

College of Agriculture and Agricultural Research Institute, Coimbatore.

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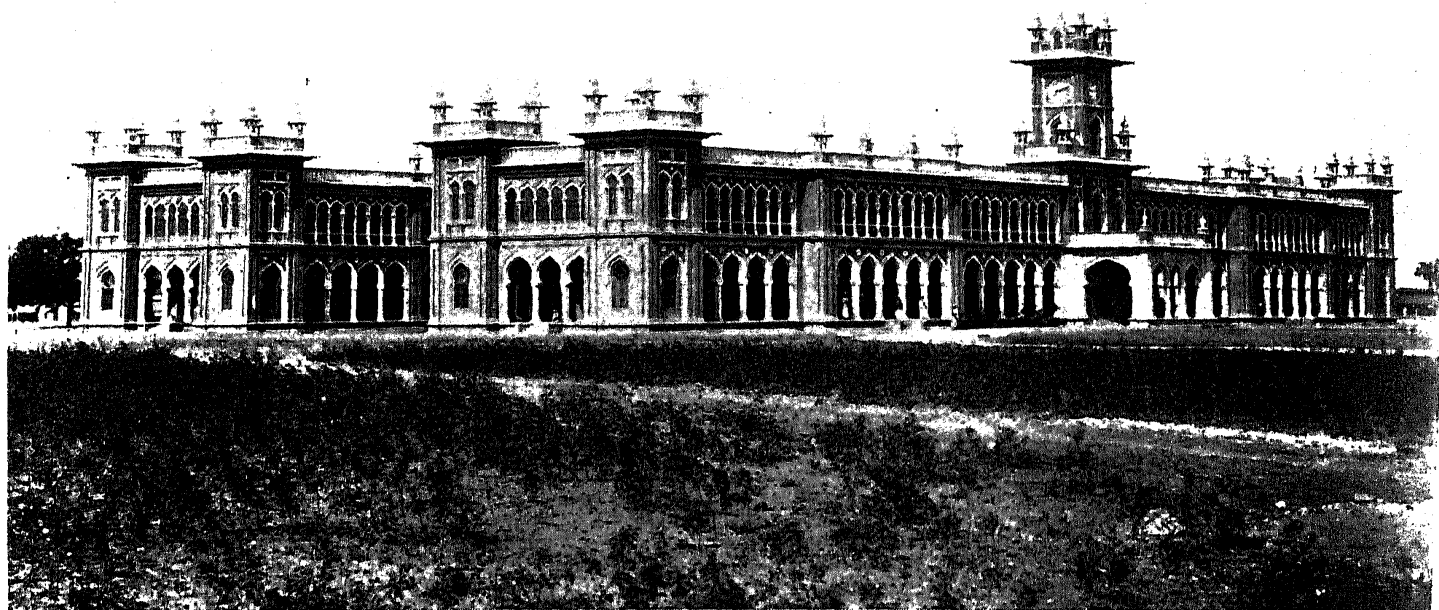
THE Institute owns a Library with 39,000 volumes. About 600 scientific periodicals are regularly received. The Madras Herbarium which contains 83,240 mounted sheets is housed in the Research Institute.

COTTON SECTION.

This section was added in 1920, as a result of the recommendations made by the Mac-Kenna's Indian Cotton Committee of 1919.

assist and advise the Deputy Directors of Agriculture with regard to cotton work carried out in their circles.

As a result of breeding work conducted at the Cotton Breeding Station, a strain—Co-2—which gives a yield of 15 per cent. more than the unselected bulk was isolated in 1928. This strain has now spread over an area of more than 1.6 lakhs of acres in the Presidency. Recently, two more strains have been evolved and they bid



Agricultural Research Institute, Coimbatore.

At present, it has a staff of a Cotton Specialist, 8 Assistants at the Headquarters, 2 Assistants at each of the Agricultural Research Stations of Koilpatti, Hagari, Nandyal and Guntur. A farm of 86 acres comprising of red and black soil areas is attached to the section at Coimbatore for the conduct of several experiments connected with cotton crop. The main object with which this section was opened is to improve the growing of Cambodia cotton by means of breeding and agronomic methods, to train persons to take up similar work in other cotton areas of the Presidency and to

fair to be more popular. Attempts are on foot to effect further improvements in earliness, productivity and spinning quality. One of the latest strains has already shown to be a month earlier than Co-2 with no drop in other characters. On the agronomic side sowing Cambodia in September and irrigating it once in three weeks have been found to be beneficial.

In addition to these, four schemes financed by the Indian Central Cotton Committee are being run under the Cotton Specialist with objects of either producing strains suited to special regions or devising

measures to get rid of the defects found in the existing agricultural practices relating to cotton cultivation.

Recently, breeding work in the Bengal and red grams was also started with a view to reduce, if not to stop completely, large quantities of pulses (worth about Rs. 150 lakhs) that are being imported into this Presidency. In the former crop, two strains yielding more than 15 per cent. over the locals and resisting wilt, have already been evolved.

PADDY SECTION.

The Government Economic Botanist Section was split in 1912 into Government Economic Botany and Government Lecturing Botany Sections to deal with breeding in crops and teaching respectively. The first Economic Botanist Mr. F. R. Parnell took up the duties of the Government Economic Botanist in 1913 and commenced work on rice and cotton. With the rapid development of work on rice which required all his attention, very little attention was paid to cotton. With the retirement of Mr. F. R. Parnell in 1923, the post was designated as Paddy Specialist.

The main problems that have been undertaken for study in this section are:—

(i) Making a collection of paddy varieties, isolating and maintaining pure lines from them. The present collection, Indian and Foreign together, number over 1,300.

(ii) Study of characters (both morphological and economic) of the rice plant and understanding their mode of inheritance. The results of the study have been written up in the form of *Memoirs of the Pusa Institute* (Botanical Series).

(iii) Evolution of more prolific strains by simple selection from the important local varieties of the main rice tract of the Presidency at the main station Coimbatore and its sub-stations at Adaturai (1921), Marutur (1925), Pattambi (1926) and Berhampore (1932). So far 44 strains yielding from 10–15 per cent. over the respective local varieties suitable for the *Kar* (short duration) and *Samba* (long duration) seasons are now under cultivation in the paddy areas of the Presidency, not to mention of about dozen strains on the threshold of being distributed. It is estimated that about 12,75,000 acres are now cropped with improved strains. This alone is contributing to the increase of wealth of the country by about 50 lakhs of rupees.

(iv) Evolution of strains by artificially hybridising chosen pure lines so that desirable qualities to be found in such pure lines could be synthesised in one strain and also isolation of economic mutants from seeds treated with X-ray. A few strains resistant to Blast disease (*Pyricularia oryzae*) and non-lodging characters are shortly to be released for general cultivation.

(v) A number of agronomic studies of local interest are being carried out in the several sub-stations.

(vi) Work on quality in rice has been taken up and histological study of the rice grain has given much interesting information on the nature and location of proteins in rice grain and the thickness of aleurone layer in different kinds of rices cultivated under different conditions.

(vii) A beginning has been made in the study of the cytology along with the genetics of the rice plant. These aspects of the study will be taken up soon after the return of the Assistant, now under training in England.

MILLETS SECTION.

This section of the Agricultural Research Institute was constituted in December 1921. Lands for the Millets Breeding Station were acquired in October 1923. The Station was laid out and work on breeding millets began from the agricultural year 1924–25. There are eight millets and they are in the following order of importance:—

Sorghum	..	(<i>Sorghum vulgare</i> , Pers.)
Cumbu	..	(<i>Pennisetum typhoides</i> , Stapf. and Hubbard)
Ragi	..	(<i>Eleusine coracana</i> , Gärtn.)
Tenai	..	(<i>Setaria italica</i> , Beauv.)
Kodo	..	(<i>Paspalum scrobiculatum</i> , Linn.)
and the		(<i>Panicum miliare</i> , Lam.)
panicum		(<i>Panicum miliaceum</i> Linn.)
millets		and (<i>Panicum crusgalli</i> var. <i>frumentaceum</i> , Linn.)

The improvement of these millets by selection and hybridisation is the work of the section. The botany, genetics and cytology of the millets are under intensive study. Over 90 publications on this fundamental knowledge have appeared in many scientific journals. Millets are so very local in their evolution and spread, that much of the economic work has to be done in the respective local areas. Assistants trained in millets breeding are working in the Bellary, Nandyal, Guntur and Koilpatti areas on the improvement of the local

millet. Ragi, E.C. 593, is however an exceptional instance of a millet that is cosmopolitan enough to get a good name for itself from many parts of the Presidency. Strains of sorghum, cumbu and tenai are in various stages of trial in all the centres mentioned above.

OIL SEEDS SECTION.

In view of the importance of the oil yielding crops to the prosperity of the Madras Presidency, a section on oil seeds was organised in 1930 to conduct plant and agronomic research on major oil seeds, *viz.*, groundnut, sesamum, castor and coconut. The field work is carried out on five Agricultural Research Stations attached to the section and located in various parts of the Presidency. Dr. J. S. Patel, Oil Seeds Specialist, is in charge of the section.

Groundnut.—In 1934 a mass-selected, superior spreading variety of groundnut was released for cultivation. It gives an average increased yield of 20 per cent. over the local. This variety which is "bold" and reported to be drought resistant, is rapidly replacing the local varieties. One of the high yielding bunch selections is now in the final year of its trial, and it will be distributed for field trial next season. Numerous inter-varietal and inter-specific crosses between *A. Hypogaea*, *A. rasteiro* and *A. Nambyquarae* have been made. The mode of inheritance of the plant characters, *viz.*, habit, duration, testa-colour, chlorophyll deficiency and the colour in the plant and the flower, has been worked out.

The optimum spacing depends upon the rainfall. For South Arcot District, 9" × 9" spacing for spreading varieties and 6" × 6" spacing for the bunch, was found most economical. For the same soil, application of ten cart-loads of manure per acre proved remunerative.

The quality and the quantity of oil in the seed was found to depend upon the maturity of the crop and the conditions of storage. The crop should be harvested only at full maturity and the produce should be stored after full drying in well-ventilated dry godowns.

Anatomical and cytological studies and investigations into the vitality and the resting period of the seed have been carried out.

Coconut.—Inter-cultivation is found to increase the yield of the garden. Ammonium sulphate and ash, and cattle manure were found to be the most remunerative manures for the West Coast. The conditions under which surface planting of the seedlings is to be recommended were determined. On the West Coast, it is considered uneconomical to grow a subsidiary crop under the breeding coconuts. A green manure crop of cowgram is, however, recommended.

Selection of medium sized round seed nuts from heavy yielding palms, possessing a large number of leaves, is recommended. The seedlings should be further selected in the nursery on the basis of the girth at the collar. First generation of selfed and crossed progeny have been planted with a view to evolve suitable types.

With the aid of anatomical and cytological studies, it has become possible to understand the mode of response of the palm to climatic and edaphic conditions. Such aspects as the abortion of spadices, pollination, germination, root and leaf developments, catalase activity of the leaf, shedding of female flowers and young nuts, development of the nut, tapping in relation to yield have been investigated into.

Sesamum.—Types 46 and 89 have proved superior to the local variety. A spacing of 12" × 12" was found most economical for the irrigated crop. Floral biology and the inheritance of characters have been studied.

Castor.—Inbred pure lines having short duration and good yield, have been evolved. Showy horticulture types have also been isolated.

MYCOLOGY SECTION.

History.—The Mycological Section of the Madras Agricultural Department developed to its present magnitude from very small beginnings. The foundation of this work was laid when the Government Botanist with a single mycological assistant began the investigation of the main diseases of a few crops like sugarcane, pepper and sorghum. Since 1910 when a Mycologist was appointed, the section has made rapid progress with a number of successful investigations to its credit.

The activities of the Mycological Section may be briefly summarised as follows:—

(1) *Economic Research*.—This comprises investigations, both in the laboratory and in the field, into the occurrence, cause, nature, effects and control measures of plant diseases caused by fungi and viruses. Research of this nature involves close observation of the growth, spread and effect of the disease and artificial cultivation of the fungi on suitable media, study of their cultural characters and spore forms which enables them to be identified, inoculation of healthy plants with the pure cultures and various other studies involving special technique. Once an exhaustive study of the life-history and host range of a fungus is made, remedial measures are tried in the light of the knowledge thus acquired, firstly on a small scale within the laboratory or in the pot culture house attached to it and then in the field.

(2) *Advisory Work and Propaganda*.—Advice is given to cultivators all over the province regarding their phytopathological problems. The fruits of research are brought home to the cultivators in the form of leaflets, and by practical demonstrations, lantern lectures, exhibitions, etc.

(3) *Systematic Work*.—The systematic study of fungi is not neglected. Specimens of diseased plants are collected as often as opportunities occur. These are classified and preserved while those of special interest are forwarded to Specialists for identification. A fairly representative herbarium has been built up in Coimbatore and preserved specimens and pure cultures are available for students and to a limited extent for exchange with other countries.

GOVERNMENT AGRICULTURAL CHEMIST'S SECTION.

This section has two main functions: (i) Advisory, in matters connected with the chemistry of soil, plant and other agricultural products and (ii) Research, on problems connected with agriculture and agricultural products.

The staff of the section consists of the Government Agricultural Chemist, four Assistant Agricultural Chemists and one Agricultural Bacteriologist; one of the Assistant Agricultural Chemists is working at Siruguppa (Bellary District) at the Irrigation Research Station, which has been just opened. Each of the officers is in charge of one of the six branches of work,

which are as follows: (i) Analytical and Advisory, (ii) Soil Surveys, (iii) Bacteriology, (iv) Animal and Plant Nutrition, (v) Sugar-cane products, and (vi) Irrigation Research. Under the Advisory branch a large number of samples of various kinds are received from ryots, and private parties as well as from planters and advice rendered, based on analysis of the samples. Under the Research branch a number of problems are under investigation in all the branches. The most outstanding pieces of research so far carried out are, the effect of manuring on crop quality, the soil survey of the Tungabhadra Project area, the activation of paddy husk carbon for clarification of cane juice and the studies on the protein and mineral metabolism of cattle; work on many other problems in Agricultural Chemistry is in progress.

ENTOMOLOGICAL SECTION.

This section is in charge of Mr. M. C. Cherian, B.A., B.Sc., D.I.C., Government Entomologist, who is assisted in his work by an Assistant Entomologist and six assistants. The main work of the section is economic and is concentrated on the study of the bionomics of, and control methods against, the major insect pests of important crops grown all over the Madras Presidency. The study of live insects is carried on at the Insectary building situated inside the College Estate where facilities are provided for the rearing of and observation of insects and for the trial of various methods of pest control. There is a large and representative reference collection of insects attached to the laboratory where there are facilities for systematic studies. There is also a well-equipped apiary at the Insectary intended for research and propaganda work on the Indian honey bees and practical training is given to those who desire to learn.

It is not possible in a short note of this kind to give even a bare outline of the progress made by the section. The numerous publications including two books *Some South Indian Insects* (out of print) and *Handbook of Economic Entomology for South India* (in press) contain the results of the research work carried out from time to time by different members of the Section. The more important items of work on which research is done at present are sugarcane moth borers and mealy bugs and their natural enemies;

fruit flies and their parasites; the rhinoceros beetle; the cotton bollworms; pests of paddy; stored product pests; pests of vegetables; and the Indian honey bee and its enemies.

RESEARCH ENGINEERING SECTION.

This section was established in August 1928 for the purpose of investigating the possibilities of improving the ryots' mechanical farm equipment. A large variety of implements and machines are tested with a view to the determination of the types and makes best suited to Indian conditions and those which are approved are recommended and demonstrated by the Department.

In addition, the improvement of the efficiency of indigenous implements and machines and the evolution of new designs are subjects receiving close attention.

Achievements of the Section are: Testing a wide variety of ploughs and selection of most suitable types and their adaptation to local conditions; testing of ridge ploughs and the design of a new light steel ridger at less than 1/3 of the price of those previously available; testing of Persian wheel type of water lifts and

the development of an improved design; draught and road speed tests of rubber-tired carts and the design of cart bodies for rubber-tyre equipment; development of Burmese type wet land puddling implements; testing of engine and bullock driven cane crushing mills and the design of improvements to bullock power mills; development of an improved method of hitching draught animals by means of leather harness; improvements to earth-scoops; testing of indigenous handfed seed drills and the design of a mechanical seed distributing attachment for the indigenous drill; the design of a new device for polishing turmeric, an improved water lift of circular mhote type, a new device for forming bunds; improved ball and roller bearing mhote wheels of higher efficiency at lower cost; simple mechanical seed drill for sowing any seed at any desired seed rates with adjustable depth of sowing; a new grain polishing and cotton seed defibrating machine; a new guntaka or blade harrow; improved cotton stalk puller; improved pitting crowbar; improved cast iron grating for jaggery furnace; clod crushers, etc., etc.

ASTRONOMICAL NOTES.

Planets during November 1937.—About the end of the month, Mercury will be visible in the western sky for a short while after sunset. Venus is gradually moving towards the Sun but will still be a fairly bright object rising about an hour and a half before sunrise.

Mars will be situated in the western sky in the early part of the night and is getting fainter. Jupiter also can be seen nearly in the same direction a little to the west of Mars. The stellar magnitude of the planet at this time will be -1.6 ; the same as that of Sirius.

Saturn is moving in a retrograde direction; it will cross the meridian at about 8 p.m. in the middle of the month and will be in a convenient position for observation. Uranus will be in opposition to the Sun on November 4 and will be just visible to the naked eye as a faint star very near σ Arietis.

The only lunar eclipse of 1937 occurs on November 18; but it will not be visible in India. It is a partial eclipse, of magnitude 0.15.

Comets.—Finsler's comet (1937 f) became fairly bright in August and has been widely observed. From the photographs taken, the comet appears to have developed several tail streamers in a fan-shaped form, the brightest tail being about 9° in length. It is moving farther away from the earth and getting fainter.

According to a U.A.I. circular, Encke's comet has been re-discovered by Jeffers at the Lick Observatory. It was an extremely faint and diffuse object at that time and had no central condensation; its estimated magnitude was 18.

A Supernova.—Information has been received from the Harvard College Observatory, of the discovery by Dr. Zwicky on August 28, of a bright supernova of magnitude 8.5 in the nebula Index Catalogue No. 4182, in the constellation Canes Venatici. By September 8, the star appears to have declined one magnitude in brightness. Prof. Seares has announced that spectrograms obtained on August 29 by Humason at Mt. Wilson show the typical supernova bands.

T.P.B.