

RESEARCH PROGRESS, 1930-1951

The Past, Present and Future of the Institute

A SCHEME or plan for research on coconuts and coconut products was first implemented in April, 1930. The Institute, which for some reason is still officially only a Scheme, thus came of age in April this year. It would seem, therefore, that the time is opportune for it to be recognised as a fully-fledged and responsible Research Institute, in accordance with the recommendation made by the Board of Management in August, 1949.



COCONUT RESEARCH SCHEME, LUNUWILA.

It is also fitting at such a time to review the past work of the institute, to consider the work done during 1950, and to indicate the lines of future work and development.

The Past.—The Division of Chemistry has advised on and contributed materially to the development of various major and minor coconut industries; the many valuable products to be obtained by the distillation of coconut shells were systematically investigated in the laboratory; useful work has been done on the chemistry of coconut water, refined vinegar, arrack, copra poonac, coconut oil, desiccated coconut, coconut charcoal and soaps, based on coconut oil, with a view to improving these products or finding new uses. The Technological Chemist collaborated with the Government Analyst in an extensive and successful series of experiments on the production of an improved grade of arrack by double distillation which is now an established industry.

The Division of Soil Chemistry has, over a long period of years, studied the nutritional requirements of the coconut palm and as a result of a series of experiments under different conditions, the predominant role of potash has been conclusively proved, the heavy doses of phosphates, formerly used, have been found to be unnecessary and the use of excessive amounts of nitrogen in fertiliser mixtures has been found to depress yields. Considerable financial economies and improved yields have resulted from the use of the correct mixtures of fertilisers to suit different conditions. The use of husks, the chemistry of cattle manuring and the correct management of cover crops on coconut estates have also been studied,

The principal work of the Botanical Division has been the improvement of the coconut palm by selection and breeding. Two thousand high-yielding mother palms have been selected after systematic recording, over a long period of years, and selection at the seednut and seedling stage has been placed on a sound basis. During the war, when food supplies were in danger, the possibilities of growing subsidiary food crops under coconuts were examined. The floral biology of the coconut palm has also been studied.

The Present.—During the year now under review, a large amount of work has been done in support of the Coconut Replanting Project and investigations of the premature senility of coconut palms, otherwise known as tapering disease, have been initiated. An exhaustive study of nursery technique was initiated with a view to accelerating the rate of germination of seednuts and improving the quality of seedlings. It was particularly interesting to find that “first and second bunch” nuts are both equally suitable for use as seednuts, and that soaking the seednuts for two weeks, prior to placing them in the seed bed, results in earlier and better germination and sturdier seedlings. The correct depth of planting seednuts has been found to be six inches, and the horizontal or floating position of the seednut has been conclusively proved to be the right position for laying down a nut in the seed bed. A study of various methods of mulching nursery beds has revealed that it is definitely advantageous to cover the nursery beds with coconut leaves.

The effect of various applications of NPK fertilisers on young palms, planted between old coconuts and also on virgin land, is being studied in a series of experiments which will be continued over a period of years till the palms reach full maturity.

The form of premature senility, otherwise known as tapering disease, which was given considerable publicity in the Press at the beginning of the year, is now considered to be a manifestation of malnutrition, due either to deficiencies of plant food in the soil, the unsatisfactory conversion of available plant foods into living plant tissue, to restriction of root growth, or to root injury or decay.

In this connection, the possibility that magnesium may be the fourth element of nutrition is being examined. Recent investigations in other countries have revealed that magnesium deficiency in crops may develop in acid sandy soils, which have been severely leached by tropical rains. Magnesium is required by the plant for the formation of the chlorophyll molecule, the green pigment in the leaves, and so it follows that a deficiency of magnesium in the soil at the base of the palm would produce yellow in the leaves. The principal characteristic of tapering disease too is the inability to form woody tissue and so it is also significant that magnesium is the chief mineral constituent of the trunk of the coconut palm.

Selected mature palms, in various stages of the disease are being treated with various chemical plant foods, magnesium being applied either in the form of ground dolomitic limestone obtained from Matale or as Epsom salts. On visual observation, such addition of magnesium appears

to be associated with an improvement in the colour of the foliage of all the palms under treatment on four different estates. The crowns are improving in size and shape although only in a few cases is there as yet an improved setting of nuts. This is only to be expected since the palms have been under treatment for less than a year. Although no sound conclusions can be reached in under two years, it is encouraging to note that one palm originally on the point of death has made a complete recovery.

In addition to these empirical trials, the problem is also being studied from another angle. Chemical plants foods—various combinations of major, minor and trace, elements,—are being added to pot cultures of young coconut seedlings, growing in white sand, otherwise known as hydroponic cultivation.



POT CULTURES OF COCONUT SEEDLINGS.
Various combinations of major, minor and trace elements are applied.

The major difficulty in studying tree crops is the time factor and it is hoped that these preliminary trials will give useful indications in a few months for future long-range work on a more elaborate scale. It is interesting that according to a press report similar experiments are being carried out in the United States where Hevea (rubber) seedlings are also being raised in pot cultures, using chemical-free, white, sea sand.

The Future.—An important decision of Government in 1950 was that the Coconut Research Scheme would be concerned mostly with the agricultural side of the industry and that industrial research on coconut products and the development of coconut industries would in future be the work of departments under the Ministry of Industries. This does not mean that the Institute will have less work to do; on the contrary, the cess for research on coconuts was increased by five times in order to make it possible to develop new lines of work, such as an exact study of the

water requirements of the coconut palm, the effect of irrigation and water conservation on crops, the establishment of an isolated seed garden of high-yielding palms and the development of subsidiary industries in association with coconuts.

Already, with the appointment of an Animal Husbandry Officer, a new division has been created, the objects of which are as follows :—

- (a) To study the interdependence of coconuts and livestock and the production of compost from waste products of various animals.
- (b) To investigate the problem of the economic production of milk under hygienic conditions on coconut estates and its organised delivery to urban areas.
- (c) To suggest alternative sources of income to small-holders, so as to reduce the dangerous dependence on coconuts alone, and to maintain them during periods of low prices.
- (d) To ascertain the correct livestock population per acre, so that coconut lands are not overgrazed.
- (e) To study the selective consumption and rate of consumption of herbage, with and without concentrates.
- (f) To investigate the control of insect pests, associated with coconuts, by means of poultry
- (g) To consider the utilisation of useless waste products as food for pigs and livestock.
- (h) To study the effect of bees in improving the setting of nuts.
- (i) To work in collaboration with the Department of Agriculture, for the supply of pure-bred and cross-bred stock of approved types, so that the cattle population per acre can be reduced by the removal of the useless cattle.
- (j) To provide additional publicity in coconut-growing areas for the Department's activities in connection with livestock and diseases of animals.

Another direct result of the increased cess is that in accordance with the recommendations of the Ceylon Coconut Commission (Chapter XIII), the *Ceylon Coconut Quarterly* has been started and the advisory, propaganda and educational activities of the Institute have been extended. Five advisory officers have been appointed to advise coconut small-holders, to co-operate with the Coconut Producers and the Rural Development Societies, and to organise propaganda meetings and demonstrations ; in addition to these duties, they are responsible for the siting and establishment of nurseries and the distribution and after-care of the seedlings sold to the public. When trained these officers are to be stationed at Chilaw, Negombo, Kurunegala, Puttalam and Mannar.

In addition, a scheme of technical training in the theory and practice of coconut estate management has been started and the full details of the course are given elsewhere in this issue. From a large number of applicants, five were accepted for the first course ; larger numbers cannot be taken at present owing to limitations of teaching staff and accommodation. Planting is a highly-skilled profession, requiring years of practical experience, but the course of lectures and field-work will, it is hoped, provide a sound foundation on which to build.

The improved financial position has also made it possible for the Board of Management to send technical officers overseas for post-graduate studies in plant breeding and plant chemistry and, as a result, it is to be expected that the work of the Institute will be guided into new fields of useful research and that the officers themselves will make valuable contacts and obtain a broader outlook on agricultural problems.

F. C. C.