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THE TEA RESEARCH INSTITUTE OF SRI LANKA 50 YEARS OF PROGRESS

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The 8th day of October 1925 was a historic day for the tea industry of Sri Lanka, for it was then that the Legislative Council enacted the Tea Research Ordinance for the establishment of the Tea Research Institute of Sri Lanka and for the incorporation of its Board of Management. Fifty years have elapsed since that day and we have recorded earlier the major events of significance for the industry and the Institute. This record would not be complete without a brief documentation of the events of the last ten years of the first half century of the existence of the Tea Research Institute of Sri Lanka. No article such as this can be expected to achieve completeness and many events must only be covered with the briefest mention while others have necessarily been left out altogether.

PROGRESS IN RESEARCH 1965—1975

Substantial progress in research was achieved in the ten year period 1965-1975 in the entire range of scientific disciplines covered by the Institute. The record of progress is spectacular despite the attendant drawbacks associated with the times—*e.g.* high cost of equipment, staffing difficulties *etc.*

Synthesising all the information available over the previous forty years, new fertilizer recommendations were made to estates in 1971 for mature seedling and VP tea and for young VP tea. The new recommendations were based on the potential yield realizable from various types of tea in the different districts. Intensive work was done on the use of urea as a substitute for ammonium sulphate as a source of nitrogen. By 1975, most estates were fully conversant with the use of urea and were applying it according to TRI recommendations. The fertilizer subsidy scheme was organized and urea was issued under this scheme.

The plots in Dr T. Eden's historic NPK experiment on St Coombs are still being given differential fertilizer treatments, although after 15 cycles, no useful purpose would be served by continuing to maintain yield records. The experiment is still invaluable in developing proper standards for leaf and soil analysis techniques which may find future use for advisory purposes.

A large number of herbicides have been experimented with over the years and estates were given precise recommendations on how to handle these chemicals and develop suitable programmes of weed management. The outstanding development in this line was the TRI discovery that *Panicum repens* could be successfully controlled with glyphosate.

Extensive work was undertaken in the decade on soil conservation and improvement. Various measures have been recommended to estates and increased emphasis was given to the construction and maintenance of drains and terraces, to soil cultivation, mulching and the planting of *Eragrostis curvula* on banks in order to minimize soil erosion.

Some new tea clones have been added to the recommended list and some clones previously allowed have been withdrawn, following the availability of new information on their performance. The TRI 62 series and the TRI 3000 series offer promising possibilities in addition to the already outstanding TRI 2020 series of clones. A large number of clonal crosses have been tested in the nursery and in the field and tetraploids of some clones have been artificially developed. Clonal testing has been intensive and over 2500 clones have been evaluated in the field at St Coombs and other TRI Stations, while several thousands have been tested in the nursery. A comprehensive compilation of the quality ratings of clones has been issued to estates.

Basic work on the nutrition of the tea plant has been undertaken and every nutrient deficiency symptom on tea has been artificially produced in sand culture experiments. These symptoms have been described and depicted in the literature.

Pruning is the most crucial operation that a tea plant is subjected to. Most deaths of plants occur following pruning. Much research effort has been concentrated on understanding the physiological and biochemical changes taking place at pruning and the Institute's recommendations to estates have been changed from time to time as more information became available. Fundamental physiological studies have been carried out on the dormancy of tea shoots and the movement of growth hormones in tea shoots.

New recommendations for the control of *Poria* and other major root diseases by soil fumigation with methyl bromide enabled many estates which grappled with these problems for many years to eradicate them altogether. On estates where *Poria* has been extremely serious, it has been possible to contain the spread of *Poria* Root Disease using this chemical. On St Coombs alone, over 500 *Poria* patches were treated and the disease is now absent from the property.

The control of Blister Blight was one of the outstanding achievements of the Institute. Since the early fifties much research has been done to reduce the cost of control of the disease. As a result of 12 years research on its epidemiology and several years work on losses of crop caused by *Exobasidium vexans* it has been possible to bring down the cost of control using only minimal doses of fungicide.

Recommendations have been issued to estates on the management and control of various other diseases of tea.

In 1961 the TRI provisionally recommended the use of dieldrin for the control of the Shot-hole Borer on pruned tea. In their enthusiasm tea growers sometimes used it excessively and side effects, often drastic, resulted. The TRI worked intensively on the shot-hole borer problem over the last decade. New recommendations have been issued from time to time and the present view is that the use of chlorinated hodrocarbon compounds can be dispensed with, and more acceptable substitutes used.

Caterpillar pests were earlier controlled using DDT but the use of DDT was banned some years ago at the instigation of the TRI. Today, biological control methods are operative and it is well known that the introduction by the TRI of *Macrocentrus homonae* from Java, to control the Tea Tortrix is one of the most successful instances of biological control of an insect pest in the entire history of biological control in the world. Several other lines of biological control of caterpillar pests were also investigated.

A serious problem that the TRI was faced with over the last few years was the increased appearance of termites (*Glyptotermes dilatatus* and *Postelectrotermes militaris*) on tea plantations. Intensive research has been carried out on several lines. Various cultural practices including more careful pruning and certain sanitary measures have been recommended. The TRI developed and patented a new stem fumigant TRITOX, for controlling termites within infested plants. Suitable nematocides have been recommended for the control of root-infesting nematodes which could be a serious problem in nurseries and young new clearings.

There have been many contributions to our knowledge of the Biochemistry of the tea plant and of these, the more important ones include work on chemical changes during pruning, and during the manufacture of tea, the extraction and purification of tea seed oil, caffeine, tea saponins and a variety of other compounds. These studies have helped research workers to understand the essential vital processes of the tea plant. An outstanding contribution has been made to our knowledge of the constituent chemicals associated with the quality, strength and the aroma complex of tea.

Within the last ten years tea factories have been revolutionized. The major recommendations of the Institute have been the introduction of withering troughs, the introduction of the Rotorvane, the introduction of CTC manufacture and most important of all, the introduction of the fluid bed tea drier, conceived, pioneered and commercially produced in Sri Lanka. The advantages of this machine are too well known to recount here. It is considered to be one of the most important innovations since black tea was first dried more than a century ago.

Finally, the production of new forms of tea including scented tea, instant tea, instant scented tea, instant green tea, tea wine, tea cider, carbonated tea and brick tea have all been made at the TRI and advice is available to those interested in their production and export.

In the foregoing account of the research activities of the Institute, only the research that has led to concrete recommendations are touched upon, and here too, many have been omitted. In addition to this work, a large amount of information has been collected which will be of use in the formation of future recommendations. Much of this information has been published in *The Tea Quarterly* (see Bibliography) and other journals.

ADVISORY AND EXTENSION SERVICES

Over the last decade, the TRI has arranged a large number of field days for Managers, Assistant Managers and Field Officers of estates, and also factory visits for Managers, Assistant Managers and Factory Officers at TRI Stations in the various districts. Several symposia have been held on subjects of interest to the industry, and the TRI held one Conference to commemorate the Centenary of the tea indudstry of Sri Lanka. Field days and discussion groups have been organised for representatives of the Agency Houses and every Senior Staff Officer of the Institute has addressed meetings of the Planters' Association at district level and the Head of the Institute has made it a point to address the Planters' Association of Ceylon and the Low-Country Products Association of Ceylon at their General Meetings in Colombo. Several field days have been organised for small holders together with film or slide shows on important subjects like the replanting of tea land with clonal tea. Several conferences for Visiting Agents and Senior Superintendents of estates were arranged in conjunction with the Agency Houses to help formulate agricultural policy.

A large number of exhibitions were held in various parts of the Country and the TRI has participated in several exhibitions at a national level in Colombo and elsewhere. On more than one occasion the TRI stall has been a prize winner and always a top draw. In addition, a permanent tea museum was established at St Coombs for the benefit of visitors and students.

Several hundred visits were made each year by TRI officers to estates and factories to help tackle a variety of problems and Managers of estates were invited to visit the Institute by appointment to discuss their difficulties.

The success already achieved by the tea industry with new technological developments would not have been possible without the assistance and active participation of the Advisory and Extension Services of the TRI.

EDUCATION

Many members of the Senior Staff are visiting lecturers, some are also examiners, in the Science, Agricultural and Engineering faculties of the University of Sri Lanka. Some graduate officers have obtained their Masters' Degree in Science on research work done at the TRI from the University of Sri Lanka and Universities abroad. The TRI also has the distinction of having produced the first thesis to be awarded the degree of Doctor of Philosophy in the Department of Botany of the University of Sri Lanka, on work done at St Coombs. A large number of undergraduate students from Sri Lanka and elsewhere visit the TRI every year for short courses on some aspect of tea production or manufacture and the TRI has organised training courses for tea inspectors of the Tea Control Department at all its stations.

The Tea Research Institute has published *The Tea Quarterly*, its scientific journal for the last 48 years and encourages its Scientists to publish more fundamental findings in appropriate journals elsewhere. It is an undisputed fact that *The Tea Quarterly* is the foremost scientific journal in Sri Lanka today, and has been for many years. In addition the TRI publishes Advisory Phamphlets, Annual Reports, Advisory Circulars, Books and Special Publications on tea from time to time.

STAFF

The staff of the TRI consisted entirely of nationals of Sri Lanka since 1968. Exchanges of staff for short periods, between the TRI and other establishments have been encouraged and have always been mutually beneficial.

TRI STATIONS

The Low-Country Station

The Factory at St Joachim, Ratnapura, commenced manufacture on NewYear's day of 1965 of leaf from St Joachim Estate, under the supervision of the Technologist. This event was the culmination of the efforts of the TRI to establish a research station in the Low-Country to serve the needs of tea growers on two hundred thousand acres of land in the Sabaragamuwa, Western, and Southern Provinces of Sri Lanka. Some of this land has given the highest yield of tea ever recorded in the world (over 8000 kg made tea per hectare). Today, in 1975, the Station is fully equipped and continues to render valuable assistance to the tea growers in the low country. With the addition of a Sports Club for staff, the building programmes is now complete.

FIG. 3—*Demonstration to tea small holders on nursery techniques*

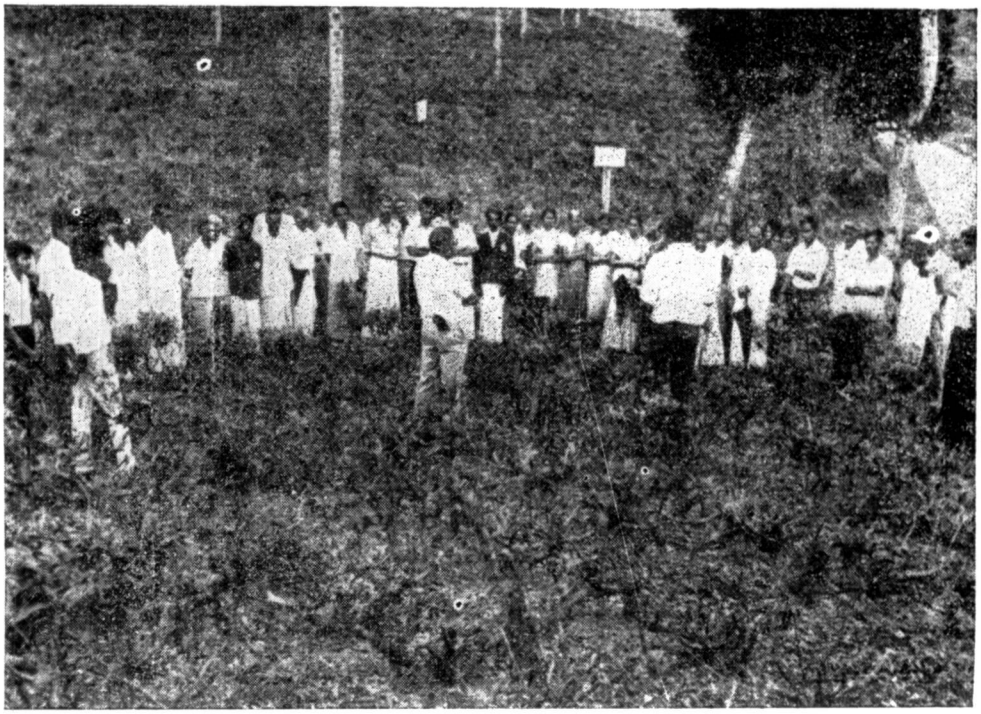

FIG. 4—*Field demonstration to tea growers*

FIG. 5—*HE The President of Burma at the TRI*

The Kottawa Substation

The outer arm of the Low-Country Station is the Kottawa Substation which serves the needs of tea growers, particularly the small holders, in the Southern Province. From Kottawa, two hundred thousand perfectly-grown, clonal tea plants are supplied each year to small holders in the Southern Province under the Tea Replanting Subsidy Scheme operated by the Tea Control Department. Expansion of buildings at Kottawa has been modest in comparison with the expansion of the research functions of the station.

The Uva Station

Both Gonakelle and Agratenne have, like Kottawa, not seen expansion in terms of buildings but more so in the varied activities that have been undertaken at these Stations. The Agratenne Substation is said to be situated within the 'dust-bowl' of Uva where tea growers have strived valiantly to establish tea with only partial success. The cry was raised 'let the TRI try it and see whether it can be done'. Within the last ten years the work at Agratenne was centred around identifying and providing solutions to the problems of tea growers in this dust bowl of lower Uva. Tea is not the most successful crop there, but sugarcane, timber, lemon grass, fodder and a number of other crops have been demonstrated to grow well. This has led to increased interest in diversifying away from tea in lower Uva.

The Mid-Country Station

For the last ten years, entomological research on Shot hole borer and allied pest problems has been centred at Hantane. Here again, expansion of buildings has been modest. A Biochemistry unit was set up at the Mid-Country Station for work on Instant Tea and apart from this and improvements in staff housing, no major building projects were undertaken. Like lower Uva, some marginal tea lands in the Mid-Country were encouraged to diversify away from tea and the work on crop diversification for the mid country was concentrated at Hantane.

St Coombs

The greatest expansion of facilities has centred around the Institute's headquarters at St Coombs, Talawakele. Construction work on a new laboratory intended to house the Agronomy and Plant Physiology Divisions, as well as new analytical chemistry, isotope and residue analysis laboratories was begun in 1972. The foundation stone for the Rs 2 million building was laid by the Hon. the Prime Minister (Mrs Sirimavo R. D. Bandaranaike) on 29th April 1972. A new administration building, a new auditorium to seat 300 persons, an extension to the Tea Research Institute Sports Club, a new Pavillion for the grounds and increased housing facilities have been constructed. Two new glass houses and various ancillary facilities have also been provided.

St Coombs Factory received much new equipment and prices fetched for St Coombs teas at the Colombo Auctions have consistently been the highest in the Dimbulla District. St Coombs also produced a consignment of tea which fetched the highest wholesale price ever realised for tea (Rs. 238 per kg.). The estate serves as both site for experiments and also as a profitable commercial venture.

Lamiliere

On the 11th of September, 1975, the Land Reform Commission of Sri Lanka handed over to the TRI, 161 acres of Lamiliere Estate, Talawakelle, situated one mile away from St Coombs. Of the 161 acres, 24 acres were planted in clonal tea and most of the balance in medium jat seedling tea. The TRI also took possession of Lamiliere factory, the Superintendent's and staff bungalows, labour quarters, stores, school buildings and the Temple. The yield per hectare of Lamiliere is around 400 Kg made tea, about the same as that of St Coombs, when the TRI acquired it 48 years ago. (Today St Coombs yields 1700 Kg/hectare). Lamiliere is today in a state of abject neglect and one of the objectives of the Institute is to determine economic ways and means of developing those neglected properties of which Lamiliere is typically representative.

Ekala

A new building has been leased by the TRI at the Ekala Industrial Estate where a pilot plant for producing Instant Tea is under construction.

CHANGES IN THE TEA INDUSTRY

The decade 1965 - 1975 has been one of ups and downs for the tea industry. Sri Lanka started off in 1965 by becoming the world's largest exporter of tea for the first time, nearly one hundred years after she became the world's largest exporter of coffee. In 1967 when the tea industry celebrated its centenary, the industry was beset with falling tea prices and the future of tea began to look uncertain, reaching its lowest ebb in 1968. At about that time the Government appointed a Tea Commission to look into all aspects of the tea industry and recommended suitable measures for the resuscitation of the industry. The TRI itself was included in the terms of reference of the Commission.

As a result of poor sale prices investments in tea properties began to decline but the confidence of growers was by no means lost. On the contrary, it appeared to sharpen their interest and led to a strong determination to do whatever was necessary to revitalize the industry. It was at about this time that more interest was generated in CTC manufacture and in the production of new forms of tea. Since Sri Lanka became a Republic, the prices fetched by tea have risen slowly, due to increased consumption by countries other than traditional consumers, as well as due to a short-fall in world production and an increase in consumption in producing countries. Tea has also acquired some glamour with younger people in the developed countries and its consumption in the Arab world, has increased following increased prosperity in those countries.

In 1970 the public sector ownership of tea land in Sri Lanka was less than 1% of the total tea land in the country. Consequent to the Land Reform Laws this has increased tremendously and the State has emerged as the largest owner of tea land in the country. Investment on state-owned property has been stepped up and these properties are receiving inputs which might otherwise not have been available to some of them.

A commission was appointed by the Government to report on the activities of the Agency Houses and Brokering firms and to recommend measures to improve the running of the estates and the brokering system. This Commission published its report in 1975. The Colombo Tea Auctions moved over to the Metric System and metrication was gradually introduced to estates.

FIG. 6—*Factory demonstration to Factory Officers and Estate Managers*

FIG. 7—*Lectures on new production techniques to growers*

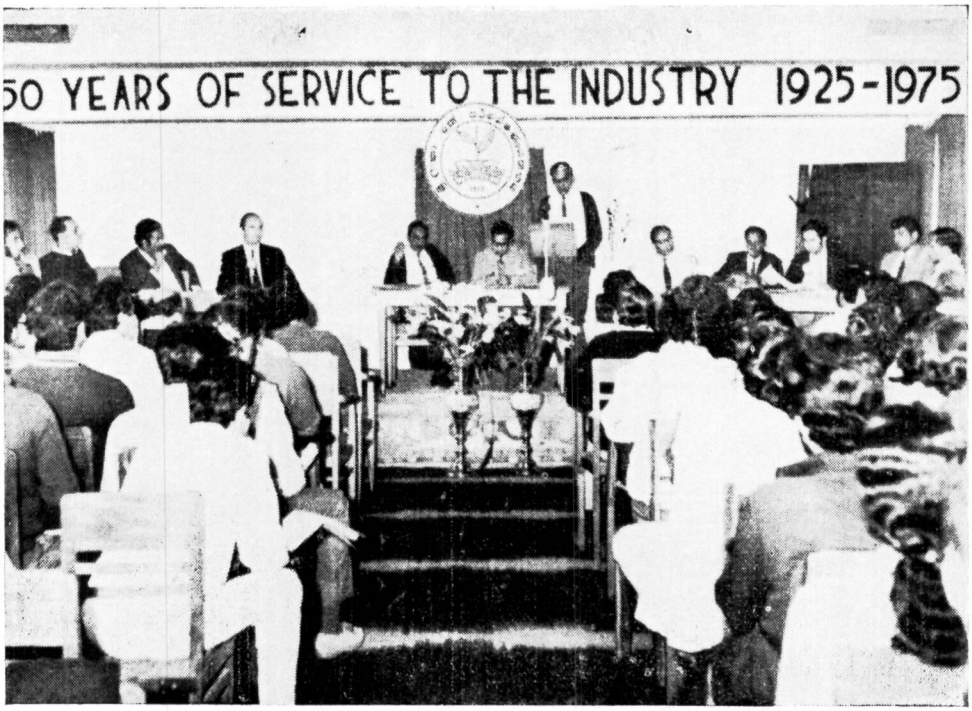

FIG. 8—*TRI Golden Jubilee Seminars*

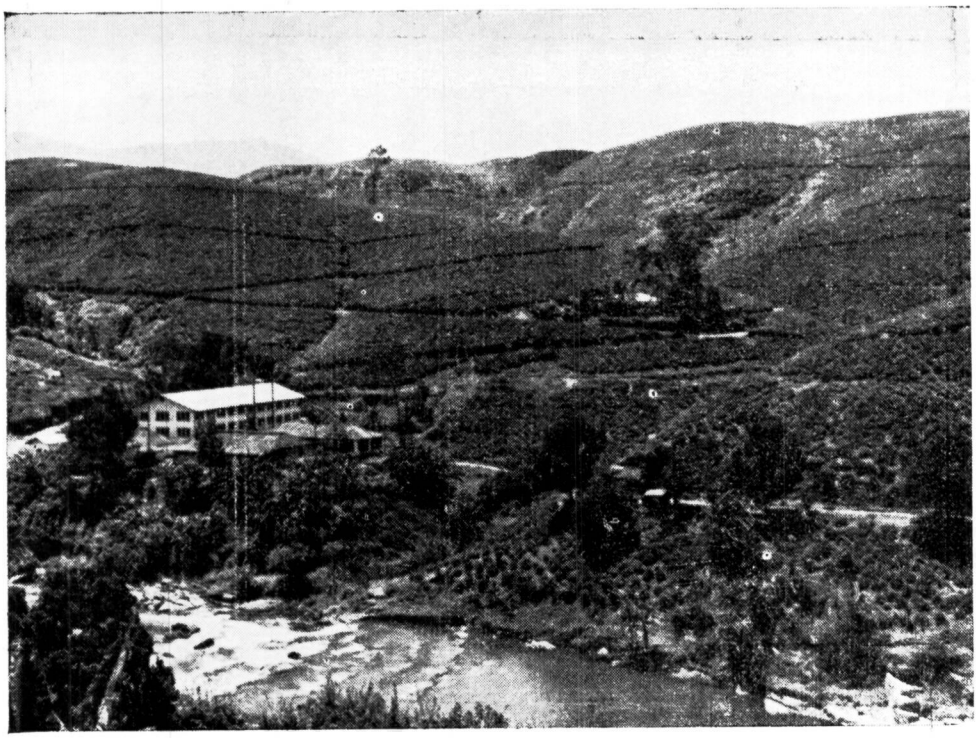

FIG. 9—*Lamiliere Estate, Talawakelle in* 1975

The Tea Replanting Subsidy Scheme under which about 75,000 acres of tea have been replanted, largely with TRI clones, the Tea Factory Development Scheme and the package deal under which Government agreed to meet part of the cost of various inputs into the estates have all been designed to provide an impetus to thc tea industry, to keep the properties in good heart and to develop and modernise further, the means of production. In addition, the income of the Tea Research Institute, which had remained static for 12 years despite increased costs over the years, was increased by 50% in 1974 by an Act of the National State Assembly. It has been clear that Government policy has been geared to providing as much encouragement to the industry as possible, and the effects of this policy will no doubt be seen in the future.

VISITORS

Several thousand visitors from all walks of life from many countries have been received at the Institute over the past ten years. The large majority of them have been Managers of estates and officials of Agency Houses including Directors of Principal Companies, Two Heads of State, two Prime Ministers, twelve incumbent Ministers, 18 Ambassadors, 64 foreign Parliamentarians, 11 Fellows of the Royal Society and over a hundred Professors from foreign Universities have also visited the TRI. Representatives from all research institutions working on tea in foreign countries including India, Indonesia, Iran, Japan, Kenya, Malawi, Pakistan, Tanzania and Uganda have visited the Institute. Reciprocal visits have been made by the Institute's staff to these countries. As a result of this exchange of personnel, cordial relationships have developed between these institutions and a spirit of co-operation engendered. This has assisted the research work in many ways and it is to be hoped that the liaison between them will be developed further in the futute.