition to other normal work. 321 new planting permits covering an extent of 412 acres 2 roods were issued by the Rubber Controller during the year. 436 preliminary reports, 1734 special reports and 418 final inspection reports have been submitted to the Rubber Controller. A total of 102 new planting areas of 137 acres 3 roods 03 perches and 109 areas of 156 acres 0 rood 15 perches have been lined by Instructors for soil conservation work and planting holes respectively in 1967 and 1968 permit areas. A total of 3,045 advisory visits were made, and 3,078 tappable trees in 57 new planted areas have been marked by the Instructors. A sum of Rs. 2,764.13 was paid to 46 peasant-class smallholders as soil conservation grants during the year.

A large slice of Instructors' time was taken up by replanting. Every possible advice and assistance were given to smallholders in replanting and maintaining their lands. Copies of 3,366 replanting permits were received from the Rubber Controller and were referred to Rubber Instructors for their attention. 33,378 advisory visits have been made by Rubber Instructors to replanting and replanted areas of the current year as well as previous years. Instructors have lined a total of 1,559 subsidy areas of 2,170 acres 1 rood 39 perches and 1,992 areas of 2,892 acres 1 rood 27 perches for soil conservation work and planting holes respectively in permit areas of this and previous year. 12,283 tappable trees in 277 replanted areas have been marked for tapping, and a total of 6,308 plants were checked at random on 72 inspections to various Commodity Purchase Depots.

The annual field day of the department was held this year at Wevita Maha Vidyalaya, Bandaragama. The Chairman of the Rubber Research Board, the Smallholders' Representative, the Director, the Geneticist and the Head, Estate Advisory Department, guest speakers, and an Assistant Estates Advisory Officer were the distinguished invitees present. The day's proceedings commenced with a lecture cum demonstration on the use of metrolac in rubber sheet manufacture. The Chairman and the Director addressed the audience and this was followed by two speeches on behalf of supervisory staff and Instructors. The guest speakers delivered two lectures which were very instructive and useful.

The State-aided Sulphur Dusting Scheme organised for smallholders was carried out this year too. The cost of sulphur was reduced as the response of members to join this scheme was poor, in general. The poundage of dusting sulphur too was reduced in keeping with the dosage recommendation of the Institute. A trial dusting was carried out to find out whether 3 rounds of dusting were sufficient to control *Oidium* as against the normal 4 rounds of dusting, and the results revealed that there was no significant difference between the test and the control groups. This test will therefore be repeated in the forthcoming season too on a more broad-based scale. 87 dusting groups covering an extent of 8,891 $\frac{3}{4}$  acres were formed and dusting was carried out in 84 groups covering an extent of 7,904 $\frac{1}{4}$  acres. Members of one group were reluctant to dust their lands even after the removal of sulphur due to the favourable dry climatic conditions prevailing at that time. A few members in the dusted groups too were reluctant to get their lands dusted and therefore finally the actually dusted acreage dropped to 7,904 $\frac{1}{4}$  acres. It is proposed to dust 103 groups comprising of 10,300 acres in the next dusting season.

The two publicity units were very useful in doing its propaganda work in the field. 121 publicity meetings and film shows and 27 publicity meetings and slide shows were held by Units 1 and 2 respectively during the year. A few scenes were shot in Matugama division for our own film which is in the course of preparation.

Field staff did their best in persuading smallholders to improve their sheets to Grade 1 RSS. Every advice and assistance were given to them by the field staff in this connection. No assistance in the form of subsidised aluminium pans and strainers could be given to smallholders this year as the expected financial assistance from the Department of Commodity Purchase was not received during this period. However 1,421 aluminium pans and 94 strainers, a balance left over from the previous years' stock, were sold to smallholders at a subsidised rate. Two proto-type smokehouses cum curing sheds of 225 and 350 lb capacities were designed. 2 each of these houses were started in most of the 8 Divisional Advisory Officers' divisions and some of these houses were completed while others were nearing completion. Arrangements were made to form 16 new rubber co-operative societies at the rate of two in each D. A. O. S. division. It was found rather difficult to get these societies registered and the writer had to take this matter up with the Department of Co-operative Development. A series of joint meetings attended by the officers of both these departments were held at district level at 5 rubber growing districts. 13 demonstration and 77 private smokehouses were started and 20 demonstration and 46 private ones were completed during the year. Out of the 20 demonstration houses completed, 7 were started in the previous year.

Two smallholders purchased 2 kinds of manure mixtures through this department at a discount of 5%.

A scheme of training smallholders in tapping and allied subjects was organised this year too. 627 trainees participated in 25 classes and finally 333 were successful and were eligible to receive certificates.

This department participated in 7 exhibitions and the publicity unit too was sent to some of them.

Two Divisional Advisory Officers have delivered 2 lectures to students of a training school and a Maha Vidyalaya, while another D. A. O. S. had conducted a series of lectures to teacher-trainees of a Government Farm.

Rubber Instructors have conducted 3,050 demonstrations on various aspects of their work during the year.

4 conferences of supervisory staff were held during the period. The writer attended a meeting of the Department of Co-operative Development and a Board meeting by invitation. He also attended a series of joint meetings of the Department of Co-operative Development and this department at district level.

An Indian delegation and a Japanese senior research staff officer were taken round on a tour of inspection in some of the D.A.O.S. Divisions. A United Nations expert on rubber visited some of the rubber co-operative societies and Multi-Purpose Co-operative Societies producing and selling their members' sheet rubber.

## DETAILED REVIEW

### Introduction

The work of the Smallholdings Department has increased over the years. The field and office staff were again busy this year with the issue of a large number of subsidy replanting permits and new planting permits by the Rubber Controller. A slight increase in the rubber market price was noticed during the year.

Instructors' time was mainly spent on subsidy replanting and new planting work. Every effort was made by the field staff to improve the quality of sheet rubber of smallholders to Grade 1 RSS. All possible advice and assistance were given to smallholders by the field staff in this connection. The sulphur dusting scheme was carried out successfully this year and for the first time two publicity units functioned during the year. The scheme for training smallholders in correct methods of tapping too was organised and classes were held in most of the ranges.

### New Planting

A considerable amount of Instructors' time was taken up for rubber new planting work in spite of heavy calls made on their time by other important work of the department such as subsidy replanting, sulphur dusting, smokehouse construction and sheet improvement etc.

436 preliminary reports on the suitability of smallholdings for new rubber planting were forwarded to the Rubber Controller, during the year under review. 321 new planting permits, covering an extent of 412 acres 2 roods 00 perches, were issued by the Rubber Controller to new planting smallholders, and notified to this department during the year. 1,734 special reports and 418 final inspection reports on new rubber areas too were submitted to the Rubber Controller.

Rubber Instructors and their assistants have lined 64 (1968) new planting permit areas covering an extent of 85 acres 2 roods 00 perches for soil conservation works and 68 permit areas of the same year covering an extent of 101 acres 2 roods 20 perches for planting holes.

They have also lined 38 permit areas covering an extent of 52 acres 1 rood 03 perches and 41 permit areas covering an extent of 54 acres 1 rood 35 perches for soil conservation works and planting holes respectively in 1967 permit areas during the year. A new planting permit is valid during the year of issue and the following year.

141 first visits and 914 subsequent visits were made by the field staff to new planting areas. Further, a total of 6,990 subsequent visits too were made by them to permit areas for which permits have been issued prior to 1967.

Rubber Instructors have marked a total of 3,079 tappable trees in 57 new planted permit areas during the year.

### *Soil Conservation*

- A sum of Rs. 2,764.13 was paid to 46 peasant-class permit holders for conserving soil in their lands during the year. 33 permit areas covering an extent of 42 acres 3 roods 10 perches were measured by the Rubber Instructors, payment vouchers prepared and submitted. 20 measurement report vouchers were checked in the field by Divisional Advisory Officers.

### **Replanting**

A large slice of Instructors' time is taken up for replanting work. Every possible advice and assistance were given to replanting smallholders in replanting and maintaining their lands according to the requirements of the Rubber Replanting Advisory Board.

3,366 replanting permits covering an extent of 4,668 acres 0 rood 25 perches were received from the Rubber Controller and were referred to field staff for their attention.

6,291 visits to 1968 subsidy replanting permit areas and 27,079 visits to previous years' subsidy replanted permit areas were made by field staff during the year.

Rubber Instructors and their assistants have lined a total of 1,157 subsidy replanting areas covering 1,492 acres 3 roods 30 perches and 1,532 subsidy replanting areas covering an extent of 2,107 acres 0 rood 28 perches of this year's permit areas for soil conservation works and planting holes, respectively, during the year.

In addition to the above, Instructors have lined a total of 402 subsidy permit areas of 677 acres 2 roods 09 perches and 460 subsidy permit areas of 785 acres 0 rood 39 perches of previous year's permits for soil conservation works and planting holes respectively during the year.

Rubber Instructors have marked a total of 12,283 tappable trees in 277 subsidy replanted areas during the year by way of demonstrations to induce smallholders to open tapping cuts correctly in their smallholdings.

Random checks on planting material issued to subsidy replanting smallholders by the Rubber Controller at various Commodity Purchase Depots were carried out by the field staff on their visits to these depots. A total of 6,308 plants were checked at 72 such random inspections carried out by Instructors during the two planting seasons of May — June and October — November this year.

### **Annual Field Day**

The annual field day of the department was held at the Wewita Maha Vidyalaya, Bandaragama on 7th August, 1968.

Mr. D. B. Ellepola, Chairman, Rubber Research Board, Mr. S. Randeny Smallholders' Representative on the Rubber Research Board, Dr. R. T. Wijewantha, Director, Dr. Y. D. A. Senanayake, Geneticist, Mr. A. B. Dissanayake, Head of the Estates Advisory Department and Mr. D. S. Muthukuda, Assistant Estates Advisory Officer attended the field day besides the field and other staff of the Smallholdings Department.

The day's proceedings commenced with a lecture cum demonstration by Mr. D. S. Muthukuda on the use of the metrolac in rubber sheet manufacture.

After the tea break the Chief Advisory Officer Smallholdings invited the Chairman to preside at the proceedings. The C.A.O.S. then welcomed the Chairman, R.R.B., the Smallholders' Representative, the Director RRIC and the guest speakers.

The Chairman and the Director then addressed the audience and this was followed by two speeches by Mr. B. D. Pedrick, Divisional Advisory Officer Smallholdings (Panadura) and Mr. A. Suriyaarachchi, Rubber Instructor, Talgampola on behalf of Divisional Advisory Officers and Rubber Instructors, respectively.

Dr. Y. D. A. Senanayake, Geneticist delivered a very interesting lecture on the present status and future possibilities of breeding of *Hevea brasiliensis*. The next guest speaker, Mr. A. B. Dissanayake, Head of the Estates Advisory Department delivered a very useful lecture on weeds in rubber plantations.

### **Mature Holdings**

Visits to mature holdings are being done only on requests by owners or for special reasons such as sulphur dusting.

### **Sulphur Dusting**

The State-aided Sulphur Dusting Scheme for smallholders organised by this department was carried out this year too. The usual procedure followed in previous years was adopted. The advisory and necessary propaganda work for formation of co-operative groups commenced in July 1967. As a result of publicity given to this scheme and efforts of the Rubber Instructors, it was possible to form 87 co-operative sulphur dusting groups covering an acreage of 8,891½ acres.

Before the commencement of dusting the correct procedure of dusting and other requisite instructions were given to the staff. Collection of money for incidental expenses in the co-operative dusting scheme was one of the greatest difficulties which had to be overcome. A sum of Rs. 5/- per acre was collected from the group members for incidental expenses. In many cases the Rubber Instructors and the supervisory staff had to see personally to the collection of money.

The departmental mechanic and the agents of the sulphur dusting machines did the servicing of dusting machines prior to the commencement of dusting. Each accepted co-operative dusting group was issued a dusting machine on loan. Spare machines were made available at central spots to avoid interruption during dusting. Discussions at several conferences of the supervisory staff held at the Smallholdings Department helped to solve most of the difficulties during the period of group formation. The cost of sulphur dust was brought down from Rs. 6/05 to Rs. 4/60 per acre at subsidised rate and from Rs. 12/10 to Rs. 9/20 per acre at non-subsidised rate as the response of the members in general, to our call to join

the scheme was poor. In order to be in par with the present recommendations of the Institute, the dosage of dusting sulphur was also reduced from 50 lb to 32 lb per acre.

#### *A Dusting Trial at a Reduced Number of Rounds*

A trial was carried out in this season to find out whether 3 rounds of dusting with the approved dosage of sulphur are sufficient under normal weather conditions to control *Oidium* in smallholdings which were planted mainly with clone PB 86 ; as an appreciable reduction in the cost of dusting only 3 rounds was an important consideration to smallholders.

8 pairs of sulphur dusting groups were selected from the 8 divisions for the trial. One group of the pair in each division was given 3 rounds of dusting while the other was given the normal 4 rounds of dusting. This trial was carried out by Rubber Instructors in charge with the strict and personal supervision of the supervisory staff. The results were discussed at a staff conference where the Director presided. The results revealed that there was no significant difference between the test and the control groups. This trial will be repeated in the forthcoming dusting season as well, on a more broad-based scale.

With all the publicity and persevering efforts of the Rubber Instructors, it was possible to form only 87 dusting groups. All 87 dusting groups formed for the season comprised of 2,306 holdings giving a total of 8,891 $\frac{3}{4}$  acres (Table 1).

TABLE 1

| District  | Acreage              |                    | Holdings |      |
|-----------|----------------------|--------------------|----------|------|
|           | 1967                 | 1968               | 1967     | 1968 |
| Kalutara  | 2927 $\frac{1}{4}$   | 1912 $\frac{1}{2}$ | 796      | 409  |
| Colombo   | 2431 $\frac{1}{4}$   | 2071               | 780      | 644  |
| Kegalla   | 2185                 | 1876               | 573      | 490  |
| Ratnapura | 1441 $\frac{1}{4}$   | 1590 $\frac{1}{4}$ | 431      | 471  |
| Galle     | 1013 $\frac{3}{4}$   | 1055               | 236      | 239  |
| Matara    | 359                  | 387                | 54       | 53   |
| Kandy     | 80 $\frac{1}{4}$     | —                  | 20       | —    |
| Total     | 10,437 $\frac{3}{4}$ | 8891 $\frac{3}{4}$ | 2890     | 2306 |

The distribution of co-operative sulphur dusting groups according to districts is given in Table 2.

TABLE 2

| District  | Distribution of Groups |      |
|-----------|------------------------|------|
|           | 1967                   | 1968 |
| Kalutara  | 26                     | 19   |
| Colombo   | 24                     | 22   |
| Kegalla   | 25                     | 21   |
| Ratnapura | 12                     | 13   |
| Galle     | 8                      | 9    |
| Matara    | 3                      | 3    |
| Kandy     | 1                      | —    |
| Total     | 99                     | 87   |

Out of the 87 dusting groups formed, 2 groups had to be dropped as most of the members of these 2 groups defaulted payment for their sulphur. Finally dusting operations were carried out in 84 groups out of the 85 as members of the balance group were reluctant to dust the holdings in their group due to the dry climatic conditions that prevailed at the time. Dusting operations commenced on 1-2-68 in Yatiyantota Range. Undugoda Range was the first to complete dusting having completed the final round of dusting on 22-2-68. The dusting operations for the season were concluded on 6-4-68 when the Artigala sulphur dusting group in Hanwella Range was given the final round of dusting.

Although applications were received and accepted to cover an acreage of 8,891 $\frac{3}{4}$  acres, final arrangements were made to dust 8,283 $\frac{1}{2}$  acres. But even after the sulphur dust of Waharaka sulphur dusting group had been removed dusting was not done at the request of group members. In some of the dusted groups a few members were reluctant to get their lands dusted. Therefore dusting was done only on 7,904 $\frac{1}{4}$  acres.

This year the dusted and undusted holdings which wintered early generally showed no signs of infection by *Oidium* due to the dry climatic conditions prevailing during refoliation. But it has been observed that the late winterers had light attacks while undusted areas showed more severe attacks.

A follow-up questionnaire was distributed to ascertain the results of dusting after a period of time and the answers reveal that :

1. Almost all the dusted holdings were free of *Oidium*.
2. In general the incidence of the disease in undusted holdings has been heavier.

3. In dusted holdings, especially in the partial and late winterers, infection by *Oidium* appeared on a very small scale.
4. Most of the smallholders who took part in the scheme this year have expressed their willingness to participate in the scheme in the coming year as well.

Arrangements have been made to dust 103 groups comprising of 10,300 acres in the forthcoming 1969 dusting season.

Rubber Instructors have made a total of 12,941 visits to sulphur dusting areas during this period.

### **Village Propaganda**

The 2 publicity units of the department were very useful in doing its propaganda work in the field. These 2 units were sent to some of the exhibitions where the department participated and were very popular at these exhibitions. The units screened films of agricultural interests borrowed from foreign embassies along with a rubber film bought by this department. All film shows were preceded by a public meeting presided over by the local Rubber Instructor where many problems of the smallholders were discussed and clarified.

A film depicting the local conditions is in the course of preparation and some scenes were shot in Matugama Division during this year. 121 publicity meetings and film shows by Unit 1 and 27 publicity meetings and slide shows were held by the Unit 2 during the year.

### **Improvement of Smallholders' Sheet**

This department focussed its attention on the improvement of smallholders' rubber sheets this year too. Field staff left no stone unturned in persuading smallholders to improve their sheets to Grade 1 RSS. Advice and assistance were given readily to smallholders in their efforts to make Grade 1 sheets. No assistance in the form of subsidised aluminium pans and strainers could be given to smallholders as the expected financial assistance from the Department of Commodity Purchase was not received during the year. However, 1,421 aluminium coagulating pans and 94 strainers fitted with monel metal mesh, a balance left over from the previous year's stock, were sold to smallholders at a subsidised rate during the year.

Two proto-type smokehouses cum curing sheds of 225 and 350 lb capacities were designed mainly to cut down cost of construction and streamlining building for better sheet making and smoking. Construction of such smokehouses, two in each division, was started in most of the eight divisions and some of these smokehouses were completed, while others are nearing completion. Preliminary arrangements were made in forming 16 rubber co-operative societies at the rate of two societies in each of the 8 D.A.O.S. divisions under the proposed 1969 "crash programme" for improvement of smallholders' RSS. In view of the difficulties faced in getting these new rubber co-operative societies registered by the Department of Co-operative Development, the writer took up the matter with that department. A series of joint meetings attended by the officers of both these departments were held at district level at Kegalla, Colombo, Panadura, Ratnapura

and Galle to fully explain the regulations and by-laws etc. of the Department of Co-operative Development and to iron out problems in regard to the registration of these new rubber co-operative societies.

13 demonstration and 77 ordinary smokehouses were started and 20 demonstration and 46 ordinary ones were completed during the year. Out of the 20 demonstration smokehouses completed, 7 had been started during the previous year. Instructors have also made a total of 1,318 visits to demonstration smokehouses and 6,792 visits to private smokehouses in order to advise smallholders on sheet improvement and on construction or improvement of smokehouses.

A close watch on smallholders' reaction to aluminium mini-coagulating tanks issued to some smallholders in each D.A.O.S. Division was kept. Each tank can produce a maximum of 8 sheets and they should be popular with smallholders in the near future if their selling price could be reduced.

204 visits to rubber co-operative societies and 391 visits to Commodity Purchase Depots too were made by Rubber Instructors in connection with the improvement of smallholders' sheet.

### General Assistance

3 tons of R. 4 : 6 : 5 and 6 cwts. of R. 4 : 6 : 3 + Mg manure mixture were bought by smallholders through this department at a discount of 5%.

### Tapping Training Classes

The scheme of training smallholders in tapping, manufacture and other allied subjects on rubber was organised this year too. All applications were received by end of April 1968 and 34 classes were started. Later 9 classes had to be abandoned due to very poor attendance. 627 trainees participated in these classes and 333 trainees were successful and certificates will be awarded.

SMALLHOLDER TRAINEES SUCCESSFUL IN THE TRAINING SCHEME IN TAPPING CLASSIFIED ACCORDING TO DIVISIONS

| Division    | No. of trainees accepted | No. of trainees participated | No. successful |
|-------------|--------------------------|------------------------------|----------------|
| Kegalla     | 31                       | 31                           | 16             |
| Pasyala     | 57                       | 39                           | 28             |
| Homagama    | 77                       | 60                           | 35             |
| Avissawella | 160                      | 135                          | 70             |
| Ratnapura   | 145                      | 123                          | 57             |
| Panadura    | 22                       | 19                           | 14             |
| Matugama    | 80                       | 75                           | 43             |
| Galle       | 170                      | 145                          | 70             |
| Total       | 742                      | 627                          | 333            |

## Surveys

The rainfall survey is being continued.

## Staff

9 temporary Rubber Instructors were appointed with effect from 1-10-68. The Chief Advisory Officer was on duty throughout the year.

Mr. A. Suriyaarachchi, Rubber Instructor, Talgampola was appointed Rubber Instructor, Publicity Unit 2 with effect from 1-10-68.

## Publications

There is a great demand for the advisory leaflets of this department and arrangements have been made to reprint all leaflets that are in short supply.

## General

### *Exhibitions*

This department participated in agricultural exhibitions conducted by various organisations and schools. The department took part in 7 exhibitions during the year.

The departmental publicity unit too was sent to some of these exhibitions.

### *Correspondence*

#### General :

|         |   |        |
|---------|---|--------|
| Inward  | — | 5,558  |
| Outward | — | 11,609 |

#### With Rubber Controller :

|         |   |       |  |
|---------|---|-------|--|
| Inward  | — | 2,337 | (New planting applications etc.)                         |
| Outward | — | 2,588 | (Preliminary, special and final inspection reports etc.) |

From Rubber Instructors to permit holders — 2913

### *Special Inspections for Rubber Control Department*

|  |     |     |     |       |
|--|-----|-----|-----|-------|
| Visits for preliminary reports           | ... | ... | ... | 436   |
| „ „ final inspection reports             | ... | ... | ... | 418   |
| „ „ special reports (new planting)       | ... | ... | ... | 1,734 |
| „ „ special reports (subsidy replanting) | ... | ... | ... | 315   |

### *Lectures and Demonstrations*

The following lectures were given by the field staff to members of various organisations during the year :—

- (1) Divisional Advisory Officer — A talk on rubber to students of Nit-tambuwa Guru Vidyalaya  
(Pasyala)

- (2) Divisional Advisory Officer — A talk on rubber to students of Miga-  
(Matugama) hatenna Maha Vidyalaya
- (3) Divisional Advisory Officer — A series of lectures to teacher-trainees  
(Homagama) of Horana Government Farm.

The following demonstrations were conducted by the field staff during the year :—

|                 |     |       |
|-----------------|-----|-------|
| Sheet making    | ... | 1,188 |
| Tapping         | ... | 649   |
| Disease control | ... | 394   |
| Miscellaneous   | ... | 819   |

#### *Loans*

Loans amounting to Rs. 29,435/- were given to 6 field officers to purchase motor vehicles.

#### *Conferences and Meetings*

4 conferences of supervisory staff were convened to discuss various items such as sulphur dusting scheme 1968/69, crash programme for improvement of sheet to RSS 1, field day and co-operative rubber societies during this period. The Director was present at all these conferences.

The writer attended a meeting of the Department of Co-operative Development and a Board meeting by invitation. He also attended a series of joint meetings attended by field officers of the Department of Co-operative Development and this department at district level in connection with the registration of the proposed 18 rubber co-operative societies during this period.

#### *Visitors*

The following foreign visitors were taken round for inspection of rubber smallholdings during the year :—

1. Mr. Hachiro Fukazawa, a senior research staff officer of the Institute of Asian Economic Affairs, Tokyo, was taken round the Pasyala Division.
2. A delegation of the Rubber Smallholdings Economic Inquiry Committee of India visited the Institute. The delegation which consisted of 4 members was taken round Panadura, Pasyala and Kegalla Divisions in the company of the C.A.O.S. on 8th and 9th May. They also visited Egal-Oya Nursery on 9th May.
3. Mr. S. Hansen, United Nations Expert, visited the Ittapana Rubber Co-operative Society in the company of the writer and Kahagalla, Maha Pallegama and Hataraliyadda Rubber Co-operative Societies with D.A.O.S. (Kegalla) and R. I. Polgahawela.

# REVIEW OF THE ESTATE DEPARTMENT

By

L. WIJEYAGUNAWARDENA

## Acreage Summary — Dartonfield Group

| <i>Rubber</i>                | Dartonfield |          |           | Nivitigalakele |          |           | Hedigalla    |          |           | Total        |          |           |
|------------------------------|-------------|----------|-----------|----------------|----------|-----------|--------------|----------|-----------|--------------|----------|-----------|
|                              | A.          | R.       | P.        | A.             | R.       | P.        | A.           | R.       | P.        | A.           | R.       | P.        |
| Mature ...                   | 82          | 3        | 19        | 59             | 2        | 11        | 648          | 3        | 11        | 791          | 1        | 01        |
| Immature ...                 | 33          | 0        | 00        | 76             | 1        | 01        | 62           | 0        | 36        | 171          | 1        | 37        |
| Nurseries ...                | 3           | 2        | 00        | 8              | 1        | 07        | 19           | 0        | 00        | 30           | 3        | 07        |
| <b>Total</b> ...             | <b>119</b>  | <b>1</b> | <b>19</b> | <b>144</b>     | <b>0</b> | <b>19</b> | <b>730</b>   | <b>0</b> | <b>07</b> | <b>993</b>   | <b>2</b> | <b>05</b> |
| Abandoned ...                | 11          | 2        | 00        | 11             | 1        | 07        | —            | —        | —         | 22           | 3        | 07        |
| Building sites etc. ...      | 40          | 2        | 36        | 15             | 1        | 33        | 8            | 1        | 18        | 64           | 2        | 07        |
| Pinewood plantation ...      | —           | —        | —         | —              | —        | —         | 1            | 0        | 34        | 1            | 0        | 34        |
| Roads ...                    | 6           | 2        | 22        | 0              | 3        | 27        | 9            | 0        | 04        | 16           | 2        | 13        |
| Swamp areas ...              | —           | —        | —         | 0              | 2        | 08        | 0            | 2        | 20        | 1            | 0        | 28        |
| Streams and reservations ... | 0           | 0        | 29        | —              | —        | —         | 13           | 0        | 29        | 13           | 1        | 18        |
| Jungles etc. ...             | —           | —        | —         | 1              | 3        | 38        | 376          | 0        | 00        | 377          | 3        | 38        |
|                              | <b>178</b>  | <b>1</b> | <b>26</b> | <b>174</b>     | <b>1</b> | <b>12</b> | <b>1,138</b> | <b>1</b> | <b>32</b> | <b>1,491</b> | <b>0</b> | <b>30</b> |

*Visiting Agent* : Mr. M. W. Thompson paid one visit to the Institute's properties on 30th and 31st July 1968.

*Weather (Estate Gauge)* : Comparative rainfall figures (in inches) for 1968 are given below :—

| <i>Month</i>                | Dartonfield   |               | Nivitigalakele |               | Hedigalla     |               |
|-----------------------------|---------------|---------------|----------------|---------------|---------------|---------------|
|                             | 1968          | 1967          | 1968           | 1967          | 1968          | 1967          |
| January ...                 | 6.09          | 4.69          | 7.47           | 1.81          | 6.27          | 4.41          |
| February ...                | 2.87          | 6.92          | 1.97           | 4.32          | 2.67          | 5.93          |
| March ...                   | 10.29         | 11.37         | 11.14          | 14.16         | 10.40         | 15.13         |
| April ...                   | 14.41         | 13.64         | 13.86          | 8.40          | 15.15         | 9.54          |
| May ...                     | 16.08         | 23.67         | 18.78          | 22.68         | 11.52         | 17.31         |
| June ...                    | 28.62         | 16.11         | 28.54          | 16.25         | 26.05         | 18.03         |
| July ...                    | 20.25         | 16.99         | 19.57          | 14.20         | 18.49         | 12.98         |
| August ...                  | 6.52          | 15.93         | 6.00           | 12.95         | 7.60          | 12.93         |
| September ...               | 19.84         | 22.05         | 14.98          | 19.46         | 18.01         | 12.28         |
| October ...                 | 18.34         | 36.47         | 15.45          | 27.71         | 12.73         | 32.31         |
| November ...                | 13.05         | 13.55         | 12.66          | 8.94          | 10.07         | 17.48         |
| December ...                | 14.85         | 13.11         | 10.90          | 9.51          | 10.16         | 8.16          |
|                             | <b>171.21</b> | <b>194.50</b> | <b>161.32</b>  | <b>160.39</b> | <b>149.12</b> | <b>166.49</b> |
| Average (5-year period) ... | 179.67"       |               | 159.49"        |               | 173.42"       |               |
| Total No. of wet days ...   | 231           | 238           | 223            | 233           | 239           | 249           |

The rainfall for the year at Dartonfield, Nivitigalakele and Hedigalla Divisions amounted to 171.21", 161.32" and 149.12" on 231, 223 and 239 days respectively. The rainfall was below quinquennial averages at Dartonfield and Hedigalla but above at Nivitigalakele Division. The 2nd and 3rd quarters of the year received heavier falls at Hedigalla Division than in 1967, in spite of the lower rainfall recorded this year.

It can be seen that Hedigalla has had the highest number of wet days on the three divisions, for this season. The first quarter of the year was comparatively dry with prolonged drought conditions which continued from December of the previous year.

### Crop

The major factors contributing to the deficit in crop this season are: (a) the prolonged dry weather extending from December 1967 through to mid March 1968, (b) with the latter half of this period coinciding with the refoilation of the rubber trees, a pronounced delay was experienced in the picking up of crop intakes, (c) a poorer foliage canopy this season than in 1967, and (d) the second and third quarters of the year recorded heavier rainfalls than in 1967 which hampered the making up of the heavy crop deficit.

|           |     | 1968              | 1967              |
|-----------|-----|-------------------|-------------------|
| Estimated | ... | 683,000 lb        | 692,000 lb        |
| Harvested | ... | 557,483 ,,        | 622,679 ,,        |
|           |     | <u>          </u> | <u>          </u> |
| Decrease  | ... | 125,517 ,,        | 69,321 ,,         |
|           |     | <u>          </u> | <u>          </u> |

The crop harvested for the year 1968 = 81.62% of the season's estimate.

### Comparative Yield Records of Individual Fields

| <i>Dartonfield</i>     | <i>Acreage<br/>in tapping</i> | <i>Total yield in lb</i> |               | <i>Yield in lb per acre</i> |              |
|------------------------|-------------------------------|--------------------------|---------------|-----------------------------|--------------|
|                        |                               | 1968                     | 1967          | 1968                        | 1967         |
| 1950/51 replanted area | 25½                           | 13,888                   | 15,396        | 539.3                       | 597.9        |
| 1952   "   "           | 27                            | 22,861                   | 24,546        | 846.7                       | 909.1        |
| 1953   "   "           | 8                             | 5,800                    | 7,178         | 725.0                       | 897.2        |
| 1954   "   "           | 2½                            | 2,697                    | 2,248         | 1,078.8                     | 899.2        |
| 1955   "   "           | 5                             | 3,775                    | 3,495         | 755.0                       | 699.0        |
| 1955/56   "   "        | 4½                            | 3,301                    | 3,497         | 694.9                       | 736.2        |
| 1960/61   "   "        | *10                           | 11,162                   | —             | 744.1                       | —            |
|                        | <u>83</u>                     | <u>63,484</u>            | <u>56,360</u> | <u>764.9</u>                | <u>772.1</u> |

\*Additional 5 acres brought into tapping.

### *Nivitigalakele*

|                      |            |               |               |                |                |
|----------------------|------------|---------------|---------------|----------------|----------------|
| *1940 replanted area | —          | 263           | 6,946         | 27.0           | 712.4          |
| *1940 swamp area     | —          | 136           | 3,184         | 41.8           | 979.7          |
| 1941 clearing        | 7          | 7,440         | 8,849         | 1,062.8        | 1,264.1        |
| *1942   "   "        | —          | 282           | 3,168         | 62.7           | 704.0          |
| 1943   "   "         | 7          | 5,953         | 5,619         | 850.4          | 802.8          |
| 1944   "   "         | 4½         | 2,836         | 4,200         | 630.2          | 933.3          |
| 1946   "   "         | 21         | 28,074        | 33,549        | 1,336.8        | 1,597.6        |
| 1953   "   "         | 10         | 11,262        | 11,816        | 1,126.2        | 1,181.6        |
| 1954   "   "         | 10         | 9,767         | 11,008        | 976.7          | 1,100.8        |
|                      | <u>59½</u> | <u>66,013</u> | <u>88,339</u> | <u>1,109.5</u> | <u>1,147.3</u> |

\*Uprooted for replanting

| <i>Hedigalla</i>    | <i>Acreage<br/>in tapping</i> | <i>Total yield in lb</i> |         | <i>Yield in lb per acre</i> |         |
|---------------------|-------------------------------|--------------------------|---------|-----------------------------|---------|
|                     |                               | 1968                     | 1967    | 1968                        | 1967    |
| 1945 clearing       | —                             | —                        | 16,219  | —                           | 729.0   |
| 1946 "              | 12 $\frac{3}{4}$              | 6,502                    | 8,689   | 510.0                       | 681.5   |
| 1947 "              | 45                            | 16,422                   | 16,176  | 364.9                       | 359.9   |
| 1949 "              | 34 $\frac{3}{4}$              | 24,562                   | 28,543  | 706.8                       | 821.4   |
| 1950/51 "           | 18                            | 13,531                   | 18,202  | 751.7                       | 1,011.2 |
| 1952 "              | 79 $\frac{1}{2}$              | 58,593                   | 62,361  | 737.0                       | 784.4   |
| 1953 "              | 132 $\frac{1}{2}$             | 100,568                  | 107,660 | 759.0                       | 812.5   |
| 1954 "              | 171                           | 105,685                  | 114,537 | 618.0                       | 669.8   |
| 1955 "              | 78                            | 55,472                   | 62,059  | 711.2                       | 795.6   |
| 1956 "              | 60                            | 40,040                   | 37,024  | 667.3                       | 617.1   |
| 1957 "              | 17 $\frac{1}{2}$              | 6,611                    | 6,510   | 383.2                       | 723.3   |
|                     | 648 $\frac{3}{4}$             | 427,986                  | 477,980 | 659.7                       | 721.2   |
| Total for the Group | 791 $\frac{1}{2}$             | 557,483                  | 622,679 | 704.6                       | 766.1   |
| Other sources       |                               | 1,228                    | 868     |                             |         |
| Total               |                               | 558,711                  | 623,547 |                             |         |

### Tapping

The non-experimental areas were tapped throughout the wintering period. Tapping panels were marked with the appropriate bark consumption. Tapping was resumed in the non-experimental areas after winter rest during refoliation.

#### *Analysis of tapping rounds on Dartonfield Group for 1968 (1967 figures in brackets)*

| <i>Dartonfield</i> | <i>Early tapping</i> |       | <i>Late tapping</i> |      | <i>Winter rest</i> |   | <i>No tapping<br/>Rain</i> |      | <i>Holidays</i> |     |
|--------------------|----------------------|-------|---------------------|------|--------------------|---|----------------------------|------|-----------------|-----|
| 1st quarter        | 76                   | (72)  | 14                  | (16) | —                  | — | —                          | —    | 1               | (2) |
| 2nd "              | 39                   | (40)  | 18                  | (24) | —                  | — | 29                         | (22) | 5               | (5) |
| 3rd "              | 39                   | (45)  | 20                  | (22) | —                  | — | 33                         | (25) | —               | —   |
| 4th "              | 53                   | (49)  | 29                  | (27) | —                  | — | 10                         | (16) | —               | —   |
|                    | 207                  | (206) | 81                  | (89) | —                  | — | 72                         | (63) | 6               | (7) |

| <i>Nivitigalakele</i> | <i>Early tapping</i> |       | <i>Late tapping</i> |      | <i>Winter rest</i> |   | <i>No tapping<br/>Rain</i> |      | <i>Holidays</i> |     |
|-----------------------|----------------------|-------|---------------------|------|--------------------|---|----------------------------|------|-----------------|-----|
| 1st quarter           | 83                   | (78)  | 5                   | (12) | —                  | — | 3                          | —    | —               | —   |
| 2nd "                 | 42                   | (45)  | 13                  | (23) | —                  | — | 30                         | (17) | 6               | (6) |
| 3rd "                 | 36                   | (46)  | 28                  | (22) | —                  | — | 28                         | (24) | —               | —   |
| 4th "                 | 55                   | (50)  | 28                  | (26) | —                  | — | 9                          | (16) | —               | —   |
|                       | 216                  | (219) | 74                  | (83) | —                  | — | 70                         | (57) | 6               | (6) |

| <i>Hedigalla</i> | <i>Early tapping</i> |       | <i>Late tapping</i> |      | <i>Winter rest</i> |   | <i>No tapping<br/>Rain</i> |      | <i>Holidays</i> |     |
|------------------|----------------------|-------|---------------------|------|--------------------|---|----------------------------|------|-----------------|-----|
| 1st quarter      | 68                   | (67)  | 10                  | (20) | 9                  | — | 1                          | (3)  | 3               | —   |
| 2nd "            | 45                   | (50)  | 12                  | (18) | —                  | — | 27                         | (20) | 7               | (3) |
| 3rd "            | 45                   | (49)  | 17                  | (18) | —                  | — | 30                         | (25) | —               | —   |
| 4th "            | 59                   | (50)  | 24                  | (27) | —                  | — | 9                          | (15) | —               | —   |
|                  | 217                  | (216) | 63                  | (83) | 9                  | — | 67                         | (63) | *10             | (3) |

\*Includes no tapping on Poya holidays.

**Manufacture.** A summary of the various forms of manufacture during the year is given below:—

| <i>Latex Grades</i>       | <i>Total in lb</i> | <i>Percentage</i> |
|---------------------------|--------------------|-------------------|
| Pale crepe No. 1 ...      | 370,823            | 66·52             |
| Pale crepe No. 2 ...      | 24,852             | 4·46              |
| Pale crepe No. 3 ...      | 90,342             | 16·20             |
| Latex for experiments ... | 2,133              | 0·38              |
|                           | 488,150            | 87·56             |
| <br><i>Scrap Grades</i>   |                    |                   |
| Scrap crepe No. 1 ...     | 39,660             | 7·12              |
| Scrap crepe No. 2 ...     | 22,612             | 4·06              |
| Scrap crepe No. 3 ...     | 6,986              | 1·25              |
| Scrap for experiments ... | 75                 | 0·01              |
|                           | 69,333             | 12·44             |
| <b>Total</b> ...          | 557,483            | 100·00            |
| From outside sources ...  | 1,228              |                   |
|                           | 558,711            |                   |

The production of uniform No. 1 crepe is made increasingly difficult with acreages of experimental areas of a multiplicity of clones under test with different latices in production.

### **Factory Machinery**

*Mill No. 7 — 26" × 14" (smooth):* This mill had to be repaired during the year, mainly replacing layshaft ball bearings. Latterly, the driving system (Torque arm reducing gear) was changed to Polly-V belt driving equipment. The mill was out of commission for an aggregate of two months.

*Mill No. 8 — 26" × 14" (smooth):* Layshaft ball bearings were replaced twice during the year. The mill was out of commission nearly two weeks.

### **Field and Factory Experiments**

The Rubber Chemistry, Botany, Plant Pathology and Soils Departments were given assistance in carrying out their field and factory experiments.

### **Estimates**

Estimates of capital and revenue expenditure for 1969 in respect of Dartonfield Group were prepared and submitted by the writer to the Rubber Research Board.

### **Estate Roads**

All motorable roads and paths were maintained in good order throughout the year.

## Pests and Diseases

*Oidium heveae* : Early defoliation in January accompanied by sunny weather which prevailed from December 1967 through to mid-March 1968 were conditions not favourable for the growth and spread of the fungus *Oidium heveae*. Wintering was early at Dartonfield and Nivitigalakele but defoliation was rather protracted at Hedigalla Division due to the multiplicity of clones and late winterers suffered a mild attack. The foliage this season was comparatively poor to that which prevailed in 1967. A satisfactory control was however achieved by sulphur dusting.

*Gloeosporium alborubrum* : The incidence of *Gloeosporium* was negligible this year.

*Phytophthora palmivora* : Factors unfavourable to the build up of inoculum and to the activity of the fungus prevailed throughout the South West monsoon period. There was no marked leaf fall due to generally sparse foliage.

*Bark Rot* : The incidence of Bark Rot in the Group was negligible.

*Wind Damage* : This was rather marked this season with Dartonfield, Nivitigalakele and Hedigalla having 99, 112 and 2382 trees respectively wind-damaged.

## Capital Account — Agricultural Development

### *Dartonfield Division — Immature Areas*

|                        |     |     |              |
|------------------------|-----|-----|--------------|
| 1960/61 replanted area | ... | 21½ |              |
| 1965       "       "   | ... | 11½ | ... 33 acres |

### *Nivitigalakele Division — Immature Areas*

|                      |     |     |               |
|----------------------|-----|-----|---------------|
| 1962 replanted area  | ... | 16¾ |               |
| 1963       "       " | ... | 14  |               |
| 1964       "       " | ... | 8   |               |
| 1965       "       " | ... | 10  |               |
| 1966       "       " | ... | 5¾  |               |
| 1967       "       " | ... | 8¾  |               |
| 1968 replanting      | ... | 13  | ... 76¼ acres |

### *Hedigalla Division — Immature Areas*

|                      |     |     |              |
|----------------------|-----|-----|--------------|
| 1965 replanted area  | ... | 11½ |              |
| 1967       "       " | ... | 21¼ |              |
| 1968 replanting      | ... | 22¼ | ... 55 acres |

Routine weeding, cultivation and other agricultural operations were carried out. The immature areas are in good condition and were maintained up to the required standards of sound agricultural practice.

*1960/61 Replanted Area (31½ acres) at Dartonfield* : This area was planted with two tapping tasks of each of the clones RRIC 7, 45, 52, 88, 89, PB 28/59, PB 86 and RRIM 513. Ten acres of this area was envisaged to be brought in for tapping this season, but approximately 15 acres of this area was tapped as trees attained the required tappable girth.

*1962 Replanted Area (16 $\frac{3}{4}$  acres) at Nivitigalakele :* This area is planted with the following clones : RRIC 5, RRIC 39, RRIC 51, RRIC 86, RRIC 90, RRIC 91, RRIC 92, RRIC 93, RRIC 94, RRIC 95, RRIC 96, RRIC 97, PB 86, IAN 45 — 717, RRIM 623, RRIM 628, RRIM 701 and 17 ten-tree clones. Growth is quite satisfactory, but as reported earlier fairly uneven due to the variability of the growth characteristics of each clone. Weeding, manuring and attention of root diseases were carried out.

*1963 Replanted Area (14 acres) at Nivitigalakele :* This is planted with five plots of 300 points each of clones RRIC 59, RRIC 60, RRIC 64, RRIC 75 and PB 86 and four plots of 150 points each of clones RRIC 6, RRIC 39, RRIC 41 and RRIC 98. A further 150 points of PB 86 were planted. Uneven growth. Routine agricultural operations were carried out with special attention given to root diseases.

*1964 Replanted Area (8 acres) at Nivitigalakele :* This is planted with four clones : RRIC 41, RRIC 45, RRIC 52 and RRIC 86. The growth of plants is very satisfactory. Routine agricultural operations were carried out.

#### *1965 Replanted Areas*

- (a) *11 $\frac{1}{2}$  acres at Dartonfield :* This is planted with 5-point buddings of H.P. seedlings, RRIC 45, RRIC 88, RRIC 89, RRIC 90, RRIC 91 and RRIM 600. Growth though uneven is good. Close attention was paid to weeding, manuring and root diseases.
- (b) *10 acres at Nivitigalakele :* This area consists of a monoclonal block of RRIC 45. Growth is satisfactory. Routine agricultural operations were carried out.
- (c) *11 $\frac{1}{2}$  acres at Hedigalla :* This area is made up of sixteen small plots scattered over different fields and sandwiched among planted rubber. The originally planted material consisted of LCB 870 buddings. This carries plants of RRIC 52. Growth is satisfactory.

#### *1966 Replanted Areas*

*5 $\frac{3}{4}$  acres at Nivitigalakele :* This was replanted during the South West monsoon of 1966, in keeping with the requirements of the Plant Breeding and Botany Departments. Details of materials used are as follows : RRIC 45=265 plants ; clone No. 451=384 plants ; clone No. 1000=296 plants and another 102 plants made up of the following : J 1, *Hevea spruceana*, RRIC 5, 7, 41, 45, 52, 58, 59 and 86. The plants are coming up well.

#### *1967 Replanted Areas*

- (a) *8 $\frac{3}{4}$  acres at Nivitigalakele :* This area was replanted in the South West monsoon of 1967 and carries 1601 plants of clones 1174, 815, 1103 in three randomised replications with RRIM 623 as an observational plot. The plants are growing satisfactorily.
- (b) *11 $\frac{1}{4}$  acres at Hedigalla :* This area which was planted by the Botany and Genetics & Plant Breeding Departments received the routine attention of weeding and manuring and the plants are coming on well.
- (c) *1968 Replanting :* The balance of approximately 10 acres of the 21 $\frac{1}{4}$  acres cleared and not planted in 1967 was planted by the Genetics & Plant Breeding Department with the following clones : RRIC 45 and experimental material Nos. 451, 1004, 1152, 1174 and 1305.

## Nurseries

### *Budwood Nurseries — Dartonfield*

(a) Routine weeding and clearing of drains were carried out in the nurseries. Plants were manured in accordance with the Institute's recommendations.

(b) Plants bearing over-matured budwood were lopped.

### • *Seedling and Budwood Nurseries — Nivitigalakele*

(a) Weeding, clearing of drains and manuring were done.

(b) Vigorous-growing stocks in these nurseries were budded to meet requirements.

### *Budwood Issues*

|                                      |     |              |       |
|--------------------------------------|-----|--------------|-------|
| (a) Outside estates                  | ... | 1,103        | yards |
| (b) Botany Department Experiments    | ... | 900          | „     |
| (c) Plant Breeding Dept. Experiments | ... | 75           | „     |
|                                      |     | <u>2,078</u> | „     |

### *Budded Stumps Issues*

|                                   |     |              |               |
|-----------------------------------|-----|--------------|---------------|
| (a) Botany Department Experiments | ... | 348          | budded stumps |
| (b) Planting at Hedigalla Nursery | ... | 2,758        | „ „           |
|                                   |     | <u>3,106</u> | „ „           |

*Budwood Multiplication Nursery Hedigalla* : This nursery which carried 7 acres of budwood nursery and 3 acres of seedling stocks nursery was extended in 1968 by a further 7 acres of budwood nursery carrying the following materials : AVROS 427, 1734, PR 252, IRCI 2, IRCI 9, Nab 17, RRIC 13, 26, 40, 48, 35, 61, 99, 100 and 101.

The seedling stock nursery was increased by a further  $2\frac{1}{2}$  acres.

## Labour and Health

*Labour Force* : The regular labour force was adequate and generally settled.

*Line Rooms* : Line room accommodation was satisfactory.

*Wages* : Wages were paid during the year in accordance with the Wages Boards Ordinance in force.

*Dartonfield Group*

| <u>Working Ceylonese</u>      | <u>Resident</u> | <u>Non-resident</u> | <u>Total</u> |
|-------------------------------|-----------------|---------------------|--------------|
| Men ...                       | 112             | 221                 | 333          |
| Women ...                     | 92              | 144                 | 236          |
| Children ...                  | —               | —                   | —            |
| <br><u>Working Immigrants</u> |                 |                     |              |
| Men ...                       | 35              | —                   | 35           |
| Women ...                     | 23              | —                   | 23           |
| Children ...                  | —               | —                   | —            |
|                               | <u>262</u>      | <u>365</u>          | <u>627</u>   |

*Annual Holidays* : Annual holidays with pay were given to all labourers who were entitled to these in accordance with the ordinance.

*Maternity Benefits* : Forty maternity benefit payments were made.

*Feeding Children* : Free rations and  $\frac{1}{4}$  lb bread were issued to each non-working child.

*Health* : The health of the members of the Institute's staff and of the estate labourers was satisfactory during the year.

*Anti-mosquito Measures* : DDT/Gammexane spraying was carried out throughout the year, at regular intervals, in and around the bungalows and lines under the supervision of the Apothecary.

Immunisation against Polio and vaccination against Small Pox were carried out on the estate.

*Births* : Twenty-five children were born during the year on the Group.

*Deaths* : There were two deaths on the Group this year.

A list of diseases treated by the Institute's Apothecary is given below :—

|                             |     |              |
|-----------------------------|-----|--------------|
| Influenza ...               | ... | 1,481        |
| Ulcers ...                  | ... | 649          |
| Roundworm ...               | ... | 1,454        |
| Diarrhoea and Enteritis ... | ... | 518          |
| Eye and ear diseases ...    | ... | 146          |
| Other diseases ...          | ... | 5,477        |
| Total ...                   | ... | <u>9,725</u> |

# REVIEW OF THE R.R.I.C. SUB-STATION, KURUWITA

By

W. L. SCOTT

## Acreage

|                                 |     | <i>A</i>   | <i>R</i> | <i>P</i>  |
|---------------------------------|-----|------------|----------|-----------|
| Replanted 1961 — 1968           | ... | 212        | 1        | 12        |
| Uprooted for replanting in 1969 | ... | 10         | 1        | 23        |
| Nurseries                       | ... | 2          | 0        | 00        |
| Roads, deniya and buildings     | ... | 22         | 3        | 35        |
| <b>Total</b>                    | ... | <b>247</b> | <b>2</b> | <b>30</b> |

A further 10 acres were replanted in 1968 in hand-pollinated and RRIC clones by the Genetics & Plant Breeding Department, and the remaining 10A 1 R 23P of old polyclonal rubber has been uprooted for replanting in the S.W. monsoon period of 1969. In the 64 acres of the 1961 clearing some more trees, which attained a girth of 20" and above were brought into tapping. Also in the 20 acres of 1961 under the Soils Department, and in 1 acre of 1962 clearing and 7½ acres of 1963 clearing under the Genetics & Plant Breeding Department, trees of 20" girth and over were brought into tapping.

## Weather

With the exception of the periods January/March and November/December conditions were generally wet, and there is an increase in total rainfall against last year.

## Crop

|           |     | <u>1967</u> | <u>1968</u> |
|-----------|-----|-------------|-------------|
| Estimated | ... | 45,600 lb   | 38,600 lb   |
| Secured   | ... | 36,772 ,,   | 41,277 ,,   |

The season's estimate has been exceeded by 2,677 lb.

## Tapping and Manufacture

The actual cost of tapping is not available. Intake per tapper was 12.1 lb and shows an increase over the intake of 11.6 lb for last season. Smoked sheet manufacture was continued and out-turn of No. 1 sheet was 92% against 89% last year.

## General

Routine maintenance of buildings was carried out as necessary. The new office block was occupied during the year — 2 rooms by the Genetics & Plant

Breeding Department, 1 by the Botany Department and 1 by Soils Department, leaving one vacant room, presently used as a general store.

Messrs. Rajah Salgado, L. C. de Mel and E. D. de Alwis of the Estate & Experimental Committee visited the Sub-Station in November, 1968.

Once again we wish to place on record our appreciation of the useful advice and assistance rendered by Mr. M. W. Thompson, our Visiting Agent.

In the absence of a Rubber-Maker/K.P. our Senior Field Assistant, Mr. M. C. Perera, has continued to carry the heavy burden of responsibility cheerfully.