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Birbal Sahni Institute of Palaeobotany, Lucknow—the vision that came true

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The foremost desire of Professor Birbal Sahni, the eminent botanist, was to put palaeobotanical research in India on an organized basis. As early as 1929, he decided to establish a museum of fossil plants. Due to lack of response from the then government to grant funds for this venture, committed as he was, he resolved to see his cherished dream through by financing it from his own, as well as from other private resources.

In September 1939, Sahni convened a committee of Indian palaeobotanists to coordinate palaeobotanical research in India and also to publish periodic reports on the progress of Indian palaeobotany. To impart a formal status to the committee, the Palaeobotanical Society was founded on 19 May 1946 and registered as a trust on 3 June 1946.

The object of the Society was to promote original research in fossil botany on an all-India basis, and its application to problems of economic geology. At Sahni's behest, the governing body of the Society resolved on 10 September 1946 to establish an Institute of Palaeobotany. The Institute started functioning at the Botany Department of Lucknow University with Sahni as the Honorary Director.

Rich collections of plant fossils and literature donated by Sahni, and a small amount of private funds, mainly contributed by the Sahnis and the Burmah Oil Company, were the only initial assets of the Institute. In September 1948, the Government of United Provinces gifted to the Institute a building next to the Lucknow University, and the Institute moved in there. As Sahni envisaged the development of palaeobotany in all its aspects, a comprehensive plan was prepared for the construction of a new building for which the Government of India sanctioned the required funds.

The foundation stone for the new building of the Institute was laid by Pandit Jawaharlal Nehru, the then Prime Minister of India, on 3 April 1949. In his speech requesting Nehru to lay the foundation stone, Sahni said: 'The stone, which it will be my privilege now to ask you, Sir, to lay, is a somewhat unusual sort of monument. There it stands in front of you. It has been purposely made in this laboratory from an assortment of rocks and fossils from many different countries, and from many geological formations.' He further said: 'It is our hope that in this stone a link will have been forged in the chain of international goodwill and cultural cooperation. By laying this foundation stone you will, therefore, be helping us to achieve for this young Institute a hopeful future of a broad and truly international look which is one of our main objectives.'

Unfortunately, Birbal Sahni did not live to see his cherished dream fulfilled. He passed away on 10 April

Botany department of Lucknow University, where the institute was started.

1949. To cope with the emergent situation, the governing body of the Palaeobotanical Society authorised Mrs Savitri Sahni to discharge all the duties of the Director of the Institute in addition to those as President of the Society. In October 1949, the governing body of the Palaeobotanical Society renamed the Birbal Sahni Institute of Palaeobotany, as a tribute to the guiding beacon.

Shouldering the onerous responsibility Savitri Sahni rose to the occasion. Her untiring efforts and zeal led to the completion of the new building by the end of 1952. The building was dedicated to science by Jawaharlal Nehru on 2 January 1953 amidst a galaxy of scientists from India and abroad.

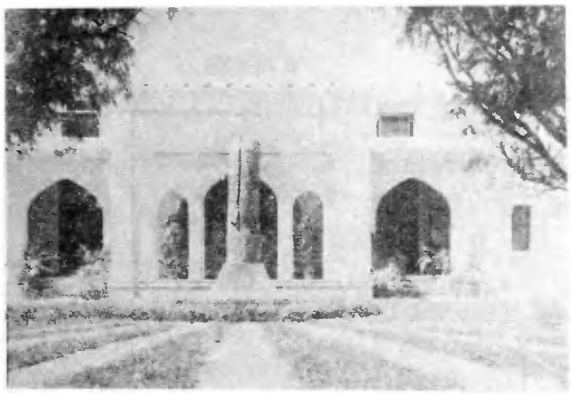
Professor Tom M. Harris of the Reading University, England, served the Institute as an advisor from December 1949 to January 1950. In May 1950, Dr R. V. Sitholey was appointed as Officer-in-Charge to carry out the duties of the Director. Professor Ove Arbo Hoeg of the Oslo University, Norway, then served as Director of the Institute from October 1951 to August 1953 on an UNESCO assignment. After his departure, Dr K. R. Surange took over as Officer-in-Charge, to be appointed in October 1959 as Director in charge of academic and research activities. The administrative powers remained vested with Savitri Sahni till 1968. Dr M. N. Bose succeeded Surange in May 1980. After Bose's superannuation in March 1985, Dr S. C. D. Sah temporarily held charge as the Director till June 1985 when Dr B. S. Venkatachala took over as Director.

It was realized that the Birbal Sahni Institute should function independently of the Palaeobotanical Society. The Society therefore reconstituted itself as a purely professional scientific body and transferred the possession of the Institute to the newly constituted Birbal Sahni Institute of Palaeobotany Society in November 1969. Under the new set-up the Institute functions as an autonomous research organization financed by the Department of Science and Technology, Government of India.

Professor T. S. Sadasivan of the Madras University, the first Chairman of the governing body of the Institute under the new set-up held office till January 1978 and was succeeded by Professor T. S. Mahabale of Poona University. Professor A. K. Sharma of Calcutta University took over as Chairman in July 1981 and continued up to July 1987. The present Chairman, Professor H. Y. Mohan Ram of Delhi University, took office in September 1987.

The main objectives of the Institute are:

- To develop palaeobotany, including palaeopalynology, in all its botanical and geological aspects;
- To constantly update the data for interaction with allied disciplines;
- To coordinate with other knowledge centres in areas of mutual interest, such as early life, exploration of fossil fuels, vegetation dynamics, climatic modelling, conservation of forests, etc; and
- Dissemination of palaeobotanical knowledge.

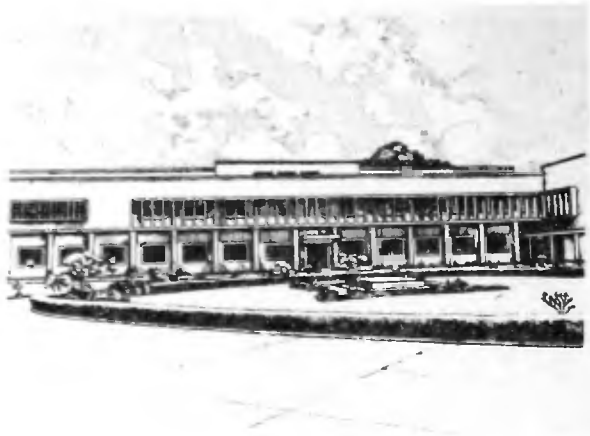


The old building of the institute

During the early phase the research activities of the Institute laid emphasis on composition of the Indian fossil floras, the form and structure of different taxa, and their distribution in time and space. Gradually, the research activities diversified to encompass palynological and petrological studies for building past history of vegetation and also to understand the genesis and palaeoecology of coal basins. Attention was also paid to phylogeny and evolution. Biostratigraphic dating of sediments, correlation of surface and subsurface sections and location of favourable areas for oil prospecting assumed added importance. Ultrastructural studies for morphotaxonomy have recently been introduced with the availability of a scanning electron microscope. Investigations on biodiagenesis have been given due importance to understand factors responsible for the degradation of dispersed organic matter. An MPV-3 microscope facility has been added for this study. Keeping in view the importance of absolute dating of palaeobotanical and archaeological samples, the Institute established a carbon (^{14}C) dating laboratory in January 1973. During the years the laboratory has attained the status of a full-fledged radiometric dating department. Fission-track dating method has been perfected; the potassium–argon (K–Ar) dating facility is expected to become operational soon.

In order to attain wider interaction among scientists at the Institute as well as to increase interinstitutional collaboration, increasingly more emphasis has been laid on multidisciplinary approaches since 1986. It has also been made a guideline for future planning. The application of this concept has substantially increased the precision and accuracy of results.

Current research activities of the Institute are organized under the following projects:



Birbal Sahni Institute of Palaeobotany, the new building

i. Antiquity, radiation and evolutionary patterns of Early Biota.
ii. Gondwana coal and associated sediments: genesis, floral evolution and biostratigraphy.
iii. Cenozoic plant biogeography of peninsular India.
iv. Phytoplankton biostratigraphy of marine sedimentaries of India.
v. Palaeofloristic diversification in the Himalayan region.
vi. Biostratigraphy and palynofacies of petroliferous basins of east India.
vii. Reconstruction of Quaternary vegetational patterns.
viii. Geochronometry of Indian rocks.
ix. Annotated atlases, catalogues, monographs, and books.

Focal themes of topical interest that form the basis of current research programmes being carried out at the Institute are:
i. Definition of early life patterns with particular reference to prokaryote/eukaryote transition and evolution of metaphytes and metazoans.
ii. Origin, radiation and decline of the Gondwana floras with particular reference to the coal-forming vegetation.
iii. Affinities and genetic relationship of the Palaeozoic and Mesozoic floras of the Himalayan region with global perspective on Continental Drift.
iv. Evolution and diversification of Tertiary floras of India with emphasis on the spread of angiosperms.
v. Domestication of plants, and agriculture and forestry in pre- and proto-historical cultural settlements.
vi. Biopetrological assessment of coals and lignites for industrial application with emphasis on coking, blending and hydrogenation characteristics of coal, economic suitability, genesis and coalification trends of lignites and evolution of oil source rocks.
vii. Palynological dating and correlation of sedimentary strata with particular reference to time boundaries, and palaeoenvironments of coal, lignite and petroliferous basins.
viii. Reconstruction of phytogeographic and palaeoclimatic models for the Quaternary Period on the basis of plant mega- and palyno-fossils, and tree-ring chronology.
ix. Causes and effects of deterioration of forest cover with particular emphasis on conservation of mangrove and shola forests.

In order to achieve tangible results as related to the focal themes, the Institute has established close coordination and collaboration with the Geological Survey of India, Oil India Limited, Oil and Natural Gas Commission, Coal India Limited, Central Mine Planning and Design Institute Limited, Neyveli Lignite Corporation of India, National Geophysical Research Institute, Bhabha Atomic Research Centre, Wadia Institute of Himalayan Geology, Institute Francaise de Pondicherry, Indian Institute of Tropical Meteorology, Physical Research Laboratory, and other institutions.

The Institute has four important ancillary units, viz. library, museum, herbarium and publication. The library which started with a gift of the private collection of books, journals and reprints by Sahni, now holds one of the finest and largest collections of literature on palaeobotany and allied subjects in the country. The library also distributes reprints of publications from the institute on an exchange basis. It is also a member of resource sharing pool of libraries located at Lucknow.

Initially, the museum was set up with the collections of fossil plants made by Birbal Sahni from India and abroad. The repository of the museum is being continuously enriched through collections made by scientists of the Institute during their field work in different parts of the country, as well as by an active global exchange of fossil specimens. Besides the type specimens/slides and other figured materials, the museum also maintains the archives of the Institute. It freely gifts fossil specimens to university and college departments of botany and geology for teaching and demonstration.

The herbarium maintains a reference collection of extant plants and their preparations useful for the comparative study of fossil material. The collections are classified under the following sections: a. general herbarium, b. xylarium, c. Sporothek, and d. Carpotheck.

The publication unit of the Insitute publishes *The Palaeobotanist*, an international journal, annual reports of the Institute, proceedings of conferences, monographs, catalogues, atlases, etc. under the supervision of an editorial board chaired by the Director. In fact, the publication unit can trace its origin to publication of *Palaeobotany in India* by Sahni as a prelude to publication of a regular science journal. Destined as it was, the first volume of *The Palaeobotanist* appeared in 1952 as the *Birbal Sahni Memorial Volume*.

The scientists of the Birbal Sahni Institute of Palaeobotany, academic successors of Birbal Sahni, always remember the philosophical oration of the founder on the occasion of laying of the foundation stone—'For what is it, after all, that pious men worship in a stone which they place in a temple, but an idea, or an ideal, a great truth, a hope or a wish for a higher existence, whether in this world or the next? And what is it that this stone symbolizes? The great fact of the antiquity of plant life on the globe, the intellect of man ever striving to bring that fact more and more clearly to light revealing different stages not only in the evolution of the plant kingdom in a more and more orderly and understandable sequence, but also the evolution own poor understanding sequence of these truths very construction of it, the flaws and imperfectio its entire make-up, the labour that has gone in preparation, are all but symbols of our imperfec helpless efforts at constructing something new, thing worthwhile.'

During the year of the birth centenary of this man, we rededicate ourselves towards achieving Sahni's dream, 'an ever brighter and more useful in which men of all nations will co-operate in the of science and of service'.

The student of science lives in a world of fragments. Nothing in that vast array of visible things that we call Nature appears to our restricted vision as a complete picture.

–Birbal Sahni

True artist that he is, the creator never reveals the whole of his design at once. Like the child with a jigsaw puzzle we try to piece together the fragments of the picture.

–Birbal Sahni

To the onlooker, who alone holds the key, the seriousness with which we go about our little attempts must seem pitiable. For after all there can be only one real solution, one truth. Some of us may boast that we have got at that one truth: we only delude ourselves. Nonetheless, curiosity lures us on, for there are few pursuits so absorbing as this study of fragments that we call science.

–Birbal Sahni