ANNUAL REPORT

1979-80

BIRBAL SAHNI
INSTITUTE OF PALAEOBOTANY
LUCKNOW

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CONTENTS

INTRODUCTION

The Institute conducts research on the various aspects of plant fossils and disseminates the palaeobotanical knowledge all over the world, truly in harmony with the ideas of its Founder—Professor Birbal Sahni. The research activities at the Institute are organised under well-established departments. Under the VI Five Year Plan, the Institute has taken up the following broad areas of research.

1. Study of microbiota from the Vindhyans and equivalent formations.

2. Morphographic studies on plant megafossils, pollen and spores occurring in the rocks of various geological ages.

3. The evolution of plant life through the geological ages of India.

4. Palynological investigations of the sediments of various ages to ascertain the location and distribution of coal seams.

5. Study of pollen and spores from various sediments to indicate favourable areas for oil prospecting.

6. Study of microplankton occurring in the marine sediments of India.

7. Geomorphological studies particularly in Kashmir Valley and Rajasthan.

8. Maturation studies on organic material in coal bearing sediments and biochemical analysis of coals.

9. Palynological history of the last glacial epoch in India.

10. Study of ancient plant economy in India.

11. Radiometric dating of sediments.

RESEARCH

1. PRE-CAMBRIAN

1.1. Vindhyan Supergroup

A. *North-east Rajasthan*—The study of microbiota from the Semri, Rewa and Bhander groups of Karauli-Sapotra area has been completed. The microbiota comprises the algae—*Vindhyacoccus* gen. nov., *Palaeoglaucocystis* gen. nov., *Eucapsiopsis* gen. nov., *Gloeocapsomorpha, Corymbococcus, Gunflintia, Archaeorestis*—and the acritarchs—*Protosphaeridium, Kildinella, Orygmatosphaeridium*. A paper on this study has been finalized and sent for publication.

B. *Madhya Pradesh*—The disc-like remains were restudied and classified under the genera *Fermoria, Chuaria, Morania, Tawaia* and a new genus *Chapmania*. These remains are either acritarchs or sporocarp-like objects. A paper on the study was sent for publication.

C. *Rewa, Madhya Pradesh*—The study of biota and organo-sedimentary structures from Semri, Rewa and Bhander groups around Chandrehai was completed. Algal forms, viz., *Huronispora, Globophycus, Sphaerophycus, Aphanocapsiopsis, Corymbococcus, Vindhyacoccus* and acritarchs, viz., *Orygmatosphaeridium* and *Bavlinella* have been identified. In addition to this 'Archaeocyatha'—*Ajacicyathus* and *Tubocyathus* have been recognized.

A paper dealing with the use of modern microscopy in determining synsedimentary biota in Pre-Cambrian rocks was completed and submitted for publication.

1.?. Pre-Cambrian—Cambrian Boundary

A. Thin section and maceration of samples from the Pre-Cambrian-Cambrian boundary of Lolab Valley, Kashmir has yielded interesting microbiota. Further work is being continued.

B. A new alga, *Sclerococcus*, has been recorded from Jutogh 'E' Simla Hills.

C. The biota and organo-sedimentary structures from Equatorial Africa have been identified as Oncolites—*Ambigolamellatus*, *Asterosphaeroides* and *Volvatella;* Catagraphs—*Vesicularites* and *Conferta;* Algae—*Corymbococcus*, *Eosynecoccus*, *Aphanocapsiopsis* and *Huronispora;* and Archaeocyatha—*Burindocyathus* gen. nov. and *Tubocyathus*. A paper on the study was sent for publication.

2. PALAEOZOIC

2.1. Morphological studies in the Glossopteris Flora

2.1.1. *Pteridophytes*

In a study of Seam—VIII of the Raniganj Coalfield, Kumardih Colliery the pteridophytic remains, viz., *Neomariopteris* sp., *Stellotheca robusta* and several equisetalean stems have been identified. *Dichotomopteris*, *Tryzygia speciosa* and *Raniganjia* have been found in the Upper shales of Kumardih Colliery.

2.1.2. *Gymnosperms*

A. The 'Revision of the Indian species of *Glossopteris*' has been completed and published as Monograph No. 2. Besides, the revision of the Australian species of *Glossopteris* was undertaken. The species housed at various places in Australia were studied, sketched and photographed and the

observations are being finalized. Starting with McCoy, 1848 to Rigby, 1978 more than one hundred specimens were examined. Out of them 25 distinct species have been finalized. However, preliminary observations indicate the presence of some more new species in the existing Australian collection. The study is in progress.

B. From Seam-VII of the Raniganj Coalfield, Kumardih Colliery the following species of *Glossopteris*, viz., *G. formosa, G. angustifolia, G. indica, G. raniganjensis, G. major, G. arberi, G. lanceolatus, G. tenuifolia* were identified. The seamwise analysis of the flora is under progress.

C. One new species of *Glossopteris, G. ornatus*, has been identified from the Churulia area of the Raniganj Coalfield. The leaves are found to be arranged in two whorls, alternate with each other. They are oblong to lorate in shape and form narrow hexagonal to polygonal meshes near midrib and short and square near margin. A paper was finalized and sent to press. Besides, the megaflora of this area is under study.

2.1.3. *Fossil flora from the Kamthi beds of Wardha-Godavari Valley, Maharashtra*

A. Studies on the impressions of the Glossopteris Flora of the Kamthi Formation from Kanhargaon, Chandrapur District, Maharashtra were completed and a paper was finalized and sent for publication.

B. The studies on the petrified fossil woods collected from Kanhargaon, Chandrapur District, Maharashtra have been completed and the results have been submitted in seven papers for publication. The petrified flora from Chittoor and Adhari (Chandrapur District) revealed some interesting results. From Chittoor *Sclerospiroxylon marguerierae* gen. et.

sp. nov. and from Adhari—*Dadoxylon adhariense* were identified. A paper on this study too was finalized and sent to press. Further work on the petrified woods from some other localities of Chandrapur District, Maharashtra is under progress.

2.2. Sporae dispersae and palynostratigraphy

2.2.1. *Palynology of the Churulia area*

The samples collected from Churulia area were studied in detail. The assemblage comprises 23 genera and 59 species, of which 4 species are new. The quantitative and qualitative analysis of the miofloral assemblage indicates a Lower Barakar age. Based on the study a paper has been sent for publication.

2.2.2. *Morphology of Lower Gondwana Monosaccates*

Morphological as well as biometrical re-examination of the species of *Plicatipollenites* was carried out to achieve more precise circumscriptions for the taxon. The holotypes of *Plicatipollenites indicus*, *P. gondwanensis*, *P. diffusus*, *P. trigonalis*, *P. stigmatus*, *P. maculatus*, *P. densus*, *P. giganticus* and *P. magnus* were reinvestigated and photographed. *Plicatipollenites ovatus* and *P. ganjrensis* (whose holotypes were not available) have been examined in original photographs. Besides, a large number of miospores of the species of *Plicatipollenites* have been studied to assess the variation ranges of the various taxa. This study forms a part of the comprehensive work on Lower Gondwana monosaccate miospores.

2.2.3. *Basal Talchir mioflora from Penganga Valley*

The lowermost Talchir sediments, overlying the Penganga Formation (Limestones, Pre-Cambrian) near Irai have yielded an interesting assemblage of typical Talchir

monosaccate miospores associated with an abundance of acritarchs—*Leiosphaeridia* and *Tasmanites*. This discovery constitutes the first authentic record of a definite basal Talchir mioflora from India. The Penganga striated platform, which lies below the spore-bearing sediments shows an unequivocal proof of the Talchir glaciation. Thus the palynological evidence clearly shows that some plants did coexist with the glaciation as advocated by Professor Birbal Sahni.

2.2.4. *Talchir palynostratigraphy in Anuppur area, Madhya Pradesh*

To establish the palynozones in the Talchir Formation in Anuppur area, the measured sections have been prepared along Chandas Nala, Bakan Nala and Tipan River. The samples collected from Chandas Nala and Bakan Nala were macerated and a preliminary appraisal of the palynomorphs was made. The important palynomorphs are *Plicatipollenites, Parasaccites, Potonieisporites, Callumispora, Caheniasaccites, Diverisaccus, Faunipollenites, Scheuringipollenites, Brevitriletes* and *Leiotriletes*. The Tipan River samples are being processed for study.

2.2.5. *Lower Barakar megaspores from Churulia area Raniganj Coalfield*

The megaspores have been studied both under dry and wet conditions through controlled maceration. The assemblage contains *Trilaevipellitis multipunctatus* sp. nov., *Srivastavaesporites indicus, S.* sp., *Talchirella trivedii, T. raniganjensis, T. media* sp. nov., *T. migra* sp. nov. and a new genus *Barakarella*. This genus is characterized by baculose exine, medianly curved arcuate ridges circumscribing the trilete ridges and a cushioned inner body. However, particular attention has

been given to the inner bodies of the megaspores and a number of significant taxonomic features have been deciphered. A paper on the study has been sent to Press.

2.3. Morphotaxonomy and Palynostratigraphy

2.3.1. A. Morphotaxonomy of Middle Triassic mioflora found in Bore Hole No. RNM-4 from Raniganj Coalfield has been completed. A paper was finalized and sent for publication.

B. A study of Permo-Triassic palynology of Bore Core No. RNM-3 from the Raniganj Coalfield has been completed. Five microspore assemblages have been found representing Barren Measures, Raniganj and Triassic deposits.

2.3.2. Work on Permo-Triassic sediments of Tethyan Himalaya, Malla Johar area is under progress.

2.3.3. Morphotaxonomic studies of West Bokaro coals have revealed about 40 genera representing triletes and bisaccate group. For palynostratigraphy and correlation of coal seams a systematic study is being continued.

2.3.4. To circumscribe different species of miospores in the Barakar Formation a detailed morphographic study of miospores encountered in the samples from the Barakar type area is being continued.

2.3.5. Palynological analysis of Jamuria River section of Jharia Coalfield has been completed. The samples represent both Talchir and Karharbari stages. The work on the samples of Bore-hole NB, Mahubani area is in progress.

2.3.6. Detailed morphographic study of the Sporae

dispersae and palynostratigraphy of the Lower Gondwana sediments of Siang District was continued.

2.3.7. Thirty samples from the Palar Basin were macerated. A few more samples have been taken up for processing.

2.3.8. Fortyfour samples collected from Godavari Valley were macerated. Out of them only 15 yielded miospores. Further work is in progress.

2.3.9. Samples from the Jaisalmer Formation (5 samples), Kuldhar Formation (10 samples), Bhadasar Formation (7 samples), Rupsi (5 samples), Baisakhi Village (1 sample), Habur (2 samples), Kanod (4 samples), Pohara (2 samples), Pokharan (2 samples), Dedia (9 samples), Lawan (1 sample), Jhalaria (3 samples), Badhaura Formation (2 samples) and Bap area (6 samples) were macerated but all proved barren.

2.3.10. Thirtysix samples collected from the Raniganj Formation were macerated. Out of these 32 yielded rich miospore assemblages. Slides of 29 samples have been prepared and further work is in progress.

2.4. Petrology and Palynology of Palaeozoic Coals

2.4.1. In the light of new advancements made in coal petrography reassessment of the Godavari Valley coals was done. A detailed morphographic and quantitative evaluation of maceral and microlithotypes alongwith maturation (Rank) study was done. From this study it was ascertained (i) detailed petrographic characteristics, (ii) correlation of the various coal seams in the different collieries of the valley bearing local names, and (iii) the suitability of these coals for proper economic utilization. The data have almost been finalized for publication.

2.4.2. Preparation of 100 coal samples from Bokaro and Raniganj area has been completed for biopetrological studies.

2.4.3. Thirtysix particulate pellets of Raniganj coals from three bore cores sent by C. M. P. D. I. for the coal seam correlation and petrographic evaluation were prepared. Further work is in progress.

2.5. Petrology of Foreign Coals

A. Detailed petrographic and maturation studies were carried out on 7 foreign coal samples (3 Australian, 3 Nigerian and 1 Canadian) sent by Steel India Limited for petrographic evaluation and coking potentiality. The results have nearly been finalized.

B. Three coal pellets (British, Canadian and South African) were received from Maceral Group sub-committee of the International Committee for Coal Petrology for International standardization. A detailed and quantitative maceral assessment was made to ascertain the Vitrinite/Resinite and Vitrinite/Inertinite transitions. Besides, the reflectance measurements (maximum and random) on various macerals were obtained extensively.

3. MESOZOIC

3.1. Megafossil Assemblages

3.1.1. *Triassic Flora*

The work on an ovulate gymnospermic cone from the Triassic beds of Nidpur has been completed. Eight pollen bearing cones have been worked out. It is observed that the genus *Nidistrobus* Bose & Srivastava needs further elaboration and other lax fruiting forms are to be removed from

the genus. Thus the fructifications bearing pad-shaped bodies having a row of pollen sacs on their abaxial side, are to be assigned to a new genus. Besides, the work on ginkgoalean leaves is being completed.

Some shale samples from Tiki Formation have been macerated in bulk. A good number of leaf fragments and megaspores have been obtained. Photography of megafossils and megaspores is in progress.

3.1.2. *Jurassic-Cretaceous Flora*

A paper on Cycadophytic leaves from Jurassic-Lower Cretaceous rocks of India has been completed and sent for publication. The paper includes *Taeniopteris spatulata* McClelland, *T. kutchensis* n. sp., *T. haburensis* n. sp., *T. oldhamii* n. sp., *T. buskoghatensis* n. sp., *Morrisia mcclellandi* (Oldham & Morris) Bose, *M. dentata* (Rao & Jacob) comb. nov., *M. rajmahalensis* (Feistm.) comb. nov., *Cycadites rajmahalensis* Oldham, *Anomozamites crenata* (McClelland) comb. nov., *A. amarjolense* Sharma, Surana & Singh, *A. fissus* (Feistmantel), *A. hasnapurensis* n. sp., *A. haburensis* n. sp., *Pterophyllum distans* Morris, *P. kingianum* Feistmantel, *P. footeanum* Feistmantel, *P. medlicottianum* Oldham & Morris, *P. rajmahalense* Morris, *P. morrisianum* Oldham, *P. guptai* n. sp., *P. princeps* Oldham & Morris, *P. incisum* Sahni & Rao, *P.* sp. and ? *Taeniopteris* sp./*Pterophyllum* sp. In connection with the work on the Lower Cretaceous flora of India descriptions of *Thallites* sp., *Equisetum borkarii* n. sp., *Gleichenia nordenskioldii*, *Phlebopteris polypodioides*, *Hausmannia pachyderma*, *Weichselia reticulata*, *Cladophlebis kathiawarensis*, *C. medlicottiana* and *C. thanensis* n. sp. have been finalized. Some photographs and text-figures have been prepared. Further work is in progress. Some fossil conifers from Sehora have been photographed and the cuticular slides are being prepared. A

paper on the occurrence of the genus *Ctenozamites* in the Jabalpur Formation has been finalized.

A paper on Mesozoic plant remains from Gardeshwar, Gujarat has been completed and sent for publication. It includes *Lycopodites ghoshii* n. sp., *Cladophlebis* sp., *Gleichenia rewahensis* Feistmantel, ? *Abropteris/Phlebopteris*, ?*Dictyophyllum* sp., two species of *Sphenopteris*, *Pachypteris* sp., *Thinnfeldia* sp., *Elatocladus tenerrima* (Feistm.) Sahni, two species each of *Pagiophyllum* and *Brachyphyllum*, *Araucarites minutus* Bose & Maheshwari and *Araucarites* sp. cf. *A. cutchensis* Feistmantel. Another paper on *Hausmannia dichotoma* Dunker and *Pterophyllum princeps* Oldham & Morris from Than, Saurashtra has also been sent to Press.

A revision of the fossil flora from Kutch has been started.

A paper on plant fossils from the Gangapur Formation has been completed and submitted for publication. The commonest megafossil is *Elatocladus*. Epidermal features of *E. kingianus* n. sp. and *Pagiophyllum marwarensis* Bose & Sukh-Dev have also been described. The palynological assemblage comprises about 64 taxa. A basal Lower Cretaceous age has been suggested for this investigated material. The study of megafossils from the Cauvery Basin is in progress. Most of the selected specimens have been photographed. Cuticular preparations from some specimens have also been prepared.

3.2. Sporae dispersae and palynostratigraphy

3.2.1. *Jurassic-Cretaceous*

A paper on 'Dinoflagellate cysts from the Morand River Section near Morghat, Madhya Pradesh' was revised and

resubmitted for publication. The dinoflagellate cysts have been described under the genera *Kalyptea*, *Batioladinium*, *Canningia* and *Tenua*. The study on megaspores recovered from Dharesi, Madhapor, Nangor and Trambau, Kutch District, has been completed. The assemblage includes *Banksisporites*, *Hughesisporites*, *Verrutriletes*, *Bacutriletes*, *Horstisporites*, *Minerisporites*, *Erlansonisporites* and *Paxillitriletes*. Work on mio-and megaspores, and dinoflagellate cysts from the Kutch Basin has been continued.

Processing of palynological samples from the Pondicherry area has been completed but with negative results. A paper on triprojectate pollen from the Upper Cretaceous Kallamedu Formation of the Cauvery Basin was completed and sent to press. The pollen belongs to the species *Aquilapollenites bengalensis* Baksi & Deb.

3.2.2. *Palynostratigraphy of Carbonaceous shales from Hathidoba, Madhya Pradesh*

The samples of coal and carbonaceous shales recovered from Hathidoba section near Ranidhar yielded a good percentage of pteridophytic miospores. The gymnospermic pollen grains are also common in occurrence. But the cycadalean or Bennettitalean pollen are very rare. Further work is in progress.

3.2.3. *Palynostratigraphy of Carbonaceous shales from Ranikamar, Madhya Pradesh*

Five samples of fine coal and carbonaceous shales were macerated. The miofloral assemblage is found rich in miospores. The scanning of the slides is being continued.

3.2.4. *Palynostratigraphy of sediments from Patbaba Ridge, Madhya Pradesh*

Trisaccate pollen genus *Podosporites tripakshii* shows its dominance in the miospore assemblage which is a very significant occurrence in the Jabalpur Stage. Pteridophytic spores are represented by a few genera. Further work is in progress.

3.3. Mesozoic from Abroad

3.3.1. *Palynological study of Zirab coals, Persia*

Out of the 23 identified genera, two genera, viz., *Zirabisporites* and *Kimyaipollenites* were found new. Besides, the occurrence of tricolpate pollen marks the presence of angiosperms in these sediments. A paper on the study is being finalized.

3.3.2. *Miofloristic study of Liassic sediments, Iran*

The miospore assemblage has yielded 31 genera. Out of these two genera, viz., *Shemshakisporites* and *Kermanisporites* are new. The gymnospermous miospores also occur commonly. A manuscript on the study is in draft stage.

4. CENOZOIC

4.1. Morphological and anatomical studies

4.1.1. *Deccan Intertrappean Flora*

A number of petrified fruits and woods from a new locality near Shahpura in Mandla District of Madhya Pradesh were studied. Two of the fruits were found to belong to Palmae and Euphorbiaceae and further efforts are being made to find out their generic affinities. Six dicot woods were described from Shahpura and a paper submitted

to Press. This included fossil dicot woods assigned to *Sterculioxylon shahpurensis* sp. nov., *Calophylloxylon dharmendrae* sp. nov., *Burseroxylon preserratum* Prakash & Tripathi, *Heyneoxylon tertiarum* gen. et sp. nov., *Dracontomelumoxylon mangiferumoides* Ghosh & Roy, and *Laurinoxylon deccanensis* sp. nov. resembling the modern woods of *Sterculia* of Sterculiaceae, *Calophyllum* of Guttiferae, *Bursera* of Burseraceae, *Heynea* of Meliaceae, *Dracontomelum* of Anacardiaceae and the family Lauraceae respectively. This assemblage and an earlier fossil record from this area indicate the presence of a rich forest flora in this region during the Early Eocene times.

A number of well-preserved fossil palm woods were also studied from Shahpura in Mandla District. One of the woods closely resembles the modern wood of *Chrysalidocarpus*. A manuscript on the study has been finalized. Another *Phoenix*-like palm wood is also being described and the manuscript is almost ready. Further, a fossil palm root showing close resemblance with the root of *Borassus* was described from Nawargaon in Wardha District and a paper has been finalized. Another paper on the anatomical variability in the stem wood of *Caryota sobolifera* was sent for publication.

A study of cherts from Mohgaon Kalan further revealed two types of algal thalli and petrified rolled leaves. The thalli appear to belong to red algae. Sections of modern leaves, petioles and younger parts of the stems of *Musa*, *Canna*, *Maranta* and *Ravenala* were prepared for comparison with the petrified rolled leaves.

About 70 well-preserved gyrogonites obtained from the calcareous clay samples from Rajahmundry were studied in detail and provisionally classified as *Charites*, *Brevichara*, *Harrisichara*, *Tectochara* and *Nitellites*.

4.1.2. *Leaf-impressions from Laki Series, Kutch*

Identification of a number of leaf-impressions, viz., *Terminalia*, *Syzygium*, *Lagerstroemia*, *Cinnamomum* and *Ficus* from the Eocene of Panandhro basin was completed and a paper was submitted for publication.

4.1.3. *Leaf-impressions, fruits and seeds from Khari Series of Kutch*

A collection of leaf-impressions, fruits and seeds from the Lower Miocene beds of Khari River was studied and eleven fossil species belonging to the families Rutaceae, Leguminosae, Lauraceae, Moraceae and Plamae were described.

4.1.4. *Fossil woods from Kankawati Series (Manchar) of Kutch*

Fossil woods comparable with the modern genera *Dipterocarpus*, *Sterculia* and *Terminalia* and a species of palm from the Pliocene of Dhaneti and Mothala were identified, photographed and described in detail. A paper on two fossil woods of Sapindaceae resembling those of *Schleichera* and *Euphoria* was submitted for publication. Some more fossil woods were cut and sections prepared for study.

4.1.5. *Fossil woods from eastern India*

A. *West Bengal*

Seven fossil woods collected from a Tertiary exposure at Bolpur near Shantiniketan in West Bengal were idnentified, described and a paper sent to Press. These consist of *Shoreoxylon tipamense* Prakash & Awasthi of Dipterocarpaceae, *Casinium barooahii* (Prakash) Prakash, *Cynometroxylon holdeni* (Gupta) Prakash & Bande, *Koompassioxylon*

elegans Kramer, *Millettioxylon pongamiensis* Prakash, *Ormosioxylon bengalensis* gen. et sp. nov., and *Peltophoroxylon ferrugineoides* sp. nov. of Leguminosae. This assemblage indicates a Neogene age for these woods.

B. *Tipam Series*

Thin sections of 50 fossil woods from Assam and Nagaland were prepared and studied. The woods resembling *Nephelium*, *Schleichera*, *Barringtonia*, *Calophyllum pulcherrimum*, *Dipterocarpus macrocarpum* and *Mangifera longipes* were identified, photographed and described in detail. A paper on a fossil wood of *Sindora* was finalized and submitted for publication.

C. *Dupitila Series*

Investigation of petrified woods from Namsang beds at Deomali in Arunachal Pradesh was continued and about a dozen new species were identified. A few of them have been found to resemble the modern woods of *Sterculia*, *Kingiodendron*, *Dalbergia*, *Pterocarpus*, *Nephelium*, *Bischofia* and Lauraceae.

4.1.6. *Fossil woods and leaf impressions from the Siwalik beds, Himachal Pradesh*

Studies were continued on the fossil woods from the Lower Siwalik beds of Nalagarh and a number of sections were cut and the slides prepared. Seven woods were identified with *Koompassia*, *Acrocarpus*, and *Ormosia* of Leguminosae and *Aglaia* of Meliaceae. These have been photographed and described. Further work is in progress.

A paper on five fossil woods resembling those of *Dipterocarpus*, *Dracontomelum*, *Sindora*, *Terminalia* and *Diospyros*

from the Siwalik beds of Kalagarh was completed and submitted or publication.

A paper describing nine leaf-impressions from Bikhnathoree, Bihar was submitted for publication. Another collection from this locality was also studied and about 30 new types of dicot leaves were photographed and described. These were tentatively identified to the families Malvaceae, Leguminosae, Meliaceae, Euphorbiaceae and Flacourtiaceae. Their further identification is in progress.

4.1.7. *Fossil woods from South India*

A. *Fossil woods from the Cuddalore Series*

A detailed study of a fossil wood collected from near Pondicherry resembling *Euphoria* of the family Sapindaceae was completed and a paper was sent to Press.

Several carbonized woods from Neyveli lignite were also investigated. Some of them were identified with modern woods of *Hopea, Cordia* and *Sonneratia.*

B. *Carbonized woods from the Tertiary of Warkala and Quilon*

Pieces of carbonized woods from Warkala and Quilon were embedded in paraffin wax and sectioned for study. Three woods from Warkala were identified with *Calophyllum, Swintonia* and Sapotaceae.

4.1.8. *Plant megafossils from Karewa beds of Kashmir*

Leaf-impressions belonging to the families Rosaceae and Ulmaceae from the Lower Karewa beds of Laredura were sorted out for critical re-examination. A collection of leaves from the Lower Karewas of Hirpur, Nichahoma and

Raithan was examined. It has been found that the assemblage of leaf-impressions from Hirpur, although very small, appears to be somewhat different from those of Laredura, Ningal Nala, Liddarmarg, Nichahoma and Raithan.

4.2. Sporae dispersae and palynostratigraphy

4.2.1. *Palaeogene miospores of India*

Miospores obtained from the calcareous clay samples of the Deccan Intertrappean Series of Rajahmundry were studied and found to belong to fungal spore genera, viz., *Inapertisporites*, *Dicellaesporites*, *Multicellaesporites* and *Monoporisporites* and to a few angiospermous types, viz., *Nonaperturites*, *Tricolpopollenites* and *Psilastephanocolpites*. A paper describing these spores-pollen was finalized and sent to Press.

4.2.2. *Neogene miospores of India*

Some more lignite samples from Neyveli were macerated and slides prepared, scanned and the interesting miospores were photographed. Pollen grains similar to those of the African palm *Sclerosperma mannii* Wendl., were identified, described and a paper submitted for publication. The occurrence of this African palm in early to middle Tertiary of India is of great significance with regard to palaeoclimate of the Indian subcontinent and the distribution of *Sclerosperma*.

4.2.3. *Sporae dispersae, palynostratigraphy and biopetrology*

A. Based on the biopetrological studies of lignites from several localities of India a study of lignite micro-lithotypes was carried out for the first time in India. A paper on the study entitled 'Classification of composite microlithotypes of lignite' was finalized and submitted for publication.

B. Morphographic and photometric studies, quantitative evaluation of maceral and microlithotypes and macerate analysis carried out from 4 lateral sections of the Neyveli lignite have revealed three distinct facies in the Main Lignite Seam. A paper on organic microconstituents of the Main Seam of Neyveli Lignite, South India based on the data was sent to Press. Besides, 40 lignite pellets representing four lateral sections of Main Seam of Neyveli Lignite were prepared.

4.2.4. *Palynostratigraphy of Tertiary sediments of Lower Assam*

Jowai-Badarpur Road Section, Meghalaya, Assam

A. Microphotography of Palaeocene-Eocene palynomorphs recovered from the Jowai-Badarpur Road Section was continued. A paper on the taxonomical study of the fungal spores/bodies was finalized and submitted for publication. The study of the remaining palynomorphs is being continued.

B. The Oligocene-Miocene palynomorphs recovered from the sediments of the above mentioned section were photographed. Identification of palynomorphs up to generic level has been done. Morphological descriptions of various entities are being carried out. A preliminary analysis of the assemblage reveals that the pteridophytic spores are dominant in occurrence followed by the gymnospermic and angiospermic pollen grains. Microplanktons and algal and fungal remains have also been recorded. Further work is in progress.

4.2.5. *Palynostratigraphy of Tertiary sediments of Upper Assam*

Palynological investigation of the Tipam sandstone

and Girujan Clay encountered in the Jorajan well-2, is being continued. Scanning of the slides has been completed. To understand its stratigraphical potential the identification of palynoflora is being continued.

4.2.6. *Palynostratigraphy of the Lower Tertiary sediments of Simla Hills, North India*

A manuscript dealing with the Palaeogene palynology of Simla Hills has been completed and submitted for publication. A comparative account of the Subathu palynoflora of Simla Hills (Upper Palaeocene-Eocene) has heen worked out and a manuscript is being finalized. The taxonomic study of the Subathu palynoflora has been completed. A manuscript is being finalized. The palynological study of the Subathu Formation was extended to the Surla-Jalal Section. Seventyfive rock samples were macerated, of which 20 proved productive. The palynoflora is rich in having microplanktons, viz., *Oligosphaeridium*, *Thalassiphora*, *Hystrichokolpoma*, *Tenua*, etc. Other palynomorphs, viz., *Cyathidites*, *Todisporites*, *Lycopodiumsporites*, *Cicatricosisporites*, *Palmaepollenites*, *Couperipollis* and *Podocarpidites*, etc. have been identified. Further work is in progress.

4.2.7. *Palynostratigraphy of Siwalik sediments of Bhakra-Nangal area*

A. One hundred and seventytwo rock samples collected from measured sections of Lower, Middle and Upper Siwalik sediments (Middle Miocene-Lower Pleistocene) were processed for the recovery of palynomorphs. Only 10 samples proved productive and yielded poorly preserved palynomorphs. Their identification is in progress.

B. Palynological investigations of the Pinjor Formation (Upper Siwalik) exposed near Chandigarh have been

completed. A paper on systematic palynology of the palynoflora, its analysis and interpretation was submitted for publication.

C. Morphological study of the Upper Siwalik palynoflora recovered from the Bharwain Road section is being continued. Scanning of slides prepared from the Una Road Section's samples (Upper Siwalik) is in progress.

4.2.8. *Palynology of Marine Cretaceous-Tertiary sediments of South India*

A. Morphotaxonomy of spumellarian Radiolaria from Uttatur phosphatic nodules has been completed. It includes 13 genera and 12 species.

B. Electron microphotographs of three coccolith species have been taken. Further work on Palaeocene nannofossils from Vriddhachalam area is in progress.

C. Morphotaxonomy of *Aquilapollenites* has been completed and a manuscript on 'Occurrence of the genus *Aquilapollenites* in the Upper Cretaceous Kallamedu Formation of Vriddhachalam area, Cauvery Basin, southern India' was submitted for publication.

D. Morphotaxonomical study of dinocysts from the Western Ghats is in progress.

E. Eight dinoflagellate taxa, viz., *Pareodinia* sp., *Muderongia mcwhaei*, *Oligosphaeridium pulcherrimum*, *Coronifera oceanica*, *Gonyaulacysta* sp., *Dingodinium cerviculum*, *Sentusidinium hystrix* and *Nammus psilatus* recovered from Lower Cretaceous sediments in Cauvery Basin were identified.

4.2.9. *Palynostratigraphy of Neogene sediments in Kutch, Gujarat*

Study of spores, pollen grains and microplanktons recovered from the Khari Nadi Formation (Miocene) in Kutch is being continued. Permian miospore genera of the Lower Gondwana comprising *Cannanoropollis*, *Potonieisporites*, *Cahenia saccites*, *Platysaccus* and *Lahirites* were detected as reworked fossils amidst typical Tertiary miospore genera, viz., *Striatriletes*, *Lycopodiumsporites*, *Palmaepollenites* and *Malvaceaerumpollis*. It was postulated that the Permian sediments in Rajasthan were eroded and redeposited in the Miocene sediments of Kutch.

4.2.10. *Bore Core 27, site Rataria, District Kutch, Gujarat*

A rich palynofloral assemblage consisting of spores, pollen, microplanktons and fungal remains has been obtained from the Bore Core 27. Photomicrography of the interesting palynomorphs has been completed. Identification of the palynoflora and its utilization in stratigraphy is being continued.

4.2.11. *Palynostratigraphy of Deccan Intertrappean beds from Rajahmundri to Bombay*

About 90 samples collected from Deccan Intertrappean beds around Umaria, Isra and Sausar in Madhya Pradesh were macerated but none of them yielded any palynological fossils.

4.3. Tertiary from Abroad

4.3.1. Some more fossil woods from the Miocene of Congo, received from Mr J. Lepersonne of the Museé Royal de l 'Afrique Centrale, Tervuren, Belgium were studied and tentatively assigned to the families Olacaceae, Combretaceae, Leguminosae and Meliaceae. Further work is in progress.

4.3.2. Four samples of fossil woods belonging to Comilla zone of Bangla Desh and received from the National Museum of Science and Technology, Dacca for age determination, were investigated. Three of them were found to resemble the modern woods of (i) *Gluta-Melanorrhoea* of Anacardiaceae, (ii) *Dipterocarpus* of Dipterocarpaceae, and (iii) *Albizia-Acacia* of Leguminosae respectively. The fourth fossil wood could not be identified due to insufficient material. This assemblage indicated a Neogene age for these fossil woods.

5. QUATERNARY

5.1. Pollen Morphology

Lahul-Spiti—One hundred and fifty three pollen slides of 51 taxa distributed in Lahul and Spiti areas of Himachal Pradesh were prepared. After studying their pollen morphology, the data were incorporated in the Pollen Key. Till now 61 pollen types have been recognized in 400 taxa distributed in Ladakh, Lahul and Spiti. The Pollen Key is being utilized for the identification of subfossil pollen from this region. Detailed pollen morphological studies particularly of four species of *Juniperus* (*oxycedrus, recurva, communis & macropoda*)) were carried out to identify subfossil Juniper pollen.

Rajasthan—Pollen grains of 40 plants collected from Rajasthan and belonging to 21 families were photographed.

Gujarat—A Pollen Key for the Rajpipla region was elaborated further. Out of 349 genera and 540 species, about 190 genera comprising 213 species were included in it so far.

Cereal vs. non-cereal pollen—In a search for large-sized grass pollen in wild grasses, slides of 14 genera and 64 species of wild grasses were prepared and studied. Large-

sized grass pollen measuring from 60-130 μ have been observed in all the Indian species of *Coix* and pollen grains above 50 μ have also been observed in some species of *Saccharum*, *Sorghum*, *Ischaemum* and *Themeda*. Percentage distribution of large-sized pollen have also been calculated and graphic representation prepared for the species of *Coix*. Besides considerable variability, decrease in overall range of pollen size after attaining particular ploidy was observed in the species of this genus.

5.2. Pollen Analysis

5.2.1. *Pollen zonation scheme for Western Himalaya, Rajasthan and Nilgiris*

A critical study of palynological patterns during the glacial and interglacial periods has shown varying behaviour of the taxa suggesting that the ecological requirements of the same taxa have evolved during the Quaternary as a result of reactions and adjustments to the repeatedly altering environmental syndromes. The uncertainty attached to the meaning of former palynological patterns can be straightened through enhanced knowledge of the ecological realities.

The botanical appraisal of the recent phenomenal and revolutionary progress in Quaternary research made by several parameters concerning particularly the duration of Pleistocene, the number and duration of glacial/interglacial periods, the environmental inference of pollen data, the relation of modern and past pollen spectra and the need for sophistication of stratigraphy associated with pollen assemblages, and the progressive influence of man upon vegetation for his socio-economic exploitation have been discussed in detail in a paper on 'Botanical perspective of the Quaternary' and was submitted for publication.

Kashmir Valley—Pollen diagrams from 5 early Pleistocene sites (Lower Karewa) and one from Toshmaidan were reconstructed by calculating percentage of individual components upon the TLP (Total land plants pollen) to introduce uniformity and proper representation of AP/NAP ratios. This exercise has brought out interesting features on the biogeography of the valley which were not observed earlier.

The history of early Pleistocene vegetation in the Kashmir Valley was built up both from pollen and megafossil evidence. The sequential development of the temperate vegetation was found to be interrupted by two stages of Steppe formation. Interesting patterns of immigration, aggregation, dispersion and behaviour of species were observed. Nearly 30% of the early Pleistocene flora occurs in the valley today and the remaining large bulk comprises of North Asiatic, European, Mediterranean, African and Sino-Himalayan species. In comparison to the present, the Pleistocene taxa exhibit ecological plasticity and diversity.

Ladakh—The data obtained so far from the pollen analysis of Tsokar Lake profile show alpine steppe interrupted by two brief episodes of amelioration or climate.

Lahul-Spiti—To facilitate proper interpretation of the Weichselian profile from Tsokar Lake in Ladakh, 33 surface and moss cushion samples collected from sites between 7,000 to 14,000 ft above sea level and from different forest communities were pollen analysed and studied.

Fourteen surface samples collected in a transact across *Juniperus macropoda* community at Keylong in Lahul Valley were pollen analysed to understand the behaviour and quantification of juniper pollen vis-a-vis the density of Juniper community.

The Gangetic Plain—The reinterpretation of the recently published pollen diagram from the Meander Lake in district Pratapgarh and near the Mesolithic site Sarai Nahar Rai provided data on the environment of early man in this region. The environment continued to be dry and was characterized by periodic inundation and waterlogging. A paper on these data was finalized and submitted for publication. It was also suggested that large-sized grass pollen belonging to wild grasses immigrated into this region rather than to Maize. The cultivation of Maize in the region according to the available records is much later than the evidence of large-sized grass pollen.

Rajasthan—Six surface samples from Sujangarh, district Barmer and Barabagh, district Jaisalmer were analysed and studied. The samples from Sujangarh show high percentage of Chenoamaranths, sedges and grasses with those of *Acacia* and *Prosopis* as dominant arboreals. At Barabagh, the grasses and sedges predominate and tree pollen is about 5%. A comprehensive assessment of surface samples so far investigated vis-a-vis present day vegetation has revealed (i) dominance of *Anogeissus* and *Acacia* in the vicinities of Ajmer and Jaipur, (ii) dominance of sedges and grasses with *Calligonum*, *Ephedra* and *Zizyphus* in the vicinities of Jodhpur and Jaisalmer, and (iii) dominance of Chenoamaranths, grasses and sedges in the vicinities of Didwana, Sujangarh and Kanod.

Of the 13 samples recovered from Pokhran Rann profile, only six yielded pollen. Sedges, grasses and chenoamaranths were found dominant with little percentage of *Capparis* and *Acacia*.

Nilgiris—Six surface samples from Bellthala and its vicinity in the Emerald Valley, eight along a transact across Shola forest at Nanjanad and seven moss cushions from the trees of different heights in the Shola forest were pollen analysed and the representativity of modern forests in their

pollen spectra was determined. The moss cushions have given a picture different from that by the surface samples which show predominance of non-arboreals over the arboreals.

At Bellthala and the vicinity the Shola forest is 6 km away but the pollen grains of its constituents transported by wind occur in smaller frequencies except of *Ilex* among the otherwise predominant non-arboreal pollen. Rare and sporadic pollen of local plantations of *Eucalyptus* was found. Predominance of non-arboreals over arboreals is also observed in the pollen spectra at Nanjanad where original vegetation is still preserved in pockets only. Even within the forest the frequency of the arboreals is very low as compared to their percentage towards the margin of the forest.

Pollen analysis of 15 samples from a profile from the Nanjanad forest shows that the Shola forest has continued since the last 5,000 years which to the extreme top of the profile shows declining trend. Prior to this (20,000—5,000 yrs) it was preceded by mostly a grassland-savanna.

5.2.2. *History of ancient plant economy of India*

Studies of husk pattern of authentic wild and cultivated rice collected earlier from Kew Herbarium have been completed. The general pattern accompanied by the nature, distribution and density of granules in the specimens give reliable characters on which the distinction between the wild and cultivated husks can be based. The geographical variability was also observed in some taxa. Between the cultivated and wild groups a transitional group belonging to the wild and annual progenitors of cultivated rices was recognized.

Two samples of potsherds from a late Harappan site,

Hulas District, Saharanpur bearing imprints of rice were examined and the imprints were found to belong to wild species of *Oryza*. Two papers, one on the food economy of the Harappans and the other on urging new approach to the understanding of various aspects of the Harappan civilization were finalized and submitted for publication. A paper on 'World's earliest record of rice from district Allahabad was also submitted for publication. This record is supported by two radiocarbon dates to pre-7,000 radiocarbon years.

5.2.3. *Studies in Ethnobotany among the Indian Tribes—Drought-Prone areas*

Data on nearly 100 additional wild plants used as food and for other purposes in Rajasthan desert were gathered. Weeds associated with wheat, barley, millets and rice were also listed. Some of them were used by man also.

The data were also collected on the plant-food habits of birds, bubblers, patridges, as known from their remains in their crop and gizzard to understand the significance of bulk collection of seeds of wild herbs grasses and sedges by the Harappans at Surkotada in Kutch.

5.2.4. *Studies of Plio/Pliestocene in Gujarat*

Eighty samples from Chandod, Rajpipla and neighbouring localities were macerated but were found to be devoid of pollen grains.

5.2.5. *Geomorphological studies on Rajasthan*

A. A paper dealing with the geomorphic evolution of Lik River channel, south of Pokharan, Rajasthan was submitted for publication. It is suggested that the crescent-shaped lakes occurring near Bhaniana, Punian Ki Dhani and Dantal were the parts of the Lik River channel.

B. Another paper on geomorphic evolution of saline depressions near Pokharan was submitted for publication. It deals with the origin and evolution of the five ranns located around Pokharan. It is suggested that the ranns represent discontinuous depressions developed along the contact of hard and compact basement rocks with the soft ferruginous sandstones and shales carved out mainly due to the formation of a chain of cuestas by differential dissection along the margins of an ancient basin.

C. Ten imageries and twenty aerial photographs of the Ajmer area were studied. This study indicates that, in general, the lakes of the area were developed mainly due to the blocking of the streams by the development of sand dunes across the channels. Besides, the geomorphic development of Bap Rann was also studied. The study indicates that Playa was developed mainly due to the differential erosion of the rocks of varying lithology.

6. GEOCHRONOLOGY

6.1. Radiocarbon Dating

The laboratory has processed 90 samples for dating. Out of these, 57 were dated while the rest 33 were of radiocarbon standards and anthracite background. In the 57 samples nearly half were of the Quaternary Palynology Department of the Institute. Some salient features of the results are as follows:

Nilgiri Series—Three profiles (12 samples) from Race Course, Colgrain and Kakathope have been dated. The dates for two depths from colgrain profile agree well with earlier measurements. The race course peat profile indicates a high sedimentation rate of nearly 20 cm/100 years whereas the Kakathope profile has a sedimentation rate of only 1.6 cm/100 years.

Kumaon Series—Dating of four profiles (15 samples)

from various lake deposits of Kumaon area revealed that these deposits are of recent origin (5,000 years B. P.) except one deep sample from Naukuchiya Tal which dates at 16,000 yrs B. P.

Some peat profiles from Assam, Manipur, Tripura and West Bengal sent by the Bose Institute, Calcutta were dated. Several archaeological samples from Imangaon, Daimabad sent by Deccan College, Pune and the Archaeological Survey of India were also dated Six samples sent by the Geological Survey of India related with their various research and engineering projects were also dated and the results have been communicated.

A printer timer unit has been connected to the counting system to enable statistical analysis of counting date and improve the accuracy of measurements. Besides, in the processing of samples several improvements have also been made.

6.2. Fission Track Dating Programme

6.2.1. *Research Aspects*

The etching conditions for revelation of fission tracks in various minerals, e.g. allanite, apatite, beryl, biotite, chlorite, epidote, garnet, kyanite, muscovite, phlogopite, tourmaline and zircon were explored. The basic requirements for etching of these minerals were also established.

Four samples of sedimentary rocks from Palaeozoic Department and three samples from Oil Palynology Department of the Institute were tried for their F-T dating by scanning for tracks on '*in-situ*' apatite, sphene and zircon grains. Fifteen thin sections of each sample were prepared

Only 5 to 10 sections of each were found to contain very few and small apatite grains. Sphene and zircon grains could not be recognized well due to their similarity with the colour of iron chloride and quartz respectively. The track counting work on the apatite grains in these samples is being continued.

The annealing experiments on Kyanite, beryl and tourmaline minerals were carried out and the determination of average range of fission fragments in them is in progress. The geochronology of Kinnaur region in north-west Himalaya is also being carried out.

6.2.2. *Setting up of equipments*

A big sample grinder to prepare thin sections is under fabrication.

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FIELD WORK

During the period under review 23 parties of the Institute scientists undertook field excursions of about 112 localities of the various parts of the country in connection with their research work. In addition to this a huge collection of fossiliferous material was also made.

SPONSORED/COLLABORATIVE RESEARCH

During the year the interdisciplinary research activities were carried out in collaboration with a number of foreign and Indian institutions such as Queensland Geological Survey, Australia; Department of Botany, University of Texas, U. S. A.; Geological Survey of India; Indian Statistical Institute, Calcutta; Oil and Natural Gas Commission, Dehra Dun; Central Fuel Research Institute, Dhanbad; Directorate of Geology and Mining, Nagaland; Neyveli Lignite Corporation, Neyveli; Department of Applied Geology, Dibrugarh University, Dibrugarh; Archaeological

Survey of India; Department of Anthropology, Gauhati University, Assam; Department of Geology, Lucknow University, Lucknow; National Institute of Oceanography Goa, Goa and Coal India Ltd., Duliajan. This collaborative work has been useful to the other organisations as well as the Institute.

TRAINING PROVIDED TO OUTSIDERS

Under this special programme Mr Sunil Anand, Department of Botany, University of Jodhpur, Jodhpur was given training in modern palynology.

TECHNICAL ASSISTANCE TO OUTSIDERS

During the period under review technical assistance was provided to the following organisations/individuals:

1. Forest Department, Jaipur, Rajasthan.
2. Archaeological Survey of India, Calcutta.
3. Mr P. R. Sengupta, Ancient Lucknow Research Society, Lucknow.
4. Prof. D. I. Axelrod, University of California, Davis, U. S. A.
5. Prof. Wilhelm S. Solhem II, University of Hawai, Honolulu.
6. Director, Maharashtra Association for Cultivation of Science, Pune.

7. Director, National Museum of Science & Technology, Dacca.

8. Maharashtra State Forest Development Corporation for preservation and protection of fossil woods in Chandrapura forest.

9. Bhutan Unit and Himachal Pradesh Circle, Geological Survey of India.

10. Coal India Limited, Duliajan.

11. Coal Survey Stations (C.F.R.I.), Dhanbad.

12. Neyveli lignite Corporation, Neyveli.

13. Directorate of Geology & Mining, U. P., Assam and Nagaland.

14. Department of Geology, Kumaon University, Kumaon.

15. Department of Geology, Mysore University, Mysore.

PARTICIPATION IN SYMPOSIA/CONFERENCES/ MEETINGS

To represent the Institute several of our Scientists attended an All India Seminar on "Recent trends in the study of plant structure" held at Allahabad from 15th—19th December, 1979. Besides, the Institute was also represented by delegates in (1) All India symposium on "Life Sciences", Nagpur; (2) Sedimentological Congress, Mysore; (3) III Indian Colloquium on 'Micropalaeontology and stratigraphy' held at Department of Geology, University of Baroda in

February, 1980, (4) International seminar on "Harappan Civilization", Srinagar; (5) International symposium on "An Atlas of South Asia, New Delhi"; (6) III Indian Geophytological Conference held at the Institute from 8—10 December, 1979, and (7) International Coal Symposium, U.S.A. in June 1979. Also a few scientists delivered lectures on the various aspects of palaeobotany in Indian and foreign Universities/institutions. These are Burdwan University, Burdwan; Department of Earth Sciences, Roorkee University, Roorkee; University of Illinois, U.S.A.; University of Pennsylvania, U.S.A.; and Department of Geology, University of western Australia, Australia. One member of Herbarium was sent as demonstrator to "A workshop on the All India co-ordinated project on aerobiology" held at National Botanical Research Institute, Lucknow.

REPRESENTATION ON COMMITTEES/BOARDS

Anand-Prakash	..	Treasurer, Indian Association of Palynostratigraphers, Lucknow.
Bharadwaj, D. C.	..	President, Indian Association of Palynostratigraphers, Lucknow. Member, National Indian Committee for IGCP.
	..	Member, Scientific Committee I.G.C.P. (UNESCO & IUGS)
	..	Member, Editorial boards of "Review Palaeobotany and Palynology" and "The Palaeobotanist".

	..	Chief Editor, "Geophytology", "Biological Memoires" and "Proceedings IV I.P.C.".
Bose, M. N.	..	Secretary, Palaeobotanical Society, Lucknow.
	..	Secretary, Organizing Committee, III Indian Geophytological Conference, Lucknow.
	..	Member, National Working Group from IGCP-Project No. 4.
	..	Member, National Working Group for IGCP-Project No. 106.
	..	Participant, IGCP-Project no. 145.
	..	Member, Editorial boards of "The Palaeobotanist" and "Geophytology".
Chandra, Shaila	..	Member, Organising Committee, K. R. Surange Commemoration Volume, B. S. I. P., Lucknow.
Jain, K. P.	..	Secretary, Indian Association of Palynostratigraphers, Lucknow. Joint Secretary, Palynological Society of India.
Kar, R. K.	..	Joint Secretary, The Palaeobotanical Society of India.

	..	Founder Member, Indian National Earth Sciences.
Khan, H. A.	..	Secretary, Palynological Society of India, Lucknow.
	..	Member, Kaul Science Foundation, Lucknow.
Lakhanpal, R. N.	..	Member. Editorial Board, "The Palaeobotanist".
	..	Vice-President, Palaeobotanical Society, Lucknow.
	..	Secretary, Organising Committee, K. R. Surange Commemoration Volume, B. S. I. P., Lucknow.
Lele, K. M.	..	B. S. I. P. Representative for the International Commission for Palynology (1980-84).
	..	Member, Organising Committee, K. R. Surange Commemoration Volume, B. S. I. P., Lucknow.
Maheshwari, H. K.	..	Member, Committee for Fossil Plants, International Association for Plant Taxonomy.
	..	Editor, Indian Association of Palynostratigraphers, Lucknow.
Maithy, P. K.	..	Joint Organising Secretary, III Indian Geophytological Conference, Lucknow.

.. Member, International Working Group on Pre-Cambrian biostratigraphy.

.. Member, National Working Group, IGCP Project 118—Upper Pre-Cambrian correlations.

.. Member, National Working Group IGCP Project-29-Pre-Cambrian-Cambrian boundary.

.. Member, National Working Group IGCP Project-22—Pre-Cambrian in younger folded belts.

Navale, G. K. B. .. Member, International Committee of Coal Petrology.

.. Member, International Gondwana Coal Committee.

.. Member, International Commission on Coal and Lignite Nomenclature & Analysis.

.. Member, Editorial Board, Elsv. Publications (Coal Geology).

.. Joint Secretary, Organising Committee of Indian Coal Petrology.

.. Editor, "Geophytology".

Prakash, U.	..	Regional Representative in India for International Association for Angiosperm Palaeobotany.
Singh, H. P.	..	Member, Executive Committee, The Palaeobotanical Society, Lucknow (till December, 1979).
Srivastava, S. C.	..	Editor, "Geophytology".
Srivastava, J. C.	..	Science Correspondent, "Vigyan Pragati".
Tiwari, R. S.	..	Member, Editorial Board, Proceedings of IV International Palynological Conference.
	..	Member, I. G. C. P. Project, International Geological Correlation Programme.
	..	Treasurer, Indian Association of Palynostratigraphers, Lucknow.
Vishnu-Mittre	..	Member, International Palynological Commission.
	..	Member, Central Advisory Board of Archaeology.
	..	Member, Committee to organise the National Museum of Man, Ministry of Education and Social Welfare.
	..	Member, Coordination Committee for Quaternary Research in western India.

.. Member Subsector Allergy & Applied Immunology, Science and Technology Department, State Council of Science and Technology, U. P.

.. Member, Committee of Research Studies, Burdwan University.

.. Member, Radiocarbon Dating Committee, B.S.I.P., Lucknow.

DEPUTATION/TRAINING/STUDY ABROAD

Bharadwaj, D. C.

Visited Paris, France to attend the meeting of the International Geological Correlation Programme at UNESCO Headquarters from 18th to 22nd February, 1980.

G. K. B. Navale

From 18th to 26th May, 1979 visited Ulbana, U.S.A. to attend the meeting of I.C.C.P. and XI International Congress for Carboniferous stratigraphy and Geology. Thereafter from 27th May to 17th June, 1979 he participated in the field excursions. During his visit he also visited a number of important coal research laboratories of U.S.A.

K. R. Surange and Shaila Chandra

Under the Indo-Australian project "Revision of gymnospermous genera of the Glossopteris Flora" they visited Australia from 24th July to 7th September, 1979 and

studied the Australian species of *Glossopteris* at the following centres:

(*i*) Department of Geology, University of Western Australia, Perth.

(*ii*) National Museum of Victoria, Melbourne.

(*iii*) Palaeontology Section, Bureau of Mineral Resources, Canberra.

(*iv*) Geological & Mining Museum, Geological Survey, New South Wales.

(*v*) Australian Museum, Sydney.

(*vi*) Geology Department, University of New Castle.

(*vii*) Examined Holmes collection of fossil plants at Wellington.

(*viii*) Geological Survey of Queensland, Brisbane.

(*ix*) Geology Department, University of Queensland, Queensland.

HONOURS AND AWARDS

Professor K. R. Surange .. Was awarded the Birbal Sahni Medal at the II Botanical Conference of the Indian Botanical Society.

During the year Ph. D. Degree were awarded to the following scientists:

J. S. Guleria	..	Awarded Ph. D. Degree for his work on "Study of Tertiary Flora of Kutch" from the Lucknow University, Lucknow.
Manoj Shukla	..	Awarded Ph. D. Degree for his work "Contribution to the Geology and Palynostratigraphy of Lower Gondwana formations of Hutar Coalfield" from the Lucknow University, Lucknow.
S. D. Bonde		Awarded Ph. D. Degree for his work on "Studies on the Fossil Flora of Chanda Area" from the Poona University, Pune.

FOUNDER'S DAY CELEBRATIONS

The Founder's Day was celebrated on 14th November, 1979, the birthday of Professor Birbal Sahni, F. R. S.

Wreaths and flowers were placed on his Samadhi at 9.00 a. m. In the evening the function started at 5.30 p. m. Professor K. N. Kaul, F. L. S., Former Vice-Chancellor, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur was the Chief Guest.

Professor R. C. Misra, F. N. A., Retired Head of the Department of Geology, Lucknow University, Lucknow

delivered the 9th Birbal Sahni Memorial Lecture entitled "Geologic evolution of Uttar Pradesh".

On 16th November, 1979 Dr T. N. Khoshoo, F. N. A., Director, National Botanical Research Institute, Lucknow delivered the 9th Silver Jubilee Commemoration Lecture entitled "Experimental taxonomy and its application in horticultural botany" at 5.30 p. m.

Professor V. M. Meher-Homji, Institut Francais, Pondicherry delivered the 27th Sir Albert Charles Seward Memorial Lecture entitled "Bio-climatic and vegetational aspects of peninsular India" on 17th November, 1979.

PUBLICATIONS

1. The Journal : "The Palaeobotanist"

During the period under review Volume 26, numbers 1 to 3 were published.

Manuscripts of Volume 27, number 1 were processed for sending to Press.

2. Sir Albert Charles Seward Memorial Lecture

The twenty-sixth lecture entitled "Growth of palaeobotany in relation to biostratigraphy of India" delivered by Professor A. K. Ghosh was published.

3. Birbal Sahni Memorial Lecture

The eighth lecture entitled "Progress of palaeobotany in India" delivered by Professor S. D. Saksena was sent to Press and published.

4. Silver Jubilee Commemoration Lecture

The fifth lecture entitled "Biology of flower" delivered by Professor Reayat Khan was published during the year.

5. Revision of the Indian species of Glossopteris—Monograph No. 2.

During the period under review this was an important publication of the Institute. This royal quarto and full-cloth hard bound book contains 302 pages. In it 70 Indian species of *Glossopteris* have been critically dealt with. The monograph will be found useful by geologists, coal miners and all palaeobotanists in general.

6. IV International Palynological Conference Proceedings

The complete proceedings of the IV I.P.C. held at the Institute in 1976-77 are appearing in 3 volumes. Volume I has been published and sent nearly to all the subscribers. It contains the Presidential Addresses, Plenary Lectures and all symposia and non-symposia papers of Division I.

Volume II is also in Press and about half of the manuscripts have been printed. It comprises all symposia and non-symposia papers of Division II and Division III. Further printing work is in progress.

The manuscripts of Volume III have also been sent to Press. The galley-proofs of about 20 articles were corrected and returned to the printer. Further work is in progress.

7. Annual Report for 1978-79

During the year both Hindi and English versions of the Annual Report were published and sent to the Department of Science and Technology, various Indian Universities, Libraries and Scientific institutions.

8. Sale

During the period under review an income of Rs. 40,974.56 was registered from the sales proceeds of the Institute publications. The sum includes the following foreign exchange :

U. S. $ = 1,669.50
£ = 237.55

LIBRARY

The following statement shows the details of stock for the year under review :

Sl. No.	Details	Position on 31.3.79	Addition during 1979-80	Total
1.	Books	3352	124	3476
2.	Journals	7119	8	7127
3.	Reprints	24701	598	25299
4.	Microfilms	221	—	221
5.	Theses	24	5	29
6.	Maps & Atlas	40	2	42
7.	Reports	39	1	40
8.	Reference Books	102	6	108

In addition to this, 71 current periodicals were also subscribed.

Number of references procured on inter-library loan—3

Number of references sent out on inter-library loan—27

2. Exchange Programme

(i)	Number of reprints purchased for exchange	27
(ii)	Total number of reprints sent out on exchange	2072
(iii)	Number of institutions on exchange	65
(iv)	Number of individuals on exchange	305
(v)	Sets of papers of Prof. Sahni published work	3
(vi)	Number of periodical received on exchange	95

3. In addition to the scientific staff of the Institute the library services were availed by a number of scientists from various organisations/institutions. Some of the important Universities/institutions/organisations are: University of Lucknow, National Botanical Research Institute, Lucknow; Central Drug Research Institute Lucknow; Geological Survey of India, Lucknow; U. P. Forest Department, Lucknow; D. G. M., Lucknow; Directorate of Archaeology, Lucknow; Department of Botany, Gauhati University; Department of Zoology, C. M. Science College, Darbhanga; Department of Zoology, Lalit Narayan Mithila University, Darbhanga; Botany Department North Eastern Hill University, Shillong; Geology Department, Ranchi University, Ranchi; School of Studies in Geology, Vikram University, Ujjain;

University of Poona, Pune; Botany Department, University of Udaipur, Udaipur; University of Calcutta, West Bengal; University of Burdwan, Burdwan; Institute of Science, Nagpur; Punjab University, Chandigarh; Botany Department Osmania University, Hyderabad; Botany Department, Shivaji University, Kolhapur; Regional Research Laboratory, Bhubaneshwar; Ram Narain Ruia College, Bombay; and Wadia Institute of Himalayan Geology, Dehra Dun.

MUSEUM

This year the position of the Type and Figured specimens, Type slides and their negatives is as under :

Details	Additions during the year	Total number
Type & Figured specimens	301	1,898
Type & Figured slides	483	6,814
Negatives of Type and Figured specimens/slides	1065	5,565

In addition to this about 2,594 samples/specimens collected from about 112 localities by the Institute's scientists were deposited in the Museum. The work of cataloguing of Type and Figured specimens is being continued.

To help in the teaching of palaeobotany, the Institute sends out plant fossils to different institutions/universities.

Under this programme two sets of 17 and 20 duplicate plant fossils were gifted to the Department of Applied Geology, Dibrugarh University and the Department of Botany, B. N. College, Udaipur respectively. Besides, a fossil tree trunk and 90 other specimens were gifted to the National Museum of Natural History, New Delhi to supplement the knowledge of lay-people about palaeobotany.

This year a large number of students of Botany and Geology from about 24 Indian Universities visited our Museum. Not only this but a number of foreign visitors also came to visit our Museum and the Institute.

HERBARIUM

Following table depicts the additions made to the stock this year and the total number of specimens, etc. in the Herbarium:

Specimens	Additions during the year	Total number
Herbarium sheets	171	10,505
Fruits & Seeds	5	1,818
Woods	10	3,136
Wood slides	235	2,863
Pollen slides	14	10,100
Leaf specimens	—	150

About 410 pteridophytic plants collected from South India, Kulu Valley, Darjeeling, and eastern and western Himalayas and 180 plant specimens from Himachal Pradesh, western Uttar Pradesh, Kashmir and Baluchistan were identified. A party from the Botanical Survey of India, Northern Circle, Dehra Dun consulted our herbarium in connection with their project "Revision of Western Himalayan Gentianaceae". In addition, the following research workers also consulted our herbarium :

1. Mr Om Prakash, T. D. Post Graduate College, Jaunpur.

2. Miss Sunita Agarwal, Botanical Survey of India, Northern Circle, Dehra Dun.

BIRBAL SAHNI PROFESSORSHIP

All the Text-figures of a book entitled "Diseased plants: Treatise on anatomical, morphological and metabolic changes under pathogenesis" by Professor T. S. Sadasivan were sent for block-making. The photographic plates were also made ready for half-tone block-making. This book will comprise about 9 chapters, out of which 3 have almost been completed. Further work is in progress.

REVIEWING COMMITTEE

Review of the work and progress of the Birbal Sahni Institute of Palaeobotany by a Review Committee under the Chairmanship of Sri S. P. Nautiyal, Chairman, Wadia Institute of Himalayan Geology, Dehra Dun in the light of Memorandum of Association and the report of the last Review Committee of 1966 is being continued.

DISTINGUISHED VISITORS

During the year under report the following distinguished visitors visited the Museum and the Institute.

1. Smt. Smita J. Baxi, Director, Craft Museum, New Delhi.
2. John Powy's, Australian High Commission, New Delhi
3. Prof. Adom Jasrewor, Institute of Botany, Polish Academy of Sciences, O. Krackow, Poland.
4. Mr Pacolus, Botanical Institute of Polish Academy of Sciences, Krackow, Poland.
5. Mr Event Capstack, West Virginia, Westeyan College, Buctlenon, W. V., U. S. A.
6. Dr Bhoomitra Dev, Prof. and Head Department of Life Sciences, University of Dibrugarh, Dibrugarh, Assam.
7. L. M. M. Hode, Director, Allied Technological Development Association.
8. Mr Philp Mak, Hongkong.
9. Prof. E. C. Beck, Director of Institute of Hygeine Pussome, University of Federal Republic of Germany.
10. Prof. J. V. Seydel, Borstel Research Institute, West Germany.
11. Dr Y. Zodenioijks, Ministry of Culture & Recreation of Social Welfare, The Netherland.

12. Dr V. M. Meher-Homji, Institut Francais, Pondicherry.

13. John & Ella Rosenfield, Fogg Art Museum, Harward University of Cambridge, Massachussets, U. S. A.

14. Shri U. Sein, Chief Executive Officer, Mondley City, Burma.

15. Shri K. D. Fernonde, Assistant Director, Urban Development, Colombo, Sri Lanka.

THE GOVERNING BODY, FINANCE & BUILDING COMMITTEE AND SCIENTIFIC PROGRAMMING & EVALUATION COMMITTEE

Chairman

Professor T. S. Mahabale, F. N. A.,
Maharashtra Association for the Cultivation of Science,
Law College Road,
Pune-411 004

Members

Mrs Savitri Sahni,
686, Birbal Sahni Marg,
Lucknow

Director,
Botanical Survey of India,
P. O. Botanic Gardens,
Howrah-711 103

Professor V. Puri,
Professor Emeritus,
Department of Botany, Meerut University,
Meerut

Secretary to the Govt. of India,
Department of Science & Technology,
Technology Bhavan, New Mehrauli Road,
New Delhi-110 029

Professor B. G. Deshpande, F. N. A.,
Head of the Geology Department (Retd.),
University of Poona,
Pune

Dr D. Lal, F. N. A., F. R. S.,
Director,
Physical Research Laboratory, Navrangpura,
Ahmedabad-380 009

Joint Secretary (Finance),
Department of Science & Technology,
Technology Bhavan, New Mehrauli Road,
New Delhi-110 029

Director-General,
Geological Survey of India,
27, Jawaharlal Nehru Road,
Calcutta-13

Vice-Chancellor,
Lucknow University,
Lucknow

Professor B. S. Trivedi,
Head of the Botany Department,
Lucknow University,
Lucknow

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

Director-General,
Archaeological Survey of India, Janpath,
New Delhi-110 011

Director,
Birbal Sahni Institute of Palaeobotany,
Lucknow (Member-Secretary)

Registrar,
Birbal Sahni Institute of Palaeobotany,
Lucknow (Non-Member-Asstt. Secretary)

2. FINANCE & BUILDING COMMITTEE

Chairman

Professor T. S. Mahabale, F. N. A.,
Maharashtra Association for the Cultivation of Sciences,
Law College Road,
Pune-411 004

Members

The Secretary
Department of Science and Technology,
Technology Bhavan, New Mehrauli Road,
New Delhi-110 029

Joint Secretary (Finance),
Department of Science & Technology,
Technology Bhavan, New Mehrauli Road,
New Delhi-110029

Sri Sardar Husain,
Superintending Engineer,
25th Circle, P. W. D., Gulistan Colony,
Lucknow

Sri Arun Kumar,
Architect,
118, Cantonment Road,
Lucknow

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

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

3. SCIENTIFIC PROGRAMMING & EVALUATION COMMITTEE

Chairman

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

Members

Professor F. Ahmad, F. N. A.,
Commissioner,
Geology & Mining,
Srinagar-190 001 (J & K)

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

Professor Rama,
Tata Institute of Fundamental Research,
Homi Bhabha Road,
Bombay-400 005

Dr Sunirmal Chanda,
Bose Institute,
93/1, Acharya Prafulla Chandra Road,
Calcutta-700 009

Dr R. N. Lakhanpal,
Deputy Director,
Birbal Sahni Institute of Palaeobotany,
Lucknow

Dr D. C. Bharadwaj,
Deputy Director,
Birbal Sahni Institute of Palaeobotany,
Lucknow

Dr M. N. Bose,
Head, Mesozoic Palaeobotany Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow

Dr Vishnu-Mittre,
Head, Quaternary Palynology Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow

Dr Uttam Prakash,
Head, Cenozoic Palaeobotany Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow

Dr K. M. Lele,
Head, Palaeozoic Palaeobotany Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow

Dr H. P. Singh,
Head, Oil Palynology Department,
Birbal Sahni Institute of Palaeobotany,
Lucknow

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

THE STAFF

DIRECTOR

Professor K. R. Surange, M. Sc., Ph. D. (Lucknow),
Ph. D. (Cantab), F. Pb. S., F. A. Sc., F. N. A.

DEPUTY DIRECTOR

Dr R. N. Lakhanpal, M.Sc., Ph.D., F.B.S., F.Pb.S.,
F.N.A.Sc., F.A.Sc., F.N.A.

Dr D. C. Bharadwaj, M.Sc., Ph.D. (Lucknow), Dr. rer.
Nat. (Bonn), F.B.S., F.Pb.S.

DEPARTMENT OF PALAEOZOIC PALAEOBOTANY

Dr K. M. Lele, M.Sc., Ph.D., F.Pb.S.
Dr P. K. Maithy, M.Sc., Ph.D.
Dr (Mrs) Shaila Chandra, M.Sc., Ph.D., F.L.S.
Dr A. K. Srivastava, M.Sc., Ph.D.

Dr Manoj Shukla, M.Sc., Ph.D.
Dr J.P. Mandal, M.Sc., Ph.D.
Dr M.N.V. Prasad, M.Sc., Ph.D.
Sri Bijai Prasad, M.Sc. (Research Scholar w.e.f. 6.10.79)

DEPARTMENT OF MESOZOIC PALAEOBOTANY

Dr M.N. Bose, M.Sc., Ph.D., F.Pb.S., 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.
Dr (Miss) Jayasri Banerji, M.Sc., Ph.D.
Dr K.P. Navaneetha Kumaran, M.Sc., Ph.D. (resigned w.e.f. 21.7.1979 A.N.)
Dr Miss Zeba-Bano, M.Sc., Ph.D. (S.S.A. w.e.f. 1.9.79)
Sri B.N. Jana, M.Sc.
Sri Pankaj Kumar Pal, M.Sc. (Research scholar w.e.f. 22.10.79)

DEPARTMENT OF CENOZOIC PALAEOBOTANY

Dr U. Prakash, M.Sc , Ph.D., F.Pb.S.
Dr N. Awasthi, M.Sc., Ph.D.
Dr Anil Chandra, M.Sc., Ph.D.
Dr M.B. Bande, M.Sc., Ph.D.
Dr K. Ambwani, M.Sc., Ph.D. (J.S.O. w.e.f. 5.3.80)
Dr Jaswant Singh Guleria, M.Sc., Ph.D. (S.S.A. w.e.f. 27.2.80)
Miss C. Lalitha, M.Sc.
Dr S.D. Bonde, M.Sc (on F.S.T.)
Sri R.R. Yadav, M.Sc. (Research Scholar)

DEPARTMENT OF COAL PALAEOBOTANY

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.
Sri Sudhendu Mandal (J.S.O. w.e.f. 2.11.79 to 27.2.80).
Dr (Mrs) Archana Tripathi, M.Sc., Ph.D. (J.S.O. w.e.f. 5.3.80)
Sri S.K. Kulshreshtha, M.Sc.
Dr (Miss) Vijaya Rana, M.Sc., Ph.D.
Sri B.K. Misra, M.Sc. (S.S.A. w.e.f. 27.2.80)
Sri Rakesh Saxena, M.Sc.
Km. Neerja Sharma, M.Sc. (Scholar w.e.f. 28.9.79).

DEPARTMENT OF QUATERNARY PALYNOLOGY

Dr Vishu-Mittre, M.Sc., Ph.D. (Lucknow), Ph.D. (Cantab).
Dr H.P. Gupta, M.Sc., Ph.D.
Dr Anand-Prakash, M.Sc., Ph.D.
Dr (Mrs) Chhaya Sharma, M.Sc., Ph.D.
Dr (Mrs) R. Savithri, M.Sc., Ph.D. (resigned w.e.f. 14.12.79)
Sri A.K. Saxena, M.Sc.
Sri Kamala Prasad, M.Sc.
Sri Amalava Bhattacharya, M.Sc.
Km. Aruna Sharma, M.Sc. (Research Scholar w.e.f. 15.10.79)

DEPARTMENT OF OIL PALYNOLOGY

Dr Haripal Singh, M.Sc., Ph.D.
Dr K.P. Jain, M.Sc., Ph.D.
Dr R.K. Kar, M.Sc., Ph.D.
Dr Pramod Kumar, M.Sc., Ph.D. (S.S.O. w.e.f. 24.9.79)
Dr R.Y. Singh, M.Sc., Ph.D. (on lien w.e.f. 21.3.79).
Dr R.K. Saxena, M.Sc., Ph.D. (J.S.O. w.e.f. 5.3.80)

Sri S.K.M. Tripathi, M.Sc.
Sri Rahul Garg, M.Sc.
Sri M.R. Rao, M.Sc.
Sri S. Sarkar, M.Sc.

C-14 LABORATORY

Dr G. Rajagopalan, M.Sc., Ph.D. (Bombay)
Dr H.S. Saini, M.Sc., Ph.D. (J.S.O w.e.f. 2.11.79)
Sri A.P. Srivastava, M.Sc. (J.S.A. w.e.f. 21.11.79)

PUBLICATION

Sri Jaswant Singh, M.Sc. (Asstt. Editor)
Sri S.B. Verma, M.A., B.Com., D.P.A. (Publications Incharge)

LIBRARY

Sri J. N. Nigam, B.A., B.Lib.Sc. (Librarian)

MUSEUM

Sri G.P. Srivastava, M.Sc. (Curator)
Sri N.C. Saxena, B.A. (Museum Assistant)

HERBARIUM

Dr H.A. Khan, M.Sc., Ph.D. (Curator)
Sri J.C. Srivastava, M.Sc. (Herb. Incharge w.e.f. 31.8.79)
Sri Diwakar Pradhan, B.Sc. (Herbarium Assistant)
Sri A.K. Singh Rathore, B.Sc. (Herbarium Assistant)
Sri Prem Prakash (Plant Collector w.e.f. 1.9.79 A.N.)

LABORATORY SERVICES

Sri H.N. Boral, B.Sc. (S.T.A.)

Sri B. Sekar, B.Sc. (S.T.A.)
Mrs Asha Guleria, B.Sc. (J.T.A.)
Mrs Madhabi Chakravarty, B.Sc. (J.T.A.)
Miss Indra Kumari, B.Sc. (J.T.A.)
Sri D.C. Joshi, B.Sc. (J.T.A.)
Miss Kamla Amarlal, B.Sc. (J.T.A.)
Sri N.K. Khasnavis, B.Sc., LL.B. (J.T.A.)
Sri T.K. Mandal, B.Sc. (J.T.A.)
Sri E.G. Khare, B.Sc. (J.T.A. w.e.f. 3.10.79 A.N.)
Sri I.J. Mehra, B.A. (Lab. Assistant)
Sri A.K. Ghosh (Electrician)
Sri Vijay Singh Panwar (Glass Blower)
Sri P.S. Salujha (Mechanic)

PHOTOGRAPHY AND DRAWING

Sri P.C. Roy (Photographer)
Sri Pramod Kumar Bajpai (Artist)

STORES

Sri Harjeet Singh, B.A. (Store Keeper)

ACCOUNTS

Sri Ghanshyam Singh, B.Com (Accounts Officer)
Sri T.N. Shukla, B.A. (Accountant)
Sri B.K. Jain, B.A. (Junior Accountant)
Sri N.N. Joshi (U.D.C. w.e.f. 16.5.79)
Sri R. K. Takru, B.A. (U.D.C. w.e.f. 16.5.79)
Sri Gopi Krishna Gupta, B.Sc., B.Lib.Sc. (L.D.C. w.e.f. 27.3.80)

ADMINISTRATION

Sri Gurcharan Singh, M.A., LL.B. (Registrar)
Sri V.P. Gulati (Deputy Registrar)

Sri S.D. Mehtani (Deputy Registrar)
Sri S.K. Suri (Stenographer)
Sri S.P. Chadha, B.A. (P.A. to Director)
Sri H.S. Srivastava, B.Com. (Office Assistant)
Sri Bhagwan Singh (Assistant)
Smt P. K. Srivastava (Receptionist)
Sri I. J. S. Bedi (U.D.C. w.e.f. 16.5.79)
Sri Ramesh Chandra (U.D.C. w.e.f. 16.5.79)
Sri R.K. Kapoor (L.D.C.)
Mrs V. Nirmala (L.D.C.)
Sri Inderjeet Prasad (L.D.C. from 10.9.79 to 20.12.79)
Sri Basant Lal (L.D.C. W.e.f. 27.9.79)
Sri Inder Raj (L.D.C. from 19.3.80 to 7.4.80)
Sri Dhoom Singh, B.A. (L.D.C. w.e.f. 15.3.80)
Sri B.M.L. Srivastava, B.A., LL.B. (L.D.C. w.e.f. 22.3.80).

R. N. KHANNA & COMPANY Phone: 32336

Chartered Accountants

Branch:
6, Newal Kishore Road
Lucknow-226001

3, Kabir Marg
Clay Square
Lucknow-226001

AUDITORS REPORT

OF

BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY, LUCKNOW

We have audited the annexed Balance Sheet of BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY, LUCKNOW as at 31st March, 1980 and also the relevant Income and Expenditure Account and Receipt and Payment Account for the year ended on that date with the help of account and vouchers relating thereto.

We report that to the best of our information and according to the explanations given to us, in our opinion, the Balance Sheet read with notes theron, shows a true and correct state of affairs of the Institute as at 31st March, 1980 and the Income & Expenditure Account gives a true and fair view of income over expenditure.

For, R. N. KHANNA & COMPANY

Sd/-
(R. N. KHANNA)
M. No.—F-13255

Seal

R. N. KHANNA & COMPANY Phone: 32336

Chartered Accountants
Branch:
6, Newal Kishore Road
Lucknow-226001

3, Kabir Marg
Clay Square
Lucknow-226001

Notes on Balance Sheet of Birbal Sahni Institute of Palaeobotany, Lucknow as at 31st March, 1980

1. Accounts of the Institute is maintained on cash basis.
2. Fixed assets are shown at cost. No depreciation are provided on fixed assets.
3. The priced publication stocks as at 31st March, 1980 are valued at selling price.
4. The following capital were created out of the recurring grants received during the financial year:

Books & Journals	Rs. 26,831.66
Maps & Toposheets	Rs. 3,379.77
Works & Building	Rs. 24,588.81
TOTAL	Rs. 54,800.24

For, R. N. KHANNA & COMPANY
Sd/-
(R. N. KHANNA)
M. No.—F-13255

Seal

Statement of Accounts for the Year 1979-80

BIRBAL SAHNI INSTITUTE OF

BALANCE SHEET AS

LIABILITIES		AMOUNT Rs.	AMOUNT Rs.
Capital Fund:			
Balance as per Last Year's Balance Sheet		49,73,199.30	
Add: Govt of India Grant on Capital Account during the year		7,23,000.00	
Add: Recurring Grant used for creating Fixed assets during the year:			
Books & Journals	26,831.66		
Maps & Toposheets	3,379.77		
Works & Building	24,588.81	54,800.24	
Add: Sale proceeds of Jeep transferred from Revenue Account		4,701.51	
		57,55,701.05	
Less: Refunds to Govt. out of Capital Grant		14,456.89	57,41,244.16
Reserves and Surplus:			
Excess of Revenue grant over Revenue Expenditure			3,44,876.30
Donated Fund/Grants:			
Cost of Land donated by U. P. Government		32,292.00	

PALAEOBOTANY. LUCKNOW

ON 31ST MARCH, 1980

ASSETS	AMOUNT Rs.	AMOUNT Rs.
Fixed Assets:		
Land (Donated by U. P. Government		32,292.00
Works & Building:		
As per Last year's Balance Sheet	15,37,061.16	
Additions during the year:		
Out of Capital Account	28,518.84	
Out of Revenue Account	24,588.81	15,90,168.81
Research Apparatus & Equipment:		
As per last year's Balance Sheet	11,81,573.33	
Additions during the year	3,72,780.64	15,54,354.02
Workshop Equipment:	—	67,374.85
Office & Miscellaneous Equipment:	—	1,00,415.71
Establishment of C-14 Lab:		
As per last year's Balance Sheet	7,27,669.11	
Additions during the year	53,381.61	7,81,050.72
Plant & Machinery:		
As per last year's Balance Sheet	1,28,858.42	
Additions during the year	1,20,344.00	2,49,202.42

LIABILITIES	AMOUNT Rs.	AMOUNT Rs.
Founder's Donation	1,52,500.00	
C. D. Pant Memorial Fund	1,626.88	
C. L. Katiyal Memorial Fund	2,218.50	
P. C. Bhandari Memorial Fund	1,976.75	
A. C. Seward Memorial Fund	5,684.50	
Other Miscellaneous donations	7,736.10	
M. G. T. Scheme (C. S. I. R.)	8,100.79	
Coal Scheme (C. S. I. R.)	7,784.66	
Palynological Scheme (C. S. I. R.)	5,207.87	
UNESCO Aid Fund	19,629.75	
Burmah Oil Co. donation	1,900.00	
Rajasthan Scheme (Sponsored by Univ. of Wisconsin)	58,913.25	
Gift in Kind: Humboldt Foundation West Germany	75,000.00	
P. K. Memorial Fund	2,780.00	
Birbal Sahni Research Award Endowment by Prof. T. S. Sadasivan	15,000.00	3,98,351.05
General Provident Fund:		10,31,318.93
Current Liabilities & Provisions:	—	300.00
Security and Earnest Money deposits	—	500.00
Value of Priced Publications	—	5,11,695.63
Advances and Loans to Employees	—	2,53,451.00
Total		82,81,437.07

ASSETS	AMOUNT Rs.	AMOUNT Rs.
Apparatus & Equipment (Donated):		
M. G. T. Scheme	7,155.79	
Burmah Oil Co.	700.00	
Founder's Donation	2,500.00	
Coal Scheme	6,645.29	
Palynology Scheme	5,207.87	
Rajasthan Scheme	21,138.90	
UNESCO Aid Equipment	19,629.75	
Humboldt Foundation W. Germany	75,091.50	1,38,069.10
Vehicles:	—	1,20,577.99
Furniture & Fixtures:		
As per last year's Balance Sheet	5,18.780.40	
Additions during the year	87,772.55	6,06,552.95
Furniture & Fixtures (Donated):		
Burmah Oil Co.	1,200.00	
M. G. T. Scheme	945.00	
Coal Scheme	1,139.37	
Rajasthan Scheme	979.70	4,264.07
Books and Journals:		
As per last year's Balance Sheet	2,04,501.48	
Additions during the year		
Out of Capital Account	47,485.01	
Out of Revenue Account	26,831.66	2,78,818.15
Founder's Library (Donated):	—	50,000.00
Founder's Fossil Collection (Donated):	—	50,000.00

LIABILITIES	AMOUNT Rs.	AMOUNT Rs.
Total B/F		82,81,437.07
Total		82,81,437.07

ASSETS	AMOUNT Rs.	AMOUNT Rs.
Maps and Topo Sheets:		
As per last year's Balance Sheet	9,213.51	
Additions during the year	3,379.77	12,593.28
Investments (Donation Account):		
As per last year's Balance Sheet	14,000.00	
Investments during the year	22.500.00	36,500.00
Current Assets, Loans & Advances:		
A. Current Assets:		
Publication in Stock:		
"The Palaeobotanist"		
Vol. 1-26(2)	2,10,910.13	
Symposia Series	58,225.00	
Monographs	1,31,300.00	
Catalogue of Indian Fossil Plants	29,100.00	
Autumn School Proceedings	28,000.00	
Seward Memorial Lecture	27,223.00	
Birbal Sahni Mem. Lecture	9,912.00	
Silver Jubilee Mem. Lecture	5,438.00	
Picture Post Cards	11,587.50	5,11,695.63
UNESCO Book Coupons	—	793.02
Cash and Bank Balance:		
Cash in hand (Imprest Account)	330.28	
With State Bank of India Current Account	7,36,411.46	7,36,741.74

LIABILITIES	AMOUNT Rs.	AMOUNT Rs.
Total B/F		82,81,437.07
Total		82,81,437.07

Auditors Report

As per our attached report of even date.

For Sd/- R. N. Khanna & Co.
Chartered Accountants

ASSETS	AMOUNT Rs.	AMOUNT Rs.
B. Loans & Advances:		
Unsettled Advances (Plan Rev. A/c)	21,570.70	
Unsettled Advances (Plan Cap. A/c)	26,783.48	
Unsettled Advances (Non-Plan Rev. A/c)	26,848.50	75,202.68
Advance to Employees:		
House Building Advance	1,88,640.00	
Natural Calamity Advance	11,000.00	
Conveyance Advance	45,071.00	
Festival Advance	8,740.00	2,53,451.00
General Provident Fund:		
Investment	7,40,000.00	
Advances	1,54,841.00	
Insurance out of G. P. F.	33,081.00	
With State Bank of India (Savings Bank Account)	1,03,396.93	10,31,318.93
Total		82,81,437.07

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

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

Sd/- M. N. Bose
Director
Birbal Sahni Institute of
Palaeobotany, Lucknow

BIRBAL SAHNI INSTITUTE OF

INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Academic Expenses:			
To Pay & Allowance of Academic Staff	5,252.39	9,37,479.60	9,42,731.99
To Field Excursion	6,583.49	2,700.93	9,284.42
To Remuneration of Birbal Sahni Professor	36,000.00	—	36,000.00
To Symposium & Seminar on Recent Advances in Cryptogamic Botany	9,968.75	—	9,968.75
To Honorarium to Lectures:			
For Birbal Sahni Mem- Lecture	—	350.00	350.00
For Silver Jubilee Mem. Lecture	—	350.00	350.00
To International Programme:			
Deputation abroad	—	45,688.35	45,888.35

PALAEOBOTANY, LUCKNOW

FOR THE YEAR ENDING 31st MARCH, 1980

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Balance of Last year's grant of Revenue Account allowed for expenditure during Current Year:	28,269.31	2,33,419.52	2,61,688.83
By Grants from Govt. of India on Revenue Account:	2,50,000.00	20,75,000.00	23,25,000.00
By Grant from U. P. Govt. on Revenue Account:	—	5,000.00	5,000.00
By Grants from other Organisations:			
University Grants Commission fellowship	—	1,120.84	1,120.84
By Sale Proceeds of priced Publications:			
The Palaeobotanist	—	35,995.76	35,995.76

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Expenses of Services Ancillary to Research:			
To Pay & Allowance of Auxi. Technical Staff	4,979.60	2,75,235.53	2,80,215.13
To Chemicals & Glasswares, Photogoods & Small Apparatus, etc.	10,250.59	99,868.20	1,10,118.79
To Library Requirements	—	15,394.60	15,394.60
To Herbarium Requirements	—	448.50	448.50
To Museum Requirements	451.00	3,190.01	3,641.01
To Maintenance of Apparatus & Equipment & Workshop Machinery	7,033.60	—	7,033.60
To Publication Expenses:			
"The Palaeobotanist"	—	38,181.40	38,181.40
Spl. Pub.—Monograph on Glossopteris Flora	—	35,394.53	35,394.53

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
The Monographs	—	650.00	650.00
Symposium & Special Publications	—	1,396.66	1,396.66
Seward Memorial Lecture	—	235.77	235.77
Birbal Sahni Memorial Lecture	—	1,274.12	1,274.12
Silver Jubilee comn. Lecture	—	25.00	25.00
Picture Post Cards	—	441.00	441.00
Catalogue of Indian Fossil Plants	—	956.25	956.25
IVth I.P.C. Proceedings	—	7,948.50	7,948.50
By Miscellaneous Receipts and Recoveries:			
Vehicle Charges	—	146.50	146.50
By Telephone Charges	—	860.25	860.25
By V. S. Room Charges	—	195.00	195.00

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Birbal Sahni Memorial Lecture	—	506.00	506.00
Annual Report	—	7,819.84	7,819.84
Seward Memorial Lecture	—	582.00	582.00
Publication of I.P.C. Proceedings	—	3,000.00	3.000.00
Travelling & Other Allowances:			
For Governing Body, Scientific Programmes and Evaluation Committee and Selection Committee Meetings		15,570.32	15,570.32
For attending Scientific meetings and conference in India and for other purposes	5,964.15	34,502.98	4),467.13
For Reimbursement of Medical expenses	521.74	24,728.78	25,250.52
For Over Time Allowance	147.42	1,987.60	2,135.02

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
By Application Fees	—	2,654.00	2,654.00
Miscellaneous Receipts and Recoveries	240.04	6,506.01	6,746.05
Recoveries of Conveyance Adv.	—	24,335.00	24,335.00
Recoveries of Festival Advance	—	14,140.00	14,140.00
Interest on Conveyance Advance	—	2,908.56	2,908.56
Recovery of Natural Calamities Advance	—	13,860.00	13,860.00
Recoveries of House Bldg. Advance	—	5,496.00	5,496.00
Pension Contribution	—	888.12	888.12
Leave Salary Contribution	—	3,509.35	3,509.35
Employees Insurance Scheme	288.00	6,318.00	6,606.00

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Leave Travel Concession	57.70	9,670·36	9,728.06
For Reimbursement of Tuition Fees	120.00	411.00	531.00
For Children Education Allowances	—	315.00	315.00
To Pensionary Expenses:			
To Superanuation Allowance and Pension	—	33,131.70	33,131.70
G.P.F. Interest	—	42,147.64	42,147.64
To General Expenses:			
To Pay & Allowances of Adm. Staff	39,433.98	3,24,537.05	3,63,971.03
To Telephone & Trunk Call Charges	—	20,596.75	20,596.75
To Postage	—	10,958.42	10,958.42
To Advertisement Charges	4,932.10	19,993.37	24,925.47
To Hot & Cold Weather Charges	—	4,764.32	4,764.32

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F-	2,78,797.35	24,45,280.21	27,24,077.56
Total	2,78,797.35	24,45,280.21	27,24,077.56

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Petrol & Mobil Oil	1,197.10	6,732.27	7,929.37
To Electricity Charges	256.29	26,015.90	26,272.19
To Municipal Taxes	—	13,656.38	13,656.38
To Insurance of Vehicle & Library	—	3,097.00	3,097.00
To Uniform to Class IVth Employees	—	7,086.54	7,086.54
To Printing & Stationery	9,357.02	15,059.45	24,416.47
To Custom duty & & Port Trust Charges	—	—	—
To Railway Ft. & Carriage	—	2,396.45	2,396.45
To Entertainment Allow to Director	—	3,633.26	3,633.26
To Miscellaneous Unforeseen	5,791.43	20,381.42	26,172.85
To Maintenance Expenses:			
To Building	—	6,526.73	6,526.73

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F-	2,78,797.35	24,45,280.21	27,24,077.56
Total	2,78,797.35	24,45,280.21	27,24,077.56

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Garden	—	5,343.73	5,343.73
To Vehicle	9,503.45	6,083.65	15,587.10
To Repairs & Renewals	—	9,156.13	9,156.13
To Petty Construction	5,460.17	8,942.20	14,402.37
To Other Expenses:			
To Medical Advice	—	88.00	88.00
To Audit Fees	—	1,500.00	1,500.00
To Welfare Expenses:			
Financial Ass. to Dept. Canteen	—	6,090.70	6,090.70
Festival Advance	—	13,800.00	13,800.00
To Conveyance Advance	—	24,050.00	24,050.00
To House Building Advance	—	6,800.000	6,800.00
To U. G. C. Expenses:			
To Fellowship	—	2,870.84	2,870.84

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F-	2,78,797.35	24,45,280.21	27,24,077.56
Total	2,78,797.35	24,45,280.21	27,24,077.56

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Govt. of India Scholarship Expenses:	—	17,123.86	17,123.86
Excess of Income Over Expenditure	1,15,535.38	2,29,340.92	3,44,876.30
Total	2,78,797.35	24,45,280.21	27,24,077.56

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

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

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total	2,78,797.35	24,45,280.21	27,24,077.56
Grand Total	2,78,797.35	24,45,280.21	27,24,077.56

Auditors Report

As per our report on the Balance Sheet of the even date.

Sd/- R. N. Khanna & Co.
Chartered Accountant

Sd/- M. N. Bose
Director
Birbal Sahni Institute of
Palaeobotany, Lucknow

BIRBAL SAHNI INSTITUTE OF

RECEIPT AND PAYMENT FOR THE

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	AMOUNT Rs.
To Opening Balance:			
Bank Account:			
Non Plan Revenue Account	—	2,31,103.79	2,31,103.79
Plan Revenue Account	28,269.31	—	28,269.31
Plan Capital Account	4,51,930.38	—	4,51,930,38
Donation Account	—	8,372.73	8,372.73
IVth I. P. C. Account	—	500.13	500.13
U.G.C. Account	—	1,750.00	1,750,00
Cash Account:			
Non Plan Revenue Account	—	65.60	65.60
To Govt. of India Grants on Capital Account:	7,23,000.00	—	7,23,000.00
To Govt. of India Grants on Revenue Account:	2,50,000.00	20,75,000.00	23,25,000.00
To Govt. of U. P. Recurring Grant	—	5,000.00	5,000.00

PALAEOBOTANY, LUCKNOW

PERIOD 1.4.1979 TO 31.3.1980

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Capital Account:			
By Works & Building	40,926.29	—	40,926.29
By App. & Equipments:	3,72,780.64	—	3,72,780.64
By Equipt. for Services Ancillary to Research:			
Library	48.679.80	—	48,679.80
C-14 Laboratory	53,381.61	—	53,381.61
Plant & Machinery	1,20,344.00	—	1,20,344.00
By Furniture & Fixture:	87,772.55	—	87,772.55
By Refund of Grants to Govt.:			
Out of Capital Grants	14,456.89	—	14,456.89
Out of Deposit Account	1,528.20	—	1,528.20
Revenue Account:			
By Pay & Allowances:			
Pay (Academic)	3,300.00	6,38,385.95	6,41,685.95

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Grants from other Organisation:			
Univ. Grants Commission	—	1,120.84	1,120.84
To Sale Proceeds of Publications:			
The Palaeobotanist	—	35,995.76	35,995.76
Monographs	—	650.00	650.00
Symposium & other special publications	—	1,396.66	1,396.66
Catalogue of Indian Fossil Plants	—	956.25	956.25
Seward Memorial Lecture	—	235.77	235.77
Birbal Sahni Mem. Lecture	—	1,274.12	1,274.12
Picture Post Cards	—	441.00	441.00
Silver Jubilee Comm. Lecture	—	25.00	25.00
IVth I.P.C.	—	7,948.50	7,948.50
To Administrative Receipts:			
Income Tax	150.00	50,152.00	50,302.00

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Pay (Auxilliary Technical)	2,692.00	1,62,366.97	1,65,058.97
Pay (Administrative)	23,225.32	1,93,025.60	2,16,251.00
D.A. & Additional D.A.	15,101.20	3,85,929.32	4,01,030.52
House Rent Allowance	4,074.48	1,18,687.81	1,22,762.29
City Comp. Allowance	1,272.97	38,856.45	40,129.42
Children Educational Allowance	—	726 00	726.00
Over Time Allowance	147.42	1,987.60	2,135.02
Reimbursement of Medical Exp.	521.74	24,728.78	25,250.52
Reimbursement of Tuition Fees	120.00	—	120.00
Leave Travel Concession	57.70	11,265.36	11,323.06
By Travelling Allowance: Governing Body & Selection Committee Meetings	—	15,570.32	15,570.32

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Insurance Premium (S. S. Scheme)	359.13	47,313.55	47,672.68
C.T.D. (Post Office)	—	6,960.00	6,960 00
G.P.F. Subscription	4,722.00	1,61,363.00	1,66,085.00
Recovery of G.P.F. Advances	3,535.00	88,888.00	92,423.00
Recovery of B.S.I.P. Credit Co-operative Society	509.44	25,210.80	25,720.24
C.D.S. from R.P.F. Commissioner Kanpur	—	96,802.54	96,802.54
To Misc. Receipts & Recoveries			
Application Fee	—	2,654.00	2,654.00
V.S. Room Rent	—	195.00	195.00
Telephone Charges	—	860.25	860.25
Vehicle Charges	—	146.50	146.50
Pension Contribution	—	888.12	888.12
Leave Salary Contribution	—	3,509.35	3,509.35

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Attending Meetings & Conferences in India	—	5,174.30	5,174.30
For other Purposes	5,964.15	29,543.68	35,507.83
By Maintenance of Property:			
For Building	—	7,481.73	7,481.73
For Garden	—	5,343.73	5,343.73
For Equipment & Apparatus	8,961.60	—	8,961.60
For Vehicles	9,503.45	6,083.65	15,587.10
For Repairs & Renewals	—	9,156.13	9,156.13
For Petty Constructions	5,460.17	9,942.20	15,402.37
By Contingencies:			
By Telephone & Trunk call Ch.	—	20,596.75	20,596.75
For Postage	—	10,958.42	10,958.42
For Advertisement	4,932.10	19,993.37	24,925.47
For Hot & Cold Weather Ch.	—	4,764.32	4,764.32
For Petrol & Mobil Oil	1,197.10	7,132.27	8,329.37

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Other Misc. Receipts	240.04	6,506.01	6,746.05
To Recoveries of Loans & Advances:			
Recovery of Festival Advance	—	14,140.00	14,140.00
Recovery of Conv. Advance	—	24,335.00	24,335.00
Recovery of Natural Cal. Adv.	—	13,860.00	13,860.00
Interest on Conv. Advance	—	2,908.56	2,908.56
Recovery of House Bldg. Adv.	—	5,496.00	5,496.00
To Deposits:			
Employees Insurance Scheme	288.00	6,318.00	6,606.00
Security Deposits	—	500.00	500.00
To Donation and Endowments:			
Donation by Prof. T.S. Sadasivan	—	15,000.00	15,000.00

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Electricity Charges	256.29	26,015.90	26,272.19
For Municipal Taxes	—	13,656.38	13,656 38
For Insu. of Vehicle & Library	—	3,097.00	3,097.00
For Liveries to Sub Staff	—	7,086.54	7,086.54
For Printing & Stationery	9,357.02	15,059.45	24,416.47
For Railway Ft. & Carriage	—	2,896.45	2,896 45
For Entertainment Allowance to Director	—	3,633.26	3,633.26
For Misc. & Unforeseen	9,052.53	20,381.42	29,433.95
For Chemical & Glasswares	10,250.59	1,01,868.20	1,12,118.79
For Library Requirement	—	19,974 55	19,974.55
For Herbarium Requirement	—	1,134.05	1,134.05
For Museum Requirement	451.00	3,190.01	3,641.01

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Misc. Receipts on Capital Account:			
Sale proceeds of Old Station Wagon transferred from Revenue Account (N-Plan)	4,701.51	—	4,701.51
Total C/o	14,67,704.81	29,45,842.83	44,13,547.64

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Legal Advice	—	1,100.00	1,100.00
For Medical Advice	—	88.00	88.00
For Audlt Fees	—	1,500.00	1,500.00
For Publications:			
The Palaeobotanist	—	38,181.40	38,181.40
For Special publication "Monograph on Glossopteris Flora"	—	35,394.53	35,394.53
For Seward Memorial Lecture	—	582.00	582.00
For Annual Reports	—	7,819.84	7,819.84
For Birbal Sahni Mem. Lecture	—	506.00	506.00
For Silver Jubilee Mem. Lecture	—	—	—
For IV I.P.C. Proceedings	—	3,000.00	3,000.00
For Academic Expenses:			
For Field Excursion	22,965.09	16,518.93	39,484.02
Birbal Sahni Mem. Lecture	—	350.00	350.00

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F	14,67,704.81	29,45,842.83	44.13,547.64
Total	14,67,704.81	29,45,842.83	44,13,547.64

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Sir A.C. Seward Mem. Lecture Out of Donation Account	—	350.00	350.00
For Silver Jubilee Lecture	—	350.00	350.00
For U.G.C. Fellowship	—	2,870.84	2,870.84
For Remuneration to Prof. T.S. Sadasivan	36,000.00	—	36,000.00
Symposium & Seminar on Recent Advances in Cryptogamic Botany	9,968.75	—	9,968.75
By International Programmes:			
Air passage for members of staff proceeding on foreign followship or invited to attend Scientific meeting and Conference abroad	—	45,688.35	45,688.35

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F	14,62,475.26	28,48,526.04	48,11,001 30
Total	14,67,704.81	29,45,842.83	44,13,547.64

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
By Welfare Expenses:			
Financial Assistance to Departmental Canteen	—	6,090.70	6,090.70
By G.P.F. Account:			
G. P. F. Subscription transferred to G. P. F. Account	4,722.00	1,61,363.00	1,66,085.00
Recovery of Advance transferred to G. P. F. Account	3,535.00	88,888.00	92,423.00
G. P. F. Interest	—	42,147.64	42,147.64
By Miscellaneous:			
Income Tax Remitted	150.00	50,152.00	50,302.00
Insurance Premium remitted	359.13	47,313.55	47,672.68
C. T. D. Amount remitted	—	6,960.00	6,960.00
B. S. I. P. Co-operative Credit Society	509.44	25,210.80	25,720.24

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F	14,67,704.81	29,45,842.83	44,13,547.64
Total	14,67,704.81	29,45,842.83	44,13,547.64

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For C. D. S. from R. P. F. Commissioner, Kanpur	—	96,802.54	96,802.54
By Govt. of India Scholarship:	—	17,123.86	17,123.86
By Loans and Advances:			
Festival advance	—	13,800.00	13,800.00
Conveyance Advance	—	24,050.00	24,050.00
House Building Advance	—	6,800.00	6,800.00
By Refunds out of Deposits:			
To M/s. Student Book Binding House, Lucknow	500.00	—	500.00
By Investments:			
Funds under Donation and Endowment Invested	—	22,500.00	22,500.00

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Totol B/F	14,67.704.81	29,45,842.83	44,13'547.64
Grand Total	14,67,704.81	29,45,842.83	44,13,547.64

Plan:	**Bank**	**Cash**	**Total**
Central Recurring	93,964.68	—	93,964.68
Central Non-Recurring	4,39,261.91	—	4,39,261.91
Non-plan:			
Central Recurring	1,97,213.51	330.28	1,97,543.79
Donation & Endowment	522.73	—	522.73
IV I. P. C. Account	5,448.63	—	5,448.63
Grand Total	7,36,411.46	330.28	7.36,741.74

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

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

Sd/- M. N. Bose
Director
Birbal Sahni Institute of
Palaeobotany, Lucknow

PAYMENT	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
By Pension and Superanuation:	—	33,131.70	33,131.70
By Closing Balance:	5,33,226.59	2,03,515.15	7,36,741.74
Grand Total	14,67,704.81	29,45,842.83	44,13,547.64

Auditors Report

As per our report on the Balance Sheet of the even date.

Sd/- R. N. Khanna & Co.
Chartered Accountant