

## BIRBAL SAHNI INSTITUTE OF PALÆOBOTANY, LUCKNOW

By DR. OVE ARBO HOEG  
Director

THE Birbal Sahni Institute of Palæobotany in Lucknow was founded on the initiative of Prof. Birbal Sahni, whose sudden death, on April 10, 1949, caused grief to his many friends and colleagues all over the world. It happened only one week after the foundation stone for the new Institute building had been laid by Mr. Nehru, the Prime Minister of India. This tragic occurrence threatened the existence of the Institute at its very start, and it was only due to the untiring work of Mrs. Savitri Sahni, with the help and co-operation of Sahni's collaborators, and to the sympathetic interest of the Government, particularly Sir S. S. Bhatnagar, that the Institute survived the difficult period which followed.

When founded in 1946 the Institute had at its disposal a nucleus of funds donated by Prof. and Mrs. Sahni and by the Burmah Oil Company, together with Prof. Sahni's collection of fossil plants and his palæobotanical library, also donated for the purpose. The Government of Uttar Pradesh gave the necessary land for the new building, together with various grants. But the main burden has been borne by the Government of India, which, until the end of the financial year 1952-53, has given non-recurring grants for the building and furniture to the amount of Rs. 652,800 and an annual recurring grant which in recent years has been Rs. 150,000. During 1951-53 Unesco, under its Technical Assistance Programme, has helped the Institute by providing a director, a scholarship, and grants for equipment.

The new building was opened officially by Mr. Nehru on January 2, 1953. It was designed by Messrs. A. P. Kanvinde and Shaukat Rai, architects to the Council of Scientific and Industrial Research. It is in two stories; but on the first floor only the front row of rooms has been built. From an architectural point of view it differs from the traditional Indian style in so far as there are no broad verandas along the front. Instead, it has vertical louvres on the south side, which act as sun-breakers, so that during summer no direct rays can fall on the windows.

The total length of the building is 271 ft. There is a 9-ft. corridor along the centre of the building, with laboratories and other rooms on both sides. The window axes are 12 ft. apart, so that, depending on the position of the partitions, there are laboratories approximately 12, 24 or 36 ft. by 22 ft. In all laboratories there are benches along the outer wall, with all service pipes concealed behind the benches. The Institute has its own small petrol-gas plant with connexions to all the laboratories.

The basement comprises workshops and store-rooms. The workshops are well equipped with cutting and polishing machines, bandsaws, etc. In the main store-room for the fossil collection there

are racks with interchangeable drawers; the racks have doors and cylindrical dust-traps with cotton wool. Similar smaller racks, for the same kind of drawers, are placed in the laboratories for keeping the specimens which are being studied there.

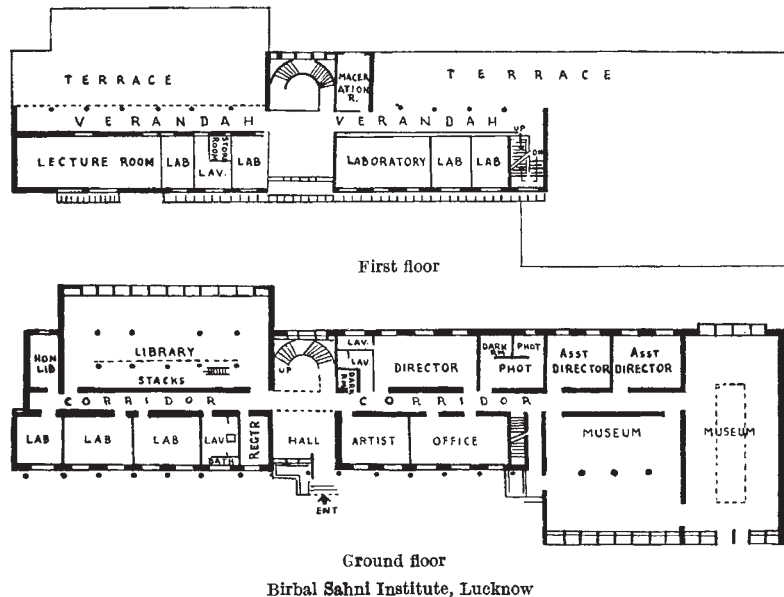
The ground floor, in addition to laboratories and offices, accommodates two large museum halls with a permanent exhibition, and a library, of which a part is provided with a mezzanine floor. There are two darkrooms, one of them air-conditioned.

On the first floor there are laboratories, including a special maceration room with fume-chambers, and a lecture theatre with eighty seats.

The library of the Institute has as its main core Prof. Sahni's collection of reprints and other palæobotanical literature which he acquired over many years by exchange, gift or purchase, and which after his death has been augmented by the same means. Altogether the library comprises approximately 9,500 reprints, 600 books and 500 volumes of journals. The reprints are stored horizontally on shelves in steel *almirahs*. This method requires more space than the usual vertical arrangement in boxes, but has considerable advantages: the reprints do not bend, they are easily taken out because they are placed in each shelf on a plate of cardboard with a tab hanging down in front, and quarto and octavo sizes can be kept together.

The Institute is publishing a journal, *The Palæobotanist*, of which the first volume was sent out in 1952 as a "Sahni Memorial Volume" (533 pages, 79 plates), and the second volume will appear this year. It is planned that as a rule there will be one volume per year.

The first classical descriptions of the Indian fossil flora, by Oldham, Morris, Feistmantel and Seward, were based on collections which belong partly to the Geological Survey of India in Calcutta, and partly to the British Museum, and also much of Sahni's



work was based on collections belonging to the Geological Survey of India. The collections in the Institute comprise those brought together by Prof. Sahni and his pupils in various parts of India, and others donated by institutions and colleagues abroad. They include many type specimens and other material described by Sahni and other members of the staff, and they are rapidly increasing, thanks to the field activities which play an important part in the Institute's programme.

The scientific staff of the Institute consists at present of the director (Dr. O. A. Hoeg), two assistant directors (Dr. R. V. Sitholey and Dr. K. R. Surange), one senior scientific officer (post vacant), three junior scientific officers (lecturers), and a number of research scholars and research assistants. Nine scholarships have been granted by the Governments of India and of Uttar Pradesh and by the Assam Oil Company (Burmah Oil Co.). The scholars work on a wide variety of problems, most of them with the intention of submitting theses for the degree of Ph.D. at one of the Indian universities by which the Institute has been recognized.

The Council of Scientific and Industrial Research has sponsored three research schemes in the Institute, each scheme with two research assistants appointed by the Council and a senior member of the scientific staff as supervisor.

The administrative and clerical staff is quite considerable, and in addition there are an artist, a photographer, a mechanic, two section-cutters, and other assistant staff.

The scope of the Institute is to promote palaeobotanical research in all its aspects, on an Indian, as well as international, basis. Necessarily, the study of Indian fossil floras will always form the main object of the activity.

Apart from a very few and poorly preserved plant remains from older periods, the oldest flora in India is the Lower Gondwana flora, with *Glossopteris*, etc., connected with the most important coalfields in India. From the younger periods there is an extremely interesting Jurassic flora, mostly in an excellent state of petrification, in the Rajmahal Hills in Bihar, and there are remains of flowering plants, in equally good preservation, in the Deccan Intertrappean of early Eocene age. In addition, there are fossil plants in other places and from different ages. Research on a variety of such material is being carried out in the Institute.

In recent years microfossils, particularly pollen grains and spores, have become more and more important in palaeobotany. It happens that they are preserved in great numbers in sediments where macrofossils are few or entirely missing, and they may therefore help to solve age problems in cases where other fossils have failed. It was in recognition of this fact that Prof. Sahni planned a search for microfossils in Indian sedimentary rocks containing no macrofossils and the age of which is uncertain. The plan received the support of the Council of Scientific and Industrial Research in 1947 and is still going on in the Institute.

Peat bogs and lake deposits with an abundance of pollen, like those of north-west Europe, are unknown in India, but even so there are some possibilities of pollen analysis of Pleistocene and older sediments, for example, in clays in Kashmir, some of which have proved to be rich in pollen, and possibly also in the plains. Until now, practically nothing has been known about pollen production of trees and other

plants in India; such knowledge forms part of the basis for pollen analysis, and the Institute therefore, in 1952, started an investigation of the pollen in the air at Lucknow. With the support of the C.S.I.R., palynological studies on a broader basis, and a pollen herbarium are now being started.

In 1952 the Institute, again with the support of the C.S.I.R., and in co-operation with the Fuel Research Institute, was able to start another research scheme, the palaeobotanical investigation of Indian coals. Studies on microfossils in Indian coals have been going on in the Institute since 1949; but under the new scheme it is possible to give the work a broader basis and a wider scope. The work so far has been concentrated on analysing the contents of spores and pollen in various seams. When a sufficiently detailed knowledge has been gained of the various spore forms and their distribution it will be of interest to ascertain to what extent this knowledge can be used for correlation of coal seams. Such practical utilization has proved to be of considerable value in other countries and has also already in a few cases been tried with success in India.

Prof. Sahni himself scarcely had any higher wish for the Institute than that it should be regarded by every palaeobotanist as a home and as a place where scientists, from all parts of the world, could come for research and exchange of ideas. He did not live to see that happen. Now, however, the Institute is established, its doors are open, and palaeobotanists are welcome to fulfil the wish of its great founder.

## NATURE OF VIRUSES

THE Society for Visiting Scientists is to be congratulated on holding yet another successful informal symposium—this time on the "Nature and Constitution of Viruses". A crowded meeting on May 5, under the chairmanship of Dr. A. S. McFarlane, listened to opening contributions from three leading international authorities in this field.

Dr. P. R. Lépine described the work going on at the Pasteur Institute, Paris, in the study of virus inclusion bodies. He adopted a predominantly morphological approach illustrated by electron micrographs of inclusions seen in rabbit myxoma (which is prevalent at present in France), fowl pox and rabies. He discussed the different types, noting particularly that some appear to consist solely of aggregates of elementary virus particles, whereas others are not uniform in composition. An extreme case of the latter is to be seen in the intracellular polyhedra which characterize some insect virus infections and which contain only a few per cent of virus. Generally, small virus forms or signs of virus particles about to divide were absent from his pictures.

Dr. R. W. G. Wyckoff (United States) also showed some striking electron micrographs, mainly of ultra-thin tissue sections. In the chick chorio-allantoic membrane infected with influenza virus, rods and spheres can be seen at the periphery of infected cells having the dimensions and general appearance of the round and filamentous forms of the virus. The rods show definite indications of originating as finger-like protrusions of the cytoplasm of the host cell, and the spheres appear to originate by fragmentation of the rods. No rods or spheres can be seen inside the infected cells. Rous virus in tissue culture showed no cytoplasmic protrusions of the host cell; but