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1. INTRODUCTION

The Institute conducts research on Palaeobotany, the discipline dealing with various aspects of plant fossils. The research projects at the Institute are organised under six scientific departments and two special units. Some of the broad areas of research to be conducted during the 5th Five Year Plan period are:

1. Search for early plant life in Indian rocks older than 300 million years.
2. To build up a composite picture of plant life as existed during the coal-forming period in India.
3. The evolution of plant life through the geological ages in India.
4. History of plant life during the last glacial epoch in India.
5. History of cultivated plants of India.
6. Study of pollen and spores recovered from sediments of various ages to ascertain the location and distribution of coal seams.
7. Study of pollen and spores from various sediments to indicate favourable areas for oil prospecting.
8. Intensive field mapping of prospective coal and oil containing areas for correlation.
During the year under review many important achievements were made under different plan and non-plan projects. Some of the outstanding results are:

1. Definite evidence of the occurrence of micro-biota was found in the Suket shales (about 900 million years old), near Rampura, Madhya Pradesh.

2. For the first time large number of reproductive organs of the important plants of the early coal-formation period (about 250 million years) were found in Orissa. This find is being analysed for tracing the phylogenetic history of these plants.

3. Several reproductive organs associated with certain younger plants have also been identified. These finds throw new light on the relationship of these plants. Particularly interesting is the identification of cycad-like strobili in the Triassic (Nearly 200 million years), and of monocot-like inflorescence in the Early Tertiary (60 million years) deposits.

4. Observations on the pollen and fungal spores in the atmosphere at Lucknow have been finalized. They have important bearing on the diseases in plants and animals, particularly in regard to allergy caused by some of them to man.

5. Remains of cultivated plants were identified from several archaeological sites, significant amongst which were rice and different varieties of wheat.

6. Study of spore and pollen florae has been quite useful in correlation of various sedimentary horizons in Raniganj and Singreni Coalfields. Evidences have been obtained which show that the
change in plant forms did not coincide with the lithological Permian-Triassic boundary, as was supposed earlier.

7. Palynological study of Oil India Project samples from Kharsang 2 section (Assam region) has provided useful information with regard to their stratigraphic position.

8. The setting up of the Radiocarbon Dating Laboratory is well on its way and it is hoped that soon the Institute would be able to take up the dating of samples.

For interdisciplinary studies the Institute worked in close collaboration with the Indian Statistical Institute, Geological Survey of India, Central Fuel Research Institute, National Coal Development Corporation, Oil and Natural Gas Commission, Oil India Ltd., Directorate of Mineral Resources of Meghalaya, and others.

Training in palaeobotanical methodology was provided to several persons, including three foreigners, one each from Bangladesh, Iran and Nepal. Technical assistance on palaeobotanical and related problems was provided to many individuals and organizations. These include Archaeological Survey of India, Rajasthan State Department of Archaeology and Museum, Gujarat Directorate of Geology and Mining, Neyveli Lignite Corporation, and others.

Quite a few scientists of the Institute participated in National and International Conferences. This year, too, some of them were nominated or elected on various National and International Committees.

An important feature of the publications brought out by the Institute this year is a book entitled "Aspects and
Appraisal of Indian Palaeobotany. This is really a critical review of the entire work done in Indian Palaeobotany so far. It would not only be a handy source of information for research workers but would also serve as a useful guide for teaching of palaeobotany in Indian Universities.
II. RESEARCH

1. PRE-GONDWANA

1.1. Pre-Gondwana Plant Life

Completed observations on the micro-biota recovered from the Suket shales collected from Rampura (Madhya Pradesh). The micro-biota comprises algae, fungi, and acritarchs. The algae remains are commonly colonial (Palaeonocystis and Myxococcoides) and rarely filamentous. The fungal remains belong to Eomycetopsis. The acritarchs are Letospheridium, Protoleiosphaeridium, Symplasmosphaeridium, Zonosphaeridium and Nucellospheridium.

2. LOWER GONDWANAS

2.1. Morphological Studies in the Glossopteris Flora

2.1.1. Pteridophytes.

A critical morphological study of Tricyclus speciosus has been done. 390 specimens collected from the Raniganj Formation of the Raniganj Coalfield have been studied. Size measurements of different plant structures have been taken to understand that the variations in size of the leaf etc. and to find out the height of the plant. This has helped to reconstruct the possible size of the plant and the number of whorls on a single plant. Studies on the epidermal structure of leaves and the anatomical structure of stems have been done by cellulose pull method. A large number of leafless articulated equisetalean stems are associated with the leaf-bearing shoots. In some cases the aerial shoots are in
organic connection to these leafless stems, on the basis of which a reconstruction of the plant has been suggested.

In addition to this, one species of Paratryzygia and one new species of Parasphenophyllum have been identified.

2.1.2. Gymnosperms.

Morphological studies of Glossopteris leaves collected from Handappa village, Dhenkanal, Orissa. For the identification of species, biometry has been applied. Sixteen types of Glossopteris are recognisable.

2.1.3. Lower Gondwana Floras from the Damodar Valley and Extension.

A. Morphological and cuticular studies of Glossopteris from the Barakar Formation of South Karanpura Coalfield.

On the basis of morphological and cuticular studies 9 distinct types of Glossopteris leaves from the Lower Nakari Seam of South Karanpura Coalfield have been recognised. Of them 5 species are new.

2.1.4. Palaeobotany of Auranga Coalfield.

Mega fossils and microfossil assemblages from the Lower Gondwana horizons of Auranga Coalfield have been completely investigated. Palaeobotanical evidence indicates the presence of Karharbari and Barren Measures which were hitherto not known in the basin.

2.1.5. Glossopteris Flora from Mahanadi and Brahmani Valley, Orissa.

Gymnospermous reproductive organs from the Glossopteris flora of India have been re-examined.
Eretmonia, Gleosotheca and Kendrostrobis are the pollen bearing members. Denkaria, Parika, Lidgestonia are the female cupulate types and Dictyopteridium, Scenun, Ottokaria and Senokinea are the multiovulate types of female reproductive organs. Most of the female fructifications are subtended by fertile scales possessing Gleosotheca type of venation. The cupulate types show some resemblance with the Lyginopteridaceae, Coryxoperoxmaeaceae and Peltaspermaeaceae, although they cannot be assigned to any of these families. Provisionally the cupulate types may be put under the Pteridospermales. The multiovulate types are quite distinct from the known Gymnosperm groups, living or fossil, and hence have been put under a new group of Gymnosperms, namely Gleosothecales. Thus, there are at least two groups of Gymnosperms, apart from conifers which are present in the Permian Gleosothea flora of the southern hemisphere.

2.2. Spores Dispersae and Palynostratigraphy

2.2.1. Morphology of Lower Gondwana Spores.

Biometric analysis has been applied systematically to locate the morphographic parameters of monosaccate genera, Plicatipollens and Potoniessporites as well as to find out the degree of transition between them. For this purpose samples of Talchir and Karharbari Stages from South Rewa basins and the Talchir of Giridih Coalfield have been completed. Characters such as heteromorphism in tetrad mark, relation between fold system and the overall shape of spore with reference to tetrad mark were taken into consideration and were plotted graphically. The results indicate the possibility of identifying the taxa biometrically.

2.2.2. Miospore assemblage from the Barren Measures of South Karanpura Coalfield.
Barren Measures of shales from the Nakari Nala Section, South Karanpura Coalfield, have yielded a miospore assemblage comprising 18 genera and 31 species. The genus *Densipollenites* is characteristically abundant.

2. 2. 3. The various aspects of Gondwana Palynology with reference to stratigraphy, palaeogeography and palaeoclimate, floristics and distribution of spore kinds have been discussed in a paper at the 1st Indian Palynological Conference held at Chandigarh.

2. 2. 4. A paper on the Palynostratigraphical study of the bore-core NCRD-5 in the Dishergarh area near Asansol, Raniganj has been finalized.

2. 2. 5. The bore-core NCRD-2 consisting of 56 samples and representing almost the entire Raniganj Formation in Raniganj Coalfield has been palynologically analysed. This study suggests a constant and continuous preponderance of striate disaccate genera within the succession. The rarity of the genus *Densipollenites* and mesosporoid trilete spores in Raniganj mioflora distinguishes it from the Barren Measure and the Lower Panchets respectively. The paper has been sent to Press.

2. 2. 6. Raniganj-Panchet successions were sampled during the month of April, 1974 along the Nonia Nala and Nonia Khal streams, Raniganj Coalfield. The maceration and slide preparation of 39 samples has been completed. Further collections have been made from these sections this year.

2. 2. 7. The palynological study of all the working Coal seams from different areas of Singreni Coalfield were completed. The miofloral Zoneation and the correlation studies are almost complete. However, the petrographic studies have not been done owing to the cutting and
polishing machines being still not ready for use and hence results could not be finalized.

2.2.8. The shale and shaly sandstones macerated from Talchir Coalfield proved barren of mioflora. Maceration of further samples is in progress.

2.2.9. The manuscript of the paper entitled "Palynology of some Talchir sediments from Mahendragarh areas, M. P." has been prepared. The paper contains successional palynological analysis of the Talchir sediment exposed in Hasdo and Hasa Nala sections along with the geological field observations.

2.2.10. The successional collection of Talchir and Barakar sediments from Betul Coalfield, M. P. has been macerated. The samples have yielded rich mioflora. Palyno-stratigraphical studies are in progress.

2.2.11. The taxonomic description of various palynomorphs encountered in the samples from South-Karanpura Coalfield is in progress. The recounting of the samples for quantitative studies has been undertaken.

2.2.12. Commencing from the earliest gymnospermous pollen organizations, the various kinds occurring in the successive geological horizons have been correlated on grounds of comparative morphology. Morphographically cohering pollen kinds from various horizons have been interpreted as constituting evolutionary lines out of which some became extinct later and others lead to the extant kinds.

2.2.13. Collection of data for morphotaxonomical study of certain trilete mioflora genera is continued.

2.3. Petro-Palynology of Coals
2.3.1. The manuscript of the paper entitled “Petrology and Palynostratigraphy of some Wardha Valley coals, Maharashtra, India” has been revised for publication, incorporating some recent information and relevant geological details.

2.3.2. Basic Coal types of Lower Gondwana sequence have been determined based on the present knowledge of the composition of coals from different stages. Combination of characters based on the analysis of coals from various Basins have been utilized for grouping the Coal types.

2.3.3. The petrographic analysis in conjunction with Palynological studies of Godavari coals could not be completed as the machine section is still out of order.

3. PALAEOZOIC FROM ABROAD

3.1.1. Collection of data and cataloguing regarding the palynostratigraphy of Silurian-Devonian of the world is being done.

3.1.2. Palynology of Brazil coals is under re-examination.

3.1.3. Collection of data for palynostratigraphy of the Permian from all over the world is being done.

4. MESOZOIC

4.1. Megafossil Assemblages

4.1.1. Triassic Flora.

Work was carried out on the Lower Triassic floras from Asansol, Auranga Valley, Ramkola-Tatapani and Nidpur regions. In the Early Triassic flora it was found that Lepidopteris-like plants appeared first and not Diroedium
which was so far thought to be a Triassic marker. It seems the Early Triassic flora thrived under unfavourable conditions.

Description and photography of *Trizygia speciosa* was completed. A new microsporangiate fructification was described under *Bosea indica* gen. et sp. nov. The fruiting body consists of a thick axis with microsporophylls arranged in opposite or sub-opposite manner. The sporangia are borne on the under surface of microsporophylls. Each sporangium contains *Weylandites*-type of spores. The cuticle of microsporophyll is somewhat like *Lepidopteris indica* Bose & Srivastava. Apart from *Bosea indica*, two other new genera have been described as *Gopadia* (leaf) and *Chakrea* (fructing body).

Studies on the Pteridospermous remains from the South Rewa Basin have been started. After photographing the megafossils, cuticular preparations have been made from them.

4.1.2. Jurassic-Cretaceous Flora.

Cycadophytic leaves from the Mesozoic rocks of India have been examined. It is found that most of the leaves described under *Nilssonia* are really Pterophyllums. The work on *Pterophyllum sahni* and *P. distans* was completed.

From Jatama in the Jabalpur series a few species of *Cladophlebis, Neumaninia* and *Sphenopteris* have been studied. From Sehora a large number of cuticular preparations have been made out of *Beckiphyllum* and *Desmioophyllum*. Their study is in progress. The work on *Elatocladus* and *Pagophyllum* from the same locality has almost been finalized. The paper will soon be sent to the Press. From Jansa three species of *Pilophyllum* have been recognized and described. The work on *Elatocladus, Dezia*-
phyllum and Araucarites is well under progress.

The studies on some pteridophytic remains from Songad in Kathiawar were undertaken. The work on Dicryophyllum is in final stages.

From Nipania the figured slides of Pentoxylon ("dwarf" and "long" shoots) were re-examined. The object was to observe the primary vascular system of Pentoxylon and to compare this with that of other gymnosperms. The supply of leaf-traces in Pentoxylon was found to be somewhat similar to Rheoxylon, Bucklandia and Ginkgo.

A comparative study of some fossil and living members of Matoniaceae and Gleicheniacese was undertaken.

4. 2. Spores Dispersae and Palynostratigraphy

4. 2. 1. Triassic Palynoflora.

The study of palynomorphs from the greenish-brown mudstones and shales of the Maitur Formation (Panchet Group) exposed in the Nonia Nala, East of Kumarpur, near Asansol, West Bengal was completed and the paper was sent for publication in the Palaeontoctaphia. Highlights of the results obtained were published in the Palaeontologia. The microspores belong to 40 genera and 60 species, of which 1 genus, viz., Playfordiaspora, and 3 species are new. There are 8 genera and 17 species of megaspores, of which 2 genera and 15 species are new. The Maitur beds above the Raniganj-Panchet contact have abundance of striate bisaccate pollen as in the underlying Raniganj beds. In the beds farther above the contact, the number of trilete forms gradually increases while the bisaccate pollen decrease in frequency. The characteristic genera of the Maitur Formation are Verrucosporites, Decisporites, Playfordiaspora, Lunatisporites sensu stricto, Bankeisporites, Pantiella and
Maiturisporites.

The study of Panchet mioflora from the Sukri River exposure near Kaima, Aurangabad Coalfield, Bihar was completed and sent for publication. The palynomorphs are assignable to 23 genera and 33 species. One genus and 5 species are new. The mioflora is quite similar to the Lower Triassic palynological assemblage obtained from the Maitur Formation of Naria Nal, West Bengal.

A large number of sporiferous slide preparations from several samples collected from the South Rewa Gondwana basin were scanned for miospores. Rough descriptions of some miospore types were completed. The study is still under progress.

Triassic miofloras known from the territories of Algeria, Tunisia, Libya, the Saudi Arabian Peninsula, Pakistan, India and Western Australia were reviewed for presentation in the Gondwana Palynology Section of the 1st Indian Palynological Congress held at Chandigarh. The paper has been submitted for publication in the Palaeobotanist.

4.2.2 Jurassic-Cretaceous Palynoflora.

Study of the mioflora from the Athgarh beds was completed. The paper is being published in the Palaeobotanist. The Palynological assemblage comprises 43 species belonging to 29 genera of pollen and spores. The assemblage has a predominance of gymnospermic pollen comprising particularly Araucariacidites and Calliasporites. Pteridophytic spores are meagrely represented. On the basis of the mioflora, the age of the Athgarh Formation is tentatively taken as upper Jurassic.

A detailed study of the palynoflora from the Upper
Gondwana of South Rewa Basin is under progress.

4.2.3. Palynostratigraphy of Mesozoic sediments from Sidheshwar Hill Cuttuck, India.

Six carbonaceous shale samples were macerated and are being scanned. Further maceration of the remaining samples is in progress.

4.3. Mesozoic from Abroad

4.3.1. The Lower Triassic palynological assemblages from Nungurbe on the Lomai River, South-East of Kitenge and from Lualaba Valley at the confluence with Loera River have been described. The former assemblage is characterized by 20 genera; of them 4 genera belong to triletes, 1 genus to monoletes and 11 genera to nonstriate bisaccates. The assemblage is dominated by triletes (73%) and striate and nonstriate bisaccate contribute 15% and 12% respectively. The sample from Lualaba yielded only 9 bisaccate genera and is dominated by *Lunalisporites* (60%).

4.3.2. Palynological studies on some Zirah Coals, Persia.

Taxonomic study is almost complete. Manuscript is being prepared.

4.3.3. Palynological studies on some Mesozoic Coals of Iran.

Taxonomic study is in progress.

4.3.4. The cataloguing of reprints of Mesozoic palynological section of the library of the Institute is being continued.

5. CENOZOIC
5. 1. Morphological and Anatomical Studies

5. 1. 1. Deccan Intertrappean Flora.

Detailed studies were carried out on a new and well preserved angiospermous inflorescence discovered in chert from Mohgaon Kalan. The morphological and anatomical characters of the petrified inflorescence indicate its affinities with monocots, showing a near resemblance to members of the Cyperaceae and Liliaceae.

Six big pieces of palm woods collected from the localities of Parapani and Mehgaon in Mandla district of Madhya Pradesh were sectioned in cross and longitudinal planes for a detailed investigation. All of them were found to be new. One specimen had roots attached. Two of them also showed a prominent lacunar ground tissue indicating a marshy habitat. Attempts are being made to identify them with the modern palms.

About thirty specimens of fossil dicot woods, also collected from Mandla district of Madhya Pradesh, were cut and their sections prepared. A detailed study showed the presence of five new types, resembling the modern woods of Grewia, Sterculia, Limonia, Cynometra and a member of the family Euphorbiaceae.

The pollen and spores recovered from the Intertrappean cherts were studied and compared with the modern pollen and spore taxa. This study revealed the pollen of Saxifragaceae, Leguminosae, Anacolaceae, Monimiaceae, Berberidaceae, Convolulaceae among the angiospermic spores of Polygodiacese, Schizaeaceae, Lygodiaceae among the pteridophytes and a variety of fungal spores.

5. 1. 2. Leaf impressions from Laki Series, Kutch.

Studies were carried out on the leaf impressions from
the Eocene of Panandhro Basin. Some of them have been provisionally assigned to the families Meliaceae, Rubiaceae, Guttiferae, Tiliaceae, Lauraceae, Urticaceae and Melastomaceae.

5.1.3. Leaf impressions from the Lower Miocene of Khari River Bed, Kutch.

Leaf impressions collected from the Khari River bed near Goyala-Mokra, were studied and tentatively assigned to the families Leguminosae, Euphorbiaceae, Combretaceae, Anacardiaceae, Celastraceae, Sapindaceae, Cactaceae, Moraceae, Rutaceae, Lauraceae, Rhamnaceae and Melastomaceae, etc.

5.1.4. Fossil woods from Kankawati Series (Manchar), Kutch.

Further studies on the fossil woods from near Mothala and Dhaneti villages showed the presence of Podocarpus, among the conifers and Sterculia of Sterculiaceae and Dysoxylum of Meliaceae belonging to the angiosperms. A paper on the wood of Podocarpus is ready for Press.

5.1.5. Fossil woods from the Siwalik beds of Nahan.

Fossil woods collected from Dhaur Kuan near Nahan in the Lower Siwalik beds were sectioned and studied. Majority of them were found to belong to Dipterocarpus and Cymometra. Four of them have been assigned to new species of the genus Dipterocarpoxylon.

5.1.6. Fossil woods from Eastern India.

(a) Tipam Series.

Further studies on the petrified woods from the Miocene
of Tipam sandstones near Hailakandi in Cachar district of Assam revealed the presence of *Mallolus, Albizzia* and a new species of *Glutoxylon* from this area. Modern comparable taxa of all these fossils are still found in the forests of Assam and neighbouring areas.

(b) *Dupitila Series.*

Further detailed investigation was carried out on the fossil woods identified as *Sterculia, Dipterocarpus, Shorea, Garuga, Afzelia-In sia, Cassia, Albizzia* and a member of the family Lauraceae. Some of them were photographed and described. Attempts are being made to compare them with the modern species. Further investigation of fossil woods collected during November-December, 1974 from Namsang River bed at Deomali and from Jairampur, Arunachal Pradesh is being done.

5. 1. 7. Fossil woods of the Cuddalore Series.


The affinities of *Hopeoxylon indicum* Navale (1963) and *Shorea xylon speciosum* Navale (1963) which were described as resembling those of *Hopea* and *Shorea* of the family Dipterocarpaceae were revised. These were found to be very similar with the woods of the Malayan genus *Sindora* of Leguminosae. Besides these, one more fossil wood resembling *Sindora* was identified.

Two more fossil woods already identified were further studied in detail with their modern equivalents, viz., *Chrysophyllum* and *Holoptelea* of the family Sapotaceae and
Ulmaceae respectively. A paper dealing with these woods is almost ready.

Out of a few other woods investigated one was identified as Sterculia. This is the first record of Sterculiaceae from the Tertiary rocks of South India.

5.1.8. Plant megafossils from Kereva beds of Kashmir.

A collection of leaf-impressions from Liddarmarg and Laredura, Kashmir was examined. After clearing these from the shales a few of them were found somewhat different from the leaves described by earlier workers. Attempts are being made to identify them with the modern leaves.

5. 2. Sporae Dispersae and Palynostratigraphy

5. 2. 1. Neogene miospores of India.

In order to identify the Neogene miospores from Assam and Neyveli lignite of South India, it was thought to have a reference collection of modern pollen taxa representing the pollen flora of India. Consequently pollen slides were prepared from 500 species belonging to 200 genera and 35 families of the angiosperms. These pollen taxa were described and photographed and reference cards prepared for each of them.

Samples of Neyveli lignite were macerated and about 150 slides were prepared and scanned. The pollen and spores are being identified.

5. 2. 2. Palynostratigraphy of Tertiary coals of Makum Coalfield, Upper Assam.

Taxonomic description and identification of miospore types recovered from samples of Namdang, Buragola, Ledo and Tipang collieries of Makum coalfield has been done.
5.2.3. Palynopetrographic study of the organic remains in coastal and up-country lignites

The main seam of Neyveli lignite area consisting of 35 samples and representing the entire thickness has been palynologically analysed. The palynofossils are not abundant. However, the study suggests preponderance of angiospermic and fungal forms. The taxonomic, statistical and evaluation studies are being completed.

5.2.4. A classification of dispersed organic tissues of lignites is being worked out from an extensive morpho-graphic study of the lignite biostructures and their assemblage pattern. The study is under progress.

5.2.5. Some gymnospermous forms have been recognized for the first time in Neyveli lignite. Attempts are being made to identify them.

5.2.6. Cataloguing and abstracting of Neogene literature for palynostratigraphic synthesis is in progress.

5.2.7. Palynological study of the Upper Cretaceous-Tertiary sediments of South Shillong Plateau.

Microphotography of spores and pollen assemblages recovered from earlier collection of Jadukata, Mahadeo and Langpar formations was completed. Morphological study of the palynomorphs photographed is in progress. A field excursion was undertaken to Jadukata River, Mawphlang-Bhalai and Gherra-Shellai road sections in Meghalaya to test the geological credibility of the marker fossils selected from previously worked out sections.

5.2.8. Palynostratigraphy of Tertiary sediments of Upper Assam for Oil India Project.

(A) Two hundred and fourteen samples were processed
in the laboratory representing the Tertiary succession encountered in various oil wells drilled at Nahorkatiya, Jorajan and Kharang areas of Upper Assam and Arunachal Pradesh respectively. About a thousand slides have been prepared of the productive samples.

(B) More than one hundred and fifty slides from different stratigraphic levels of Kharang 2 section were examined under the microscope. The study is in progress.

(C) Palynological assemblages from samples representing 1920, 1935 A, 1935 B and 1930 metres depth in Kharang 2 section were studied in detail. The stratigraphic interval covered by these samples is considered to be equivalent to the Girajan basalmost level of Nahorkatiya Reference section.

(D) Palynological assemblages from 3490, 3494 and 3496 metres depths of NHK 368 were examined for environmental interpretation. From the nature and mode of preservation of the microfossils it has been inferred that the stratigraphic horizon represented by the above samples was accumulated in restricted conditions (barred basin). The water of this basin was originally deduced to be acidic, resulting in the destruction of organic matter before it could be converted into hydrocarbon. The above levels were, therefore, considered unfavourable for the accumulation of oil.

(E) An excursion was undertaken to Upper Assam for collecting stratigraphically located samples from some exploratory bore holes of Oil India Ltd., and Assam Oil Company. About 58 palynological rock samples were collected from Digboi (Assam Oil Company) and Jaipur (Directorate of Geology and Mining, Assam) area.

(F) Spores related to Schizaeaceae and Parkeriaceae
are richly represented in the Tertiary succession of Assam. They show a great variation in shape, size and ornamentation in almost every stratigraphic level of this region. Therefore, the problem arises as to whether the different kinds of spores can be ascribed to the specific variations of the morphologic characters or they just represent the mutational variants. In either case, whether or not a solid geological range of distribution of various spores species can be established out of this rich assemblage for resolving the stratigraphic problems is being worked out. In this connection, a good deal of literature has been consulted to carry out a cytogenetical study on the living spores of Schizaceae and Parkeriaceae. All fossil spores recovered out of the Tertiary sediments of Assam are being sorted out for comparative purposes.

(G) In all 44 faunal slides containing a rich assemblage of foraminifera from the type area of the Tertiary sediments of Assam were provided by Oil India Ltd. These slides were studied in order to refine the Palaeontologic controls in the light of recent advancements. About 200 well preserved specimens of foraminifera from Mahadeo, Langpar, Koplil, Barail and Surma sediments were photomicrographed. Out of this assemblage, 19 genera were identified and their reference cards were made. The photomicrographs of the foraminifera in these cards were supplemented with a brief description, text-figure, horizon and age. The cards have been submitted to Oil India Ltd. Duliajan, Assam.

5. 2. 9. Palynostratigraphy of Tertiary sediments of Lower Assam—Resolution of the age of Barail equivalent rocks of Garo Hills.

Laboratory processing of samples already at hand was continued. Scanning has also been done for some of the productive samples. Fresh collections have been made...
from the Simsang River and Tura-Dalu road sections during the field excursion carried out in the months of January and February, 1975.

5.2.10. Palynostratigraphy of the Lower Tertiary sediments of Simla-Hills and near Jammu, North India.

About 165 stratigraphically located rock samples (Siwalik sediments) collected last year from the measured sections of the Kalka-Simla Highway, Himachal Pradesh have been chemically processed. Microslides have been made and the productive samples scanned. Several good palynomorphs have been photomicrographed. Some additional palynological productive horizons have been noticed. Almost all the assemblages consist of a variety of hystrichospherids and their closely associated marine forms together with a few representatives of pteridophytic spores and gymnospermic as well as angiospermic pollen grains. Fungal spores are also perceptible but are less both in variety and number. Taxonomic observations on the recovered palynomorphs are being continued. Besides, a large number of stratigraphically located rock samples (about 250) from several measured sections between Suria and Jalal around Banethi in Nahan district (Himachal Pradesh) have been collected together with field data.

5.2.11. Palynostratigraphy of the Eocene sediments of Kutch.

Thirty samples collected from 2 measured sections around Akri have been macerated. Out of these, 12 samples yielded palynological fossils. Slides have been prepared and their scanning is being continued.

5.2.12. Palynostratigraphy of Mudh and Kahdi Formations around Matanomadh, Kutch, Gujarat.
Algal and fungal microfossils recovered from the Matanomadh (= Madh) Formation have been described. Systematic description of other miospores obtained from the same formation is nearing completion.

5.2.13. Cretaceous-Tertiary of South India.

Ten stratigraphically located samples from a measured section near Pondicherry have been chemically processed for the recovery of microfossils. All samples proved unfossiliferous. 20 samples from the same area were processed for the recovery of Nanomicrofossils but none yielded coccoliths. Taxonomic study of productive samples from the previous is in progress.

Taxonomic study of Dalmiapuram phytoplanktons is also in progress.

Thirty samples from Varkala & 10 from Quilon, western ghats were macerated for the recovery of Dinoflagellates and spores. All proved productive. Slides were prepared and the scanning of microfossils has been completed. 50 samples from Varkala and Quilon were processed for nanofossils but did not prove productive. Microphotography of productive samples along with taxonomic study of Dinoflagellates recovered last year is in progress.

5.3. Tertiary from Abroad

5.3.1. Fossil woods received by the Institute from the Royal Forest Department, Bangkok, Thailand and identified as belonging to Millettia, Gymometra, Aseilia-Intis, Anogeissus and Diospyros were photographed and described. A paper on these woods is being prepared for publication.

6. QUATERNARY

6.1. Pollen Morphology
6.1.1. Rajasthan pollen flora.

Sixty pollen slides of ten species were prepared and examined palynologically.

Pollen morphology of 153 plant species distributed over different genera and families was studied statistically in order to facilitate the identification of sub-fossil pollen grains recovered from the sediments of Rajasthan.


Pollen grains of two hundred plant species were examined and various palynomorphs photographed. This has been done as an aid towards correct identification of sub-fossil pollen grains from Nepal profiles and also to prepare exhaustive pollen/spore key of the area.

6.1.3. Palynology of Holoptelea integrifolia

Thirty pollen slides of Holoptelea integrifolia of the material from Burma, Madras and Bengal were prepared. The statistical analysis of the pollen characters has been done to find out any variation in the same species growing at distant places.

One paper entitled "Palynology of Holoptelea integrifolia" has been processed and submitted for publication in the Palaeobotanist.

6.1.4. Pollen morphology of Indian flora.

One hundred index cards comprising pollen diagnoses of Indian modern flora from the book of Erdtman (1972) entitled "Pollen morphology and plant Taxonomy" have been completed.

6.2. Pollen Analysis
6.2.1. Pollen zonation scheme for W. Himalaya and Nilgiris.

One soil profile from Kalapani Swamp near Dehradun was investigated pollen analytically. Approximately 4-6 slides for each sample were studied and found that the whole profile was palynologically barren but for the stray occurrence of pollen grains of Gramineae, Cyperaceae, Compositae, Leguminosae, Rosaceae, Chenopodiaceae, and Pinus. It has however been found that the absence of pollen grains and spores in the profile is due to the differential pollen preservation owing to the increased pH and oxidation during sedimentation.

The collection of basic data pertaining to geographical distribution, ecological status of the representatives of forests, Ootacamund in Nilgiris and of western India has been accomplished. Reconsideration of the basic data is of prime importance with a view towards reorientation of pollen diagrams constructed from different zones.

6.2.2. Kumaon Himalaya.

One paper entitled "Pollen analytical reconnaissance of Post Glacial deposits, in Nainital district, Kumaon Himalaya" has been processed and submitted for publication in the Palaeobotanist.

6.2.3. Central Himalaya, Nepal

One soil profile comprising fifty samples and thirty two surface samples and moss cushions from Sankhu, Kathmandu have been macerated.

6.2.4. Gujarat.

One paper entitled "Pollen analysis of salt flat at
Malvan" was processed and submitted for publication in the Palaeobotanist.

6. 2. 5. Bengal Basin.

Sixteen samples from Namkhana profile, Sunderbans, Bengal have been pollen analysed. The frequency of pollen and spores present in the samples is very low and therefore 5-10 pollen slides were examined for each sample in order to record at least one hundred pollen and spores. The most important taxa recovered are, Ruppia, Rhizophora, Bruguiera, Ceriops, Sonneratia, Acanthus ilicifolius, Sueda, Acrostichum aureum, Gramineae and Leguminosae. Some animal remains such as Concentricita rubra and rotaloid type of microforams have also been encountered.

Eighteen samples from Chaltiya profile (Barind Jungle), Bengal have been macerated.

One paper entitled “Biological degradations of trilets spores from W. Bengal” has been processed and submitted for publication in Current Science.

6. 3. Archaeobotany

6. 3. 1. Harappan plant economy.

1. Mohenjo-daro and Chanu-daro, Sindh, W. Pakistan.

After a comparative statistical studies with the living counterparts the carbonised wheat grains have been identified as Triticum sphaerococcum, T. compactum and T. aestivum. The various morphographic categories have been photographed.

6. 3. 2. Kalibangan, Rajasthan.
(i) Blocks of thirteen charcoal samples have been prepared and all have been dated radiologically.

(ii) The burnt fragments of spikelets in both Terracotta cakes and pai have been reinvestigated. The detailed comparative cuticular studies of living as well as carbonised seeds has enabled the identification of these spikelets as wild wheat \((Triticum dicoccum)\) rather than to \(Hordeum\) or \(Oryza\) as identified by early workers.

On physico-chemical analysis of some translucent dirty clayey crystals sticking to the inner surface of some potsherds has revealed that they are gypsum. The occurrence of gypsum suggests that they were probably stored by the Harappans for retaining the salts and alkalies.

6. 3. 3. Purana Qila, New Delhi.

The cuticular studies of impressions and compression on bricks have proved that they belong to cultivated species of rice, i.e. \(Oryza sativa\). The sample no. 19 belongs to Gupta Period whereas sample nos. 27, 41 and 45 belong to NBP ware.

6. 4. Aeropalynology

One paper entitled “Air borned pollen grains and fungal spores at Lucknow” has been processed and submitted for publication in the \(Palaeobotanist\).

7. RadioCarbon Dating Laboratory

7. 1. Construction of Vacuum System for Sample Combustion and Methane Synthesis

The glass manifold systems for sample combustion, carbon dioxide purification, methane synthesis and methane purification have been constructed and thoroughly
tested. A few background carbon dioxide samples were prepared by anthracite in quartz tubes of indigenous make. These samples have been synthesized to methane in the reaction vessel using hydrogen gas and ruthenium (in aluminium oxide pellets) as catalyst. The synthesized methane samples were purified to check the yield and purity of methane. The maximum yield obtained was only 90%. Purity of the gas is checked in the mass spectrometer in C. D. R. I. Certain modifications in the system and changes in the procedure are being tried out to improve the yield to more than 99%.

7.2. Low Background Beta Radiation Detection System

A set of anticoincidence electronics units and power supplies for the low background beta radiation detection system has been built using components donated by TIFR earlier. The detector system consists of Geiger guard detectors (ECIL make 1-1005, 9 nos.) arranged in the form of cylinder with additional maximum coverage for gaps between the counters and loop anode type Geiger counter (ECIL make 1-1051) as the central beta detector. A small radio-active shield has also been built using lead bricks made from selected low background lead ingots.

The background rate of the detector was reduced to 1.9 counts/min in this set up from 48 counts/min outside the shield and anticoincidence. This system is intended to be used for tracer studies which employ low levels of beta activity radio isotopes.

The high sensitivity low background proportional detector for C-14 Dating has been received from Prof. Oeschger of Bern University. This needs to be refilled with gas and tested for background and efficiency. Since the electronics units and shield for this purpose are not ready yet it is intended to get this testing done at the
Radiocarbon Dating Laboratory in Physical Research Laboratory, Ahmedabad. The background methane gas synthesized here will also tested for its radioactive purity in the detector system at Physical Research Laboratory.

7.3. Glass Blowing Shop

A glass blowing shop equipped with the following items has been set up:

(i) Glass blower table with blast burner and accessories.

(ii) Air compressor.

(iii) Grinding machine with accessories for making all types of cone joints, high vacuum stop cocks etc.

(iv) Glass cutting machine.

The glass blowing shop has been able to fabricate all types of joints, high vacuum stop-cocks and other glass items needed by the Laboratory in addition to constructing the whole glass system. A glass blowing lathe is to be acquired soon for fabricating Dewar Flasks for liquid air and other items needed by the Laboratory.

7.4. Construction of Electronics Units

The first set of electronics units for the regular Radiocarbon Dating work is being constructed at the Physical Research Laboratory, Ahmedabad and in the Tata Institute of Fundamental Research, Bombay. These units are almost ready and are being tested. After these units are set up here, construction work on two more systems will be taken up using the same circuit details.
Following papers were published by the staff


Idem (1974b). *Lidgerwtonia mucronata* sp. nov. a female
fructification from the Lower Gondwana of India.

Ibid. 21 (1) : 121-26.

Idem (1974c). Some male fructifications of Glossopteridales. Ibid. 21 (2) : 253-266.


**IV. FIELD WORK**

1. Two members of the Palaeozoic Department visited (i) Raniganj Coalfield, for the collection of megafossils from the Raniganj Formation, and (ii) Hutar Coalfield for megafossils and samples for microfossil study.

2. Director and Museum Curator visited the Handappa fossil localities in the Talchir Coalfield and made a very extensive collection of Glossopteris flora from the Raniganj beds.
3. Excursions have been undertaken by the staff members of the Mesozoic Department to the Jurassic localities of the Rajmahal Hills, Bihar and Triassic localities of Aurangia Valley, Bihar, Asamol, West Bengal and Madhya Pradesh during November-December, 1974 and February, 1975. A large number of megafossils and samples for florofloral study were collected.

4. One member of the Mesozoic Department joined a few excursions arranged by the Organizing Committee for the VI Colloque Africain de Micropaleontologie, Tunisia. Collected samples from the following localities in Tunisia:

1. Marbous – Middle and Upper Oligocene
2. Saouaf – Upper Miocene
3. Nabeul – Lower Pliocene
4. Djebel Berakine – Eocene (Lutetian)
5. Dj. Bauala – Triassic
6. Raf-Raf – Lower Pliocene and Upper Miocene

He also collected some Jurassic fossil plants from Etrochey, France.

5. Three members of the Cenozoic Department went on an excursion to North-Eastern India during November-December, 1974 and visited Tertiary localities of Meghalaya, Assam and Arunachal Pradesh. Leaf-impressions and Polliniferous samples were collected from the Eocene beds near Laitryngew in Meghalaya, and fossil woods from the Tipam sandstones at Katikcherra and Sultanicherra in Assam, and also from Namang River Bed near Desmali in Arunachal Pradesh. Some polliniferous samples were also collected from near Namchik.
6. One member of the Cenozoic Department visited Meerut to discuss the identification of an angiospermous inflorescence, from the Deccan Intertrappean beds, with Professor V. Puri of the Institute of Advanced Studies, Meerut University, Meerut.

7. Three members of the Quaternary Department surveyed Dehradun division under Western Himalaya in order to collect pollen profiles and surface samples etc. In addition to this polleniferous material from F. R. I., Dehradun was also collected.

8. Three members of the Quaternary Department surveyed Rajasthan and collected soil profiles and surface samples from several sites, viz., Sambhur (Jaipur), Didwana (Nagpur), Pushkar and Buda–Pushkar (Ajmer), Kailana and Balsamand (Jodhpur). The polleniferous materials were also collected from the Herbaria of Botany Department, Jodhpur University and Central Arid Zone Research Institute, Jodhpur.

9. Three members of the Coal Department visited various areas in the Satpura Gondwana Basin (February–March, 1975) for structural studies of the basin and collection of samples for palynostratigraphic studies.

10. Four members of the Coal Department visited various areas in Raniganj East Bokaro, West Bokaro and North Karanpura coalfield (December, 1974 – January, 1975) for evaluation of coals and collection of samples for palynostratigraphic and petrographic work.

11. Two members of the Oil Department went on field excursion from 30th December, 1974 – 1st March, 1975. The object of the field party was to collect stratigraphically located samples from Tertiary and Pre-Tertiary
formations of Meghalaya and Assam. About 35 square kilometres of the area around Garampani, North Cachar Hills was geologically mapped on a large scale (1:15840). About 500 stratigraphically located samples were collected from 19 measured stratigraphic sections.

12. One member of the Oil Department visited Kutch during December - January (1974-75) and collected palynological samples from measured sections near Akri, Panandiro, Baranda Walor and adjacent localities. He also visited Ahmedabad on 24 March, 1975 to discuss with the Director, Directorate of Geology and Mining, Government of Gujarat regarding collaborative research programme with the Department of Oil Palynology of the Institute and Directorate of Geology and Mining, Government of Gujarat.

13. Two members of the Oil Department in collaboration with the Geological Survey of India undertook field excursion to several localities in the district of Nahan, Himachal Pradesh. Several sections were measured between Surta and Jalal. About 250 stratigraphically located rock samples were collected from the Lower Tertiary sediments.

14. One member of Oil Department went for field excursion to Cauvery Basin and western ghats from 1st March to 25th March 1975. The object of the excursion was to collect stratigraphically located samples from Pondicherry, Ariyalur, Kailakudi, Warkali, and Paddappakkara representing Cretaceous-Tertiary formations.

V. SPONSORED/COLLABORATIVE RESEARCH

A. Mesozoic Department

Studies on the micro-and mega-plant remains from the Jurassic of Central India were continued in collaboration with the Indian Statistical Institute, Calcutta.
Dr. Sukh Dev has been recognised as a research guide of Mr. B. P. Patra, Geology Department, Utkal University for Ph.D. thesis. The work will be done partly at the Utkal University and partly in the Institute. The thesis will be based on material collected by Mr. Patra from the Aigarh basin.

B. Geoscientic Department

Continued the study of fossil woods from the Tertiary of Blue Nile Valley, Ethiopia, with Prof. Y. Lemoigne, University of Lyon, France.

C. Coal Department

(i) G. S. I., C. F. R., L., Coal Survey Laboratories, N. C. D. C., N. L. C. organizations

(ii) T. C. P. and T. C. P.

D. Oil Department

(i) Palynostratigraphical studies of the Tertiary surface and subsurface rocks of Upper Assam (Project supported by Oil India Ltd., Duliajan, Assam).

(ii) Biostratigraphic studies of the sedimentary succession of Meghalaya I. Stratigraphic resolution of Komarrah basin on the basis of microfossils (Project in collaboration with Directorate of Mineral Resources, Meghalaya).

(iii) Biostratigraphic studies of phytoplankton in the marine Tertiary of Kutch and adjoining areas (in collaboration with Geology Department, Lucknow University, Lucknow).

VI. TRAINING PROVIDED TO OUTSIDERS

(i) Mr. M. D. Kajale, Deccan College, Poona.
Mr. D. K. Shukla
Allahabad University,
Allahabad.

Shri M. S. Rawat
(Asst. Professor)
Botany Department, Govt.
Degree College, Sehor (M. P.).

Shri F. Mojoab
(Asst. Professor)
Department of Geology,
College of Arts and Science,
Pulahavi University, Shiraz,
Iran.

Shri V. S. Chetri
(Senior Geologist)
Nepal Geological Survey,
Kathmandu, Nepal.

Shri A. T. M. Fazul
Haque
Department of Geology,
University of Dacca, Dacca,
Bangla Desh.

VII TECHNICAL ASSISTANCE TO OUTSIDERS

(i) Identification of Mega­fossils and niospores from Lower Gondwana of East Bokaro and Jharia Coalfield.

Dr. Arabinda Ghosh,
Department of Geological Science, Jadavpur University, Calcutta-33.

(ii) Identification of fossil woods from the Deccan Intertrappean beds and consultation of literature.

Mr. K. S. Patil, Kasturba College, Sangli, Maharashtra.

(iii) Identification of fossil plants from the Eocene beds of Deccan Intertrappean Series and consultation of literature and Palaeozoic fossil plants.

Mr. D. G. Varadpande,
Department of Botany, Poona University, Poona.
The following executives of Oil India visited the Department of Oil Palynology to study the Palynological succession through the Tertiary rocks of Assam especially in reference to their oil exploration programmes:

Shri J. M. B. Barua 19 June, 1974 to 25 June, 1974
Shri A. Mukhopadhyay 10 December, 1974 to 19 December, 1974
VIII. PAPERS AND LECTURES AT SYMPOSIA/CONFERENCE MEETING

Evolution of Gymnospermous organizations  D. C. Bharadwaj  9th Annual Lecture of the Palynological Society of India.

The various Aspects of Gondwana Palynology  D. C. Bharadwaj  Chairman’s address to the Gondwana Palynological Section.

Some fertile organs associated with the leaves of Glossopteris and Dicroidium  M. N. Bose  Laboratoire de Palaeobotanique, University de Paris.

The male and female fructifications of Glossopteris  M. N. Bose  The Palaeobotany and Palynology Laboratory, State University of Utrecht.

Recent Advances in Gondwana Palaeobotany  M. N. Bose  Geology Institute, University of Oslo.

History of Flora- Vishnu-Mittre Palaeobotanical and Pollen analytical methods  Vishnu-Mittre Forest Research Institute, Dehra Dun.

History of Indian floristics—Present position  Vishnu-Mittre Forest Research Institute, Dehra Dun.

Palaeobotanical evidence for the History of cultivated plants  Vishnu-Mittre Central Drug Research Institute, Lucknow under the auspices of Indian Science Congress.
Pollen grains and spore—our friends and foes.

Vishnu-Mitre Christian College, Lucknow.

Glossopteris flora of India.

Vishnu-Mitre Meerut University, Meerut.

The distribution of modern gymnosperms in India.

Vishnu-Mitre Meerut University, Meerut.

Pentoxyleae and Pro-gymnosperms

Vishnu-Mitre Meerut University, Meerut.

The classification and evolution of Psilophytalean complex

Vishnu-Mitre Meerut University, Meerut.

Nomenclature of fossil dicot woods: Irregularities and suggestions.

U. Prakash Birbal Sahni Institute of Palaeobotany Seminar.

Ultramicroscopy in Palynology.

K. M. Lele —do—

Lower Gondwana Genetic Coal types.

G. K. B. Navale —do—

Palynology of the Main Seam of the Neyveli Lignite.

G. K. B. Navale 1st Indian Palynological Congress held at Chandigarh.

Status of Tertiary Palynology in Northern India.

H. P. Singh Birbal Sahni Institute of Palaeobotany Seminar.

Cretaceous microplankton.

K. P. Marine plankton and
ton from Senegal Basin
N.W. Africa Pt.2: Taxonomy and biostratigraphy.

Indian Lower Gondwana, Pteridophytes.

Some aspects of Glossopteris flora.

Triassic mioflora South of Tethys.

Miofloristics of Rani ganj Stage, Lower Gondwana.

Permian Palynomorphs South of Tethys.

Aspects and prospects of Tertiary Palynology in Western India.

Fossil flora of the Cuddalore Series and its modern allies.

Vegetation and palynology of Bengal Estuary.

Glossopteris fructicosa

Jain

P. K. Maithy

P. K. Maithy

Hari K. Maheshwari

R. S. Tiwari

R. S. Tiwari

R.K. Kar

N. Awasthi

H. P. Gupta

Shaila

Birbal Sahni Institute
of Palaeobotany Seminar.

Birbal Sahni Institute of Palaeobotany Seminar.

Birbal Sahni Institute of Palaeobotany Seminar.

1st Indian Palynological Congress, Chandigarh.

Birbal Sahni Institute of Palaeobotany Seminar.

Birbal Sahni Institute of Palaeobotany Seminar.
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The importance of anatomical studies in the identification of remains of food grains.

Some observations on the Glossopteris from the Barakar Formation of South Karanpura Coalfield.

Fossil flora from the Tertiary of Kutch.

IX. REPRESENTATION ON COMMITTEES/BOARDS

1. K. R. Surange... Secretary, Editorial Board, The Palaeobotanist. Organizer, Working Group in Palaeobotany and Palynology of the International Union of Geological Sciences Sub-committee on Gondwana Stratigraphy. Member, Sub-committee, VIII International Congress of Carboniferous stratigraphy and Geology under IUGS.

2. R. N. Lakhanpal... Member, Editorial Board, The Palaeobotanist. Member, Apex Committee for the IV I. P. C.
3. D. C. Bharadwaj ... Vice-President, International Committee on Palynology. 
Chairman, Organising Committee, IV I. P. C. 
Member, International Commission on Carboniferous stratigraphy. 
Member, Editorial Board of "Review Palaeobotany & Palynology, Palaeobotany & Geophylogy."

4. M. N. Bose ... Member, Editorial Board, The Palaeobotanist. 
Member, Executive Committee, "The Palaeobotanical Society. 
Member, Apex Committee, IV I. P. C.

5. Vishnu-Mitre ... Member, Central Advisory Board for Archaeology, Govt. of India. 
Member, Advisory Board, World Pollen Flora. 
Convener, Sub-Committee, History of Biological Sciences in India for Indian National Committee for International Union of History and Philosophy of Science. 
Vice-Chairman, Organising Committee, IV I. P. C.
6. S. C. D. Sah  
   Member, Apex Committee for IV International Palynological Conference, Lucknow.

   Secretary General, Organizing Committee, IV I. P. C.
   Treasurer, College of the Fellows of the Palynological Society of India.
   Founder Member, College of the Fellows of the Palynological Society of India.
   Foundation Fellow, Indian National Earth Sciences Academy, Calcutta.

7. U Prakash  
   Chief Editor, Geophytology (Since January, 1975).

8. K. M. Lele  
   Secretary, Publication Section, Organizing Committee, IV I. P. C.
   Chief Editor, Geophytology (Till December, 1974).

9. G. K. B. Navale  
   Member, International Committee of Coal Petrology.
   Member, Special Committee "Gondwana Coal" of International Coal Petrology.
   Member, International Commission of Coal and Lignite Analysis.
   Member, Organizing Committee of Indian National Committee of Coal Petrology.
10. H. P. Singh  
   Secretary, Organizing Committee, IV I. P. C.

11. K. P. Jain  
   Assistant Editor, Geophytology.  
   Secretary, Organizing Committee, IV I. P. C.
   Member, Executive Committee, The Palaeobotanical Society.

12. P. K. Maithy  
   Additional Secretary, Organizing Committee, IV I. P. C.  
   Editor, Geophytology.

13. H. K. Maheshwari  
   Member, Committee for Fossil Plants, International Association for Plant Taxonomy (I. A. P. T.)  
   Editor, Catalogue of Indian Fossil Plants.  
   Additional Secretary, Organizing Committee, IV I. P. C.

14. R. S. Tiwari  
   Joint Secretary, The Palaeobotanical Society.  
   Additional Secretary, Organizing Committee for the IV I. P. C.

15. R. K. Kar  
   Assistant Secretary, Organizing
16. N. Awasthi  ... Editor, Catalogue of Indian Fossil Plants.
17. H. P. Gupta ... Additional Secretary, Organizing Committee, IV I. P. C.
                 Member, Bibliography of Quaternary Palynology, Indian Palynological Society, N. B. G., Lucknow.
18. S. C. Srivastava ... Member, Organizing Committee, IV I. P. C.
19. Anand-Prakash  ... Member, Organizing Committee, IV I. P. C.
20. Pramod Kumar  ... Member, Organizing Committee, IV I. P. C.
21. Mrs. C. Sharma ... Member, Organizing Committee, IV I. P. C.
22. R. Y. Singh    ... Member, Organizing Committee, IV I. P. C.

X. DEPUTATION/TRAINING/STUDY ABROAD

1. Dr. M. N. Bose    Visited the following countries during 3rd April – 19th May, 1974:
                     FRANCE : Visited Labora-
toire de Paleobotanique, Université de Lyon I and examined some of the type specimens of Saporta and Dr. Barales collections of Jurassic plants. Also visited the Geology Department of the University of Dijon where too, some of the type specimens of Saporta were available for examination.

Spent a few days in Paris, working mainly at the Laboratoire Paleobotanique, Museum de Histoire Naturelle and Laboratoire de Paleobotanique, Université de Paris.

BELGIUM: (12th April-26th April, 1974) Worked mainly at the Musée Royal de l'Afrique Centrale, Tervuren to complete the manuscript of a paper on "A palynological reconnaissance of the Mesozoic sediments of Zaire." Sorted out a large number of samples from Zaire which have now arrived here. Also brought a few samples of living woods from Zaire for our xylarium.

HOLLAND: (26th April-28th April, 1974) Visited the Palaeobotany and Palynology Laboratory, the State University of Utrecht and the Rijksherbarium,
Leiden. At the former laboratory saw some interesting fossil collections from the Jurassic of Yorkshire and Permo-Triassic of Italian Alps.

SWEDEN: (28th April—5th May, 1974) Spent most of the time at the Palaeobotany Section of the Riksmuseum in Stockholm, and examined many interesting plant collections from the Southern Hemisphere (Graham Land, Terra del Fuego, Australia etc.).

NORWAY (5th May—12th May, 1974) Besides examining the Triassic collection from the Umkamas of S. Africa brought pieces of cuticle from different genera for comparison and some samples for maceration. Also examined collections of Triassic plants from Argentina and Palaeozoic plants from Uganda at the Geology Institute, University of Oslo.

Was invited to visit the Norsk Polar Institute for identification of certain Palaeozoic plants from the Antarctica.

U.S.S.R. (12th May—19th May, 1974) At the Geological Institute of the Academy of Sciences, Moscow he was shown collections of Mesozoic plants from North Caucasus.
Dr. K. P. Jain

In Leningrad spent most of his time at the Geology Museum and Komarov Botanic Garden mainly seeing Mesozoic collections from Central Russia, Siberia, China, Amur, Kamchak, Caucasus, and Turkistan.

Before he left U. S. S. R., Prof. Valtrameev presented him the following specimens:

- Hausmannia leeiana Sze
- Klukia westii (fertile)
- Coniopteris burrenensis (fertile)
- Coniopteris angustiloba (fertile)

KEIL (West Germany) to attend the Symposium "Marine Plankton and Sediments and Third Planktomic Conference" from 9th to 13th September, 1974. Afterwards visited Geologische Palaeontologische Institut der Universität, Frankfurt (West Germany). Thereafter spent three weeks in U. K. attending Joint-International symposium on "The evolutionary significance of the Exine" and visited research laboratories/centres.
XI. FOUNDER'S DAY CELEBRATIONS

(1) On the morning of 14th November, 1974, the birthday of Professor Birbal Sahni, F. R. S., wreaths and flowers were placed on his Samadhi.

(2) The Founder's Day celebrations were held on 18th November, 1974. The deliberations started at 5.00 p.m. Shri A. K. Mustafy, Vice-Chancellor, Lucknow University, Lucknow was the Chief Guest at the well attended function.

Professor T. S. Sadasivan, Chairman, Governing Body welcomed the Chief Guest and other distinguished persons and Guests.

At 5.45 p.m., Dr. M. R. Sahni, Honorary Professor of Geology, Punjab University, Chandigarh, delivered the 22nd Sir Albert Charles Memorial Lecture entitled "Early Biota of South Asia".

Professor K. R. Surange, Director, thanked the Guests.

(3) Professor C. V. Subramanian, Director, Centre for Advanced Studies, University Botany Laboratory, Madras delivered the 4th Professor Birbal Sahni Memorial Lecture entitled "Molds, mushrooms and men" on Tuesday, the 19th November, 1974 at 5.30 p.m. at the Birbal Sahni Institute of Palaeobotany, Lucknow.

(4) Dr. D. Lal, Director, Physical Research Laboratory, Ahmedabad delivered the 4th Silver Jubilee Commemoration Lecture entitled "Fruits of exploration of moon and neighbouring planets of the solar system" on 20th November, 1974 at 5.30 p.m. at the Birbal Sahni Institute of Palaeobotany, Lucknow.
XII. PUBLICATIONS

1. The Journal The Palaeobotanist

(a) Volume 21, numbers 1 to 3 were published during the year.

(b) Volume 22, number 1 and 2 were sent to the Press. Galley proofs of Volume 22 (1) were received from the Press. They were duly corrected and returned.

2. Seward Memorial Lecture

The XX Lecture was received from the Press and the XXI Lecture "Polystry, primary, xylem and the pteropsida" by Professor Wilson N. Stewart was sent to the Press.

3. Birbal Sahni Memorial Lecture

The Galley proof of the third lecture "The theory of Continental Drift in the light of recent researches" by Professor D. D. Pant was returned duly corrected to the Press.

4. Silver Jubilee Lecture

The second lecture was received from the Press. The third lecture "Biology of the Mistletoes" by Prof. B. M. Johri was not received from the author and will be sent to the Press on receipt.

5. Symposia Numbers

All the five numbers were received from the Press.

6. Proceeding of the Autumn School

(Aspects and Appraisal of Indian Palaeobotany).

This was received from the Press.
7. Annual Report

The Annual Report for the year 1973-74 was received and distributed.

8. Sale

During 1974-75 an income of Rs. 45,257.60 was registered from sale proceeds of Institute's publications. The sum included the following foreign exchange earned:

<table>
<thead>
<tr>
<th>Currency</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. $</td>
<td>2,703.94</td>
</tr>
<tr>
<td>£</td>
<td>189.95</td>
</tr>
</tbody>
</table>

XIII. LIBRARY

1. Statement Showing the details of Stock for the Year 1974-75

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Details</th>
<th>Position on 31.3.74</th>
<th>Added during 1974-75</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Books</td>
<td>2,732</td>
<td>102</td>
<td>2834</td>
</tr>
<tr>
<td>2</td>
<td>Issues of Journals</td>
<td>5,854</td>
<td>216</td>
<td>6070</td>
</tr>
<tr>
<td>3</td>
<td>Reprints</td>
<td>21,569</td>
<td>687</td>
<td>22256</td>
</tr>
<tr>
<td>4</td>
<td>Microfilms</td>
<td>207</td>
<td>7</td>
<td>214</td>
</tr>
<tr>
<td>5</td>
<td>Theses</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>Maps</td>
<td>22</td>
<td>2</td>
<td>24</td>
</tr>
</tbody>
</table>

2. Exchange

(i) Number of papers purchased for exchange 26
(ii) Total number of reprints sent out on exchange 2,179
(iii) Number of individuals on exchange 302
3. Visitors to the Library

As usual, the available reading material on Palaeobotany and its related topics was consulted by a number of outside scientists and research scholars. In addition, literature was also loaned to the various Universities for consultation within a given period. These are:

2. Geology Department, Lucknow University, Lucknow.
3. Botany Department, Lucknow University, Lucknow.
4. Physical Research Laboratory, Ahmedabad.
5. Botany Department, Osmania University, Hyderabad.

4. Maintenance

(i) A large number of out-of-print and rare books and periodicals were reconditioned. The covers in many of the reprints were replaced.

(ii) The number of scientific journals bound during the year rose to 800.

5. Improvements in the Library Functions over the Previous Years

(i) Classifications—A scheme using Dewey-Decimal classification system was followed in classifying the books. These numbers were marked on the catalogue cards, book plates, charging book-cards and
the spine of the books, along with the cutter book numbers. These two numbers greatly facilitate in fixing exact locations of the books.

(ii) Cataloguing—For the purpose of making the contact between a book and its readers easier, greater stress was laid on development of subject-catalogue. Each document was analyzed facet-wise and each facet was put as a heading to a card giving comprehensive information about the book. These cards were arranged alphabetically. This enhanced to a great extent, the potential of the catalogue in providing the requisite information.

(iii) Bibliography—A comprehensive bibliography of all the journals present in the library was compiled using alphabetical order. Copies of it were exchanged with various reputed scientific research libraries to form an information pool, though of simplest form yet a major help in inter-library-exchange programme.

(iv) Circulation—Using the new method of circulation started during the last year, the Library was able to cater to the need and growing number of registered borrowers. The number of them increased 69 to 81 during the year.

XIV. MUSEUM

A. Exhibition Halls

1. Geology Hall (Hall No. 1)

All the reconstruction models of this hall have been repainted and the broken ones have been repaired. Labels and legends of the show cases have been checked up and
necessary corrections made therein. Mastic varnish has been applied on the paintings in the wall show cases. A cyclostyled booklet containing all the major informations about the exhibits will be out soon.

2. Botany Hall (Hall No. 2)

This Hall still remains closed for the visitors as the steel cabinets meant for storing types and figured specimens and other wooden furnitures are laying here.

B. Fossil Store Hall (Hall No. 3, Basement)

Printed labels have been fixed up on the rack shelves indicating the year of collection, horizon, locality and the name of the field party. Display boards have been kept on the side of these racks showing department-wise collection. Some space has been provided for registering the newly collected material. Cataloguing of the material in this Hall has almost been completed.

C. Type and Figured Specimens/Slides etc.

The type and figured specimens and slides are kept in Professor Sahni’s room as the basement corridor is still not considered safe. Their number as on 31.3.1975 is as follows:

- Type and figured specimens: 1159
- Type and figured slides: 4801
- Negative of type figured specimens and slides: 3357

The type and figured specimens are being checked up with the concerned papers. More than half of them have already been checked up likewise and are being kept in a
most systematic manner. The number of the statement, total number of specimens, author/s, journal, year of publication have been briefly pasted on the cardboard boxes containing these specimens. Details of various specimens in accordance with the explanation of plates have been pasted inside the boxes. The lectotype or the syntype would be named in due course. Negatives of various functions held in the institute have now been registered by the museum and these have been stored properly.

While numbering the holotype and figured specimens expression is now made to indicate the locality number as well.

D. New Collections

During this year collections have been made from about 89 localities of India by the Institute staff. The details are as follows:

- Palaeozoic: 261 Specimens & samples (Approx.)
- Mesozoic: 1375 "
- Cenozoic: 1058 "
- Quaternary: 320 "
- Oil Department: 125 "
- Coal Department: 354 "

Fresh collections have been properly registered and the individual megafossils and petrified woods have been numbered. A duplicate copy of the list detailing the number of the specimens or samples, their locality number as allotted by the Museum etc., has been issued to the leader of the excursions, for maintaining his own record. This has been found to be useful.
The new collection has been properly stored in the racks.

E. Excursions

One member of the museum visited (i) Jairampur, Arunachal Pradesh for collection of large petrified woods and to find out new fossils localities in and around the adjoining area on the information of the Forest Department, Arunachal Pradesh, (ii) Sikkim for collecting marine Permocarboniferous samples for microfossils studies. (iii) Handappa, Orissa to collect plant fossils mainly for display in the Museum.

The collections are excellent and suitable ones would be displayed in the museum after the identification is complete.

F. Conferences, Seminars etc.

1. All India Museum Conference 1974, Mathura. Dr. Anil Chandra Organization and Development of small Museum including site museum, Mathura.

2. Architecture in South and South East Asia, New Delhi. Dr. Anil Chandra Regional Seminar on museums, New Delhi.

G. Presentation of Duplicate Fossils

Representative plant fossils from different eras of India have been presented to the following:

1. Professor H. P. Banks
   Department of Botany, Plant Service Building, Cornell University, Ithaca, New York-14850-U.S.A.
2. Professor W. N. Stewart,
   Department of Botany, University of Alberta,
   Edmonton, Alberta, (Canada).

3. Professor & Head of the Department of Biology,
   Guru Nanak University, Amritsar, Punjab.

4. Head, Department of Botany,
   Feroz Gandhi College, Rae Bareli.

II. Visitors from the Institutions

The following 9 institutions visited our Museum, viz.,
(i) State Institute of Scientific Education, U. P., Allahabad
(ii) Geology Department, Ranchi University, Ranchi
(iii) Post-Graduate Students, Geology Department, D.B.S.
     College, Dehra Dun (iv) Department of Botany, Osmania
     University, Hyderabad (v) Department of Geology &
     Geophysics, University of Roorkee, Roorkee (vi)
     Department of Geology, Jammu University, Jammu (vii)
     Rajendra College, Chapra, Bihar (viii) Agriculture
     Department, Calcutta University, Calcutta (ix) Department
     of Botany, Christ Church College, Kanpur.

I. Presentation to the Museum

(i) Professor V. A. Vakhramev of USSR has presented
   4 plants fossil specimens from lower part of Neo-
   canian and Middle Jurassic stage of Russia

(ii) Professor Stewart of Canada has presented 11
    plant fossil specimens from Upper Devonian,
    Palaeocene, Miocene, and Upper Cretaceous
    formations of Canada.

(iii) Prof. H. P. Banks, Cornell University, Ithaca,
     U.S.A. has presented one plant fossil specimen of
     Father Mount Formation.
A large number of plant fossils covering almost all geological horizons of India have been presented to the Natural History Museum, Department of Science and Technology, Government of India, F. I. C. C. I. Museum-Building, Barakhamba Road, New Delhi for display in their palaeobotanical gallery.

XV. HERBARIUM

Herbarium Specimens

Addition of plant specimens during the year 322
Total number of plant specimens as on 31.3.75 9748

Fruit and Seed Specimens

Addition of fruits and seeds during the year 50
Total number of fruits and seeds as on 31.3.75 971

Woods

Addition of wood samples during the year 25
Total number of wood specimens as on 31.3.74 2596
Total number of wood slides as on 31.3.75 2062

Pollen Slides

Addition of pollen slides during the year 111
Total number of pollen slides as on 31.3.75 8133

Other Slides

Total number of slides as on 31.3.75 4632

A joint expedition in collaboration with Botanical Survey of India, Eastern Circle, Shillong was organized to collect plant specimens from Garo Hills and Khasi Hills. About 180 plant specimens were collected from different
places of the above two localities. During the stay at Shillong, confirmation of identification of about 100 plant specimens collected by Professor Takhtajan and U. Prakash and few collected in the previous years by B. D. Sharma were authentically done. Three wood logs for our Xylarium were also collected from Khasi Hills which were only confined to this area.

Another tour was organized to procure wood samples for our Xylarium in order to have stock of wood specimens for exchange purposes. About 55 woods were collected along with herbarium voucher specimens from North Gonda, Forest Division.

Identification of about 14 erroneous woods was not got confirmed from Cenozoic Lab. Carpenter was engaged to cut and plain the wood blocks and in all 134 samples were sent to the following parties from whom woods had already been received by us on exchange.

1. Chief of the Division, 20 wood samples
   Centre Technique Forestier
   Tropical, 45 bis avenue dela-Belle,
   Gabrielle, Nogent Sur Marne
   (Seine) FRANCE.

2. The Curator, 30
   U. S. National Museum, Smithsonian
   Institute, Washington 25 D. C.,
   U. S. A.

3. The Incharge, 20
   Wood Identification Research
   Division, Forest Product Lab.,
   Madison-5, Wisconsin, U. S. A.
4. The Curator. 22 wood samples
F. P. R. L., Princess Rishorrough,
Aylesbury, Bucks,
England.

5. The Wood Anatomist,
Musee Royal de' Afrique,
Central, Tervuren,
Belgium.

6. The Director,
National Science Development Board, F. P. R. I. Development
Commission College, Laguna,
Philippines.

185 wood slides have been submitted by the Cenozoic Palaeobotany Department, which have properly been indexed, catalogued and incorporated.

Quaternary Palynology Department has passed on to the Herbarium 776 seed specimens brought by Dr. Vishnu-Mitre and party from the germ plasm collection of I. A. R. I. New Delhi.

Plant specimens of the genus Paederia were received on loan from B. S. I., Eastern Circle, Shillong for confirmation and study of our specimens. 12 fern specimens were lent to the National Botanic Gardens, Lucknow for their research purpose. A set of 50 herbarium specimens was sent to the Systematic Botany Branch, F. R. I., Dehra Dun on exchange. A set of 32 plant specimens of Himachal Pradesh was received from B. S. I. Northern Circle, Dehra Dun on exchange basis.

An stress was laid to develop the phyllotheke. About 10 cleared leaf specimens have been prepared. 19 specimens
received from Systematic Botany Branch, F. R. I., Dehra Dun were added to the Phyllotheck collection after indexing and cataloguing. The work is in progress.

A packet of 12 seed samples was sent in exchange to Laboratory de Botanique, Grenoble, France on their request. They were requested to send few samples of seeds of their country.

Routine work of poisoning, mounting, labelling and repairing remained continued.

Curator Herbarium was invited to attend the 1st Indian Palynological Congress held at Chandigarh and was nominated member of the Bibliographical Committee of Indian Palynology. His paper "The Thalamiflorae—An Analysis of Pollen Morphology, with reference to Taxonomy and Evolution" has been accepted for publication in New Botanist.

Partner Power Chain Saw has been procured to hasten the collection of woods and to have representation of all woods of our country in the Xylarium. Mechanic from the firm which supplied the Power Chain Saw was engaged to impart training to the Herbarium staff as well as other interested members of the Institute. A short trip to the L. I. T. forest of Avadh Forest Division was organized to give field demonstration of cutting and felling of trees. Scientist Incharge N. B. G., Lucknow very kindly allowed to make collection of woods from their rare collection of plants. About 20 specimens from the dried stumps or the branches were collected from there.

XVI. BUILDING

Due to recent orders of Government of India on economy measures, maintenance expenditure on Building was kept to the nearest minimum and no major construction was taken up during the year.
XVII. VISITORS

DISTINGUISHED PERSONS

Shri P. R. V. Bhiman, I. A. S.
Administrator,
Kanpur Corporation, Kanpur.

Shri F. Mojah
Department of Geology, College of Arts &
Science, Pahlavi University, Shiraz, Iran.

Shri V. S Chettri,
Senior Geologist, Nepal Geological Survey,
Kathmandu, Nepal.

Shri A. T. M. F. Haque
Department of Geology, University of Dacca,
Bangladesh.

Dr. S. M. Sherfuddin, I. A. S., T. T.,
Dona, Bangladesh

Prof. & Mrs. T. A. Davis,
Indian Statistical Institute,
Calcutta.

Professor M. R. Sahni,
Revd. Professor of Geology,
Punjab University, Chandigarh.

Prof. C. V. Subramanian,
Director,
Centre for advanced Studies, University of Madras,
Laboratory, Madras.

Shri A. K. Mustafy,
Vice-Chancellor,
Lucknow University, Lucknow.
Dr. T. N. Khoshoo,
Director-in-charge,
National Botanic Gardens,
Lucknow.

Dr. D. Lal,
Director,
Physical Research Laboratory,
Ahmadabad.

Dr. Nitya Nand,
Director,
Central Drug Research Institute,
Lucknow.

Professor H. D. Sankalia,
Emeritus Professor, Deccan College,
Poona.

Swami Chimmayanand Ji Maharaj

Dr. Y. Nayudamma
Secretary to the Govt. of India
& Director-General, Council of
Scientific & Industrial Research,
New Delhi.

Shri W. I. Mouins,
54, Munro Building, Toronto,
Canada.

Dr. H. Fajfe,
University of Vienna
Austria.

Ven D. Somaratana & Col. Rajapahare,
131/2, Lake Road, Mobarogama,
Sri Lanka.
XVIII. THE GOVERNING BODY, FINANCE & BUILDING COMMITTEE AND SCIENTIFIC PROGRAMME & EVALUATION COMMITTEE

1. The Governing Body

CHAIRMAN

Professor T. S. Sadasivun,
"Gokulam", M. K. A. Koll St.,
Madras-600004.

MEMBERS

Mrs. Savitri Sahni,
686, Birbal Sahni Marg,
Lucknow.

Director,
Botanical Survey of India,
14, Madan Street,

Professor D. D. Pant,
Head of the Botany Department,
University of Allahabad,
Allahabad.

Dr. A. Ramachandran,
Secretary to the Govt. of India,
Department of Science & Technology,
Technology Bhavan, New Mehrauli Road,
New Delhi-110029.

Professor Uma Shankar Srivastava,
Professor of Zoology, University of Allahabad,
Allahabad.

69
Professor A. R. Rao,
No. 2, XI Main Road, 3rd Block, East Jayanagar,
Bangalore-11.

Shri M. N. Venkataraman,
Deputy Financial Adviser (Science & Technology),
Technology Bhavan, New Mehrauli Road,
New Delhi.

Director-General,
Geological Survey of India,
27 Jawaharlal Nehru Road,

Professor T. S. Mahabale,
Maharashtra Association for the Cultivation of
Sciences, Law College Road,
Poona.

Director-General,
Archaeological Survey of India,
New Delhi.

Shri A. B. Das Gupta,
Managing Director,
Oil India Ltd., 17 Parliament Street,
New Delhi-110001.

Vice-Chancellor,
Lucknow University,
Lucknow.

Professor K. R. Surange,
Director,
Birbal Sahni Institute of Palaeobotany,
Lucknow (Member-Secretary).
Shri Gurcharan Singh,
Registrar,
Birbal Sahni Institute of Palaeobotany
Lucknow (Non-member Asstt. Secretary).

2. Finance and Building Committee

CHAIRMAN
Professor T. S. Sudarshan,
"Gokulam", 54, M. K. A. Koil St.,
Madras-600004

MEMBERS
Professor D. D. Pant,
Head of the Botany Department, University of Allahabad,
Allahabad.

Shri M. K. Venkataraman,
Deputy Financial Adviser (Science & Technology)
Technology Bhawan, New Mehrauli Road,
New Delhi.

Chief Engineer, or his Nominee
State P. W. D., U. P.,
Lucknow.

Representative,
Department of Science & Technology,
New Delhi.

Shri Naresh Kochar,
Kochar & Associate,
16, Vidhan Sabha Marg,
Lucknow.

Professor K. R. Surange,
Director,
Birbal Sahni Institute of Palaeobotany,
 Lucknow.
3. Scientific Programming and Evaluation Committee

CHAIRMAN

Professor K. R. Surange,
Director,
Birbal Sahni Institute of Palaeobotany,
Lucknow.

MEMBERS

Professor A. R. Rao,
No. 2, XI Main Road, 3rd Block, East Jayanagar,
Banglore-11.

Professor D. D. Pant,
Head of the Botany Department,
University of Allahabad,
Allahabad.

Director General or his Nominee
Geological Survey of India.
27 Jawaharlal Nehru Road,

Dr. R. N. Lakhanpal,
Head of the Cenozoic Palaeobotany Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow.

Dr. D. C. Bharadwaj,
Head of the Coal Palaeobotany Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow.

Dr. M. N. Bose,
Head of the Mesozoic Palaeobotany Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow.
Dr. Vishnu-Mitte
Head of the Quaternary Palynology Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow.

Dr. S. C. D. Sah,
Head of the Oil Palynology Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow.

Dr. G. Rajagopalan,
Head of the Carbon Dating Laboratory
Birbal Sahni Institute of Palaeobotany,
Lucknow.

XIX. THE STAFF

DIRECTOR
Professor K. R. Surange, M. Sc., Ph. D. (Lucknow)

DEPUTY DIRECTOR
Dr. R. N. Lakhani, M. Sc., Ph. D., F. Pb. S., F. B. S.
F. N. A. Sc., (Assistant Director till 12.12.74 and
Deputy Director since 12.12.1974).

DEPARTMENT OF PALAEOZOIC PALAEOBOTANY
Dr. K. M. Lèle, M. Sc., Ph. D.
Dr. P. K. Maithy, M. Sc., Ph. D.
Dr. (Mrs.) Shaile Chandra, M. Sc., Ph. D., F. L. S.
Dr. (Mrs.) Rehana Makada, M. Sc., Ph. D. (Resigned
on 3.8.1974)
Shri A. K. Srivastava, M. Sc.
Shri Manoj Shukla, M. Sc.
Miss Reshima Bijlani, M. Sc. (Research Scholar)
DEPARTMENT OF MESOZOIC PALAEOBOTANY

Dr. M. N. Bose, M.Sc., Ph.D., F.Pb.S., Head
Correspondent de l’arsom
Dr. Sukh Dev, M.Sc. (Hons), Ph.D. (Lucknow)
Ph.D. (Reading)
Dr. H. K. Maheshwari, M.Sc., Ph.D.
Dr. Shyam C. Srivastava, M.Sc., Ph.D.
Miss Jaya Puri Banerjee, M.Sc.
Shri K. P. Navneeth Kumaran, M.Sc.
Miss Zeba Bano, M.Sc.
Shri B. N. Jana, M.Sc. (Research Scholar joined on 15.11.74)

DEPARTMENT OF CENOZOIC PALAEOBOTANY

Dr. U. Prakash, M.Sc., Ph.D.
Dr. N. Awasthi, M.Sc., Ph.D.
Dr. M. B. Bande, M.Sc., Ph.D.
Dr. K. Ambwani, M.Sc., Ph.D.
Shri Jawant Singh Guleria, M.Sc. (Research Scholar)

DEPARTMENT OF COAL PALAEOBOTANY

Dr. D. C. Bharadwaj, M.Sc., Ph.D. (Lucknow) Head
Dr. rer. Nat. (Bonn), F. B. S., F. Ph. S.
Dr. G. K. B. Navale, M.Sc., Ph.D., F.G.S., B.G.M.S.
Dr. R. S. Tiwari, M.Sc., Ph.D.
Dr. Suresh C. Srivastava, M.Sc., Ph.D.
Dr. Anand-Prakash, M.Sc., Ph.D.
Dr. Pramod Kumar, M.Sc., Ph.D.
Shri B. K. Misra, M.Sc.
Miss Archana Dwivedi, M.Sc.
Miss Vishwa Rana, M.Sc. (Research Scholar)

DEPARTMENT OF QUATERNARY PALYNOLGY

Dr. Vishnu-Mitre, M.Sc., Ph.D. (Lucknow) Head
Ph.D. (Can tab)
Dr. H. P. Gupta, M. Sc., Ph. D.
Dr. (Mrs.) Chhaya Sharma, M. Sc., Ph. D.
Miss Asha Khandelwal, M. Sc.
Miss R. Savithri, M. Sc.
Mr. Awadhesh Kumar Saxena (Research Scholar since 7.11.1974)

DEPARTMENT OF OIL PALYNOLGY
Dr. S. C. D. Sah, M. Sc., Ph. D. Head
Dr. Haripal Singh, M. Sc., Ph. D.
Dr. K. P. Jain, M. Sc., Ph. D.
Dr. R. K. Kar, M. Sc., Ph. D.
Dr. R. Y. Singh, M. Sc., Ph. D.
Shri R. K. Saxena, M. Sc.
Shri A. K. Khanna, M. Sc.
Shri S. K. M. Tripathi (Research Scholar since 7.11.74)

GEOLOGY SECTION
Shri S. K. Kalshreshtha, M. Sc.
Shri N. C. Mehrotra, M. Sc.

C-14 LABORATORY
Dr. G. Rajagopalan Head
Shri G. Jain

PUBLICATION
Shri N. N. Moitra, B. A. (Assistant Editor)

LIBRARY
Shri J. N. Nigam, B. A., B. Lib. Sc. (Librarian)
Shri S. N. Joshi, B. Sc., B. Lib. Sc. (Library Assistant)

MUSEUM
Dr. Anil Chandra, M. Sc., Ph. D. (Curator)

75
Shri Mohan Shanker, B. Sc. (Museum Assistant—Resigned on 27.8.74)
Shri N. C. Saxena, B. A. (Offg. Museum Assistant)
Shri J. C. Srivastava, M. Sc. (Offg. Junior Museum Assistant)

HERBARIUM
Dr. H. A. Khan, M. Sc., Ph. D. (Curator)
Shri G. P. Srivastava, M. Sc. (Herbarium Incharge)
Shri Dileshwar Pradhan, B. Sc. (Herbarium Assistant)
Shri A. K. Singh Rathore, B.Sc. (Herbarium Assistant)
Shri R. S. Ojha (Plant Collector)

LABORATORY SERVICES
Miss Asha Bharadwaj, B. Sc. (J. T. A.)
Miss Madhavi Chowdhury, B.Sc. "
Miss Indra Kumari, B. Sc. "
Shri H. N. Boral, B. Sc. "
Shri D. C. Joshi "
Shri B. Sekar, B. Sc. "
Miss Kamla Amarlal, B. Sc. "(Scheme "Palynological studies from Oil India Ltd. till 31.12.1974 and J. T. A. in Quaternary Palynology Department since 1.1.1975)."
Miss Sona Rani, B.Sc. "since 1.1.1975 in the Scheme "Palynological studies from Oil India Ltd.
Shri N. K. Khasnavis, B. Sc. (Laboratory Assistant)
Shri Vijay Singh Panwar (Glass Blower)

PHOTOGRAPHY & DRAWING
Shri S. S. Rana (Artist)
Shri P. C. Roy (Photographer)

STORE

Shri I. J. Mehra, B. A. (Store-keeper)

ACCOUNTS

Shri Ghanshyam Singh, B. Com. (Accounts Officer)
Shri S. B. Verma, M. A., B. Com., D. P. A. (Accountant)
Shri T. N. Shukla, B. A. (U. D. C.)
Shri B. K. Jain, B. A. (U. D. C.)
Shri N. N. Joshi (L. D. C.)
Shri R. K. Takru, B. A. (L. D. C.)

ADMINISTRATION

Shri Gurcharan Singh, M. A. (Registrar)
Shri V. P. Gulati (Deputy Registrar)
Shri S. D. Mehtani (Office Assistant)
Shri S. K. Suri (Stenographer)
Shri S. P. Ghadisa, B. A. (P. A. to Director)
Mrs. P. K. Srivastava (Receptionist)
Shri H. S. Srivastava, B. Com. (U. D. C.)
Shri B. Singh (U. D. C.)
Shri I. J. S. Bedi (Stenotypist)
Shri Ramesh Gandra (L. D. C.)
Shri R. K. Kapoor (L. D. C.)
Shri K. Devrajan (L. D. C.)
### BIRBAL SAHNI INSTITUTE OF

### BALANCE SHEET AS

<table>
<thead>
<tr>
<th>LIABILITIES</th>
<th>Rs.</th>
<th>Rs.</th>
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#### Capital Funds

<table>
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<tr>
<th>Description</th>
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<tr>
<td>Govt. of India grants on Capital Account during the year</td>
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<td>Recurring Grant used for Capital formation</td>
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<td>Library Books &amp; Journals</td>
<td>13,399-14</td>
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<td>Maps &amp; Toposheets</td>
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**Add Excess of Revenue grants over Revenue Expenditure**

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<tr>
<th>Organisation</th>
<th>Rs.</th>
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<tr>
<td>M. G. T. Schemes (G.S.I.R.)</td>
<td>8,109-79</td>
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<tr>
<td>Coal Scheme</td>
<td>7,794-66</td>
</tr>
<tr>
<td>Palynology Scheme</td>
<td>5,207-87</td>
</tr>
<tr>
<td>Rajasthan Scheme (Sponsored by Univ. of Wisconsin)</td>
<td>58,913-25</td>
</tr>
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**Total C/o** | 29,62,992-09 |
PALAEOBOTANY, LUCKNOW

ON 31st MARCH, 1975

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<thead>
<tr>
<th>ASSETS</th>
<th>Rs.</th>
<th>Rs.</th>
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<tr>
<td>Land Donated By U. P. Government</td>
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<tr>
<td>Works and Buildings</td>
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</tr>
<tr>
<td>As per 31st March, 1974</td>
<td>11,04,031'76</td>
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<tr>
<td>During the year</td>
<td>3,013'58</td>
<td>5,615'58</td>
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<tr>
<td></td>
<td>2,600'00</td>
<td>11,09,645'34</td>
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<tr>
<td>Apparatus &amp; Equipments</td>
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<tr>
<td>(A) Apparatus &amp; Equipments</td>
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<tr>
<td>As per 31st March, 1974</td>
<td>5,71,870'98</td>
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<tr>
<td>During the year</td>
<td>8,310'05</td>
<td>1,887'29</td>
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<td></td>
<td>14,092'60</td>
<td>25,079'85</td>
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<td>5,96,930'83</td>
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<tr>
<td>(B) Workshop Equipments</td>
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<td>As per 31st March, 1974</td>
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<td>62,213'95</td>
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<td>(C) Office &amp; Miscellaneous Equipments</td>
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<td>As per 31st March 1974</td>
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<td>46,278'37</td>
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<td>(D) Plant &amp; Machinery</td>
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<td>7,347'31</td>
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<td>2'13</td>
<td>3,17,234'14</td>
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<td>4,02,705'54</td>
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<td>Total</td>
<td>C/o</td>
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<td>Rs.</td>
<td>Rs.</td>
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<td>----------------------------------------------------------</td>
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<tr>
<td>Total B/F</td>
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<td>General Provident Fund</td>
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<td>Donation Accounts</td>
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<td>G. L. K. Memorial Fund</td>
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<td>P. C. B. Memorial Fund</td>
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<td>A. C. Seward Memorial Fund</td>
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<td>P. K. Srivastava Memorial Fund</td>
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<td>Value of Priced Publications</td>
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<td>C/o</td>
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<table>
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<th>ASSETS</th>
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<th>Rs.</th>
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<tbody>
<tr>
<td><strong>Total</strong></td>
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<td>Coal Scheme</td>
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<td>Palynology Scheme</td>
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<td>Rajasthan Scheme</td>
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<td>(Gift of Microscope)</td>
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<td>Founders Library Donated</td>
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<td><strong>Total C/o</strong></td>
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<tr>
<td>LIABILITIES</td>
<td>Rs.</td>
<td>Rs.</td>
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<tr>
<td>-------------</td>
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<tr>
<td>Total B/F</td>
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<tr>
<td>ASSETS</td>
<td>Rs.</td>
<td>Rs.</td>
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<tr>
<td>--------------------------------------------</td>
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<td>Total B/F</td>
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<td><strong>Maps &amp; Toposheets</strong></td>
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<td>(Donation)</td>
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<td><strong>General Provident Fund</strong></td>
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<tr>
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<td>Advances out of G. P. F.</td>
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<td>“The Palaeobotanist”</td>
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<td>Volume 1-21</td>
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<td>“Birbal Sahni Memorial Lecture”</td>
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<tr>
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<td>“Picture Post Cards”</td>
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<td><strong>Loans and Advances</strong></td>
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<td>Total Giro</td>
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83
<table>
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<th>LIABILITIES</th>
<th>Rs.</th>
<th>Rs.</th>
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<tr>
<td></td>
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<tr>
<td>Total B/F</td>
<td>45,40,785.05</td>
<td></td>
</tr>
</tbody>
</table>

Sd/- Ghanshyam Singh  
Accounts Officer  
Birbal Sahni Institute of Palaeobotany,  
Lucknow.

Sd/- S. M. Singh  
Section Officer  
Office of A.G U.P.  
Camp at ...........
## ASSETS

<table>
<thead>
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<th>Rs.</th>
<th>Rs.</th>
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<tbody>
<tr>
<td><strong>Total</strong> B/F</td>
<td><strong>39,77,412.70</strong></td>
</tr>
</tbody>
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### Sundry Debtors

- **For unsettled advances (C/R)**
  - Account | 26,702.00 |
- **For unsettled advances (C. N. R.)**
  - | 2,893.00 | 29,595.00 |

### UNESCO Book Coupons
- 982.94

### Cash Balances

#### At Bank
- Current Account at S. B. I. Lucknow | 1,32,509.89 |
- Savings Bank Account at S. B. I. Lucknow | 2,63,601.90 | 3,96,111.79 |

#### In Hand
- Cash in hand (C.R.) Account | 108.21 |
- Cash in hand (Oil India Scheme) | 16.16 | 124.37 |

### Excess of Revenue Expenditure Over Revenue Income
- 1,36,558.25

### Total
- 45,40,785.05

---

Sd/- Gurcharan Singh  
Registrar  
Birbal Sahni Institute of Palaeobotany, Lucknow  

Sd/- G. D. Agarwal Sd/- K. R. Surange  
Zonal Audit Officer  
Director  
Birbal Sahni Institute of Palaeobotany, Lucknow  

Sd/- K. R. Surange  
Director  
Birbal Sahni Institute of Palaeobotany, Lucknow.
<table>
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<th>EXPENDITURE</th>
<th>PLAN</th>
<th>NON-PLAN</th>
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<td>44,985</td>
<td>76,340.28</td>
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<td>To Refresher Course Expenses</td>
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<tr>
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<tr>
<td>(i) Birbal Sahni Memorial Lecture</td>
<td>350.00</td>
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<td>350.00</td>
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<tr>
<td>(ii) Silver Jubilee Memorial Lecture</td>
<td>350.00</td>
<td>350.00</td>
<td>350.00</td>
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<td>To Training of Academic Staff at G.S.I. Camp</td>
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<td>15,266.50</td>
<td>15,266.50</td>
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<td>To Presentation of Medals</td>
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<td>Expenses on Services</td>
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<td>38,369.45</td>
<td>8,19,698.88</td>
<td>8,57,639.33</td>
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86
## Income Plan | Non-Plan | Total
--- | --- | ---
Balance of Last Year's Grant on Revenue A/C |  |  
Allowed for Expenditure |  |  
During Current Year, Silver Jubilee and Oil India Grant Account | 150.00 | 1,97,029.39 | 1,97,179.39 
By Grants from Govt. of India on Revenue Account | 1,87,500.00 | 8,73,000.00 | 10,60,500.00 
By Grants from Govt. of India for Silver Jubilee |  |  
By Grants from U.P. Govt. on Revenue Account | 5,000.00 | 5,000.00 
By Grants from Govt. of India for Research Scholarship |  |  
By Grants from Other Organisations |  |  
(i) Oil India Ltd. | 15,000.00 | 15,000.00 
(ii) Subventions from Universities and U.G.C. for Silver Jubilee Celebrations |  |  
Total C/s | 1,87,650.00 | 10,90,829.39 | 12,78,479.39
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<tr>
<th>EXPENDITURE</th>
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<td>Total B/F Rs.</td>
<td>38,369.45</td>
<td>8,19,269.88</td>
<td>8,57,639.33</td>
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<td>To Herbarium Requirements</td>
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<td>B/F Rs.</td>
<td>1,87,650.00</td>
<td>10,90,829.39</td>
<td>12,78,479.39</td>
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**By Sale Proceeds of Publications**

(i) The Palaeobotanist 43,108.06 43,108.06
(ii) Monographs 50.00 50.00
(iii) Symposium 2,099.54 2,099.54
(iv) Seward Memorial Lecture 132.31 132.31
(v) Picture Post Cards 238.00 238.00

**By Other Income**

(i) By Vehicle Charges 300.43 300.43
(ii) By Telephone Charges 900.30 900.30
(iii) By Visiting Scientist Room Charges 170.00 170.00

**By Miscellaneous Receipts and Recoveries**

Miscellaneous Receipts & Recoveries 2,283.23 2,283.23
Recoveries of Flood Advance 666.00 666.00
Recoveries of Conveyance Advance 150.00 23,202.00 23,352.00
Recoveries of Festival Advance 3,820.00 3,820.00
Receipts from Contractors 352.13 352.13

Total C/o Rs. 1,87,800.00 11,68,231.39 13,56,031.39
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<th>EXPENDITURE</th>
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<th>NON-PLAN</th>
<th>TOTAL</th>
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<td>18,090.77</td>
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<td>TOTAL</td>
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<td>Total</td>
<td>1,87,800.00</td>
<td>11,68,231.39</td>
<td>13,56,031.39</td>
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</table>

Sd/-G. D. Agarwal  
Zonal Audit Officer,  
Lucknow Zone, Lucknow.

Sd/-K. R. Surange  
Director,  
Birbal Sahni Institute of Palaeobotany, Lucknow.
<table>
<thead>
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<th>EXPENDITURE</th>
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<td>13,16,279.60</td>
<td>14,48,812.02</td>
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<td>INCOME</td>
<td>PLAN</td>
<td>NON-PLAN</td>
<td>TOTAL</td>
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<td>Total B/F</td>
<td>Rs. 1,87,800.00</td>
<td>11,68,231.39</td>
<td>13,56,031.39</td>
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<tr>
<td>Total C/o</td>
<td>Rs. 1,87,800.00</td>
<td>11,68,231.39</td>
<td>13,56,031.39</td>
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### EXPENDITURE PLAN NON-PLAN TOTAL

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<td>1,531.96</td>
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<th>To Other Expenses</th>
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<td>To Medical Advice</td>
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<td>To Festival Advance</td>
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<td>To Flood Relief Advance</td>
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<td>To Conveyance Advance</td>
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Total B/F Rs. 1,32,532.42 13,16,279.16 14,48,812.02
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## EXPENDITURE

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**EXCESS OF EXPENDITURE OVER INCOME**

\[ (+) 48,281.38 \quad \text{(--) } 1,36,558.25 \]

\[ \text{(--) } 1,84,839.63 \]

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Total Rs. 1,87,600.00 11,68,231.99 13,56,031.39

---

Sd/-Ghanshyam Singh Sd/-S.M. Singh Sd/-Gurcharan Singh

Accounts Officer Section Officer Registrar


96
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<th>INCOME</th>
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<td>1,87,800·00</td>
<td>11,68,231·39</td>
<td>13,56,031·39</td>
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</tbody>
</table>

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Zonal Audit Officer,  
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Sd/-K. R. Surange  
Director,  
Birendra Sahai Institute of  
Palaeobotany, Lucknow.
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<td><strong>10,84,397.12</strong></td>
<td><strong>18,42,610.66</strong></td>
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98
## PALAEOBOTANY, LUCKNOW
THE PERIOD 1.4.1974 to 31.3.1975

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Total C/o Rs. 2,60,302.88 00-25 2,60,303.13
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<td>Sir A. C. Seward Memorial Lecture out of Donation Account</td>
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<td>For Training of Academic Staff at C. S. I. Camp.</td>
<td>150.00</td>
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<tr>
<td><strong>By International Programmes</strong></td>
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<td>Air passage for members of Staff proceeding on foreign fellowships or invited to attend Scientific meetings and Conferences abroad.</td>
<td>15,266.50</td>
<td>15,266.50</td>
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<tr>
<td><strong>Total</strong></td>
<td>Rs 4,34,779.44</td>
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<td>RECEIPTS</td>
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<td>NON-PLAN</td>
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<tr>
<td>B/F Rs.</td>
<td>7,62,795.51</td>
<td>14,23,643.51</td>
<td>21,86,439.02</td>
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<td>C/o</td>
<td>7,62,795.51</td>
<td>14,23,643.51</td>
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<td>TOTAL</td>
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<tr>
<td>Total B/F Rs.</td>
<td>4,34,779.44</td>
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<td>17,34,186.56</td>
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<td><strong>International Culture</strong></td>
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<td>Exchange Programmes</td>
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<tr>
<td>Honorarium to foreign Visiting Scientist</td>
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<td><strong>By Silver Jubilee Celebration</strong></td>
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<td>Silver Jubilee Publications</td>
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<td>Contribution towards G. P. F.</td>
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<td>G.P.F. Sub. transferred to G. P. F. A/c</td>
<td>549.00</td>
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<td>Recovery of advances &amp; interest thereon transferred to G. P. F. Account</td>
<td>62,599.00</td>
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<tr>
<td><strong>By Miscellaneous</strong></td>
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<td>Income Tax Remitted</td>
<td>490.00</td>
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<td>Insurance Premium Remitted</td>
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<td>C.D.S. (Add. D.A.) Remitted</td>
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<td><strong>By Government of India Scholarship</strong></td>
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<td><strong>By Loans and Advances</strong></td>
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<td>Flood Relief —</td>
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<td>Festival Advance —</td>
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<td><strong>Total C/o Rs.</strong></td>
<td>4,36,197.83</td>
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<td>Total B/F</td>
<td>Rs. 7,62,795'51</td>
<td>14,23,643'51</td>
<td>21,86,439'02</td>
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</tbody>
</table>

| Cash | 108'21 | 16'16 |

<p>| Closing Balance |
|-----------------|-----------------|-----------------|
| Bank Recurring | Non-Recurring | Non-Recurring |
| Plan | | |
| Central Recurring (-) | 2,14,047'08 | — | 100'21 |
| Oil India | 7,960'62 | — | 16'16 |
| Silver Jubilee | 19,635'46 | — | — |
| Donation &amp; Endowment (+) | 5,285'23 | — | — |
| Total | 32,881'31 | 1,81,041'40 |
| (-) | | |
| Cash in Hand | 1,81,165'77 | 124'37 |
| Total | 1,81,041'40 | 124'37 |</p>
<table>
<thead>
<tr>
<th>PAYMENTS</th>
<th>PLAN</th>
<th>NON-PLAN</th>
<th>TOTAL</th>
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<td>Total B/P</td>
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<td>Conveyance Advance</td>
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<td>By Oil India Expenses</td>
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<td>By Expenditure out of Misc. Receipts</td>
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<td>474'86</td>
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<td>By amount transferred to C.N.R. Deposit A/C</td>
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<tr>
<td>By Donation Account Expenses</td>
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<tr>
<td>By Investment in F.D.R. at S.B.I.</td>
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<td>By Pension &amp; Superannuation</td>
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<td>By Refund out of Deposits</td>
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<td>To Modern Construction</td>
<td>11,836'98</td>
<td>-</td>
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<td>To Rajiv &amp; Co.</td>
<td>1,075'04</td>
<td>-</td>
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<td>3,13,675'66(-)1,81,041'40</td>
<td>1,32,634'26</td>
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<tr>
<td>Total</td>
<td>Rs.</td>
<td></td>
<td>21,86,439'02</td>
</tr>
</tbody>
</table>

Sd/-Ghanshyam Singh Sd/-S.M. Singh Sd/-Gurcharan Singh
Accounts Officer Section Officer Registrar
Birbal Sahni Institute of Palaeobotany, U.P. Camp of Palaeobotany,
Lucknow. at Lucknow.

Sd/- G. D. Agarwal
Zonal Audit Officer, Lucknow Zone, Lucknow.

Sd/- K. R. Surange
Director
Birbal Sahni Institute of Palaeobotany, Lucknow.