ANNUAL REPORT
1978-79

BIRBAL SAHNI INSTITUTE
OF PALAEOBOTANY
LUCKNOW

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CONTENTS

INTRODUCTION

The Institute is devoted to research on the varied aspects of plant fossils, both applied and fundamental. The scientific activities at the Institute are organized under six well-established departments and a Radiocarbon Dating Laboratory. The work is conducted according to Five Year Plans of which five have been successfully completed so far. From this year some of the important areas of research taken up are:

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. Studies have been carried out on different rock groups measuring more than about 600 million years in age, in order to find out the earliest forms of life, both plant and animal, that existed in our planet. For this purpose the following strata were analysed:

1. Iron ore series at Kasia near Barbil, Orissa.
2. Vindhyan Supergroup from (i) Rewa-Shikarganj area, (ii) Suket-shales, (iii) Sapotra-Karauli Sections, Rajasthan.
3. Cuddapah Supergroup from Varikunta area, Karnataka.
4. Ganga Valley samples from Ujhani and Kasganj, Uttar Pradesh.
5. Penganga beds near Ghugus, Maharashtra.
6. Jutogh Group.
7. Samples from Zäire (Central Africa).

All these rocks have yielded interesting, simple forms. The finds from the Vindhyan Supergroup are specially noteworthy. Besides colonial or single-celled spherical microbiota, the stromatolite *Conophyton cylindricus* has also been identified. Specimens of jelly fish and sponge-like objects have also been found. The disc-like remains referred to *Fermoria* and *Tasmanites* have been studied critically. Samples of Suket shale were macerated to prepare about 100 single mount specimens for study by modern techniques

like phase contrast, interference contrast and scanning electron microscopy.

1.2. Thin sections and maceration of 38 samples from the Pre-Cambrian-Cambrian boundary of sections in Lahaul and Spiti districts of Himachal Pradesh have yielded interesting microbiota.

2. PALAEOZOIC

2.1. Morphological studies in the Glossopteris Flora

2.1.1. *Pteridophytes*

A morphological and biometric study on the *in situ* spores of four Lower Gondwana ferns, viz., *Dizeugotheca*, *Phegopteroides*, *Dichotomopteris major*, *D. lindleyii* and *Neomariopteris hughesii* has revealed certain interesting points, viz., two morphologically distinct species have been found to produce closely similar spores whereas in one species the spores possess such wide variations that in the dispersed state they can be easily placed under more than one genus.

2.1.2. *Gymnosperms*

A. Manuscript on the 'Revision of Indian species of *Glossopteris*' was completed and sent to press. This study of all the species of *Glossopteris* known from India clearly shows that this genus can be classified into distinct taxa described as "species" on the basis of external morphological characters. The shape and venation pattern are the constant characters peculiar to each taxon. The most important resultant of this study is that, contrary to the belief held earlier, the species of *Glossopteris* will prove as distinct stratigraphical markers.

B. Five distinct types of *Glossopteris* leaves were studied in detail from the external morphological as well as cuticular point of view from the Raniganj Stage of Raniganj Coalfield, West Bengal.

Type-1 leaves are characterized by open meshes with narrow elongate form. Type-2 leaves are broad spathulate in shape with narrow mesh pattern. Type-3 leaves are narrow elongate in shape where the secondary veins are arched and form narrow elongate meshes. Type-4 leaves are also narrow in shape but show a thick and solid midrib with intermediate mesh pattern. The leaves of Type-5 are lanceolate in shape where the secondary veins are arched and form short and narrow meshes. All the 5 types of leaves have yielded distinct types of cuticle.

2.2.2. *Lower Gondwana Flora from Kamthi beds of Wardha-Godavari Valley, Maharashtra*

Fossil plants collected from the Kamthi beds of Kanhargaon, Chandrapur District and Bazargaon, Nagpur District, Maharashtra were studied and results have been incorporated in a Ph. D. Thesis. It deals with the impressions of pteridophytes, Glossopteris Flora and petrified gymnospermous woods. Of those, two species of Glossopteris and 13 species of gymnospermous woods are new. The investigated flora of Kamthi beds has been correlated with the known flora of equivalent formations and an Upper Permian age has been assigned to it.

2.3. Glossopteris Flora from Pachwara Coalfield

The study of fossil plants and miospores from a Lower Gondwana bed exposed near the village Tattitola, Pachwara Coalfield, Bihar has been completed. The megafossil assemblage is characterized by the dominance of open mesh

Glossopteris leaves alongwith the occurrence of *Schizoneura gondwanensis, Trizyzia speciosa, Stellotheca robusta* and other Lower Gondwana ferns. The miospore assemblages show a dominance of striate-disaccate forms alongwith *Scheuringipollenites, Densipollenites* and other trilete forms. These assemblages suggest an Upper Raniganj age for this bed.

2.4. Fossil wood from Raniganj Coalfield, West Bengal

One fossil wood has been identified as a new genus *Palaeospiroxylon.*

2.5. Sporae dispersae and palynostratigraphy

2.5.1. *Palynostratigraphy of Lower Gondwana Formation, Hutar Coalfield*

The palynostratigraphy of the Hutar Coalfield has been completed and the results of this study have been incorporated in a Ph.D. Thesis. The highlights of the work are:

(i) Demarcation of Karharbari Formation in the Hutar Coalfield on the basis of lithological and palynostratigraphical evidences;

(ii) Indication of the possibility of the Barren Measure Formation in this coalfield on the palynological evidences;

(iii) Recognition of 6 biozones in the Lower Gondwana Formation of Hutar Coalfield, viz.,

Zone—VI Barren Zone

Zone— V *Densipollenites-Scheuringipollenites Faunipollenites* Assemblage zone (Upper Barakar).

Zone—IV *Scheuringipollenites-Striasulcites* Assemblage zone (Barakar).

Zone—III *Parasaccites-Scheuringipollenites* Assemblage zone (Upper Karharbari).

Zone— II *Parasaccites-Callumispora* Assemblage zone (Lower Karharbari).

Zone— I *Parasaccites-Plicatipollenites* Assemblage zone (Talchir)).

The extension of these biozones in the Lower Gondwana beds of other coalfields has also been traced.

2.5.2. *Morphotaxonomic study of Trilete genera*

The monograph on the miospore group Varitriletes has been completed and the morphotaxonomic study of the *Corisaccites-Guttulapollenites*-complex is being continued.

2.5.3. *Permo-Triassic palynology*

Palyno-dating of the samples from bore-cores from East Raniganj coalfield proves the extension of Permo-Triassic deposition of the Raniganj Coalfield beyond its present limits, towards the eastern side. The subsurface coal deposits in the eastern part of the West Bengal basin have thus been indicated.

The Permian-Triassic sediments of Tethyan Himalaya, Malla Johar area have indicated a palynological affinity with the Gondwana deposits of the Indian peninula, rather than with the European of Angara region. It has been concluded that the original provenance of the Tethyan Permo-Triassic deposits was in the Indian Plate.

2.5.4. Detailed morphographic studies of sporae dispersae from Giridih Coalfield, Bihar and from Siang District, Arunachal Pradesh are being continued, while palynostratigraphic studies of the Lower Permian sediments

from the north-western part of the Karanpura Coalfield, Bihar have been completed.

2.5.5. *Tanzania*

Palynostratigraphic studies of the Lower Permian sediments have been completed and the results have been compiled for publication.

2.6. Petrology and palynology of Palaeozoic coals

2.6.1. *Biostructural features of Permian coals of India*

Permian coals reveal varied biostructures and these depend on the source material of the coal forming swamps. Some of the organic entities are bark, wood, spore, pollen and cuticles apart from the inorganic constituents. The organic entities suggest genetic affinities by their biomorphological features. The ultimate coal formation depends on structural and compositional nature.

2.6.2. *Typological analysis of Permian coals*

The compositional distribution of coal constituents suggests that V/F ratio is most conspicuous in the organization of organic constituents. The proportion of other microconstituents combine to form several coal microlithotype.

2.6.3. *Maturation of Permian coals*

The degree of maturation is of primary importance in the evaluation of coals for technological utility. The general trend of maturation values ranges from sub-bituminous to bituminous ranks. However, the localized higher rank values have been recognized owing to igneous activities.

2.6.4. *Interrelationship of Permian coal lithotypes*

Lithotypes of the Permian coals show interrelationship. Some of the related types are durofusain, vitrofusain, clarofusain, in Fusain; fusodurain, vitrodurain and clarodurain, in Durain; duroclarain, vitroclarain, fusoclarain, in Clarain. These all form tetrahedral type of Permian lithotypes.

3. MESOZOIC

3.1. Megafossil Assemblages

3.1.1. *Triassic Flora*

Out of a large number of seeds have been isolated from the Nidpur shale samples. Their epidermal feature have been found to be quite different from the hitherto known seed genera from this locality. Peel preparations from a gymnospermous cone have yielded *Praecolpatites* type of pollen grains. The epidermal features of the microsporophylls are somewhat to the epidermal characters of *Nidia ovalis* described by Bose and Srivastava (1973).

3.1.2. *Jurassic-Cretaceous Flora*

The work on the cycadophytic leaves from the Mesozoic rocks of India was continued. In connection with the work on the Lower Cretaceous flora of India the first draft concerning the description of *Equisetum rajmahalense, Gleichenia nordenskioldii, Phlebopteris polypodioides, Weichselia reticulata,* a few species of *Cladophlebis, Sphenopteris, Pachypteris indica, Ginkgo feistmantelii,* species of *Ptilophyllum* and *Brachyphyllum* has been prepared. A new species of *Ctenozamites* from the Satpura basin is under study. Some gymnospermous cuticles isolated by bulk maceration from the shale samples from Parsapani are under study.

Three papers from the Jurassic-Cretaceous localities in Gujarat, viz., Tarnetar, Kurbi and Himmatnagar respectively, have been finalized and sent to Press.

Studies on the plant fossils from Habur and Gardeshwar were continued. Some shale samples from Walkamata, Kutch were macerated in bulk. Fragmentary leaves and pieces of cuticle of *Otozamites*, *Ptilophyllum*, conifer twigs and a few seeds and megaspores have been sorted out. Fossil woods pieces collected from Bela Island, Kutch and the Lathi Formation of Rajasthan are under study.

A study on the plant fossils from Pranhita-Godavari basin and the East Coast is also under progress. Sections of about 80 petrified wood pieces from Kadamba block near Gundepalle and Yamonpalle villages have been examined. They probably belong to *Mesembrioxylon*/*Podocarpoxylon*.

3.2. Sporae dispersae and palynostratigraphy

3.2.1. *Triassic*

A paper on the Upper Triassic pollen and spores from Janar Nala Section, near Bijouri, Shahdol District, Madhya Pradesh has been finalized and sent for publication. A palynological comparison shows that the Janar Nala assemblage has an affinity with the mioflora from the middle part of the Mungaroo beds, Carnarvon Basin, Australia.

3.2.2. *Jurassic-Cretaceous*

Work on the dinoflagellate cysts from the Morand River section near Morghat is being revised.

A manuscript on the Dharesi miospore assemblage has almost been completed. The assemblage is qualitatively

rich in trilete miospore genera but quantitatively dominated by alete and saccate pollen grains.

More palynological samples from Gangapur beds were processed and scanned. Identification of the taxa up to specific level has almost been accomplished.

A study of the genus *Aquilapollenites* and other spores and pollen grains from Mattur, Vridhachalam District, Tamil Nadu has been completed.

3.2.3. Work on the palynostratigraphy of carbonaceous shales from Kotri, Narsinghpur District, M. P. and palynostratigraphical studies of carbonaceous shales from Morghat section exposed on Morand River in Hoshangabad District, Madhya Pradesh have been completed.

4. CENOZOIC

4.1. Morphological and anatomical studies

4.1.1. *Deccan Intertrappean Flora*

A large number of well-preserved fossil woods from a new fossiliferous locality near Shahpura in Mandla District, Madhya Pradesh were tentatively assigned to the families Sterculiaceae, Burseraceae, Anacardiaceae, Rhamnaceae, Lauraceae, Celastraceae and Palmae. One of the palm woods shows close resemblance with *Phoenix*.

Work on Nawargaon fossil dicot woods belonging to *Evodia*, *Amoora* and *Sonneratia* was completed and two species of palm woods were also described. One of the species resembles closely the modern wood of *Livistona*.

Maceration of calcareous clay samples from the Intertrappean beds of Rajahmundry has yielded a rich assemblage of charophytic remains.

Studies on the fossil fruits of *Viracarpon hexaspermum* were continued. It has been observed that the interpretation of various structures of this fruit given by earlier workers are not correct because of fossil fruit does not show close affinities with the fruits of *Pandanus*. Attempts are being made to find out its modern equivalent among the members of the family Araceae.

4.1.2. *Leaf impression from Laki Series, Kutch*

Identification of a leaf-impression belonging to the genus *Pandanus* from the Eocene of Panandhro basin has been confirmed.

4.1.3. *Fossil plants from Kutch, Gujarat*

A thesis on "The Tertiary Flora of Kutch" was finalized and submitted giving a detailed systematic study of the fossil plants from the Eocene, Miocene and Pliocene beds of Kutch. All these depicted an entirely different picture of past vegetation in western India comprising of a rain forest during the Tertiary period, contrary to the dominant scrubby vegetation of today. Furthermore, the present xeric conditions in Kutch are the result of Post-Pliocene changes in the climate.

4.1.4. *Fossil woods from eastern India*

A. Tipam Series

Sections of 230 fossil woods from Assam and Nagaland were prepared and studied. These woods comparable to *Calophyllum inophyllum*, *Phylanthus emblica*, *Albizia procera*, *Cassia fistula*, *C. nodosa*, *Dialium* and *Hopea* were described and photographed. Two fossil woods belonging to Euphorbiaceae and one of Leguminosae have also been identified

from this collection. A paper on a new fossil wood of *Gymnosporia* was finalized and submitted for publication.

B. Dupitila Series

A few more fossil woods were identified from Namsang River bed at Deomali in Arunachal Pradesh. These belong to *Dipterocarpus*, *Sindora*, *Barringtonia* and *Lagerstroemia*. Some fossil woods from Namsang beds of Lairampur in Arunachal Pradesh were also studied. This shows that most of the species are common with those of the Namsang beds at Deomali.

4.1.5. *Fossil woods from the Lower Siwalik beds*

About 200 pieces of petrified woods from Nalagarh in Himachal Pradesh were cut and slides prepared. A few of them were identified as belonging to *Dipterocarpus*, *Albizia*, *Afzelia-Intsia* and *Cynometra*, while 6 others belonging to new genera are being studied. Fossil woods of *Sindora* and *Dracontomelum* were also identified from the Lower Siwalik beds of Uttar Pradesh.

4.1.6. *Leaf-impressions from the Siwalik beds*

Leaf-impressions showing close resemblance with *Zyzyphus mauritiana*, *Mangifera indica*, *Indigofera pulchella*, *Dalbergia* sp., *Bauhinia* sp., *Gardenia turgida*, *Cinnamomum tamala*, *Litsea nitida* and *Ficus* sp from the Siwalik beds of Bhikhnathoree, West Champaran District, Bihar were described

4.2. Sporae dispersae and palynostratigraphy

4.2.1. *Neogene miospores of India*

Pollen grains of two species of *Ctenolophonidites* from Neyveli lignite have been described.

4.2.2. A. Compilation of geological and palynological data on the coals of Makum Coalfield was continued. Along with this the compilations of petrographic data, morphographic, statistical evaluation of petrographic microconstituents, reflectance study and depositional history of coals of Makum Coalfield were also taken up.

B. For the first time in India, the maturation studies of organic microconstituents of coals and lignites have been utilized for ranking of coal and exploration of oil and gas. A paper on the study has been finalized and submitted for publication.

4.2.3. *Palynostratigraphy of Tertiary sediments of Lower Assam*

A. *Palynology of the Kopili Formation in North Cachar Hills*

Ten lithologs showing the stratigraphic position of palynological rock samples from the Kopili Formation were prepared. A rich spore-pollen and microplankton assemblage has been recovered from the Garampani area.

B. *Palynostratigraphy of the Jowai-Badarpur Road Section*

Palynostratigraphical studies are being carried out on the spore-pollen assemblages recovered from the Paleocene-Miocene strata of the Jowai-Badarpur Road Section in order to establish palynological controls for the identification of different levels. Out of the 546 palynological samples, 476 samples have yielded rich spore-pollen assemblages. Interesting palynomorphs have been scanned and photographed. A geological map of the Jowai-Badarpur Road Section has been prepared on 1: 363640 scale. Also, a manuscript dealing with the lithostratigraphy of the sediments exposed in this area has almost been finalized. Part of the work has been submitted for publication.

C. *Palynostratigraphy of Tertiary sediments of Upper Assam*

Palynological investigations of the subsurface Neogene sediments of Jorajan Well-3 have been completed. Besides, the systematic palynology and stratigraphical significance of the assemblage have been discussed.

D. *Palynostratigraphy of the Lower Tertiary sediments of Simla Hills, North India*—A paper on the palynostratigraphical correlation of the 8 measured sections representing the Subathu Formation in the Kalka-Simla area has been completed. An attempt has also been made to trace the lateral continuity of the palynological zones in the different sections under study. On the basis of palynological evidences the Subathu Formation in the same area has been dated as varying from Upper Palaeocene to Upper Eocene in age. Furthermore, it has been inferred that the environment of deposition of this formation varies from shallow marine brackish water to fresh water conditions.

4.2.4. *Palynostratigraphy of the Siwalik sediments of Bhakhra-Nangal area*—Chemical processing of the available rock samples from the previous collections of the Siwalik sediments has been done. Some productive horizons have been located.

4.2.5. *Marine microplankton biostratigraphy of Mesozoic and Cenozoic sediments of India*

A. *Palynology of marine Cretaceous-Tertiary sediments of South India*—Morphotaxonomical study of dinoflagellates and acritarchs from the Vridhachalam (Gopurapuram) area has been completed. It includes taxa, viz., *Areoligera*, *Cyclonephelium*, *Operculodinium*, *Cyclopsiella*, *Homotryblium*, *Cordosphaeridium* and *Spiniferites*. The study of spumellarian radiolarians from Uttatur Formation is under progress.

B. *Palynostratigraphy of Western Ghats (around Varkala & Quilon)*—Morphotaxonomy of spores and pollen grains from Varkala and Quilon has been completed. It includes 44 genera and 56 species. Morphotaxonomical study of dinoflagellates was continued.

4.2.6. *Palynostratigraphy of Neogene sediments of Kutch*

Spores, pollen grains and microplanktons have been recovered from the Khari Nandi Formation (Miocene) in Kutch, Gujarat. Megaspore and massula containing microspore of fossil *Azolla* have been described as *A. aglochidia* sp. nov.

4.3. Tertiary from Abroad

A. A paper on a fossil palm wood from the Tertiary of Germany was finalized.

B. Eight types of fossil dicot woods from the Tertiary of Zäire were tentatively assigned to the families Meliaceae, Leguminosae, Simaroubaceae and Burseraceae.

5. QUATERNARY

5.1. Pollen morphology

Six hundred and fifty pollen slides of 137 taxa from Lahaul and Spiti and 100 slides of 20 taxa from Nilgiris were prepared. Pollen morphology of nearly 370 taxa from Lahaul-Spiti, Nilgiris and Rajasthan was done and quite a number of them were photographed. The data were utilized to improve upon and extend the pollen keys for the high altitude flora (Ladakh, Lahaul & Spiti), Rajasthan and Nilgiris. A Pollen Key has also been prepared for Gujarat area.

5.2. Pollen analysis

5.2.1. *Pollen zonation scheme for Western Himalaya, Rajasthan and Nilgiris*—A paper on the local and regional pollen zones and their delimitation in Indian pollen diagrams dealing with the present day criteria for pollen zonation together with the history of thought and the application of the criteria and Indian pollen diagrams was prepared and submitted for publication.

A. *Ladakh*—A surface sample from near the alpine Tsokar Lake, 5,000 m a. s. l., revealed dominance of non-arboreal over the arboreal pollen of which *Pinus*, *Cedrus*, *Picea* and *Abies* are derived from temperate regions through upthermic winds. *Juniper* pollen was poorly represented against its higher values in the pollen profile from this lake.

The Tsokar Lake pollen diagram from a profile of about 23.85 m and dated by radiocarbon to the last glaciation is largely dominated by herbaceous pollen belonging to Compositae, Chenopodiaceae and Urticaceae. With the exception of *Juniper* pollen, pollen of temperate genera such as *Abies*, *Picea*, *Cedrus* and *Pinus* are indeed derived. The biogenic evidence, rise in *Juniper* pollen frequencies and the radiocarbon date of 30,600 $\pm$ 140 years B. P. suggests an interstadial (equivalent of Denekamp in Europe) at 21-22 m depth. Rise in temperature or lack of snow-fall during 21,000 — 15,000 years B. P. is apparent from the increase in *Juniper* pollen and during the period an environment of disturbed soil was prevalent as indicated by a rise in Urticaceae pollen.

B. *Himachal Pradesh*

The pollen analysis of the 6 samples from subtropical Unchi-Bassi profile has shown the dominance of non-arbo-

reals. Pine pollen is about 10 per cent and most likely derived.

C. *Rajasthan*

Twentyfive surface samples collected from the vicinities of Jaipur, Jodhpur, Jaisalmer, Ajmer and Nagaur/Didwana Lake area were pollen analysed. Dominance of grasses, sedges and chenoamaranths were observed in all the samples together with pollen of *Zizyphus*, *Prosopis cineraria*, *Salvadora* and *Maytenus* with 1.7 per cent pollen of *Typha*; in samples from the vicinity of Didwana Lake a good percentage of pollen of *Anogeissus*, *Acacia*, etc. was found. A good percentage of pollen of *Calligonum*, *Zizyphus and Ephedra* was observed in the samples from Ajmer and Jaipur while those from Jodhpur and Jaisalmer are in keeping with the local vegetation.

A fresh profile 3 m deep was further collected from Didwana Lake and pollen analysed. It is now supported by four radiocarbon dates with the base of the profile dated to about 8,000 yrs (BS—24, 7,836± 163 yrs B. P.). The rate of deposition of sediments has been found to be 3.75 cm/100 years.

The new pollen diagram constructed shows certain marked features from the one published by Singh (1974). The curve for Chenopodiaceae shows a different behaviour; *Cleome* has not been identified; Aerva is absent in the extreme base of the diagram and starts about 7,000 yrs ago (BS—99 7,210 ± 155 yrs B. P.); *Potamogeton*, *Phyla nodiflora* and *Rhus* were not identified earlier, etc. The advent of pollen of *Calligonum* at the site is dated to about 6,000 yrs B. P.

Cerealia type pollen grains above 60 μ, (69μ, 7,836 ± 163 yrs B. P. and 6,110 ± 123 yrs B. P.) have been encoun-

tered at the base of the diagram. Such large-sized grass pollen are not met within modern surface samples.

Environmental analysis of Holocene pollen has revealed fluctuations in 5 desert plant communities with no evidence of development into the climax vegetation of *Prosopis-Salvadora*. Pollen of *Salvadora* has not been encountered prior to 3,000 years ago.

D. *Nilgiris*

Seven surface samples from Kappeathorai and two from Bellthala in Nilgiris have shown abundance of grasses, sedges, composites and Ranunculaceae together with the pollen of *Ilex*, *Dadonaea*, *Ligustrum*, *Syzygium*, *Viburnum*, etc. indicative of the Shola Forest which occurs about 7 km away from the site. Local vegetation in the vicinity of the sites consists of plantations of *Eucalyptus*, *Cupressus* and *Acacia* spp. apart from grasses and shrubs.

Seven samples from a profile from Kappeathorai have shown the dominance of grasses, composites, sedges and *Impatiens*. The constituents of the Shola Forest such as *Ilex*, *Dadonaea*, *Gaultheria*, *Viburnum*, *Ligustrum*, *Symplocos*, etc. are also represented by their pollen in comparatively higher percentage than in surface samples indicating that the Shola Forest was perhaps much nearer to the site than the present.

5.3.2. *Geomorphological studies on Rajasthau*

The detailed study of the surface features around the ranns in Pokharan area has suggested that these were developed mainly due to the differential erosion along the margins of an ancient basin. Further, the nature of the profile sediments has indicated that the deposition in the ranns took place mainly under fluvial and lacustrine phases.

Geomorphological studies on some salt lakes near Jaisalmer, Rajasthan have suggested that these linear basins represent an ancient river channels.

5.3.3. *Preparation of Atlas of modern pollen flora, seeds and fruits*

Three hundred sixty nine pollen index cards and 149 seeds and fruits index cards the latter together with notes on their distribution, ecology and ethnobotany have been prepared. A few of the cards have also been illustrated.

5.3.4. *History of ancient plant economy of India*

Impressions of *Oryza nivara* from earthen urns from the megalithic site Gunduvancheri in district Pallavaram, grains of *Setaria* and fragmentary husks of *Oryza sativa* from Mallapadi, district Dharmapuri; imprints of *Oryza sativa* in earthen urns from Adichechanallur in district Tirunelveli, Tamil Nadu and carbonized grains of *O. sativa* and *Phaseolus radiatus* dated to about 400 yrs ago (BS—44,410 $\pm$ 125, A. D. 1540) from Bhalukpung near Jeypore in Arunachal Pradesh have been identified.

5.3.5. *Studies in the Ethnobotany among the tribes-drought prone area*

Information on wild plants or their parts used as diet, oil, fat and fibre, etc. by the tribals in Rajasthan, Gujarat and Madhya Pradesh has been compiled from the literature. Over 40 diverse uses of wild plants have been observed. These have been arranged in context of cultural evolution from the Neolithic to the Iron Age citing examples for each category. The work has brought to light immense wild germ plasm in the country as well as the possible processes which led to the domestication of some of them.

5.3.6. *Studies in the Geomorphology of the Kashmir Valley and Rajasthan*

The botanical analysis of the oxidised layer at the base of a sand dune near Budha Pushkar Lake revealed the presence of *Chara* nucules suggesting its deposition under fresh water conditions. It has been dated by radiocarbon to 800 years B. P. (BS—80, 825 $\pm$ 115) whereas on typological evidence it should be much older (Upper Palaeolithic).

The grain analysis of a profile from Pokharan Rann has revealed the bottom sediments of fluvial origin and the overlying thick clay bed of fluvial and lacustrine origin. The top fine grained sands coated with iron oxide in the sand dunes suggest an arid aeolian environment for their deposition.

5.3.7. *Plio/Pleistocene boundary in Gujarat*

The geomorphological studies of the classical Pleistocene sections around Kumarpura, Rajpipla and Chandod in southern Gujarat were carried out and the samples were collected for pollen analysis.

In contrast to Zeuner's (1950) observations the cemented gravel has not been found to be the lowermost bed as it rests in the laterite or trap derivatives. Further a black kankar bed has been found between the mottled clay and the brown fossilized soil. Charcoal samples at depths of 3.5 m and 1 m in the Rajpipla sections have been dated to 380 $\pm$ 140 and 160 $\pm$ 95 yrs B. P. respectively suggesting that the deposition has been rapid. From the upper gravel bed, a few hand-axes of Palaeolithic man have been collected.

6. RADIOCARBON DATING LABORATORY

The Radiocarbon Dating Laboratory has processed 120

samples including anthracite background, Radiocarbon standard preparation (35) and sediment samples for which carbon content was determined but could not be dated due to lack of enough organic carbon. Nearly half the number of samples dated relate to various research projects of the Quaternary Palynology Department of the Institute.

The Laboratory has also dated 28 samples pertaining to geological, geophysical and archaeological investigations sent from G. S. I.; N. I. O., Goa; Deccan College, Pune, and other Institutions in the country. Dredge core samples collected by R. V. Gaveshani in a collaborative work with the G. S. I. and N. I. O. have been dated. The samples of coral reef formations along Minicoy Island coasts have also been dated.

6.2. Fission track dating programme

The equipments for sample mounting, grinding and polishing have been set up. Etching and counting of track have been standardized, using apatite crystals as specimens. Thus the preliminary work on the fission track dating method has been started.

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FIELD WORK

During this year different parties of the Institute scientists undertook 21 field excursions to collect fossiliferous material from various parts of the country and to make observations essential for their work.

SPONSORED/COLLABORATIVE RESEARCH

Interdisciplinary research studies were carried out in collaboration with a large number of foreign and Indian Institutions such as Geological Survey of Queensland, Australia ; Botany Department, University of Texas U.S.A.; Botany Department, Lyon University, France; Oil & Natural Gas Commission, Dehra Dun; Geological Survey of India; Indian Statistical Institute, Calcutta; Neyveli Lignite Corporation, Tamil Nadu; Directorate of Geology and Mining, Nagaland; Dibrugarh University, Dibrugarh; National Institute of Oceanography, Goa; Central Fuel Research Institute, Dhanbad; Coal India, Ltd; Geology Department, Lucknow University; Deccan College, Pune and Wadia Institute of Himalayan Geology, Dehra Dun.

TRAINING PROVIDED TO OUTSIDERS

1. Miss Ira Andrew, Department of Applied Geology, Dibrugarh University, Dibrugarh, Assam.

2. Dr Mrs G. Banerjee, Department of Geology, M. S. University, Baroda.

3. Dr V. P. Mishra, Geologist, Palaeontology Laboratory, Eastern Region, G. S. I., Calcutta.

4. Shri S. K. Modak, Research Scholar from Bangla Desh, Department of Geology, Lucknow University, Lucknow.

5. Mr B. P. Patra, Geology Department, Utkal University, Bhubaneshwar, Orissa.

TECHNICAL ASSISTANCE TO OUTSIDERS

1. Archaeological Survey of India, New Delhi.

2. Geological Survey of India, Division Regional Integrated Surveys, Lucknow.

3. Institute of South-east Asian Studies, Singapore.

4. AFRO Geohydrological Investigation Team, Coimbatore.

5. Deccan College and Post-Graduate Research Institute, Pune.

6. Department of Anthropology, Gauhati University, Gauhati.

7. Mr P. R. Sengupta, Ancient Lucknow Research Society, Lucknow.

8. Forest Department, Srinagar.

9. Indian Council of Historical Research, New Delhi.

10. Assam State Museum, Gauhati.

11. Akademic der Wissenschaften der DDR, Gaterslaben.

12. Department of Archaeology & Museum, Punjab, Patiala.
13. Nehru Centre, Bombay.
14. National Institute of Design, Ahmedabad.
15. Botany Department, University of Dar-es-Salaam, Tanzania.
16. Botany Department, Dibrugarh University, Dibrugarh.
17. Geological Survey of India, Calcutta (Coal Wing).
18. Coal India Limited, Duliajan, Assam.
19. Coal Survey Stations, Central Fuel Research Institute, Dhanbad.
20. Neyveli Lignite Corporation, Neyveli.
21. Directorate of Geology & Mining, Assam & Nagaland.
22. Mr P. N. Agarwal, Geology Department, P. P. N. Degree College, Kanpur.
23. Geological Survey of India, Himalayan Geology Division, Northern Region.
24. Directorate of Geology & Mining, Jammu & Kashmir Govt., Srinagar.

PARTICIPATION IN SYMPOSIA/ CONFERENCES/MEETINGS

The Institute was represented by a large delegation of about two dozen scientists in a symposium on "Evolutionary Botany and Biostratigraphy" held at Calcutta in February 1979. Besides, delegates were also sent to the VII Indian

Colloquium on "Micropalaeontology and Stratigraphy" at Madras in December, 1978. IX Seminar on "Himalayan Geology" at Dehra Dun in November, 1978; International Symposium on "Coal and Technology for the Eighties" in February, 1979 and X International Congress of Anthropological and Ethnological Sciences held in December, 1978. A few senior scientists also delivered lectures on different aspects of palaeobotany at (*i*) Department of Geology and Geophysics, Roorkee University, Roorkee ; (*ii*) Botanical Society, Kanpur; and (*iii*) National Research Laboratory for Conservation of Cultural Property, Lucknow.

REPRESENTATION ON COMMITTEES/BOARDS

Bharadwaj, D. C.	..	Vice President, International Society of Applied Biology.
	..	Vice President, Organizing Committee, Symposium on 'Evolutionary Botany and Biostratigraphy'.
	..	Member, Indian National Committee for IGCP.
	..	Member, Scientific Committee of IGCP (UNESCO).
	..	Chief Editor, Geophytology and Biological Memoirs.
	..	Member, Editorial Boards of 'Review Palaeobotany and Palynology' and 'The Palaeobotanist'.
Bose, M. N.	..	Secretary, Palaeobotanical Society.

	.. Secretary, Organizing Committee, III Indian Geophytological Conference.
	.. Vice-President, Organizing Committee, Symposium on 'Evolutionary Botany and Biostratigraphy'.
	.. Chairman, Palaeozoic-Mesozoic section of symposium on 'Evolutionary Botany and Biostratigraphy'.
	.. Member, National Working Group for 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'.
Gupta, H. P.	.. Member, Radiocarbon Dating Committee, B. S. I. P., Lucknow.
Jain, K. P.	.. Secretary, Indian Association of Palynostratigraphers.
	.. Member, Executive Council, Palaeontological Society of India.
Kar, R. K.	.. Joint Secretary, Palaeobotanical Society.

Khan, H. A.	..	Assistant Secretary, Palynological Society of India (w.e.f. October, 1978).
Lakhanpal, R. N.	..	Member, Editorial Board, 'The Palaeobotanist'.
	..	President, Organizing Committee, Symposium on 'Evolutionary Botany and Biostratigraphy.'
	..	Vice-President, Palaeobotanical Society.
Maheshwari, H. K.	..	Member, Committee for Fossil Plants, International Association for Plant, Taxonomy.
	..	Co-chairman, Palynology Section, VII Indian Colloquium on 'Micropalaeontology and Stratigraphy.' Madras.
	..	Member, Managing Council, Indian Association of Palynostratigraphers.
Maithy, P. K.	..	Joint Organizing Secretary, III Geophytological Conference.
	..	Member, International Working Group on Pre-Cambrian Biostratigraphy.
	..	Member, National Working Group IGCP Project no. 118, Upper PreCambrian Correlations.
	..	Member, National Working Group IGCP Project no. 29, Pre-Cambrian-Cambrian Boundary.

Navale, G. K. B.	..	Member, International Committee of Coal Petrology.
	..	Member, Gondwana Coal Committee, I. C. C. P.
	..	Member, International Commission on Coal and lignite Nomenclature.
	..	Member, International Commission on Coal and Lignite Analysis.
	..	Joint Secretary, Organizing Committee of Indian Coal Petrology.
	..	Editor, 'Geophytology'.
Prakash, U.	..	Regional Representative for India, International Association for Angiosperm Palaeobotany.
Singh, H. P.	..	Member, Executive Committee, The Palaeobotanical Society (w.e.f. 9th March, 1979).
Srivastava, Suresh C.	..	Editor, 'Geophytology'.
Tiwari, R. S.	..	Member, Editorial Subcommittee, IV I. P. C.
Vishnu-Mittre	..	Member, International Palynological Commission.
	..	Member, Central Advisory Board of Archaeology.
	..	Member, Committee to organize the National Museum of Man for the Ministry of Education and Social Welfare.

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

.. Member, Committee for Garhwal University for Programming Studies and courses for Institute of Himalayan studies.

.. Member, Coordination Committee for Quaternary Research in Western India.

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

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

DEPUTATION/TRAINING/STUDY ABROAD

D. C. Bharadwaj

Visited Washington, U. S. A to attend the meeting of the IGCP Scientific Committee from 6th to 10th March, 1979 and thereafter visited the Department of Biology, Harvard University, Cambridge (Mass.) from 13-14th March, 1979. He also visited the Department of Biology, University of Moncton, Canada from 15-17 March, 1979.

HONOURS AND AWARDS

HONOUR

Dr R. N. Lakhanpal	..	Elected a Fellow of the Indian National Science Academy (F. N. A.).

AWARDS

K. P. N. Kumaran	..	Awarded Ph.D. Degree for his work on 'Contributions to the Palaeobotany of India and Zäire', from the Lucknow University.
M. N. V. Prasad	..	Awarded Ph.D. Degree for his work on 'Contribution to the knowledge of fossil plants from Kamthi beds of Maharashtra, India' from the Lucknow University.
Zeba-Bano	..	Awarded Ph.D. Degree for her work on 'Studies on the fossil flora from the Upper Gondwana of India' from the Lucknow University.

FOUNDER'S DAY CELEBRATIONS

The Founder's Day was celebrated on 14th November, 1978, the birthday of Professor Birbal Sahni, F. R. S.

In the morning at 9.00 a. m. wreaths and flowers were placed on the Samadhi of Professor Birbal Sahni.

In the evening at 5.30 p. m. Professor S. D. Saksena, Retd Principal, Rewa College, Rewa delivered the 8th Birbal Sahni Memorial Lecture entitled "The progress of Palaeobotanical research in India".

On 15th November, 1978 at 5.30 p. m. Professor A. K. Ghosh, Department of Botany, University College of Science, Calcutta delivered the 26th Sir Albert Charles Seward Memorial Lecture entitled "Palaeobotany and Biostratigraphy in India".

PUBLICATIONS

1. The Journal: "The Palaeobotanist"

Volume 25, a special "Silver Jubilee Volume" was published during the year under review. The hard bound volume consists of 581 pages and 52 important contributions from distinguished palaeobotanists from all over the world.

From Volume 26, publication of the Hindi version of "Abstract" of each paper has also been started as a regular feature.

2. Sir Albert Charles Seward Memorial Lecture

The twentyfifth lecture entitled "Plant anatomy and evolution" delivered by Prof. K. A. Chowdhury was published.

3. Birbal Sahni Memorial Lecture

The seventh lecture entitled "Gondwanaland: the concept that failed" was delivered by Prof. F. Ahmad was published.

4. Silver Jubilee Commemoration Lecture

The seventh lecture entitled "The so-called primitive angiosperms" delivered by Prof. V. Puri was published.

5. Monograph on 'Revision of the Indian species of *Glossopteris*'

The manuscript of the monograph was sent to Press.

6. Sale

During the period under review an income of Rs. 92,396.32 was registered from the sales proceeds of the Institute publications. The sum includes the following foreign exchange earned:

US $=6,019.20
£= 562.80

LIBRARY

1. Statement showing the details of stock for the year 1978-79.

	Details	Position on 31.3.78	Addition during 1978-79	Total
1.	Books	3188	164	3352
2.	Journals	6693	426	7119
3.	Reprints	23621	1020	24701
4.	Microfilm	221	—	221
5.	Theses	15	9	24
6.	Maps	40	—	40
7.	Reports	38	1	39
8.	Reference books:			
	General	62	—	62
	Specific	40	—	40

Besides, 70 current periodicals were also subscribed during the year under review.

2. Exchange Programme

(i) Number of reprints purchased for exchange	12
(ii) Total number of reprints sent out on exchange	4253
(iii) Number of Institutions on exchange	66
(iv) Number of individuals on exchange	324
(v) Sets of papers of Professor Sahni's published work	6
(vi) Number of periodicals received on exchange	95

3. In addition to the Scientific staff of the Institute the library services were availed by the scientists from Geology and Botany Departments, Lucknow University, National Botanical Research Institute, Lucknow; Central Drug Research Institute, Lucknow; Geological Survey of India, Lucknow; Dibrugarh University, Assam; Wadia Institute of Himalayan Geology, Dehra Dun; Geological Survey of India, Calcutta; Atomic Energy Commission, Bangla Desh; Geological Survey of Queensland, Australia; Komorov Botanical Institute, Leningrad and various other research organisations.

MUSEUM

Every year the Museum draws a large number of students of Botany and Geology of Indian Universities and colleges to supplement their knowledge about fossil plants. Representatives of 8 Institutions and 28 individual scientists visited the Museum this year, besides a large number of lay people.

The Institute sends out sets of fossil plants to different Institutions to help in the teaching of palaeobotany at these centres. Durirg this year such sets were sent to 6 Institutions—4 Indian and 2 foreign.

HERBARIUM

The following table depicts the additions made to the stocks this year and the total number of specimens in the Herbarium.

Specimens	Addition during the year	Total number
Herbarium sheets	100	10,334
Fruits & seeds	3	1,813
Woods	32	3,126
Wood slides	110	2,628
Pollen slides	361	10,086
Leaf specimens	2	150

A party from the Botanical Survey of India, Northern Circle, Dehra Dun consulted our Herbarium for preparation of a 'Flora'. Besides, the following research workers of various organizations/Institutions consulted the Herbarium for their research work:

1. Mr C. V. Upadhya,
   Head, Department of Botany,
   Shivaji College, Akola, Maharashtra

2. Mr B. P. Patra,
   Department of Geology,
   Utkal University,
   Bhubaneshwar

3. Mr Anil K. Mathur,
   Geological Survey of India,
   N. E. Region, Shillong, Meghalaya

4. Dr Chowdhury,
   Botanical Survey of India,
   Northern Circle, Dehra Dun

BIRBAL SAHNI PROFESSORSHIP

Professor T. S. Sadasivan who was appointed as Birbal Sahni Professor with effect from 1st September, 1977 continued to work on his monograph project entitled "The Diseased Plant: A Treatise on Anatomical, Morphological and Metabolic changes under Pathogenesis".

REVIEWING COMMITTEE

During the year under report the Government of India appointed a Reviewing Committee under the Chairmanship of Shri S. P. Nautiyal, Chairman, Wadia Institute of Himalayan Geology, Dehra Dun to review the work and progress of Birbal Sahni Institute of Palaeobotany since the last Reviewing Committee appointed in September, 1966 in the light of its recommendations and in accordance with the Memorandum of Association of the Institute.

DISTINGUISHED VISITORS

1. Mr Jack Galson.
   National University, Australia

2. Dr T. Marsewski,
   Krakow Ul. Na Blonie, 3B, M 75, Poland

3. Mr Takeo Miyaka,
   2-38-15, Wakamiya Naka No Tokyo, Chuo University, Japan

4. Mr M. Hari Narayana,
   Director of Museum, Govt. of Tamil Nadu, Madras

5. Mr Knut Norstog,
   Fairchild Tropical Garden, Miami, Florida (U.S.A.)

6. Mr C. Ramasastry,
   Sr. Professor of Physics, Indian Institute of Technology, Madras-600 036

7. Dr Tim Sandberg,
   Professor of Pharmacognosy, University of Upsala, Sweden

8. Dr Siwechi,
   Institute of Dendrology, Kornitz, Poland

9. Dr Mrs Julia Szujko-Lacza,
   Director, Hungarian Natural History Museum, Budapest, Hungary

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

1. THE GOVERNING BODY

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 Science,
Law College Road,
Pune-411 004

Members

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

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

Shri Sardar Husain,
Superintending Engineer,
XXV Circle, P. W. D., Gulistan Colony,
Lucknow

Shri 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 DIRECTORS

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.
Shri Manoj Shukla, M.Sc., Ph.D.
Dr J. P. Mandal, M.Sc., Ph.D.
Dr M. N. V. Prasad, M.Sc., Ph.D.
Shri D. E. P. Jayasinghe, M.Sc. (Research Scholar: U. G. C. Teacher Fellow)

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.
Dr (Miss) Zeba Bano, M.Sc., Ph.D.
Shri B. N. Jana, M.Sc.

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.
Shri Jaswant Singh Guleria, M.Sc.
Miss C. Lalitha, M.Sc.
Shri S. D. Bonde, M.Sc. (J. S. A. w.e.f. 7.10.78)
Shri R. R. Yadav, M.Sc. (Research Scholar w.e.f. 18.9.78)

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.
Dr Pramod Kumar, M.Sc., Ph.D.
Shri S. K. Kulshreshtha, M.Sc.
Dr Mrs Archana Tripathi, M.Sc., Ph.D.
Dr (Miss) Vijaya Rana, M.Sc., Ph.D.
Shri Rakesh Saxena, M.Sc. (J. S. A. w.e.f. 30.9.78)
Shri B. K. Misra, M.Sc.

DEPARTMENT OF QUATERNARY PALYNOLOGY

Dr Vishnu-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.S . .D.
Shri A. K. Saxena, M.Sc.
Shri Kamla Prasad, M.Sc.
Shri Amalava Bhattacharyya, M.Sc. (J.S.A. w.e.f. 3.10.78)

DEPARTMENT OF OIL PALYNOLOGY

Dr Haripall Singh, M.Sc., Ph.D. (Asstt. Director w.e.f. 21.9.1978)
Dr K. P. Jain, M.Sc., Ph.D.
Dr R. K. Kar, M.Sc., Ph.D.
Dr R. Y. Singh, M.Sc., Ph.D. (on lien w.e.f. 21.3.79)
Dr R. K. Saxena, M.Sc., Ph.D.
Shri S. K. M. Tripathi, M.Sc.
Shri Rahul Garg, M.Sc.
Shri M. R. Rao, M.Sc.
Shri S. Sarkar, M.Sc. (Research Scholar w.e.f. 13.10.78)

C-14 LABORATORY

Dr G. Rajagopalan, M.Sc., Ph.D. (Bombay)
Shri Dev Kumar Biswas, M.Sc. (J.S.A. up to 30.11.78)

PUBLICATION

Shri Jaswant Singh, M.Sc. (Asstt. Editor)
Shri S. B. Verma, M.A., B.Com., D.P.A. (Publication Incharge w.e.f. 1.6.78)

LIBRARY

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

MUSEUM

Shri G. P. Srivastava, M. Sc. (Curator w.e.f. 3.7.78)
Shri N. C. Saxena, B. A. (Museum Assistant)
Shri J. C. Srivastava, M. Sc. (Offg. Junior Museum Assistant)

HERBARIUM

Dr H. A. Khan, M. Sc., Ph. D. (Curator)
Shri Diwakar Pradhan, B. Sc. (Herbarium Assistant)
Shri A. K. Singh Rathore, B. Sc. (Herbarium Assistant)

LABORATORY SERVICES

Shri H. N. Boral, B. Sc. (S. T. A.)
Shri B. Sekar, B. Sc. (S. T. A.)
Miss Asha Guleria, B. Sc. (J. T. A.)
Miss Madhabi Chowdhury, B. Sc. (J. T. A.)
Miss Indra Kumari, B. Sc. (J. T. A.)
Shri D. C. Joshi, B. Sc. (J. T. A.)
Miss Kamla Amarlal, B. Sc. (J. T. A.)
Shri N. K. Khasnavis, B. Sc., LL. B. (J. T. A.)
Shri I. J. Mehra, B. A. (Lab. Assistant)
Shri A. K. Ghosh (Electrician)
Shri T. K Mandal, M. Sc. (J. T. A. w.e.f. 26.7.78)
Shri K. Rehman, B. Sc. (J. T. A. up to 11.1.79)
Shri Vijay Singh Panwar (Glass Blower)
Shri P. S. Salujha (Mechanic)

PHOTOGRAPHY AND DRAWING

Shri S. S. Rana (Artist) (on lien w.e.f. 5.4.77 for 2 years)
Shri Pramod Kumar Bajpai (Artist w.e.f. 28.1.78)
Shri P. C. Roy (Photographer)

STORES

Shri Harjeet Singh, B. A.

ACCOUNTS

Shri Ghanshyam Singh, B. Com. (Accounts Officer)
Shri T. N. Shukla, B. A. (Accountant w.e.f. 1.12.78)
Shri B. K. Jain, B. A. (Junior Accountant w.e.f. 1.12.78)
Shri N. N. Joshi (U. D. C.)
Shri R. K. Takru, B. A. (U. D. C.)
Shri Baby Yohannan (L. D. C. up to 6.2.79)

ADMINISTRATION

Shri Gurcharan Singh, M. A., LL. B. (Registrar)
Shri V. P. Gulati (Deputy Registrar)
Shri S. D. Mehtani (Deputy Registrar w.e.f. 30.10.78)
Shri S. K. Suri (Stenographer)
Shri S. P. Chadha, B. A. (P. A. to Director)
Shri H. S. Srivastava, B. Com. (Office Asstt. w.e.f. 11.2.78)
Shri Bhagwan Singh (U. D. C. Special Grade w.e.f. 8.12.78)
Mrs P. K. Srivastava (Receptionist)
Shri I. J. S. Bedi (Steno-typist)
Shri Ramesh Chandra (L. D. C.)
Shri R. K. Kapoor (L. D. C.)
Mrs V. Nirmala (L. D. C.)

Statement of Accounts for the Year 1978-79

BIRBAL SAHNI INSTITUTE

BALANCE SHEET AS

LIABILITIES		AMOUNT Rs.	AMOUNT Rs.
Capital Fund :			
Balance as per last year's Balance Sheet ..		43,93,076.26	
Add: Government of India non-recurring grant		5,50,000.00	
Recurring grant used for creating fixed assets :			
Maps & Topo sheets	6.55		
Books & Journals	3,458.58		
Works & Building	30,487.53		
Furniture & Fixtures (out of field excursion)	1,599.84	35,552.50	
Refund by M.M.T.C. on Capital account		93.00	
		49,78,721.76	
Less: Refund out of Capital grants	360.69		
Value of Station Wagon/ w/off	5,161.77	5,522.46	49,73,199.30
Reserves & Surplus :			
Excess of Revenue Grant over Revenue Expenditure			3,09,823.34

OF PALAEOBOTANY, LUCKNOW

ON 31st MARCH, 1979

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	14,44,577.70	
Additions during the year	92,483.46	15,37,061.16
Apparatus & Equipments		
Research Apparatus & Equipments :		
As per last year's Balance Sheet	8,06,311.52	
Additions during the year	3,76,261.86	11,81,573.38
Workshop Equipment :		
As per last year's Balance Sheet	62,213.95	
Additions during the year	5,160.90	67,374.85
Office & Miscellaneous equipments :		
As per last year's Balance Sheet	94,016.77	
Additions during the year	6,398.94	1,00,415.71
Establishment of C-14 Lab :		
As per last year's Balance Sheet	6,71,154.15	
Additions during the year ..	56,514.96	7,27,669.11
Plant & Machinery :		
As per last year's Balance Sheet	1,07,075.54	
Additions during the year	21,782.88	1,28,858.42

LIABILITIES	AMOUNT Rs.	AMOUNT Rs.
Donated Funds/Grants		
Cost of land Donated by U.P. Government	32,292.00	
M.G.T. Scheme (C.S.I.R.)	8,100.79	
Coal Scheme (C.S.I.R.)	7,784.66	
Palynology Scheme (C.S.I.R.)	5,207.87	
Rajasthan Scheme (Sponsored by University of Wisconsin)	58,913·25	
U.N.E.S.C.O. Aid Fund	19,629.75	
C.D.P. Memorial Fund	1,626.88	
CLK Memorial Fund	2,218.50	
P.C.B. Memorial Fund	1,976.75	
A. C. Seward Memorial Fund	6,034.50	
P. K. Srivastava Memorial Fund	2,780.00	
Gift in kind—Humboldt Foundation, W. Germany	75,000.00	
Founder's Donation	1,52,500.00	
Burma Oil Company Donation	1,900.00	
Dorothy Walton	352.70	
Other Donation funds	7,383.40	3,83,701.05
General Provident Fund		8,31,419.80
Current Liabilities & Provisions :		
Security & Earnest Money deposit	2,028.20	
Value of Priced Publication (As per contra)	3,76,185.33	
Advances and loans to employees (As per contra)	2,61,728.00	6,39,941.53
Total carried over		71,38,085.02

ASSETS	AMOUNT Rs.	AMOUNT Rs.
Apparatus & Equipment (Donated)		
M.G.T. Scheme	7,155.79	
Burmah Oil Company	700.00	
Founder's Donation	2,500.00	
Coal Scheme	6,645.29	
Palynology Scheme	5,207.87	
Rajasthan Scheme	21,138.90	
U.N.E.S.C.O. Aid Equipment	19,629.75	
Humboldt Foundation W. Germany (Gift of Microscope)	75,091.50	1,38,069.10
Vehicles :		
As per last year's Balance Sheet	1,24,936.51	
Additions during the year	803.25	
	1,25,739.75	
Less : Value of Station Wagon sold	5,161.77	1,20,577.99
Furniture & Fixtures :		
Balance as per last year's Balance Sheet	4,75,600.31	
Additions during the year	43,180.09	5,18,780.40
Furniture & Fixtures (Donated)		
Burmah Oil Company ..	1,200.00	
M.G.T. Scheme	945.00	
Coal Scheme	1,139.37	
Rajasthan Scheme	979.70	4,264.07
Founder's Library Donated :		50,000.00
Books & Journals :		
As per last year's Balance Sheet	1,71,369.36	
Additions during the year	33,132.12	2,04,501.48
Total carried over		48,11,437.67

LIABILITIES	AMOUNT Rs.	AMOUNT Rs.
Total B/F		71,38,085.02
Total B/F		71,38,085.02

ASSETS		AMOUNT Rs.	AMOUNT Rs.
Founder's Fossil Collected (Donated)		50,000.00	
Maps and Toposheets:			
As per last year's Balance Sheet	9,206.96		
Additions during the year ..	6.55	9,213.51	48,70,651.18
Investments (Donation Account):			
Current Assets & Loans and Advances:			
(A) Current Assets :			
The Palaeobotanist			
(Vol. 1-24)	1,63,689.83		
Symposium	59,180.00		
Autmn School Proceedings	28,800.00		
Monographs	42,550.00		
Seward Mem. Lecture	25,129.00		
Birbal Sahni Memorial Lecture	8,950.00		
Silver Jubilee Lecture	5,588.00		
Catalogue of Indian Fossil Plants	30,075.00		
Picture Post Cards	12,223.50	3,76,185.33	

LIABILITIES	AMOUNT Rs.	AMOUNT Rs.
Total B/F		71,38,085.02
Total		71,38,085.02

Auditor's Report :

As per our attached report of even date.

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

ASSETS	AMOUNT Rs.	AMOUNT Rs.
U.N.E.S.C.O. Coupons	793.02	
Cash & Bank Balance		
Cash in hand (Imprest) with State Bank of India	65.60	
Current Account	7,21,926.34	10,98,970.29
(B) Loans & Advances :		
Unsettled Advances (C.R.) A/c Plan	9,260.00	
Unsettled Advance (C. R.) A/c Non-Plan	38,874.51	
Unsettled Advance (C. N. R.) A/c	13,181.24	
Festival Advance to Staff	9,160.00	
Conveyance Advance to Staff	40,372.00	
Natural Calamities Advance to Staff	24,860.00	
House Building Advance to Staff	1,87,336.00	3,23,043.75
General Provident Fund :		
Investments	5,72,000.00	
Advance out of G. P. Fund	1,29,399.00	
Insurance Policies subscribed out of G. P. Fund	31,530.00	
With State Bank of India S/B (G. P. Fund) A/c	98,490.80	8,31,419.80
Total		71,38,085.02

Sd/- Ghanshyam Singh
Accounts Officer

Sd/- Gurcharan Singh
Registrar

Sd/- K. R. Surange
Director

BIRBAL SAHNI INSTITUTE OF

INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Academic Expenses :			
To Pay & Allowances of Academic Staff	3,12,102.98	5,60,944.35	8,73,047.33
To Field Excursion	34,730.94	5,795.71	40,526.65
To Remuneration of Birbal Sahni Professor	36,000.00	..	36,000.00
To Honorarium to Lecturers :			
(i) Birbal Sahni Mem. Lect.	..	350.00	350.00
(ii) Silver Jubilee Lect.	..	350.00	350.00
To Training of Academic Staff	..	850.00	850.00
To International Programme :			
Deputation abroad	..	9,086.05	9,086.05
Expenses of Services Ancilliary to Research :			
To Pay & Allowance of Auxilliary Tech. Staff ..	34,100.08	2,36,381.38	2,70,481.46

PALAEOBOTANY, LUCKNOW

FOR THE YEAR ENDING 31st MARCH, 1979

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Balance of Last Year's Grant of Revenue Account allowed for the expenditure during Current Year	1,13,060.73	3,22,862.30	4,35,923.03
By Grants from Government of India on Revenue Account	5,03,000.00	16,80,000.00	21,83,000.00
By grant from U. P. Govt. on Revenue Account	..	5,000.00	5,000.00
By grants from other Organisations :			
(i) University Grants Commission's Fellowship	..	6,012.23	6,012.23
By Sale Proceeds of Priced Publications :			
(i) The Palaeobotanist	..	85,963.82	85,963.82
(ii) Monograph	..	295.85	295.85

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Chemicals & Glasswares, Photo-goods & Small App. etc.	36,686.03	86,767.66	1,23,453.69
To Library Requirements	..	2,217.55	2,217.55
To Herbarium Requirements	..	524.80	524.80
To Museum Requirements	957.75	3,274.75	4,232.49
To Maintenance of Equip. Apparatus & Workshop Machinery	13,642.27	..	13,642.27
To Publication Expenses :			
"The Palaeobotanist"	..	81,248.40	81,248.40
Spl. Publication Monograph on Glossopteris flora	..	7,481.14	7,481.14
Birbal Sahni Mem. Lecture	..	2,375.79	2,375.79
Silver Jubilee Lecture	..	2,032.45	2,032.45
Annual Report	..	3,174.00	3,174.00
Seward Memorial Lecture	..	843.57	843.57

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
(iii) Symposium Spl. Publications	..	3,937.35	3,937.35
(iv) Seward Mem. Lecture	..	284.00	284.00
(v) Birbal Sahni Mem. Lecture	..	209.00	209.00
(vi) Silver Jubilee Mem. Lecture	..	30.00	30.00
(vii) Picture Post Cards	..	487.45	487.45
(viii) Catalogue of Indian Fossil Plants	..	1,676.25	1,676.25
(ix) IV I.P.C. Proceedings	..	500·13	500.13
By Miscellaneous Receipts and Recoveries :			
(i) Vehicle Charges	..	393.36	393.36
(ii) By Telephone Charges	..	1,158.45	1,158.45
(iii) By Visiting Scientist Room Charges	..	265.00	265.00
(iv) By Application Fees	..	1,738.50	1,738.50

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Travelling and Other Allow. : For Governing Body, Scientific Programmes, and Evaluation Committee & Selection Committee Meeting	297.40	28,301.09	28,598.49
For attending Scientific meetings and Conferences in India and for other purpose ..	5,638.23	9,321.33	14,959.56
For reimbursement of Medical expenses	3,024.96	18,488.43	21,513.39
For Overtime Allowance	43.20	1,101.06	1,144.26
For Leave Travel Concession ..	3,586.40	12,424.53	16,010.93
For Reimbursement of Tuition Fees	505.00	749.25	1,254.25
To Child Education Allowance	..	360.00	360.00
To Pensionary Expenses : (i) To Superanuation Allowance and Pension	..	47,812.20	47,812.20

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
(v) Miscellaneous Receipts and Recoveries ..	1,638.62	7,702.99	9,341.61
(vi) Recoveries of Conv. Advance ..	..	18,087.00	18,087.00
(vii) Recoveries of Fest. Adv. ..	..	6,700.00	6,700.00
(viii) Interest on Advance (Con. Advance)	..	171.99	171.99
(ix) Recoveries of Calamities Advance	..	4,580.00	4,580.00
(x) Recoveries of House building Advance	..	2,664.00	2,664.00
(xi) C.D.S. Addl. D.A. from R.P.F. Commissioner, Kanpur	..	51,719.29	51,719.29
(xii) Pension contribution of Dr S. C. D. Sah & others	..	757.49	757.49
(xiii) Leave Salary contribution of Dr S. C. D. Sah	..	7.86	7.86

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
(ii) G.P.F. Interest	..	10,608.90	10,608.90
To General Expenses:			
To Pay & Allowance of Adm. Staff	30,740.73	3,06,053.01	3,36,793.74
To Telephone & Trunk Call Ch.	..	21,335.55	21,335.55
To Postage	..	8,627.65	8,627.65
To Advertisement Charges	13,994.62	18,952.26	32,946.88
To Hot & Cold weather Charges	1,000.00	4,307.61	5,307.61
To Petrol & Mobil Oil	795.31	5,572.79	6,368.10
To Electricity Charges	20,489.43	9,180.68	29,670.11
To Municipal Taxes	..	11,500.00	11,500.00
To Insurance of Vehicle & Library	..	1,617.00	1,617.00
To Uniform of Class IVth Employees	864.96	6,698.92	7,563.88
To Printing & Stationery	9,527.80	15,604.88	25,132.68
To custom duty and port trust charges	..	..	..
To Rly. Ft. & Carriage	..	1,910.58	1,910.58
To Entertainment Allow. to Director	..	2,381.77	2,381.77
To Misc. & Unforeseen	9,658.30	22,529.05	32,187.35

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
(xiv) Employees Insurance Scheme	1,001.50	4,931.50	5,993.00
Total	6,18,700.85	22,08,135.81	28,26,836.66

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Maintenance Expenses :			
To Building	..	6,724.25	6,724.25
To Garden	..	4,653.30	4,653.30
To Vehicle	8,585.15	5,729.46	14,314.61
To Repairs & Renewals	..	8,223.70	8,223.70
To petty construction	4,200.00	14,773.73	18,973.73
To Other Expenses :			
To legal advice	..	377.50	377.50
To Medical Advice	..	32.00	32.00
To Festival Advance & Natural Calamity Advance	..	40,900.00	40,900.00
To Conveyance advance	..	20,775.00	20,775.00
To Welfare Expenses :			
Financial Assistance to Departmental Canteen	..	5,947.22	5,947.22
To house building advance	..	1,90,000.00	1,90,000.00
To U.G.C. Expenses :			
To Fellowship	..	7,232.13	7,232.13

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F	6,18,700.85	22,08,135.81	28,26,836.66
Total	6,18,700.85	22,08,135.81	28,26,836.66

EXPENDITURE	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To Government of India Scholarship Expenses :	..	9,618.07	9,618.07
To Expenditure out of Receipts : C. D. S. Addl. D. A. from R. P. F. Commissioner, Kanpur	..	51,719.29	51,719.29
Excess of Income over Expenditure	37,529.31	2,72,294.03	3,09,823.34
Grand Total	6,18,700.85	22,08,135.81	28,26,836.66

Sd/- Ghanshyam Singh
Accounts Officer

Sd/- Gurcharan Singh
Registrar

INCOME	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total B/F	6,18,700.85	22,08,135.81	28,26,836.66
Grand Total	6,18,700.85	22,08,135.81	28,26,836.66

Sd/- K. R. Surange
Director

Auditor's Report

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

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

BIRBAL SAHNI INSTITUTE OF

RECEIPT AND PAYMENT ACCOUNT FOR

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs
To Opening Balance:			
Bank Account	2,82,247.18	3,19,761.45	6,02,008.63
Cash Account	..	130.95	130.95
Oil India Account :			
Cash Account	..	..	..
Bank Account	..	761.73	761.73
Donation Account :			
Bank Account	..	6,252.73	6,252.73
Refund of Excursion Advance	..	..	..
To Govt. of India Grants (Cap. A/c)	5,50,000.00	..	5,50,000.00
To Govt. of India Grants (Rev. A/c)	5,03,000.00	16,80,000.00	21,83,000.00
To Govt. of U. P. Rec. Grants	..	5,000.00	5,000.00
To Grants from Organisations :			
Bank Account (O.B.)	..	2,969.90	2,969.90
To University Grants Commission	..	6,012.23	6,012.23
Sale Proceeds of Publications :			
The Palaeobotanist	..	85,963.82	85,963.82

PALAEOBOTANY, LUCKNOW

THE PERIOD 1.4.1978 TO 31.3.1979

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Capital Account by Opening Balance :			
By Works & Building	64,527.80	..	64,527.80
By App. & Equipments :			
By Res. App. & Equipment	3,96,681.34	..	3,96,681.34
By Equip. for Services Ancilliary to Research :			
Photography Section	3,885.60	..	3,885.60
Library	29,995.43	..	29,995.43
Museum	935.21	..	935.21
Office & Misc. Equipment	27,646.78	..	27,646.48
C-14 Laboratory	13,702.89	..	13,702.89
By Furniture & Fixtures:	31,795.04	..	31,795.04
By Refund of Grants to Govt. :			
Capital Grants	360.69	..	360.69
By refund of grants to Oil India	..	761.74	761.74
Pay and Allowances :			
Pay (Academic)	2,16,942.42	3,97,040.73	6,13,983.15

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Monograph	..	295.85	295.85
Symposium	..	3,937.35	3,937.35
Catalogue	..	1,676·25	1,676.25
Seward Mem. Lecture	..	284.00	284.00
Birbal Sahni Mem. Lecture	..	209.00	209.00
Picture Post Cards	..	487.45	487.45
Silver Jubilee Mem. Lecture	..	30.00	30.00
IV. I.P.C.	..	500·13	500.13
To Administrative Receipts :			
Income-tax	13,473.00	27,061.00	40,534.00
Insurance premium (S. S. Scheme)	17,485.06	30,431.84	47,916.90
C.T.D. (Post Office)	1,440.00	6,720.00	8,160.00
Vehicle Charges	..	393.36	393.36
Telephone Charges	..	1,158.45	1,158.45
V. S. Room Charges	..	265.00	265.00
Recovery of advances under G.P.F.	14,495.00	69,876.00	84,371.00
G.P.F. Subscription	35,414.00	1,11,439.00	1,46,853.00
Miscellaneous Receipts & Recoveries	1,638.62	7,702.99	9,341.61

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Pay (Auxiliary Technical)	20,902.35	1,44,582.92	1,65,485.26
Pay (Administrative)	17,742.07	1,89,020.86	2,06,762.93
Dearness Allowance & A.D.A.	80,876.96	2,59,560.60	3,40,437.56
House Rent Allowance	30,299.15	84,040.80	1,14,339.95
City Compensatory Allow.	10,180.84	29,132.84	39,313.68
Children Educational Allow.	..	360.00	360.00
Overtime Allowance	43.20	1,101.06	1,144.26
Reimbursement of Medical Exp.	3,024.96	18,488.43	21,513.39
Reimbursement of Tuition Fees	505.00	749.25	1,254.25
Leave Travel Concession	3,586.40	12,504·53	16,090.93
By Fellowship to U.G.C. Fellow	..	7,232.13	7,232.13
By Remuneration to Birbal Sahni Professor	36,000.00	..	36,000.00
By Travelling Allowance :			
For Governing Body & Selection Committee meeting	297.40	17,979.89	18,277.29

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
C. D. S. Receipts from R. P. F. Commissioner, Kanpur	..	51,719.29	51,719.29
Application fees	..	1,738·50	1,738.50
Pension Contribution	..	757.49	757.49
Leave salary contribution of Dr S. C. D. Sah	7.86	7.86	7.86
Birbal Sahni Institute of Palaeobotany Co-operative credit Society	1,947.25	6,464.80	8,412.05
For Loans and Advances :			
Recovery of Festival Advance	..	6,700.00	6,700.00
Recovery of Conveyance advance	..	18,087.00	18,087.00
Recovery of Natural Calamity Adv.	..	4,580.00	4,580.00
Interest on conveyance Advance	..	171.99	171.99
Recovery of House Building Adv.	..	2,664.00	2,664.00
To Deposits :			
Employees Insurance scheme	1,001.50	4,931.50	5,933.00

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For attending meeting & Conference in India and other purposes	5,638.23	20,022.53	25,660.76
By Maintenance of Property :			
For Building	..	6,724.25	6,724.25
For Garden	..	4,653.30	4,653.30
For Equipment & Apparatus	13,642.27	..	13,642.27
For Vehicles	8,585.15	5,729.46	14,314.61
For Repairs & Renewals	..	8,223.70	8,223.70
For petty construction	7,250.00	14,773.73	22,023.73
By Contingencies :			
By Telephone & Trunk Call ch.	..	21,335.55	21,335.55
For Postage	..	8,727.65	8,727.65
For advertisement	13,994.62	18,952.26	32,946.88
For Hot & Cold weather charges	1,000.00	4,307.61	4,307.61
For Petrol & Mobil Oil	795.31	5,972.79	6,768.10
For Municipal taxes	..	11,500.00	11,500.00

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Security Deposits	6,464.00	..	6,464.00
To Misc. Receipts on Capital Account	3,29,874.41	..	3,29,874.41
Donation and Endowments :			
Proceeds of Matured securities	..	2,000.00	2,000.00
Interest	..	120.00	120.00
Refund of undisbursed account of Honorarium for Sri A. C. Seward Memorial Lecture	..	350.00	350.00
Total	17,58,480.02	24,69,612.92	42,28,092.94

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Insurance of Vehicle and Library	..	1,617.00	1,617.00
For Liveries to Sub-Staff	864.96	6,698.92	7,563.88
For Printing & Stationery	10,027.80	15,604·88	25,632.68
For custom duty & port trust charges	..	..	..
For Railway Ft. & Carriage	..	2,110.58	2,110.58
For entertainment Allowance to Director	..	2,381.77	2,381.77
For Misc. & Unforeseen	9,658.30	22,529.05	32,187.35
For Chemicals & Glasswares	36,686.03	88,539.70	1,25,225.73
For Library Requirements	..	19,871.77	19,871.77
For Herbarium Requirements	380.00	542.80	904.80
For Museum Requirements	957.75	3,462.99	4,420.74
For Legal Advice	..	377.50	377.50
For C. D. S. from R. P. F. Commissioner, Kanpur	..	51,719.29	51,719.29

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
Total	17,58,480.02	24,69,612.92	42,48,092.94
Total	17,58,480.02	24,69,612.92	42,28,092.94

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Medical Advice	..	32.00	32.00
For Publications :			
The Palaeobotanist	..	82,048.40	82,048.40
For Special Publication	..	7,481.14	7,481.14
Monograph on Glossopteris flora			
For Seward Memorial Lecture	..	843.57	843.57
For Annual Report	..	3,174.00	3,174.00
For Birbal Sahni Mem. Lecture	..	2,375.79	2,375.79
For Silver Jubilee Mem. Lecture	..	2,032.45	2,032.45
For Academic Expenses :			
For Field excursion	40,060.94	21,095.71	61,156.65
Birbal Sahni Mem. Lecture	..	350.00	350.00
Sir A. C. Seward Mem. Lecture out of Donation Account	..	350.00	350.00

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
	17,58,480.02	24,69,612.62	42,28,092.94
Total	17,58,480.02	24,69,612.92	42,28,092.94

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
For Silver Jubilee Lecture	..	350.00	350.00
For training of Academic staff at G.S.I. Camp	..	850.00	850.00
By International Programme			
Air passage for members of staff proceedings on foreign fellowships or invited to attend scientific meetings & conferences abroad	..	11,086.05	11,086.05
By Welfare Expenses :			
Financial assistance to departmental canteen	..	5,947·22	5,947.22
By G.P.F. Account :			
1. G.P.F. Sub. transferred to G.P.F. A/c	35,414.00	1,11,439.00	1,46,853.00
2. Recovery of Advances transferred to G.P.F. A/c	14,495.00	69,876.00	84,371.00
3. G.P.F. Interest	..	10,608.90	10,608.90

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
	17,58,480.02	24,69,612.92	42,28,092.94
Total	17,58,480.02	24,69,612.92	42,28,092.94

PAYMENTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
By Miscellaneous :			
Income-tax remitted	13,473.00	27,061.00	40,534.00
Insurance premium remitted	17,485.06	30,431.84	47,916.90
C.D.S. Addl. D.A. remitted	..	..	..
C.T.D Amount remitted	1,440.00	6,720.00	8,160.00
B. S. I. P. Coop. credit Society	1,947.25	6,464.80	8,412.05
By Govt. of India Scholarships	..	9,618.07	9,618.07
By Loans & Advances			
Natural Calamity advance & Festival advance	..	40,900.00	40,900.00
Conveyance advance	..	20,775.00	20,775.00
House Building Advance	..	1,90,000.00	1,90,000.00
By Oil India Expenses	..	..	..
By Amount transferred to C. R. Deposit Account	..	..	..
By Refunds out of Deposits	34,064.00	..	34,064.00

RECEIPTS	PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
	17,58,480.02	24,69,612.92	42,28,092.94
Grand Total	17,58,480.02	24,69,612.92	42,28,092.94
	28,269.31	4,51,930.38	4,80,199.69
Central Recurring			2,31,103.79
U.G.C.			1,750 00
Donation & Endowment			8,372 73
IV. I.P.C. A/c			500.13
Cash in hand			65.60
			2,41,792.25

Sd/- Ghanshyam Singh
Accounts Officer

Sd/- Gurcharan Singh
Registrar

Sd/- K. R. Surange
Director

PAYMENTS		PLAN Rs.	NON-PLAN Rs.	TOTAL Rs.
To M/s Jyoti Trader Linkers	2,408.00			
To M/s Ram Dayal Ram Jas	31,064.00			
	34,064.00			
By Pension and Superannuation		..	47,812.20	47,812.20
By Closing Balance		4,80,199.69	2,41,792.25	7,21,991.94
Grand Total		17,58,480.02	24,69,612.92	42,28,092.94

Recurring
65.60

Non-recurring
Nil

Auditor's Report

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

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

R. N. Khanna & Co.
Chartered Accountants

3, Kabir Marg,
Clay Square,
Lucknow-226 001

BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY LUCKNOW

Auditor's Report :

We have audited the attached Balance Sheet of BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY, LUCKNOW as at 31st March, 1979 and Income & Expenditure Account annexed thereto for the year ended on that date and report as under :

(i) No depreciation are provided on the fixed assets.

(ii) Fixed assets are shown at cost.

(iii) The stocks of priced publications are valued at sales price.

(iv) Out of recurring Government grant, the following Capital expenditures were incurred and Capital expenditures were capitalised :

	Rs.
Maps & Topo Sheets	6.55
Books & Journals	3,458.58
Works & Building	30,487.53
Furniture & Fixture (out of field excursion)	1,599.84
..	35,552.50

(v) Rs. 5,151.77 was incurred in procuring Station Wagon in the year 1947-48. It was sold during the year therefore its value was adjusted from the Vehicle account and Capital fund account. The sale proceeds of station wagon is credited under the head miscellaneous receipts.

Subject to above remarks, we have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of audit. In our opinion and to the best of our information and according to the explanations given to us the said accounts give a true and fair view of :

(i) In the case of Balance Sheet of the state of affairs of the Institute as at 31st March, 1979.

(ii) In the case of Income and Expenditure account of the excess of Revenue grant over Revenue expenditure.

Further to report that subject to above remarks the Institute had utilized the Government Grants for the purpose it were sanctioned.

For, R. N. KHANNA & COMPANY,
Chartered Accountants
Sd/- R. N. KHANNA,
9.8.79

Seal