

The Imperial Agricultural Research Institute, New Delhi

By Dr. W. Burns, Imperial Council of Agricultural Research

SINCE the time when Voelcker wrote his report "The Improvement of Indian Agriculture" in 1893, it has been recognized that agricultural progress in India must be based firmly on research. Accordingly, when Mr. Henry Phipps, an American philanthropist, came forward in 1901 with a splendid donation of £30,000 to be devoted to some project of public utility, if possible in the direction of scientific research, Lord Curzon, who was then Viceroy, decided to use the greater part of this donation for the construction of an agricultural research laboratory at Pusa. Pusa is in a rather out-of-the-way part of the province of Bihar, and the choice of site was not perhaps the happiest. The earthquake of January 1934, which did great damage to the Institute, brought up the question of rebuilding or shifting it. The second alternative won the day, and the result is the new Institute of Agricultural Research at New Delhi. But the old name Pusa has become very familiar, and those coiners of local place-names, the taxi and tonga drivers of Delhi, have already christened the new Institute the "Pusa College", while many scientific workers in India often refer to it as the "New Pusa".

The early days of Pusa saw the pioneer work of Leather in soil chemistry, of Butler in the realm of fungal diseases of plants, of the Howards in the production of new races of crops, especially wheat, and of Maxwell-Lefroy (whose name is written in the Book of Martyrs of science) in the cataloguing and combating of insect pests.

The Howards' wheats, particularly Pusa 4, Pusa 12 and Pusa 52, are now grown over six million acres in India, and some of the Pusa wheats have a vogue in Australia. Plant breeding for strictly economic ends and also the study of pure genetics have always figured largely on the programme of the Institute. Some useful hybrids between American and Indian tobaccos, wilt-resistant pigeon-pea strains, and better linseed types are some of the economic results, while the inheritance of characters in several important crops including linseed and chillies (*Capsicum*) has been the subject of important memoirs. It should be mentioned that the now world-famous Sugar Cane Research Station at Coimbatore in the Madras Presidency is a sub-station of the old Pusa and of the new Institute.

The site of the new Institute is within the limits of Imperial Delhi, and contains 476 acres of good agricultural land, plus 300 acres, of which part

is pasture and part occupied by roads and buildings. About seventy miles from Delhi on the Grand Trunk Road (and also on the railway) is Karnal, where there is a farm that is now a sub-station of the Imperial Institute. Progress with the construction of the Institute was rapid. Lord Willingdon laid the foundation stone of the library on February 19, 1935. The library and laboratories were, in April 1936, ready for internal fittings and equipment. Work in these laboratories actually began in August 15, and the formal opening took place at the hands of His Excellency the Viceroy, the Marquis of Linlithgow, on November 7, as soon as possible after the Government of India came back to Delhi from Simla. Special references were made on that occasion to the late Sir Fazl-i-Husain (who had as Member for Education, Health and Lands been of the greatest help to the Institute) and the late Dr. F. J. F. Shaw, who was director of the Institute during the period of transfer and reconstruction. The total cost of the transfer, including the building of the new Institute and the acquisition and layout of the land, was Rs. 36 lakhs. The climate and soil of Delhi are suitable for growing a much greater range of crops than at Pusa. Part of the land will be cultivated under rainfall and the rest under irrigation water from the Jumna pumped through 12,000 feet of pipe line and open channels.

The New Delhi Institute naturally differs from that of Pusa in its buildings and layout. The Pusa laboratories were located in a central two-story building, divided up into sections for the various sciences and the library. At Delhi each science has its own separate single-story block, giving ample room for the present and opportunity for expansion in the future. The library is housed in a spacious central building with a clock tower. The Institute now possesses 80,000 volumes and is considered to have the biggest agricultural library in the East. It also receives every important periodical dealing with agriculture and its underlying sciences.

The Botanical Section is housed in two blocks. The main one consists of a number of rooms equipped for advanced scientific work. The out-buildings are situated in an area of 50 acres laid out for plant breeding. New developments of this section are to be in the directions of plant physiology and cytology, while the plant breeding activities of the section will be maintained and intensified.

The Chemical Block, housing activities in soil science and agricultural chemistry, contains forty rooms fitted up for work in general analytical chemistry, micro-analysis, microbiology, soil physics, physical chemistry and plant chemistry. In addition, there are underground rooms where even temperatures can be maintained, laboratory workshops, a pot-culture house and lysimeters. A new feature of the Chemical Block is a laboratory for carrying out small investigations on the utility of agricultural products and to devise ways and means for the making of intermediate products. The need for this was recognized in 1921 by the Board of Agriculture in India.

In the Entomological Block are a main laboratory, a parasite laboratory and underground constant-temperature rooms. The rooms containing the collections have about 10,000 species represented by hundreds of thousands of specimens both pinned and in alcohol.

The Mycological Block has similarly rooms for use as laboratories, as constant-temperature rooms, as culture rooms and as herbaria, the last named containing a very valuable collection of fungi.

There is a group of buildings consisting of a dairy cattle byre with modern fittings, a veterinary dispensary, bull runs, sheds for sick animals and for segregation, and sheds for implements.

No mention of the Institute would be complete without a mention of what is a great attraction to visitors, namely, the famous Pusa pedigree Sahiwal herd. This is one of the finest herds of milch cattle in India. It has been in existence since 1904, when fourteen cows and one bull were purchased from the Punjab. It has gradually been selected from homebred stock with occasional fresh blood from outside. The average milk yield per cow per day has risen from 5 lb. in 1914 to 22 lb. in 1934. The bringing of this herd, numbering 172, from Pusa to Delhi was an achievement

in itself, a special train being required, taking four days on the journey. There was no break in the recording of milk yields or of the routine of the herd during the transit, and the animals arrived at Delhi in first-class condition.

In addition to the research work of the Institute, there is also its educational activity. This takes the form of two-year postgraduate courses in which the student specializes in one or other of the subjects botany, chemistry, entomology or mycology, and in which the current research work of the Institute is the background of the teaching. Since the inception of this course in 1923, fifty-six students have passed out from the Institute, of which number forty-six have obtained employment either in provincial or State departments of agriculture or under schemes financed in whole or in part by the Imperial Council of Agricultural Research. There is also given a one-year course in farm management, and as occasion or need arises, short courses in special subjects such as the flue-curing of tobacco are arranged.

Lord Curzon, when laying the foundation stone of the original Pusa Institute, remarked that he would like to visit the place in fifty years time and see what it had grown into. He said, "Should I find Pusa the centre of a great organization, with ramifications extending to all parts of the Indian Continent, training a series of students who will devote their acquired knowledge to the practical pursuit of agriculture and able to point to the tangible results of successful scientific experiment, both in the quality of seeds and plants, in the destruction of pests, and in improvement of breeds of cattle? That is the prospect that I should like to look forward to, and if it be at all realized then we may be assisting at a rather momentous child-birth to-day."

The now twice-born Institute faces the future with the means and the will to carry on to still completer realization this prophetic vision.

Chronological Problems in the Prehistory of North Africa

IMPORTANT questions relating to the antiquity of 'fossil' man in North Africa and to the dating and cultural affinities of the later stone age civilization of North Africa and the Sahara are debated by M. R. Vaufrey, of the Institut de Paléontologie humaine, Paris, in two recently published papers*.

In the first of these, M. Vaufrey has assembled and examined critically the evidence bearing on the age of the skeletal remains and artefacts found in the "escargotières" of Mechta el-Arbi, Tunisia. This midden site was discovered in 1907; but knowledge of its content is imperfect. Owing to the dispersal of the collections both of human remains and artefacts made by M. A. Débruge, to whom the exploration of the site was entrusted in 1913 and again in 1923, only one of the four skulls

* Vaufrey, R., "L'Age des Hommes Fossiles de Mechta el-Arbi". *Bull. Soc. Historique et Géographique de la Région de Sétif* (1935).
Vaufrey, R., "L'Age de l'Art rupestre nord-africain". *Bull. Soc. Préhistorique Française*, 33, No. 11.