



Birbal Sahni Institute of Palaeobotany

(An Autonomous Institution under Department of Science and Technology, Government of India)

NEWSLETTER

No. 12

November, 2009

From Director's Desk

Contents

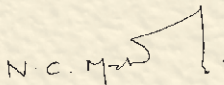
BSIP's Progress	03
Foundation Day	04
Jubilee Lecture	04
Founder's Day	05
Seward Memorial Lecture	05
Birbal Sahni Memorial Lecture	06
Diamond Jubilee Lecture	07
Lectures delivered	07
Medals and Awards	09
National Science Day	09
Publications Released	11
Participation of the Staff in	11
Scientific/Technical Meets	
Staff News	14
Research Notes and Articles	15
Conference, Symposium,	18
Workshop and Training Reports	
Doctoral Degree Awarded	28
Library	29
Sponsored Projects	31
हिन्दी परिशिष्ट	33
राजभाषा की स्थिति	33
सावित्री साहनी महिला समिति	34

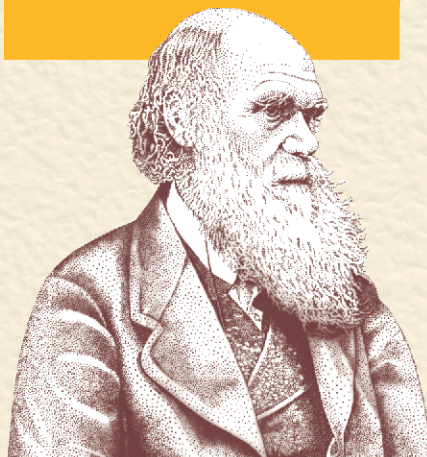


November is a busy month for BSIP. It has two themes – Founder's Day Function and two Memorial Lectures. It is the occasion to assess our past performance and to rededicate ourselves to the lofty ideals of the Founder. I always had feeling that success has no short-cuts. Over the past five years we took certain initiatives for the progress of the Palaeobotany and infuse new developments into the system. The results of these initiatives have started reflecting in our annual reports. In the present issue of BSIP Newsletter some of these achievements are presented and also new steps taken to enhance visibility of scientific activities and innovative approaches are also mentioned. Scientific and technical staff is continuously trained in recent new developments in Science. Newly recruited staff and new research scholars have been imparted Geological Training and Orientation Courses. Last year, BSIP sponsored a Conference organized by the Palaeobotanical Society on *Plant Life through the Ages*. A large number of scientific and technical staff participated in the Conference. The numbers of Extra Mural Projects currently implemented in the institute have increased to 18 from 15. I have a strong conviction that for healthy growth of the institute we will have to increase the scholar-scientist ratio, we are continuously making efforts in this direction.

The Chairman and Governing Body of the Institute have been kind enough to approve the implementation of the recommendations of the VIth Pay Commission as applicable to the employees of the Government of India. All other facilities provided with the Pay Commission recommendations have also been extended to the staff members of the Institute. Research Advisory Council of the Institute has recommended certain new projects in a mission mode in the remote areas of the country and very important training in the field of sequence stratigraphy for the entire scientific members of BSIP. It has been very successfully concluded. It is felt that such training programmes should be organized regularly and hope to design training programmes suitable for our need in the future.

My thanks go to each one of you who have been involved in BSIP's growth and achievement. To all of your – former, present and future members of the BSIP community- thank you for the continued support.


(N. C. Mehrotra)

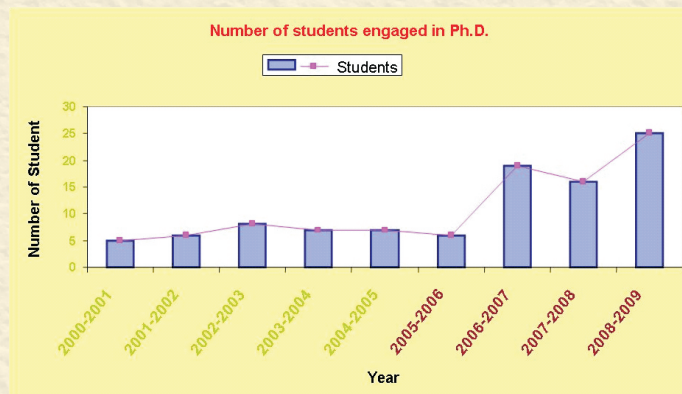
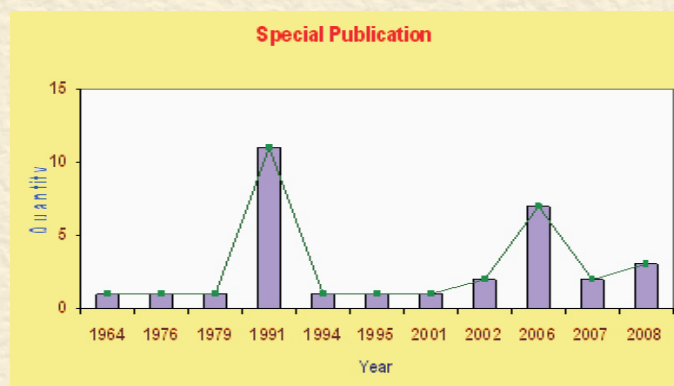
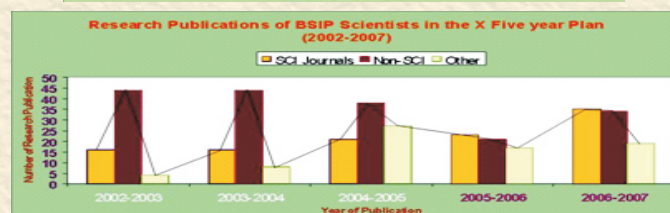
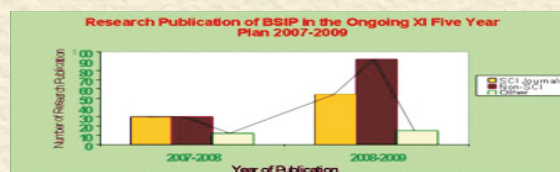
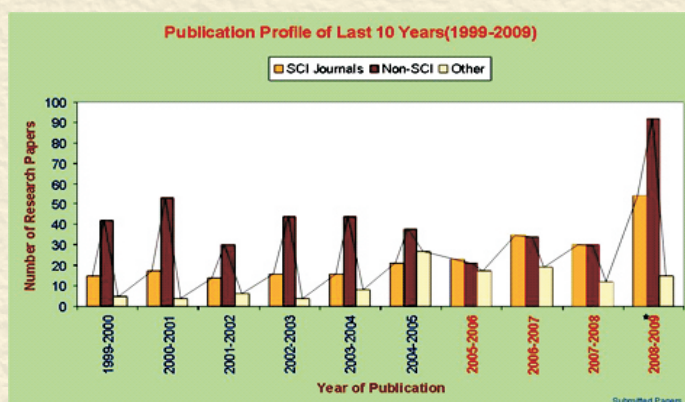
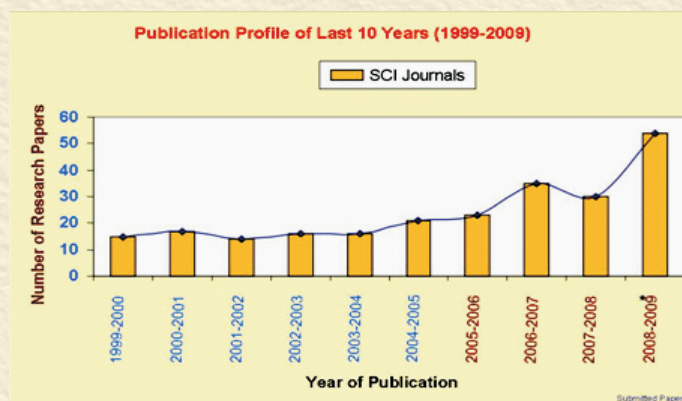
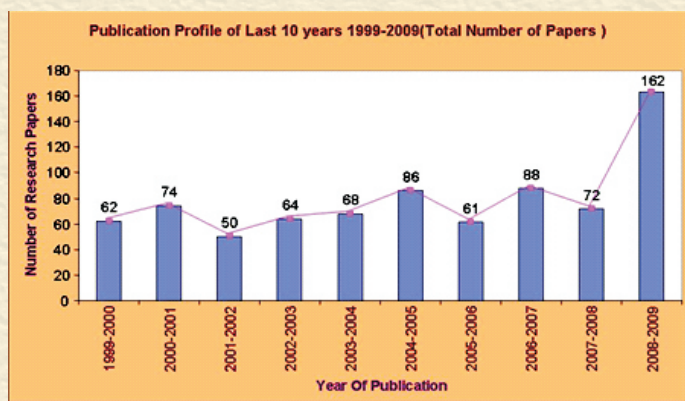


Ch. Darwin



Participants of the Conference on Plant Life through the Ages

BSIP's PROGRESS



- Nine BSRS and Six BSRAs (Birbal Sahni Research Associates) were appointed during 2005 - 2009. Presently 25 research personnel are working for their Ph. D. degree under the supervision of different scientists of the institute. The number of Research Scholars (both BSRS and Sponsored Projects), Research Associates has substantially increased in recent years.



FOUNDATION DAY

The Institute celebrated its 62nd Foundation Day on September 10, 2008. On this occasion Prof Sir Peter R. Crane, FRS, Professor in the Department of Geophysical Sciences, University of Chicago, USA delivered '12th Jubilee Commemoration Lecture'.

On the same evening, Dr (Mrs) Suman Keshari, Deputy Secretary, Department of Science and

Technology, New Delhi delivered a popular lecture in Hindi on *Motivation in Working Place: Some Thoughts (Karyakshetra mein Abhiprerana: kuchh vichar)* to mark the beginning of Hindi Pakhwara.

Professor A.S. Brar, Vice-Chancellor, University of Lucknow, Lucknow presided over the function. Many guests and scientists from outside the Institute attended the function.



Lighting the lamp on occasion of Foundation Day Function of BSIP (from left to right) Prof. Sir Peter R. Crane, FRS, Prof. A.S. Brar, Dr. N.C. Mehrotra, Dr. (Mrs.) Suman Keshari; Prof. Crane delivering Jubilee Lecture.

TWELFTH JUBILEE LECTURE

Prof Sir Peter R. Crane, F.R.S. Department of the Geophysical Sciences, University of Chicago, Chicago, USA delivered the Twelfth Jubilee Lecture on the topic Fossils and Angiosperm Evolution: Lessons from Fagales and Prospects for the Future.

Fossils and Angiosperm Evolution: Lessons from Fagales and Prospects for the Future

Over the last 30 years, angiosperm palaeobotany has matured greatly as a field and nowhere have the changes been more evident than in studies of the fossil history and evolution of Fagales. Three decades ago the potential evolutionary impact of angiosperm palaeobotany was only just beginning to be realized through more rigorous comparison of living and fossil angiosperms, attempts to reconstruct "whole angiosperm plants", and integration of information from fossil pollen and macrofossils. Several groups of "Amentiferae" were among the first to receive critical attention. Since then, knowledge of Fagales has been further illuminated by discoveries of mesofossil flowers of *Normapolles* and other taxa from the Late Cretaceous and by the rapid clarification of phylogenetic patterns based on both morphology and phylogenetic analyses of molecular data.

We now understand the limits of the Order, where it fits within angiosperm phylogeny, and we have a near complete understanding of how the ca. 35 extant genera

are interrelated. We also have information about phylogenetic and biogeographic patterns at the species level as well as diverse, well-preserved fossil leaves and reproductive structures that can be attributed to the group from both the Late Cretaceous and Cenozoic. These fossils help show us how much we miss when we think of Fagales only in terms of extant diversity, and they also calibrate the history of the group over more than 80 million years of earth history.

There is still much to be learnt about the evolution of Fagales and other groups of angiosperms from the discovery and description of well-preserved fossil material from the Cretaceous and Cenozoic. Continued study of extant angiosperms is also needed. However, continued systematization and synthesis is also necessary, so that systematics, which is often too narrowly construed, can develop into a true science of plant diversity in which living plants are placed in their appropriate historical context by understanding how they came to be.



FOUNDER'S DAY

The Institute celebrated its Founder– Prof Birbal Sahni's 117th Birth Anniversary on November 14, 2008. The Institute's staff and distinguished guests from other organizations offered *Pushpanjali* on the *Samadhi* of the Founder Professor Birbal Sahni, FRS in the campus. Same day in the evening two memorial lectures were organized.

Dr B.R. Arora, Director, Wadia Institute of Himalayan Geology, Dehradun delivered the '54th Sir Albert Charles Seward Memorial Lecture' on the fascinating topic *Geodynamic Evolution of Himalaya*.

Prof Song Ge, Director, Institute of Botany, Chinese Academy of Sciences, Beijing delivered the '38th Birbal Sahni Memorial Lecture' on the topic—*Molecular phylogeny and taxonomy of the rice tribe (Oryzeae) based on DNA sequences of multiple genes*.

Shri Rasik Ravindra, Director, National Centre for Antarctic and Ocean Research, Goa presided over the function. Many guests and scientists from outside the



Shri Rasik Ravindra, Director, NCAOR addressing guests and scientists

Institute and several symposium delegates attended the function.

SIR ALBERT CHARLES SEWARD MEMORIAL LECTURE

Dr B.R. Arora, Director, Wadia Institute of Himalayan Geology, Dehradun delivered the '54th Sir Albert Charles Seward Memorial Lecture' entitled Geodynamic Evolution of Himalaya on November 14, 2008.

Geodynamic Evolution of Himalaya



Dr. B.R. Arora

One of the challenging problems of the Himalayan Geology is the development of evolution model of the orogenic belt that can not only explain the archetype of the collision tectonics but can also trace the metamorphic history, extent and nature of crustal shortening, kinematics of

the crustal deformation as well as can provide clues to the space-time distribution of seismicity. Given the sensitivity of the electrical resistivity to fluids (free or fluid released by metamorphic dehydration) or temperature (partial melt), the presentation illustrated the merit of high-resolution resistivity images in constraining the geodynamic processes involved in the evolution of the Himalaya.

The deep resistivity section established from the inversion of long period magnetotelluric (MT) field recordings at 15 sites on a ~250 km long profile across the Indus Suture in NW Himalaya reveals a low resistivity layer at mid-crustal depth that exits beneath the full length of the profile. South of the Indus Suture, beneath the Tethyan Himalaya, this layer is characterized by a low

resistivity zone (~30 m) and represents the accreted sedimentary rocks overlying the underthrust Indian Plate, thus defining the Main Himalayan Thrust. North of the Indus Suture zone, the dipping low resistivity zone flattens out at 20-25 km depth and the resistivity decreases to around 5-10 Wm. The presence of partial melt and/or fluid phase has significant influence on rheology and can control channel flow. Thus, imaged distribution of resistivity at mid-crustal depth can be useful guide to test the role of the channel flow model in the emplacement of eclogite and other ultra high-pressure metamorphic rocks in the Higher Himalaya. The low resistivity marking presence of partial melt also symbolises low viscosity layer decoupling the upper crust from lower crust, allowing extrusion at surface while collision might continue at depth. The relative low conductance of this layer beneath NW Indian Himalaya compared to the Tibet allows imaging the geometry and extent of the underthrusting Indian Plate beneath the Trans Himalayan block, cutting across the collision zone.

The upper crust is generally resistive along most of the profile to a depth of 15 km. This is compatible with the exposed lithology of granitic rocks in the Laddakh Batholith and the crystalline gneissic basement beneath the Tethyan Himalaya. Embedded in the resistive crust, the Indus Suture is seen as a sub-vertical conductive



structure near surface but dips down steeply to the northeast to extend and merge with the mid-crustal low resistivity layer. The retention of vertical configuration of the Indus Suture is consistent with the palaeomagnetic data, which warrants slow rate of convergence between Indian and Asian Plates in this part of the Himalaya and also support GPS observations that post collision deformation strains are consumed by strike-slip movements along the Karakoram Fault.

The near surface resistivity distribution is dominated by the two narrow conductive zones in the northern and southern limbs of the Tso-Morari dome. These narrow conductivity structures may signify serpentinization of ultramafic section in the Tethyan ophiolite nappe wedge that was emplaced onto the India's massive margin prior to the continental collision. The serpentinization of ultramafics may be caused by the consumption of upward propagating fluids from the

underlying shelf sediments during the doming of the Tso-Morari dome.

In the Outer and Lesser Himalaya, the well designed MT investigations bring out the evidence of the presence of gently dipping mid-crustal conductor that define the cut-off depth of crustal seismicity and also corresponds with the plane demarcating alignment of hypocenters of large earthquakes of the region. The mapped mid-crustal conductor represents a thermal/metamorphic boundary below which fluids originating from the down-going sediments or produced by dehydration reactions are trapped. The fluid saturated zone tends to simulate onset of ductile behaviour in the crust and, thus, define the cut-off depth of crustal seismicity (brittle-ductile transitions). Further, the presence of fluids along the detachments/thrust planes serves as lubricant and, thus, reduces the sliding resistance. This can explain focusing of hypocenters on a linear plane.

BIRBAL SAHNI MEMORIAL LECTURE

Prof Song Ge, Director, Institute of Botany, Chinese Academy of Sciences, Beijing delivered the '38th Birbal Sahni Memorial Lecture' entitled Molecular phylogeny and taxonomy of the rice tribe (Oryzeae) based on DNA sequences of multiple genes on November 14, 2008.

Molecular phylogeny and taxonomy of the rice tribe (Oryzeae) based on DNA sequences of multiple genes



Dr. Song Ge

The tribe Oryzeae (Poaceae) includes approximately 12 genera and more than 70 species distributed throughout the tropical and temperate regions of the world. Species in the genus *Oryza* and other genera closely related to *Oryza* have been extensively studied either because of their agronomically useful traits in rice genetic improvement (wild species in *Oryza* and *Porteresia*) or because of their economic value as part of cuisine (*Zizania*) and forage (*Leersia*). However, phylogenetic relationships among genera in this tribe have not been well studied, and the circumscription and taxonomic position of some genera have remained controversial for decades. In addition, the origin and diversification of this tribe, in particular the origin of the genus *Oryza* and its divergence, remain largely unclear. In this study, we explored the phylogeny and

evolutionary history of the tribe using sequences of chloroplast *matK* and *trnL*, mitochondrial *nad1*, and nuclear *Adh2* and *GPA1*. Results indicate (1) Oryzeae is a monophyly and falls into two main clades, corresponding to the traditionally recognized subtribes; (2) previous treatments of three monotypic genera (*Hydrochloa*, *Porteresia* and *Prospytochloa*) are not justified and *Porteresia coarctata* should be treated as a member of the genus *Oryza* rather than as a separate monotypic genus; (3) close affinities of the monoecious genera are not supported, suggesting the possibility of multiple origins of unisexual florets. Based on the magnitude of *matK* and *GPA1* sequence divergence, has been suggested that *Oryza* and *Leersia* branched off from the remaining genera of Oryzeae ~20 million years ago (MYA), and separated from each other ~14 MYA. The divergent time of ~9 MYA is obtained for the most basal split within *Oryza*. These estimations suggest that Oryzeae diverged during the Miocene, and thus imply that long distance dispersal appears to be one of the important factors in the diversification of the tribe.



DIAMOND JUBILEE LECTURE

Shri D.K. Pande, Director (Exploration), Oil and Natural Gas Corporation Limited, New Delhi delivered the '3rd Diamond Jubilee Lecture' on the theme R & D in High Impact Palynological Research as applied in Hydrocarbon Exploration

The presentation focused on the current status of high impact palynological researches in ONGC. The current areas of interest include high resolution dating and correlation of Proterozoic and Phanerozoic sequences of continental to marine realms in Indian petroliferous basins and identification of sequence boundaries based on unconformities based on multi-microfossil criteria. In petroleum systems analysis of the sequences, palynological studies are being employed for palaeo-environmental interpretations of source facies.

Source rock palynological studies have been carried out to understand the timing and duration of generation of

hydrocarbons based on subsidence history curves and TTI plots.

Advanced palynological techniques including PMI studies, integrated palynological and chemostratigraphic studies for interpretation of depositional environments of successions devoid of microfauna and silicoflagellate studies for inferring palaeo-temperatures are also being successfully pursued.

A summary of current palynological research in ONGC and future road map in the field of palynology were discussed with case histories from Indian petroliferous basins.

LECTURES DELIVERED

By Institute's Staff

N.C. Mehrotra

- *Multidisciplinary Antarctic studies at BSIP* at Open Science Conference on Polar Research– Arctic and Antarctic Perspectives, St. Petersburg, Russia (July, 2008).
- *Commercialisation of R & D Issues and Challenges—Role of BSIP in Present Scenario* at Petrotech Society Meeting, Goa (August, 2008).
- *High Impact Palynology in Hydrocarbon Exploration in Indian Petroliferous Basins* at GEO India-2008 Expo & XXI International Conference, New Delhi (September, 2008).
- *BSIP Perspectives: Today and Tomorrow* at Annual Meeting of Directors and Scientists of DST Institutions, ARCI, Hyderabad (January 17-18, 2009).

A.K. Srivastava

- *Latest trend in Plant Science Research and Relevance of Palaeobotany in modern context* (Focal theme) at Inaugural Function of the Conference on Plant Life through the Ages, BSIP, Lucknow (November 16, 2008).

A. Rajanikanth

- *Global Warming Share, Care or Bear* at The Alarms of Global Warming- Reduce or Perish- S.N. Tripathi Memorial Lecture Series, Lucknow Management Association & Swayam Siddha, Lucknow (August 23, 2008).
- *Reinventing Scientific Temper* at National BHU Alumni Meet, Varanasi (January 29-30, 2009).

Mukund Sharma

- *Palaeo-Meso-Proterozoic Carbonaceous Remains from India-Recent Developments* at IGCP-509 Field Meeting, Zavar, Udaipur (November 28, 2008).

Amalava Bhattacharyya

- *Research related to Himalayan Glaciers carried out at BSIP* at the 4th Meeting of Study Group of Himalayan Glaciers, TIFAC, DST, New Delhi (July 28, 2008).
- *Tree Ring Analysis of the Himalayan Region* at the National Seminar on Remote Sensing and GIS Application, HNB Garhwal University, Srinagar (September 11, 2008; as Resource Person).

C.M. Nautiyal

- *Sooraj Hamara Padosi Tara* at Prasar Bharati, Lucknow (April, 2008).
- *Radiocarbon and Isotopic Methods and Cultural Heritage* at Brainstorming Session on Cultural Property Theft and Authentication, NRLC, Lucknow (May 13, 2008).
- *Global Warming* (Hindi) at Prasar Bharati, Lucknow (June 21, 2008).
- Three lectures *Science Popularisation Scenario in India, Writing Science for Radio, Writing and Science for TV* in District Science Club- BSIP Workshop on Science Journalism at BSIP (June 26-30, 2008).
- Two Lectures at MB College, Barabanki during Regional Workshop on NCSC, Energy and Noosphere (August 30-31, 2008).



- *CNG Kya Hai?* (Hindi) at Prasar Bharati, Lucknow (October 10, 2008).
- *Dividing Lines between Science Fiction, Science Fantasy and Fiction: Are They There?* at Varanasi (November 10, 2008).
- *How Old is Old?* at Science Expo-2009, Regional Science City, Lucknow (February 01, 2009).

Vandana Prasad

- *Holocene studies: Climatic Variability of Recent Past* (young scientist presentation) at Golden Jubilee Celebrations Function of Geological Society of India, Bangalore (October 13, 2008).
- *Late Cretaceous-Early Palaeogene: Cradle for Tropical Palaeobiodiversity* at DST sponsored Symposium on *Out of India Hypothesis*, New Delhi (November 22-23, 2008).

A.K. Ghosh

- *Problems of Water Logging and Remedies: Alternative Practices in Duck Rearing and Aqua-*

Crop Cultivation for Waterlogged areas at Kisan Sewa Sansthan (Mother NGO, GOI, R.C.H. Programme), Sant Kabir Nagar, Basti, U.P. (December 11, 2008).

S.K. Shah

- *Application of tree-ring data in analyzing Himalayan climate* at Annual Meeting of Directors and Scientists of DST Institutions, ARCI, Hyderabad (January 18, 2009).

S.C. Bajpai

- *Solar Radiation and Photovoltaic Systems* at the Training Programme on Non-Conventional Sources of Energy, NEDA Alternative Energy Research Development and Training Centre, Chinhat, Lucknow (December 16 & 17, 2008).
- *Role of Renewable Energy for Habitat Development* (Guest Lecture) at National Conference on Energy Security for Rural Development, Gandhigram Rural University, Gandhigram, Dindigul, Tamil Nadu (March 26, 2009).

By outside scientists in the Institute

Robert Spicer, Department of Earth Sciences, Open University, Milton Keynes, U.K.

- *Sequence Stratigraphy and Sedimentology* (May 02, 2008).

Prabhas Pande Director, Geological Survey of India, Lucknow

- *Earthquake Disaster Management* (August 01, 2008) (Under the auspices of the Geological Society of India, Northern Chapter).

Peter Crane, University of Chicago, Chicago, USA

- *New information on Bennettitales, Erdmanithecales and Gnetales* (September 12, 2008).

Steven R. Manchester, Florida Museum of Natural History, Gainesville, Florida, USA

- *Systematics and fossil history of Vitaceae (Grapes)* (September 15, 2008).

Christopher Liu, Department of Biological Sciences, Johnson City, Tennessee, USA

- *A newly found Late Neogene flora in NE Tennessee USA* (November 24, 2008).

Z.K. Zhou, Department of Biogeography & Ecology, Kunming, Yunnan, China

- *Quercus sect. Heterobalanus response to uplift of Himalayas* (November 24, 2008).

Sreepat Jain, Smithsonian Institute, National Museum of Natural History, Washington, USA

- *Changes in Caribbean Palaeoproductivity, Diversity and Benthic Foraminiferal Test Size caused by the Neogene closing of the Tropical Atlantic-Pacific Ocean Gateway* (December 15, 2008).

K.B. Jain, DST, New Delhi

- *International Science and Technology Collaborations: Need, Relevance and some Approaches* (February 13, 2009).

P.N. Kapoor, KDMIPE, ONGC Ltd., Dehradun

- *Organic Matter Maturation studies in Hydrocarbon Exploration* (February 19, 2009).
- *Fluorescence Microscopy in Palynology* (February 20, 2009).



MEDALS AND AWARDS

N.C. Mehrotra

Invited by Geological Society of India to felicitate and address the Geoscientific community on the occasion of Golden Jubilee Celebrations at Bangalore (in October, 2008).

Archana Tripathi, Ram Awatar, R.C. Mehrotra, Anupam Sharma & Binita Phartiyal

Awarded “Team Medal–2008” from BSIP, amongst scientists who have excelled to inculcate team spirit and collaborative integrated work within the Institute.

Neerja Jha

Awarded “Scientific Output Medal–2008” of BSIP.

A. Rajanikanth

Chaired, Session 1- Global Warming: Fallacies and Facts— The Alarms of Global Warming- Reduce or Perish, S.N. Tripathi Memorial Lecture Series, Lucknow Management Association & Swayam Siddha, Lucknow on August 23, 2008.

Amalava Bhattacharyya

Chaired a Technical Session of the National Seminar on “Remote Sensing and GIS Application in Natural Resources Management, Sustainability and uses” held at HNB Garhwal University, Srinagar in September, 2008.

Co-chaired a Session at the “3rd LIMPACS Conference- Holocene lake records: Patterns, impacts, causes and societal importance of abrupt hydroclimatic changes” held at Chandigarh in March, 2009.

K.J. Singh & Rajni Tewari

Awarded “Diamond Jubilee Medal–2008” of BSIP for publishing research papers of high quality in refereed journals.

C.M. Nautiyal

Coordinator (Academic), Workshop on Science Journalism, organized under the joint auspices of District

Science Club and BSIP during June 26-30, 2008.

Coordinator, Regional Workshop for RTI (AIR), Lucknow during February 4-8, 2008 on Popularising Science at Lucknow.

Asha Gupta

Conferred Fellowship of the Society of Earth Scientists.

Anupam Sharma

Awarded “Shri Chandra Dutt Pant Medal–2008” for the best piece of research work amongst the Scientist- 'C' category of the BSIP, Lucknow.

Anupam Sharma, Vandana Prasad, Binita Phartiyal & Kamlesh Kumar

Won “2nd Prize” in the Best Poster category for their paper *Late Holocene estuarine sedimentary sequences of Mahi River Basin, Mainland Gujarat: their significance in palaeoclimatic and depositional regime studies presented at the 'National Conference on Quaternary Geological Processes' held at Lucknow in February 2009.*

Vandana Prasad

Received a “Memento” for valuable contribution in the field of Geology on the occasion of 50th Anniversary of Geological Society of India Celebrations (in October, 2008) at Bangalore.

Poonam Verma & M.R. Rao

Awarded “Second Best Poster” for poster *Quaternary vegetation and climate change in central Narmada Valley: Proxy records from hominin bearing sedimentary successions* presented at the 'National Conference on Quaternary Geological Processes: Natural Hazards & Climate change' held at Lucknow in February 2009.

NATIONAL SCIENCE DAY

Keeping in with the tradition of outreach programmes of the BSIP, Science Day, open house for the students of the city, general public, staff and scientists were organized. BSIP received a group of 150 students along with their teachers from Madhya Pradesh in the month of December under a joint programme of NCSTC (DST) and the M.P. Council of Science and Technology. These students were addressed by the Director at Regional Science City, Lucknow. The students also interacted with Drs AK Srivastava, SKM Tripathi, Mukund Sharma and CM Nautiyal at BSIP and visited the museum. The Institute participated in the Pride of India Exhibition at Shillong during the 97th Science Congress and exhibited a number of posters introducing the activities and

achievements of the Institute. The simultaneous display of a variety of fossils attracted a lot of people.

During the Science Expo–2009 at Regional Science City, during January 28- February 01, the Institute put up an exhibition which was visited by a large number of people. Introduction to BSIP was included in the EXPO booklet. Dr NC Mehrotra, Director was a patron and Dr CM Nautiyal a member of the organising committee for the EXPO. Dr Nautiyal also delivered an invited lecture on *How Old is Old*.

The Science Day celebrations spread over a period of February 13 to 28, 2009 were inaugurated on the 13th of February by Dr Bhushan K Jain, Adviser, International Division, DST. Dr Jain talked on *International S & T*





A view of the inaugural function of the National Science Day, Dr. K.K. Dwivedi, DST & Mr. Ravi Shanker, former DG, GSI, addressing the students



A group of students from Bhopal visiting BSIP Museum

Collaborations: Need, Relevance and some Approaches. In his very informative and interesting lecture, Dr Jain stated that science has become international in nature and hence international cooperation is the order

of the day. There are about 12 countries with whom India has active collaboration programmes. The session was followed by interaction with the audience. Dr PN Kapoor, from Keshav Deo Malaviya Institute of Petroleum Exploration, ONGC, Dehradun, delivered two lectures on 19th and 20th of February at the Institute on *Organic Matter Maturation Studies in Hydrocarbon Exploration* and *Fluorescence Microscopy in Palynology* and followed by interaction.

On Science Day, the 28th February, 2009, several science-based films were shown to visiting students and general public and competitions were organized for the students. Essay Competition on *Significance of Science in Societal Welfare* elicited 97 responses, while 157 posters were drawn by students of Class V-VIII in the campus. Science Quiz for students in two groups (Class VI-XI and X-XII) had 198 entries and was coordinated by Dr Rashmi Srivastava. The essays in Hindi as well as English were evaluated by Shri VK Joshi, former Director, Geological Survey of India, and the posters by Prof YN Yogi, former Principal, College of Arts and Crafts and Shri AK Deb, Secretary, Rashtriya Lalit Kala Akademi, Lucknow. The day was also observed as Open House and people visited the laboratories, museum, and the herbarium.

The prize distribution was held on the Science Day during the Valedictory programme. The Director welcomed the guests and dwelt on the history of Science Day and Raman's achievement. The highlight of the Valedictory programme was a very interesting and

illustrated lecture by Dr KK Dwivedi, Adviser, International Division, DST on *A Curious Walk through Time*. Dr Dwivedi, also quoting extensively from the ancient texts like *Bhagavat*, stated that the concept of time or even time-dilation is not new. He said that an object doesn't exist if it has only length, breadth and thickness but not time dimension. So time, he said, is an essential fourth dimension. He traced the evolution and accuracies of different types of clocks like sun dial, water, mechanical, quartz and atomic clocks. Elaborating on the concepts of time, he stated that time moves slower with increasing velocity leading to the well known twin- paradox. In the presidential address, Shri Ravi Shanker, former Director General, GSI, said that our ancient scripture were richer than generally thought. Dr AK Srivastava highlighted significance of the celebrations. Dr CM Nautiyal, Convener of the Science Day Celebrations, elaborated on the idea behind Science Day and activities undertaken.

Over fifty medals and prizes were given away on National Science Day at BSIP which included medals for excellence in scientific, technical and administrative work and prizes to BSIP staff under the scheme of encouragement for working in official language. The 28 winners out of 442 participants from over 40 schools of the city also received prizes and certificates for their performance in the essay, science quiz and poster competitions from the two guests and the Director.



A group of students at poster competition



PUBLICATIONS RELEASED

Journal— *The Palaeobotanist* Volume 57(1-2) as the proceedings volume for the Diamond Jubilee National Conference on *Challenges in Indian Palaeobiology: Current Status, Recent Developments and Future Directions* organized during November 15-17, 2005. *The Palaeobotanist* Volume 57(3) as the proceedings volume for Diamond Jubilee International Conference on *Changing Scenario in Palaeobotany and Allied Subjects* from November 15-17, 2006.

BSIP Newsletter 2008 (No. 11).

Bilingual (English/Hindi) Annual Report—2007-2008.

Hindi Book *Padpashm- Ateet ki ek Kari* translated by Mukund Sharma. This book is the Hindi translation of popular book *Plant Fossils- A link with the Past* earlier published by BSIP in English.

Booklet on Lectures A booklet entitled *Facets of*



Invited guests releasing Souvenir for the Conference
on Plant Life through the Ages

Palaeobotany was released comprising the lecture notes by the institute scientific staff.

Abstract Volume for Conference on *Plant Life through the Ages*.

Souvenir for Conference on *Plant Life through the Ages*.

PARTICIPATION OF THE STAFF IN SCIENTIFIC/TECHNICAL MEETS

Abroad

N.C. Mehrotra and Rajni Tewari

Participated in the *SCAR/IPY Open Science Congress on Polar Research* held at St. Petersburg, Russia during July 08-11, 2008.

Mukund Sharma

Participated in the *World Summit on ancient Microscopic fossils* held at University of California, Los Angeles, US during 26.7.2008 to 4.8.2008.

Participated in the *33rd International Geological Congress* held at Oslo, Norway during August 6-14, 2008.

Visited Geological Institute of Russian Academy of Science Moscow during 23.3.2009 to 18.4.2009 under ILTP Project between India and Russia.

Alpana Singh

Attended the *International Conference on Coal and Organic Petrology (ICCP)* and *The Society for Organic Petrology (TSOP)* held at Oviedo, Spain during September 21-27, 2008.

S.K.M. Tripathi

Attended the *12th International Palynological Congress* held at Bonn, Germany during August 30-September 5, 2008.

Visited the Institute of Geological Science, Masaryk University, Brno, Czech Republic during September 06 to October 15, 2008 under the INSA Exchange of Scientists Programme to work with Dr Nela Dolacova.

Asha Khandelwal and Shilpa Singh

Attended the *EMECS-8 International Conference Harmonizing River catchments and Estuary* held at Shanghai during October 27-30, 2008.

R.R. Yadav

Visited Germany under INSA Exchange of Scientists Programme for a period of 3 months w.e.f. 01 November, 2008.

C.M. Nautiyal

Attended the *2nd African Science Communication Conference* held at Gallagher Convention Centre, Gauteng, South Africa during February 18-21, 2009.

R.C. Mehrotra and D.C. Saini

Visited Beijing under the Joint Research Project entitled *Cenozoic Vegetation and Climate changes in China and India and their response to the Himalayan uplift* under the MOU signed between Indo-Chinese Inter-Governmental Science & Technology Cooperation Programme with Professor Cheng-Sen-Li of the Institute of Botany, Chinese Academy of Science, Beijing, China during 15.4.2009 to 3.5.2009.

Visited Japan on an invitation of Chuo University, Tokyo, Japan and to deliver a lecture on 15.4.2009.

In India

Santosh K. Shah

Attended the Seminar *Seventh Framework Programme for Research and Technological Development (FP7)* held at India Habitat Centre, New Delhi on July 7, 2008.



Dhirendra Sharma, Sumit Bisht and Avanish Kumar
Participated in the IIM-LibSys Workshop on “RFID Application in Libraries” held at Indian Institute of Management, Lucknow on July 18, 2008.

A. Bhattacharyya

Attended the “Interaction Meet with Glaciologists” held at DST, New Delhi on August 05, 2008.

Rahul Garg

Attended the “Annual Meeting of the Vigilance Officers” held at JNCASR, Bangalore during August 06-07, 2008.

A. Bhattacharyya, Ram Awatar, Anupam Sharma and Binita Phartiyal

Participated in the 23rd *Himalayan-Karakoram-Tibet Workshop (HKT)* held at Leh, Ladakh during August 07-11, 2008.

A. Rajanikanth

Participated *SN Tripathi Memorial Lecture – The Alarms of Global Warming: Reduce or Perish* jointly organized by the Swayam Siddha and Lucknow Management Association held at BSIP on August 23, 2008.

चन्द्र मोहन नौटियाल

एम.बी. कालेज, मुनेश्वर विहार कालोनी, दशहराबाग, बाराबंकी में आयोजित राष्ट्रीय बाल विज्ञान कांग्रेस 2008 की दो दिवसीय आंचलिक कार्यशाला में दिनांक 30–31 अगस्त, 2008 को सम्मिलित हुए।

The Society of Earth Scientists की दिनांक 17.09.2008 को GSI (लखनऊ) में होने वाली बैठक में भाग लिया।

वि.प्रौ.वि. की स्वायत्तशासी संस्था विज्ञान प्रसार, नोएडा में दिनांक 29.09.2008 को आयोजित “हिंदी में विज्ञान लेखन: व्यक्तिगत एवं संस्थानिक प्रयास” शीर्षक की विचार गोष्ठी में भाग लिया।

दिनांक 10–11 नवंबर, 2008 को वाराणसी में विज्ञान गल्प पर आयोजित संगोष्ठी में भाग लिया।

उत्तराखंड विज्ञान प्रौद्योगिकी परिषद द्वारा आयोजित दिनांक 08 दिसम्बर, 2008 को आयोजित 'Project Review Group Meeting' में भाग लिया।

दिनांक 08.09 मार्च, 2009 को इलाहाबाद में आयोजित दो दिवसीय ‘युवा विज्ञान लेखकों एवं पत्रकारों के लिए विज्ञान लेखन प्रशिक्षण कार्यक्रम हेतु संसाधन सामग्री का विकास’ में भाग लिया।

Jyotsana Rai

Participated in a field Workshop held at Jaisalmer, Rajasthan under IGCP-506 during November 10-11, 2008.

Mayank Shekhar

Attended the three-days-Workshop and National Seminar in “Remote Sensing and GIS Application in Natural Resources Management, Sustainability and Uses” held at Department of Geology, HNB Garhwal University, Srinagar, Uttaranchal during September 11-13, 2008.

Biswajeet Thakur, Vartika Singh, K.G. Misra, Shilpa Singh, Gaurav K. Singh, Deepti Singh, Divya Srivastava, Kamlesh Kumar and Poonam Verma

Participated in the Conference on *Geo India 2008 Expo*

XXI held at Greater Noida, New Delhi during September 17-19, 2008.

Neerja Jha and Rajni Tewari

Attended the Workshop on 4th *Seminar on Modern Practices in Petroleum Exploration* held at KDMIPE, Dehradun during September 22-27, 2008.

Sumit Bisht and Dhirendra Sharma

Attended the four day Workshop on *Digitization of Resources using Open Source Software: Greenstone Digital Library (GSDL)* organized by Indian Institute of Management (IIM), Lucknow during September 23-26, 2008.

Kavita Kumar

Attended the *DST Librarian Meeting- CSIR-DST E-Journals Consortium* held at ARCI, Hyderabad on September 27, 2008.

M.R. Rao, A. Rajanikanth, Mukund Sharma, B.D. Singh and Vandana Prasad

Participated in the *Golden Jubilee Function of the Geological Society of India*, held at Bangalore during October 12-13, 2008.

Vandana Prasad

Attended the DST Sponsored Meeting on *Out-of- India hypothesis* held at INSA, New Delhi during November 22-23, 2008.

Dipak Kumar Dutta

Attended the *Workshop on Pay Fixation at ISTM, New Delhi* held at New Delhi during October 13-15, 2008.

R.R. Yadav

Attended the *International Workshop on Environment Conservation for Sustainable Livelihoods in the cold Desert Region of Asia* held in Solan, Himachal Pradesh during October 15-17, 2008.

Anupam Sharma

Attended the 3rd *Meeting of PAMC-SSS* held at Trichurapalli during October 16-17, 2008.

A. Bhattacharyya, Anupam Sharma and Binita Phartiyal

Attended the *International Symposium on Mountain Building and Climate-Tectonic Interaction* held at Wadia Institute of Himalayan Geology, Dehradun during October 23-25, 2008.

R.K. Saxena, Archana Tripathi, Vijaya, J.S. Guleria, B.N. Jana, Usha Bajpai, Mahesh Prasad, Anil Agarwal, Asha Khandelwal, Chanchala Srivastava, A. Rajanikanth, Mukund Sharma, D.C. Saini, Neerja Jha, Ram Awatar, K.L. Meena, Madhav Kumar, Rupendra Babu, Amit Kumar Ghosh, S.C. Bajpai, Veeru Kant Singh, Santosh K. Shah, Parminder Singh Ranhora, E.G. Khare, S. Suresh Kumar Pillai, Sanjai K. Singh, Om Prakash, Shivani Kapoor, Yogmaya Shukla, Poonam Verma, Kamlesh Kumar and Mayank Shekhar

Attended the Conference on *Plant Life through the Ages*



jointly organized by the Palaeobotanical Society & BSIP held at Birbal Sahni Institute of Palaeobotany, Lucknow during November 16-17, 2008.

A.K. Srivastava, Archana Tripathi, Vijaya and Deepa Agnihotri

Participated in the *International Symposia on Perspective in Pteridophytes* held at National Botanical Research Institute, Lucknow during November 27-29, 2008.

Mukund Sharma

Attended the 2nd NWG Meeting and field workshop on the *Palaeoproterozoic Aravalli Supergroup* at GSITI, Zawar, Rajasthan from November 28 to December 02, 2008 under IGCP- 509.

M.R. Rao and Poonam Verma

Attended the *International Workshop on Plio-Pleistocene Environments and Human Adaptations in India* held at Bhopal during December 01-05, 2008.

Pradeep Mohan

Attended the 24th FIP All India Convention of *Photography* organized by Lucknow Camera Club, Lucknow during December 05-08, 2008.

Mahesh Prasad, Asha Gupta, Amit Kumar Ghosh and Sanjai Kumar Singh

Attended the *International Symposium on Plant Biology and Environment: Changing Scenario* held at Department of Botany, University of Allahabad, Allahabad during December 17-19, 2008.

S. Suresh K. Pillai

Attended the *Indian Association of Sedimentologists XXV Convention 2008 and National Seminar on Sedimentary Basins of India – Their Geological Significance and Economic Prospects* held at Department of Geology, The M.S. University of Baroda, Vadodara during December 26-28, 2008.

Chanchala Srivastava

Attended the XXXVI Annual Conference of AIS, IHCS & ISPQS held at Department of Culture & Archaeology, Orissa State Museum, Bhubaneswar during December 29-31, 2008.

C.M. Nautiyal, Ratan Kar, P.S. Ranhotra, S. Suresh K. Pillai, Prem Prakash and Inder Kumar

Participated in the 96th Indian Science Congress and put up an Exhibition-cum-stall in the Pride of India Science Expo-2009 held at Shillong during January 03-07, 2009.

Neerja Jha and Rajni Tewari

Participated in the one week training programme on *Ethical, Legal and Gender Issues in Science* exclusively for women scientists being sponsored by Department of Science & Technology, Government of India held at ASCI, Hyderabad during January 12-16, 2009.

B.D. Singh and Om Prakash

Participated in the *Academia-Industry Interface Meet* organized by PETROTECH Society held at New Delhi during January 13-14, 2009.

Mukund Sharma and C.M. Nautiyal

Participated in the *Science Expo-2009* held at Regional Science City, Lucknow during January 14-18, 2009.

Ratan Kar and Santosh K. Shah

Participated in the *Annual meeting of the Directors and Scientists of Autonomous Scientific Institutions of DST* held at International Advance Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad during January 17-18, 2009.

A. Rajanikanth

Attended the National BHU Alumni Meet 2009 & National Seminar on *Mahamana's Vision for a Self Reliant India: Current Issues and Future Prospects* held at Banaras Hindu University, Varanasi during January 29-30, 2009.

Shilpa Singh

Participated in an Elocution Contest held at Regional Science City, Lucknow on January 31, 2009.

Nilay Govind

Participated in the *National Conference on Advance Computing & Communication Technology* organized by Departments of Computer Science & Engineering Information Technology Computer Application, Academy of Business & Engineering Science held at Ghaziabad during February 06-07, 2009.

A. Bhattacharyya and Jyoti Verma

Attended *Maintaining Sustainable Flows in River Ganga: Methodology Workshop* held at IIT, Kanpur during February 16-17, 2009.

M.R. Rao, A. Bhattacharyya, Anupam Sharma, Binita Phartiyal, Ratan Kar, S.K. Shah, P.S. Ranhotra, Anju Saxena, Nivedita Mehrotra, Jyoti Verma and Mayank Shekhar

Participated in the Conference on *Quaternary Geological Processes: Natural Hazards & Climate Change* organized by the Centre of Advanced Study in Geology, University of Lucknow held at Lucknow during February 25-26, 2009.

Sanjai K. Singh

Attended the 3 day *All India Museums Conference* of Museums Association of India, at NRLC, Lucknow on March 01, 2009.

M.R. Rao, A. Bhattacharyya, Anjum Farooqui, S.K. Shah, Harinam Joshi and Poonam Verma

Attended the Conference, the 3rd LIMPACS Conference- *Holocene Lake records: patterns, impacts, causes and societal importance of abrupt hydroclimatic changes* held at Golden Jubilee Hall, Panjab University, Chandigarh during March 05-08, 2009.

Kavita Kumar

Attended the Seminar on *The World Bank and its Knowledge Resources* held at Giri Institute of Development Studies, Lucknow on March 05, 2009.

Participated in the 3 days Short Term Course on *Access*



and Management of E-Resources to be held at National Institute of Science Communication and Information Resources (NISCAIR), New Delhi on 29.04.2009.

Attended the 2nd Meeting of the DST Librarian/Information Officer AI & PB held at Aryabhata Research Institute of Observational Sciences (ARIES), Manora Peak, Nainital during May 15-16, 2009.

Suresh C. Bajpai

Attended and delivered a Special Lecture on the topic *Role of Renewable Energy for Habitat Development in the National Conference on Energy Security for Rural Development* (ESRO-2009) held at Rural Energy Centre, Gandhigram Rural University, Gandhi Gram Dindigul, Tamil Nadu on March 26, 2009.

Ratan Kar

Attended the Team Selection Workshop for the forthcoming Indian Arctic Expedition (2009-2010) held at National Centre for Antarctic & Ocean Research (NCAOR), Goa on March 13, 2009.

Chanchala Srivastava

Delivered a lecture on Application of Modern Techniques in the study of Past held at Department of Ancient History, Culture and Archaeology, University of Allahabad, Allahabad during April 04-05, 2009.

Santosh K. Shah

Attended the Workshop on *Climate Change and Himalayan Environment* held at Department of Forestry, HNB Garhwal University, Srinagar (Garhwal), Uttarakhand during April 06-07, 2009.

Mayank Shekhar

Participated in the Seminar on *Snow Characterization* at SASE, Manali during April 13-15, 2009.

C.M. Nautiyal, Anju Saxena and Sunita Khanna

Attended Workshop on *Technique of Scientific Writing* held at Geological Survey of India, Lucknow during 22-26 May, 2009 organized by District Science Club, Lucknow.

A. Bhattacharyya and Biswajeet Thakur

Attended two days Workshop on *Evaluation of Research Project for Planning the Indian Scientific Exploration to Antarctica* NCAOR held at GOA during 11-12 June, 2009.

Neerja Jha and K.G. Misra

Attended fieldwork on *Post-Barakar Stratigraphy in Peninsular India* organized by Mr A.B. Dutt, Ex-Director, General Coal Wing of India, Geological Survey of India, Kolkata and Mr B.V. Raman Murty, Ex-Chief Geologist, Singerani Colliery, Andhra Pradesh during 21-30 June, 2009.

STAFF NEWS

APPOINTMENTS/RESIGNATIONS

Name	Designation	Date
Miss Vartika Singh	Scientist 'B'	15.09.2008 (F.N.)
Shri Mayank Shekhar	JRF	14.07.2008 (F.N.)
Shri Ram Ujagar	T Asst. 'A'	28.07.2008 (F.N.)
Miss Kirti Singh	T Asst. 'D'	29.07.2008 (F.N.)
Shri Nilay Govind	T Asst. 'D'	29.07.2008 (F.N.)
Shri K. G. Mishra	B.S.R.A.& Scientist 'B'	29.07.2008 (F.N.)
Miss Richa Tiwari	T Asst. 'A'	31.07.2008 (F.N.)
Shri V. Srivastava	JRF	31.07.2008 (F.N.)
	Resigned	02.04.2009 (A.N.)
Shri Gaurav Kumar Singh	BSRS	01.08.2008 (F.N.)
Miss Deepti Singh	BSRS	04.08.2008 (F.N.)
	Resigned	13.04.09 (A.N.)
Shri Sunil Kumar Bisht	T Asst. 'D'	19.08.2008 (F.N.)
Dr (Smt) Binita Phartiyal	Sci. 'C'	15.09.2008 (F.N.)
Dr Ratan Kar	Sci. 'C'	15.09.2008 (F.N.)
Dr Santosh Kumar Shah	Sci. 'B'	15.09.2008 (F.N.)
Shri S. Suresh K. Pillai	Sci. 'B'	15.09.2008 (F.N.)
Dr P.S. Ranhotra	Sci. 'B'	15.09.2008 (F.N.)
Dr (Miss) K.P. Sabina	Sci. 'B'	24.09.2008 (F.N.)
Smt Anju Saxena	Sci. 'B'	06.11.2008 (F.N.)
Miss Jyoti Verma	SRF	16.01.2009 (F.N.)
		to 15.03.2009
		02.04.09
		(Regular appointment)

Miss Nivedita Mehrotra	BSRS	02.02.2009 (F.N.)
Dr Shantanu Chatterjee	RA	16.02.2009 (F.N.)
Shri Ram Ketar	Field Asst.	16.02.2009 (F.N.)
Smt Kalpana Devi	JRF	20.02.2009 (F.N.)
	Resigned	20.03.2009 (A.N.)
Miss Sandhya Sharma	JRF	02.04.2009
Shri R.K. Mishra	LD Clerk	20.04.2009 (F.N.)
Miss Archana Singh	Project Asst	20.04.2009 (F.N.)
Miss Jyoti Srivastava	JRF	20.05.2009
Shri Kanud Kumar Gupta	JRF	10.06.2009 (F.N.)
		(Temporary appointment)

PROMOTION

Shri V.P. Singh	Driver 'III'	29.01.2009 (F.N.)
Shri Madan Mohan Misra	Driver 'III'	02.02.2009 (F.N.)
Shri Pushpendra K. Misra	Driver 'II'	02.02.2009 (F.N.)

SUPERANNUATION

Shri Ram Kishan,	Atten. 'III'	31.08.2008 (A.N.)
Shri Dhoom Singh	Accountant	31.03.2009 (A.N.)
Dr B.N. Jana,	Scientist 'E'	30.06.2009 (A.N.)

OBITUARY

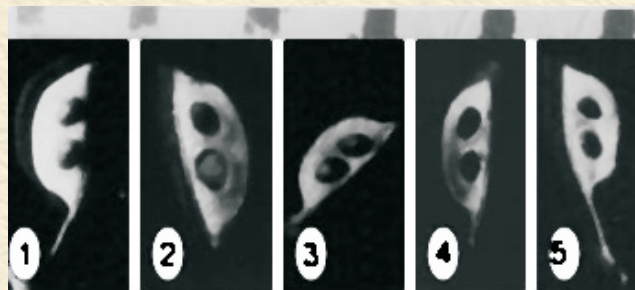
Shri Subhash C. Misra
Attendant 'I'
23.01.2009



RESEARCH NOTES AND ARTICLES

Holocene Legume fruits (with seeds) from Kumaun Himalaya

Critical investigation of lacustrine sediments from temperate zone of Kumaun Himalaya has revealed a large number (>100) of Legume fruits, hitherto not reported. These are small in size, containing two seeds each (Figs.1-5) and have possessed specific distribution. Investigated sediments vary in age from Early Holocene to the top, but fruits have been found in the Late Holocene sediments only. In the beginning their frequency is low but subsequently became considerably high. Their presence and specific distribution indicate that the area enjoyed considerable anthropogenic activities during Late Holocene.



Figs 1-5—Holocene fruits from Kumaun Himalaya.

Asha Gupta

Packing of Museum Objects

The material of packaging, packing systems are essential to take care of the museum objects through transportation. Normally wood casings are used in packing to minimise cost. Packing containers are made out of wood, plywood, fibre board, block board, steel, etc. Traditionally cushioning materials such as cloth, straw, gunny bags were used. All these absorb moisture and transfer it to the object resulting in decay. In recent years, a variety of foamed plastic materials in the form of balls, peanuts, are used in surround packing. Depending upon the type of museum object, (two dimensional or three-dimensional) condition, size, type of transit, weight, distance, duration, etc., the packing system has to be chosen. There are many systems and techniques of packing either expensive or moderate. Depending upon the museum's budget the packing also can be chosen.

Entire packing operation should be supervised for requisite specifications by a conservation personnel.

Conservation measures

Air-tight packing cases will avoid change of R.H. and therefore mould growth is avoided.

Before packing all the interior wood, filling materials should be fumigated with a fungicide, like thymol.

The organic objects and paintings should be treated for the eradication of insects and fungi with suitable insecticides.

The packing case should be marked with the directional marks at which it should be positioned.

Sanjai Kumar Singh

Why should we sustain a sensitive and sensible planet?

Sensitizing global citizens on issues of greater threat to life is inevitable for sustaining living planet- 'Earth'. The time has come to fasten efforts to combat climate change supposed to be consequence of 'Global- Warming'. We should ponder over the methods to rescue an unhealthy planet created through our own actions in the name of development. A *Global-Warning*' is impending since biosphere in which we live is an integrated part of earth and increasingly threatened by human actions. Modern Age is mistakenly called 'Information-Age', but in reality it should be called an "*Inflammatory-Age*". Rhythmically balanced beautiful earth has been perpetuated by dynamic processes operative since millions of years. The virginity of earth is maintained by fauna and flora. Different ecosystems like land, sea, air, water and various interrelated associated micro-systems have been threatened by human civilization. The precious balance among bio, litho and atmospheres should be maintained for sustenance of life. Man being trespasser is

creating a dangerous situation, which may lead to total annihilation of life.

Continuum of life

Life on Earth is a part of an interconnected and interlocking system that binds the atmosphere to the continent and oceans. The evolution of life is understood through the theory of evolution propounded by Sir Charles Darwin. Evolutionary theory propounds primarily a struggle of living organisms to adapt to a fickle environment. Fossil history stands as a testimony to endurance of life forms during the vicissitudes of nature. Geological and Living components behave as a single integrated well regulated system. Life forms positively affect surroundings through metabolism, growth, production and removal of gases, ions and organic compounds which in turn regulate temperature, acidity and atmosphere composition. Thus atmosphere is the extension of the biosphere. This demands a greater care for life on earth. Human activities such as deforestation,



desertification, and introduction of non-indigenous species affect homeostasis of ecosystem. Competition / predation exerted by one species-*homo-sapiens* on a variety of other species are causing modern time extinctions. The concept that life forms have co-evolved with their environment in such a way that environmental conditions are held steady in the face of a continual flux of energy and matter has been supported by many earth scientists.

Nascent planet possessed initial atmospheric composition was akin to Mars and Venus with almost 100% CO₂ from volcanoes and with no oxygen. It is also suggested that solar radiation would have been lower than today. Ultraviolet radiation at the ground would have been high, with no protective ozone layer. Over millions of years, much of the CO₂ was consumed by inorganic reactions. Carbon-di-oxide levels were 1000-1500 ppm during the Cretaceous times and it was about 180 ppm during 40 000-1 60 000 years ago. To bring CO₂ down from 100% to today's 0.036 % probably it got dissolved in the sea and much of the C ends up in carbonate rocks. Atmospheric O₂ came from photosynthesis. Decomposition and fire both decompose biomass and use up oxygen, releasing the CO₂ back into the atmosphere. Biomass is buried and thus protected from oxidation to make an oxygen atmosphere. CO₂ balance of the earth's atmosphere was a variation in the rate at which rocks containing calcium silicate is worn down or weathered. Organisms like soil bacteria, lichens, burrowing organism or worms to plants are partly responsible for weathering. Along the evolutionary progress the biological weathering increased and released nutrient elements that formed soil. This encourages growth of plants / animals which enhance carbon dioxide release in the soil which increases acidity and this in turn increase weathering process. The weathering results in formation of calcium bicarbonates and silicate acids resulting from the carbon dioxide reacting in the presence of water with the calcium silicates in the rocks. Both the products are soluble and move through the waters to streams, rivers and eventually sea. The sea organisms take up the calcium bicarbonates and make their shells. The carbon dioxide trapped in this compound is ultimately deposited as sediment and forms limestone. The net effect is increase in biological activity, increase of biomass and carbon dioxide pumping from the air.

Global Warming (GW)

It is the increase in the average measured temperature of the Earth's near-surface air and oceans since the mid-twentieth century, and its projected continuation. The average global air temperature near the Earth's surface increased 0.74 ± 0.18 °C (1.33 ± 0.32 °F) during the hundred years ending in 2005. It is suggested that natural phenomena such as solar variation combined with volcanoes probably had a small warming effect from pre-industrial times to 1950 and a small cooling effect

from 1950 onward. Greenhouse gases are the gases present in the earth's atmosphere which reduce the loss of heat in to space and therefore contribute to global temperatures through the Green House Effect. Greenhouse (also called a glasshouse or hothouse) is a building where plants are cultivated. A greenhouse is built of glass. It heats up mainly because the sun warms the ground inside it and this warms the air in the greenhouse. The air continues to heat because it is confined within the greenhouse, unlike the environment outside the greenhouse where warm air near the surface rises and mixes with cooler air aloft. Greenhouse gases are essential to maintaining the temperature of the Earth; without them the planet would be so cold as to be uninhabitable. Greenhouse gases include water vapor, carbon dioxide, troposphere ozone, nitrous oxide, and methane (Natural). Chlorofluorocarbons- *hydrofluorocarbons* (HFCs), *perfluorocarbons* (PFCs), and *sulfur hexafluoride* (SF6) result exclusively from human industrial processes (Induced). Greenhouse gases are transparent to solar radiation but opaque to long wave radiation. Increase in globally averaged temperatures since the mid-twentieth century is probably due to the observed increase in *anthropogenic (man-made)* greenhouse gas concentrations via an enhanced Green House Effect. Some benefits of global warming should also be given due weightage. GW will increase humidity in tropical deserts. Also the higher levels of carbon dioxide in the atmosphere trigger plant growth. Due to the global warming the sea levels will rise. But this can be readily adapted. It is known that earth has been warmer than today as seen in its history. Global warming is nothing to get afraid of because it just takes us back to a more natural set of environment of the past. Animals and plants appeared to do just fine in those eras of warm climate on the earth.

Role of Green Plants

Trees are green machines that act as natural filters of our air. Through the process of photosynthesis they absorb carbon dioxide from the atmosphere and store it in their trunk, branches, leaves, roots, soil and foliage, while releasing oxygen back out. Long-term storage of carbon in the terrestrial biosphere (soil and organisms), or the oceans enables to build up of CO₂ concentration in the atmosphere. Carbon Sequestration should be taken up to meet the threat. Whereas deforestation, degradation and poor forest management reduce carbon storage in forests, sustainable management, planting, and rehabilitation of forests contribute to an increase in carbon sequestration. Natural carbon sinks like the oceans, soil, plants and other organisms use photosynthesis to remove carbon from the atmosphere by incorporating it into biomass and act like *carbon reservoirs*.

Education and Awareness

Actions of people that disturb earth's normal functioning should be minimized to enhance life of our



planet. Environmental education coupled with right action will be instrumental to sustain our living planet. Scientific temper should be inculcated to face the threat. Efforts of reputed environmentalists Rachael Carson, Al Gore, Mahatma Gandhi, Amrita Devi, R.K Pachauri, Wangari Mathai and also the Intergovernmental Panel on Climate Change (IPCC) should also be supplemented through people's participation. We need to become *Eco-citizens* to foster awareness on contemporary environmental issues and live a life of co-operation, co-determinism, co-tolerance and thus co-evolve. The development of environmental knowledge and attitude is indispensable for all citizens and professions to advance towards

sustainable development. There is a need to change *environmental policies* and formulate easier and effective solutions. It is not sufficient to be *Netizens* and boast about our technological achievements but should be able to cope up with *Inflammatory Age Syndrome*. All individuals and institutions have a mutual responsibility to act as Trustees of Earth, seeking the choices in ecology, economics and ethics that will eliminate pollution, poverty and violence, foster peaceful progress, awaken the wonder of life, and realize the best potential for the future of the human adventure. As Mahatma Gandhi once said "one must care about a world one will not see. *We are part of the problem and we should also be part of the solution.*"

A. Rajanikanth

An expedition to Kargil, Jammu & Kashmir

Kargil Town (altitude 2700-3000 m) located in the lap of Northwestern Himalayas and situated in the midway between Srinagar and Leh on the Srinagar-Leh Highway is the second largest urban centre of Ladakh and Headquarter of Kargil District of Jammu & Kashmir State. Visitors travelling between Leh to Srinagar generally stay here overnight. During ending year of the last century (1999), this place was popularized due to a battle fought for the first time at the highest altitude and extreme low temperature (-20 to -30°C) in the world History. Before 1947, it was an important trading centre linking the Ladakh and the Lower Indus Valley with Gilgit (now in Pakistan). It was also an important trading centre in the Pan-Asian trade networks. By the impact of such trades one can visualize here the finest example of the Turkish architecture especially in the hotels and markets. The town lies in the Lower Suru Basin and is bestowed with high altitude mountains nestling along the great Himalayan mountain ranges. Most of the tributaries of the Indus River namely Dras and Wakha-Chu are the main sources of drinking water and irrigation of the crops and trees grown at hill terraces. The Kargil region is a convenient base for

undertaking adventurous activities like trekking, mountaineering, camping, river rafting, geological excursion, etc. in the high Himalayan valleys. People sometimes make camps before 35-40 km of Kargil Town for excursion to the Wakha-Mulbek valleys where the chief attraction is 9 m high rock sculpture of Lord Buddha at Maitreya (located near the Mulbek). The other mountains enriched with sedimentary and tectonic deformities can be approached from here. Besides these, the other interesting places for these purposes are Dras, Tolo-ling, Akchamal, Tiger Hills, etc. which are well connected with Kargil by metalled roads. The best time for the field work in this region is from mid June to September when the rocks are not covered with snow but due to intensive sunlight sunburn is very common and one may use sunscreen lotion to avoid it.

The Himalayas display one of the strongest geological features in Central Asia. Due to the interest in Himalayan Geology, tectonics, flora and fauna, researchers from several countries visit the Ladakh and Kargil regions to carry out investigations. Birbal Sahni Institute of Palaeobotany (BSIP), Lucknow is also



Fig. 1—Kargil Formation exposed near Akchamal Village (Kargil-Batalik Road).



Fig. 2—Tharumsa Formation exposed near Tharumsa Village (Wakha-Chu River Section).



producing valuable palaeobotanical, palaeontological and palynological data since the last four decades. To examine topography, local tectonics, palaeoclimatic change and floral depositional events, a team of scientists comprising Drs Rakesh Chandra Mehrotra, Madhav Kumar and Amit Kumar Ghosh from the BSIP and Dr Kishor Kumar from the Wadia Institute of Himalayan Geology, Dehradun undertook a field excursion in this region. The study of palaeobotanical and palaeontological remains is of great significance for understanding the tectonics and sedimentation processes in thick sedimentary sequences of the Kargil Molasse outcropped in the road and river cutting sections. It is well known that immense mountain ranges were formed by the huge tectonic forces and denudation processes during and after the collision of Indian and Tibetan (Asian) Plates. As a result of this

activity entire region was formed by the sedimentation and tectonic deformities which are hidden in the lap of lofty Himalayas but can be visualized at several places. The sedimentary outliers of Kargil (Fig. 1), Tharumsa (Fig. 2) and Pashkyum formations are exposed in the Kargil-Batalik Road. An extensive collection of rock samples from these places shows evidences of fossil spores, pollen grains, gyrogonites of charophytes, angiosperm leaf impressions and faunal remains. Their study will help to explain the process of sedimentation characterizing with new record and views. The characterization of such palaeobotanical and palaeontological remains would help to develop a picture of the evolution of the Himalayas in the Kargil region.

**R.C. Mehrotra, Madhav Kumar and
Amit K. Ghosh**

CONFERENCE, SYMPOSIUM, WORKSHOP AND TRAINING REPORTS

Indo-China International Conference

India and China, the two neighbouring countries of Asia, have the treasure of living material, i.e. the tropical forests. In India, these forests are located in the Western Ghats, Andaman & Nicobar Islands and in northeast, while in China they occur in south Yunnan, Hainan, Taiwan, Guangdong, Guangxi and Tibet, etc. As most of these occur near the sea, they are under the influence of

of development, many of these rain forests are being destroyed. As a result many plants have disappeared and some of them are at the verge of their extinction. The destruction of forests would have an adverse effect on the climate causing increase in the greenhouse gases and global warming.

Keeping in view, the Institute hosted the Indo-China International Conference on *Biotic and Climatic Changes in the Indo-China Region* during November 14-15, 2008 following the Founder's Day Function. It was jointly organized by the BSIP, Wadia Institute of Himalayan Geology (Dehradun) as well as Agharkar Research Institute (Pune) on the Indian side and Institute of Botany, Beijing as well as Institute of Earth Environment, Xi'an on the Chinese side. It was sponsored by the DST & INSA, Govt. of India, Chinese Academy of Sciences, and National Science Foundation of China. Though this Conference was first of its kind in India, the credit goes to Prof Song Ge and his team for becoming pioneer in organizing a Sino-India International Conference held at Sanya of the Hainan Province, China from March 28 to April 01, 2007.



Dr. N.C. Mehrotra, Prof. Cheng-Sen Li and Dr. A.K. Sood (from left to right)

monsoon responsible for the growth of these forests. Both the countries enjoy enormous biological diversity comprising a rich flora and fauna. It has been observed that many tribal communities live in these forests and utilize a large number of plants for medicines, oils, timbers, fibres, dyes, perfumes, resins, etc. Therefore, the ethnobotanical study in these areas would be helpful not only in tracing the history of agriculture in both the countries but also for the commercial development. Unfortunately, in the name

The experts have been invited to deliver their talk on various themes, such as taxonomy, dendrochronology, archaeobotany, biodiversity, palaeoclimate, radiometric dating, etc. In all, 25 abstracts were received. The welcome address was given by Dr NC Mehrotra, Director, BSIP, while the speakers on dais were introduced by Dr RC Mehrotra, Convener of the Conference. At the occasion, Prof De-Yuan Hong, the Academician in the Chinese Academy of Sciences and President of the Botanical Society of China emphasized the significance of



the global climate change. Dr AK Sood, Adviser in the International Cooperation Division of DST, New Delhi spoke on the government policy for the long term cooperation in research between India and China. Dr BR Arora, Director, WIHG, Dehradun, Prof Song Ge as well as Prof Cheng-Sen Li, Institute of Botany, Beijing and Prof Yu Liu, Director, Institute of Earth Environment, Xi'an also delivered their presidential address.

Academic Session

3 Technical Sessions were held. In the First Session, chaired by Prof Ashok Sahni in which 6 presentations were made. The 2nd Session was chaired by Prof Song Ge in which 5 presentations were made, while the 3rd Technical Session was chaired by Prof Yu Liu in which 4 presentations were made. In the evening, a Poster Session was held and chaired by Prof KPN Kumaran. A pre-conference field trip was also organized, with the support of WIHG, Dehradun. In this trip 8 Chinese and 5 Indian scientists (3 from BSIP and 2 from WIHG) participated and collected many samples from and around Nainital.

The Chinese delegation comprised of 13 Chinese scientists. Besides, Prof RA Spicer of the Open University, UK was a guest delegate. Delegates from various organizations, namely Lucknow University, Kolkata University, Panjab University, Wadia Institute of Himalayan Geology, Dehradun, Agharkar Research Institute, Pune and National Botanical Research Institute, Lucknow participated in the Conference. Post

Conference, the Chinese delegates visited the National Botanical Garden, NBRI and Lucknow University for scientific discussion in the areas of mutual interest.

Recommendations of the Conference

All the delegates emphasized the need to hold such meetings at the regular intervals preferably annually/once in two years. The Chinese delegation promised to hold one such meeting in China next year. The conference provided an opportunity to the delegates to interact with Indian Scientists for the future collaboration.

The pre-conference field trip provided an opportunity to the delegates to make detailed discussion on the future expedition in the area.

The experts of radiocarbon dating of the two countries discussed problems of common interest. There is good scope of cooperation in target preparation for AMS in the Institute of Earth Environment by the BSIP scientists and carrying out AMS measurements there to understand palaeoclimate from samples from the Himalayan sites.

The Chinese scientists showed interest in the dendrochronological work being carried out in the BSIP.

The Tertiary megafossil scientists from India got an opportunity to develop contact with their Chinese counterparts and to chalk out their future programme.

R.C. Mehrotra

Conference on Plant Life through the Ages

The Conference on *Plant Life through the Ages* was organized by BSIP and Palaeobotanical Society during November 16-17, 2008 and it was inaugurated by Shri DK Pande, Director Exploration, Oil & Natural Gas Corporation Limited. Dr RN Lakhanpal, one of the senior most palaeobotanists of the country and Founder Member of the BSIP and the Palaeobotanical Society blessed the organizers for the success of Conference. The Conference was presided over by Prof Ashok Sahni, Chairman, RAC and INSA Senior Scientist, Panjab University, Chandigarh and delivered the Presidential Address on *Indian Raft: On Collision Course*. Academician Prof De-Yuan Hong conveyed the greetings on behalf of the Chinese delegation.

Delegates from all over the country made their presentations. Contributions from outside the country were also received. The presentations were organized under 15 themes spread over 8 oral and 2 poster sessions. Over

140 research contributions from different research institutes, universities, colleges and industrial organizations and UNESCO South Asia office and US-India Educational Foundation (New Delhi) were presented



An inaugural view of the Conference Plant Life through the Ages



and discussed. The Conference was sponsored by DST (New Delhi), ONGC (Dehradun) and Western Coalfields Limited (Nagpur).

Special Session on Fossil Fuel

In view of importance and bearing of palaeobotanical researches in the exploration of fossil fuels (coal and oil), a special session on Fossil Fuel was organized which was presided over by Prof RA Spicer of Department of Earth Sciences, Open University (Milton Keynes, UK). The representatives of two industrial giants, Oil and Natural Gas Corporation Limited and Western Coalfields Limited presented their views on the *Relevance of Palaeobotany in Fossil Fuel Exploration*. Shri DC Garg, Chairman-cum Managing Director, WCL inaugurated the session and Shri DK Bhowmik, Executive Director and Head, KDM Institute of Petroleum Exploration (ONGC) discussed the application of palynology in dating the oil-bearing strata. The Key-Note Addresses stressed the significance of Palaeobotany in the exploration of Coal Bed Methane and Hydrocarbon potentiality in India. Prof Spicer discussed the significance of plant fossils in climatic interpretation and need to protect the fossils in natural condition.



Prof. R.A. Spicer

Academic Sessions

During the two days deliberations, it dealt with the classical aspects of Palaeobotany, i.e. morphology,

taxonomy, origin, evolution, survival, extinction and continuation of plant characteristics through their extinct and extant representatives. As per tradition the conference discussed the antiquity of life, significance of coal forming vegetation, coal characteristics, giant gymnosperms of Mesozoic, emergence and evolution of Angiosperms, Quaternary vegetation and forest history, palynology and palynostratigraphy of different sedimentary basins of India, micropalaeontology and sea level changes and Palaeoethnobotany and Dendrochronology. Themes were also aligned to include the modern and relevant topics of the competitive world of science, like the biotechnological advancement, insect-plant interaction, microbial association and factors responsible for the disturbance of present and past ecosystem dynamics.

The impact and significance of the conference can be recognized with the fact that number of research scholars, students and senior professors attended the conference to know the latest trend in the palaeobotanical researches and to advise the young generation to take up Palaeobotany as a career and to popularizing the Palaeobotany at university and college levels. Prof Manju Banerjee of Botany Department, Calcutta University presided over the Valedictory Session and highlighted the immense potentiality of Palaeobotany.

Outcome of the Conference

Contributions on different aspects of Palaeobotany highlighted the vibrant and dynamic characters of palaeobotanical researches in tune with the modern disciplines of science.

The participation of high officials of ONGC and WCL signifies the role of Palaeobotany in prognostication and hypothecation of Coal Bed Methane in different coalfields and in understanding the hydrocarbon potentiality in the oil bearing strata.

The records of well preserved plant fossils with different morphotypes and relationship advocate the need to undertake field work and to discover plant fossils from new areas.

The morphotaxonomical study of plant fossils is useful to understand the evolution, biostratigraphy and climatic interference of past and present floras.

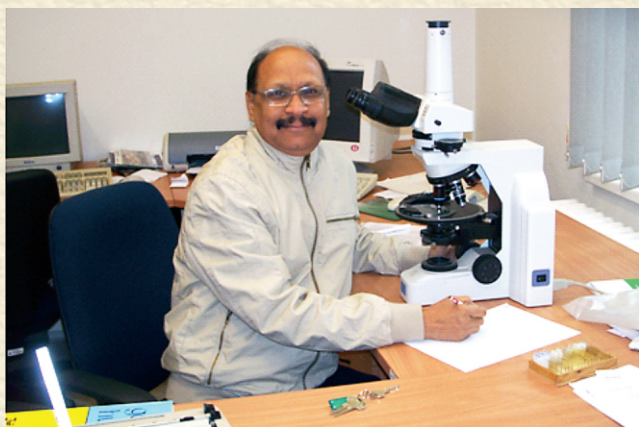
It was suggested to provide technical knowledge to protect and preserve the fossils and sites in different parts of the country.

The suggestion to have University-Institute Interactive programme was appreciated for the dissemination of palaeobotanical knowledge at university and college levels.

A.K. Srivastava



Visit under International Exchange of Scientists Programme: A report



Dr. S.K.M. Tripathi in the Lab of Dr. Nela Dolacova

Under the INSA Exchange of Scientists Programme, a visit was undertaken to the Institute of Geological Sciences, Masaryk University, Brno, Czech Republic for a period of six weeks between 6th September and 15th October, 2008. During this visit palynological work was carried out with a well known palynologist, Dr Nela Dolacova. The study was undertaken with an object to understand the Miocene vegetational history of the Carpathian Basin which constitutes a major Tertiary succession of Eastern Europe. Works carried out during the visit are as under:

1. The Czech Carpathian Foredeep is a peripheral frontal basin that developed from subsurface loading of the Alpine-Carpathian orogenic belt on passive margin of Bohemian Massif. The foredeep exhibits striking lateral variation and the southern part of it suggests a complicated evolution due to the eastern Alps and western Carpathians. The successions from which studies were carried out were brackish to marine in nature. Palynological studies were carried out on Miocene sediments from the southern part of the Carpathian Foredeep of Moravia, Czech Republic. The recorded palynospectra exhibit warm-subtropical vegetation. Pollen grains belonging to families Sapotaceae, Arecaceae and Castanaceae were profusely

recorded in the assemblage. Besides, pollen grains of the families Araliaceae and Rutaceae, though low in frequency, occur regularly. Palynotaxa representing *Alangium* and *Neogenisporis* are recorded sporadically. Practically all the palynospectra are strongly influenced by sedimentological facies. This fact is reflected in the proportional changes between the palaeotropical and arctotertiary elements and it is very difficult to specify any trends in the climatic development from these data.

The environment of the studied part of Carpathian Foredeep was extraordinary variable during the Miocene. The marine transgression invaded the sea coast with highly differentiated relief configurations. Marine facies interchanged rapidly with those of lagoons and deltas. Sedimentological evidences and the molluscs show rapid changes in salinity, dynamics, depths, light intensity and evaporation. The palynospectra reflected many of these changes. The Carpathian sedimentation began by gradual transgression on the relatively flat coast, which was connected with anoxic conditions. The frequent alteration of palynomorphs was probably caused by precipitation and growth of pyrites. Later on, fully marine conditions developed. In the Carpathian palynospectra, the marsh facies occur more uniformly.

2. Fungal remains from a Neogene succession of Israel were also studied. Various kinds of dispersed fungal spores and mycelia were observed in the assemblage. Studies indicated that sediments showing these fungal remains were deposited in a deltaic regime.

3. Conifer pollen recorded from Tertiary horizons of Czech Republic were studied at Institute of Geology and Palaeontology, Charles University, Czech Republic.

4. Studies on zonisulcate pollen recorded from Early Eocene sediments of East Europe, South America, North America and central Africa were undertaken with a view to compare these pollen taxa with those from Indian subcontinent. These studies were conducted with Prof R. Zetter at Institute of Palaeontology, Vienna University, Vienna, Austria.

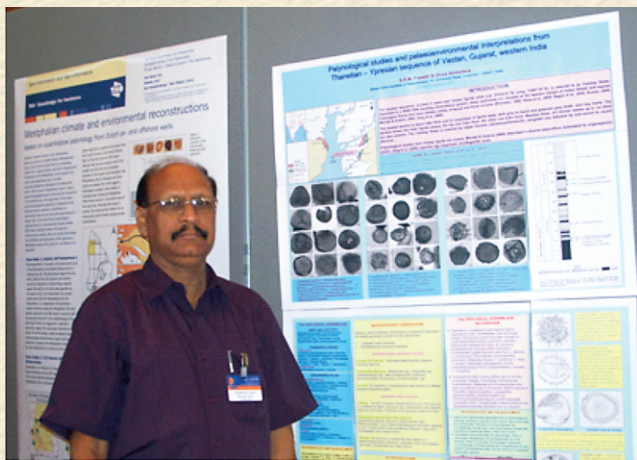
S.K.M. Tripathi

XII IPC/VIII IOPC Conferences in Bonn, Germany

International Palaeobotanical and Palynological Conferences are held every four years at nearby places separated by a gap of a few days. This time, however, 12th International Palynological Congress and 8th International Organisation of Palaeobotany Conference were held jointly at Bonn University, Bonn, Germany between 30th August and 5th September, 2008. Dr Thomas Litt of University of Bonn, Germany was Chairman of International Palynological Conference and Dr Hans Kerp

of University of Munster, Germany was the Chairman of International Organisation of Palaeobotany Conference. Dr Carole Gee of University of Bonn was Secretary of the Conference. The Conference was supported by International Federation of Societies (IFPS), the German Research Foundation and the Palaeontological Association, London. Five pre-conference field trips between August 25 and 29 and three post-conference field trips between September 6 and 10 to important geological





A poster of Dr. S.K.M. Tripathi & Ms Divya Srivastava at XII IPC

areas of Germany were organized. In addition, during the mid-conference break several one-day excursions to various geological sites were also arranged.

The Opening Ceremony was conducted in the Main Auditorium of Bonn University at 15.00 hrs and was followed by two Plenary Lectures delivered by Dr Jonathan Overpeck of University of Arizona and Prof Peter Crane of University of Chicago.

The Joint Conference, attended by about 900 delegates from all over the world offered a great diversity of palaeobotanical and palynological topics which enhanced the interactive chances and exchange of cutting-edge ideas. The conference was marked by 5 Plenary Lectures and 8 parallel sessions encompassing 48 symposia covering 536 oral and 238 poster presentations. Most of the symposia featured a plenary lecture that covered the interdisciplinary aspects of the geosciences.

Themes of the Joint Conference

Microbial diversity in Precambrian-Cambrian ecosystems

Studies on mega- and microfossils through geologic time in relation to evolution and stratigraphy.

Palaeopalynology, palynofacies studies, palaeo-environmental analysis, sequence stratigraphy and biostratigraphy.

High Resolution quantitative landscape reconstructions through pollen-vegetation calibrations.

Taphonomic processes in relation to the Palaeobotany and Palynology.

The tropical palaeoecology and global change.

Plant-animal interactions.

Biophysical approaches in Palaeobotany.

3D reconstruction of fossil plants.

Holocene Vegetation history and human environmental interaction.

Important findings Reported

The Mass Extinction at Cretaceous-Tertiary Boundary and its global effect—Some papers dealing with important findings related with Mass Extinction at Cretaceous

/Tertiary Boundary were presented. It was stated that the event eventually affected 60-80% of all living species at that time. Recent studies on pollen/spore from high and mid latitudes have provided valuable information about the response of palaeofloras to K/T event. These studies elucidated the extinction pattern at the K/T boundary with respect to the tropical palaeofloras. Pollen and spore records including the pollen genera, like *Proxapertites*, *Longapertites*, *Mauritides*, *Echitriporites* and *Spinizonocolpites* from tropical South America and western Africa indicate that during Palaeocene similar kind of flora was present in both the areas. However, the west African pollen taxa show a significant difference in morphology by exhibiting more complex sculptural pattern.

The results of Non-metric Multidimensional Scaling indicate that plant species show higher turnover between early and late Cretaceous and relatively lower rates between the Cretaceous and Palaeocene. The method allows for a different perspective on possible coarse scale extinctions in the fossil record as well as directing further investigations by revealing possible times of large scale turnover in the fossil record.

The Deccan Volcanism and Cretaceous-Tertiary Boundary—Palynological studies indicate that prior to the initiation of Deccan volcanism, the vegetation was dominated by gymnosperms and angiosperms. The advent of Deccan volcanism resulted into a complete floral turnout with pteridophytic and angiospermous floral component occupying a dominating status. The impact caused by the early volcanic activity was more devastating but the vegetation attained stability in the late history of volcanic eruption. Most of the later changes could be evolutionary as per the adaption strategies of plants. The Deccan volcanic associated sediments also witnessed appearance of dinoflagellate cysts, sponge specules and small acritarchs. Appearance of these microbiota within the Deccan volcanic sequence could be related to change in chemistry of the lakes caused by volcanic ejecta, acid rains and change in provenance.

3-D reconstruction of fossil plants and ancient microbes—With the help of Confocal Laser Scanning Microscopy (CLSM) and the Raman imagery, the fossil biota can be observed in three dimension at a micron-scale resolution. The method is very useful for the studies of Precambrian microbes and other thin walled microfossils. Application of these techniques also provides significant information about the morphology, cellular anatomy, taphonomy and geochemical maturity of kerogenous permineralized fossils.

The ecological roles of grasses in Eocene—Phytolith studies from India indicates that contrary to the earlier reports, taxa with affinity to grasses in the PACCMAD clad had evolved by Late Cretaceous.

Estimation of plant diversity from pollen diversity—A new method was reported to estimate the plant diversity



based on pollen accumulation rates. Accumulation-based pollen diversity is defined as the number of pollen types deposited per unit surface and time. It is independent of evenness and there are no percentage effects, so it is a relative measure of plant diversity and their distribution in the field.

The Nomenclature of fossils and Megafloristics—A few good papers were presented on nomenclature of fossil plants. In addition, papers dealing with micro- and megafossils from Palaeozoic to Cenozoic Eras, others with very significant information concerning the evolutionary aspects of the plants through the geological history were presented.

A Poster Presentation by Dr SKM Tripathi and Miss Divya Srivastava on "Palynological studies and palaeo-environmental interpretations from Thanetian-Ypresian sequence of Vastan, Gujarat, western India" dealt with Tertiary sediments exposed at Vastan, Surat, Gujarat.

The recovered palynofossils indicate sedimentation in varied environments. Rich representation of Arecaceous pollen in lower part of sequence suggests its deposition in coastal environment. This part is also rich in pteridophytic spores of the families Osmundaceae and Schizaeaceae. Upper part of the sequence is rich in pollen of the family Bombacaceae. Of these, the fossil pollen *Lakiapollis*

ovatus, shows affinity with the extant plant *Durio* which is a member of Indo-Malayan region. These plants grow in swampy evergreen forests. The accumulation of woody elements in the swamps of deposition site was responsible for creation of anoxic bog conditions resulting into the deposition of organic rich sediments and the lignite. Faunal evidences and the presence of pyritized wood fragments suggest that lower half part of the sequence was deposited in estuarine to lagoonal environment. The upper half of the section is characterized by high frequency of bombacaceous pollen along with the profuse occurrence of dinocysts indicating deposition in shallow marine environment. Palynofacies studies indicate that deposition of the studied sequence took place under moderately to deep anoxic conditions.

Since the studies involve a crucial time period when India was moving towards the north and occupied a strategic geographic position that was crucial to radiation of angiosperms, it generated keen interest amongst the scientists working on Palaeocene and Eocene sequences. Participants agreed that maximum possible parameters should be taken into account before arriving at any conclusion while dealing with any aspect of palaeobotanical studies.

S.K.M. Tripathi

EMECS-8 International Conference “Harmonizing River Catchment and Estuary”



8th International Conference on Environmental Management of Enclosed Seas (EMECS-8) with the theme “Harmonizing River Catchment and Estuary” was held in Shanghai, China from October 27-30, 2008. Since ancient times, enclosed coastal seas have been known for their great scenic beauty and abundant productivity. However, enclosed coastal seas are difficult places to conserve and improve water quality, because pollutants tend to accumulate easily due to poor exchange of water with open water bodies. In order to

exchange information on the measures to conserve and create coastal seas, the world's first International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS 1) was held in the city of Kobe, Japan in 1990. EMECS 8 provided a forum to all participants, including natural and social scientists, administrators, government officers, and younger students, to interact each other to work out a better understanding of how to minimize potentiality of the environmental risk.



Activities of EMECS

- Gather and make available information pertaining to enclosed coastal seas.
- Promote the conservation of enclosed coastal sea environments and contribute to the restoration of damaged habitats through training and education.
- Preserving natural enclosed coastal sea environments and creating new ones.
- Sponsoring international conferences and otherwise promote international exchanges.
- Carry out other activities necessary to achieve the International EMECS Center's objectives.

There were many Keynote and Plenary speeches by world renowned scientists. EMECS was organized by East China Normal University, Chinese Research Academy of Environmental Sciences (CRAES), SEPA International EMECS Center. Local Organizing

Committee Chairman was Prof Xiaoming Wang, Vice Chairman was Dr Yeyao Wang and Conference Secretary General was Prof Zhongyuan Chen, East China Normal University, China. The conference was assisted by National Natural Science Foundation, China Science and Technology, Commission of Shanghai Municipality, State Environmental Protection Administration (SEPA), State Ocean Administration (SOA), Changjiang Water Resources Commission (CWRC), and Chinese Academy of Sciences (CAS).

Conference Themes

1. Environmental Vulnerability under Global Warming Setting, 2. Integrated Catchment-Coastal Management, 3. Landcover Changes: from Catchment to Coastal Seas, 4. New Approaches, 5. Social Responsibility and Awareness.

There were 8 sessions.

Asha Khandelwal and Shilpa Singh

World Summit on Ancient Microscopic Fossils, University of California, Los Angeles

IGPP Center for the study of Evolution and the Origin of Life (CSEOL) at the University of California, Los Angeles convened the first *World Summit on Ancient Microscopic Fossils* during the one-week period from July 27 to August 2, 2008. The Summit was supported by CSEOL, the NASA Astrobiology Institute and Elsevier. The Summit was conceived in August 2006 when an International Organizing Committee composed of Jun-Yuan Chen (China), Vinod C Tewari (India), Vladimir N Sergeev (Russia) and David J Bottjer and J William Schopf (USA) identified a group of active scientists from different countries to participate in the meet. Finally 28 scientists from 12 countries (Australia, Brazil, Canada, China, Britain, France, Germany, India, Japan, Russia, Sweden and USA) assembled at the University of California, Los Angeles to discuss recent advancements in the field of Precambrian Palaeobiology. Though started with simple optical microscopic investigations in 1954, the present day upsurge in the studies of Precambrian Life is the result of introduction of highly advanced instrument based analytical techniques.

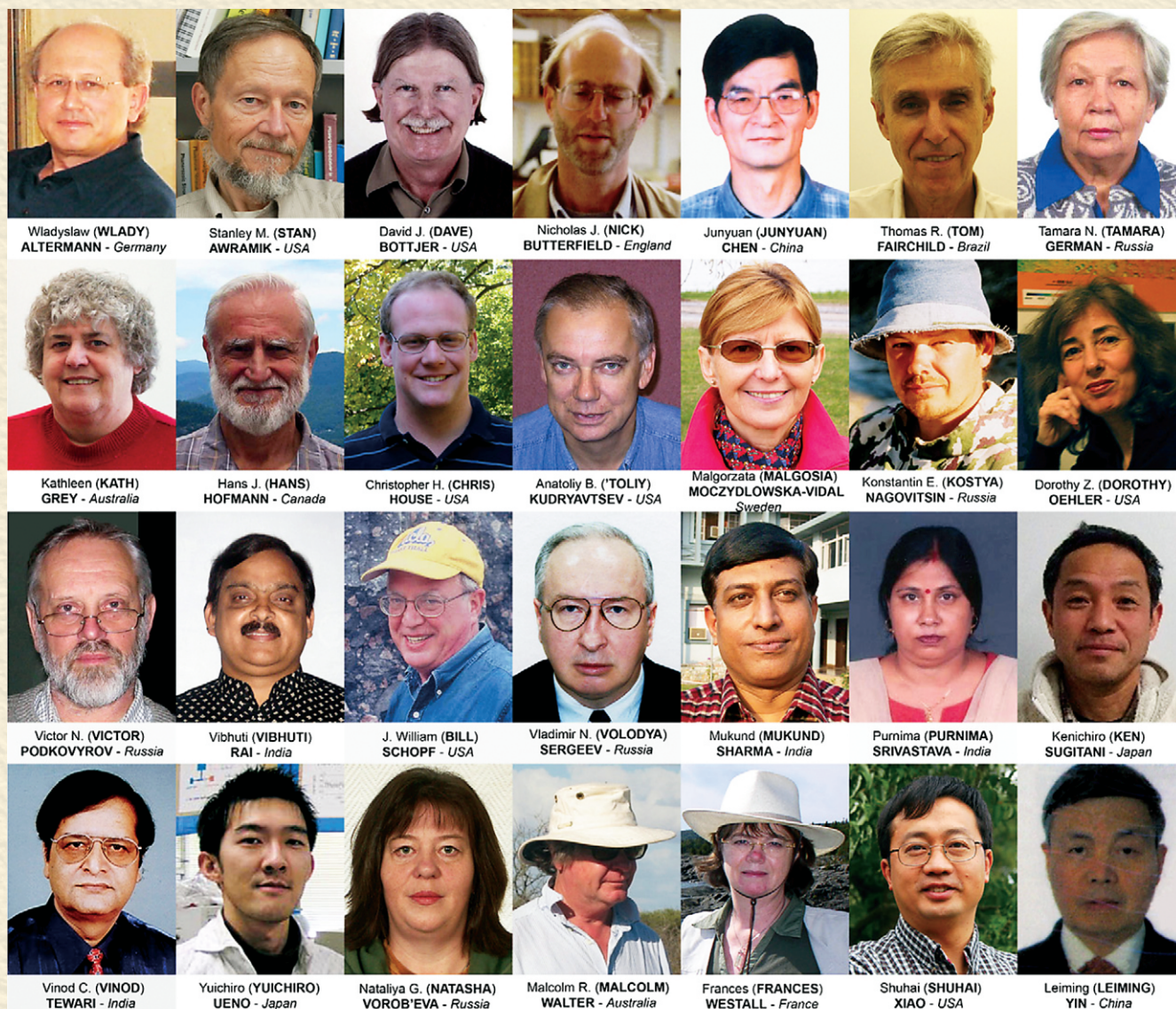
The Summit provided an opportunity to the participating scientists to present their work and group discussion of their recent results obtained through multidisciplinary studies. Summit participants were allowed to show additional PowerPoint presentations as well as hand specimens and photomicrographs of special interest. Optical microscopic facilities were extended for microfossils examination and discussion of specific enigmatic bizarre forms or rare forms described by different group of scientists. Prof JW Schopf and Dr A

Kudryavtsev allowed *hand-on* introductions to the use of Raman Imagery and Confocal Laser Scanning Microscopy (CLSM) technique recently introduced to the study of Precambrian microfossils and extensively used by the scientists of CSEOL. All the participants discussed the yet unsolved problems and future field of investigations.

The main aim of the CSEOL supported Summit was for the participants to acquaint them about the use of advanced techniques introduced to the field of Precambrian palaeobiology. Besides the Raman Imagery and CLSM, the data acquired by the use of Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Secondary Ion Mass Spectroscopy (SIMS and nano SIMS), Synchrotron X-ray Microtomography (SR- μ CT), Mass Spectroscopy (MS), Fourier Transform Infrared Spectroscopy (Micro-FTIR) and Micro-X Ray Absorption Near-Edge Spectroscopy (μ XANES) were presented. Organizers asked the participants to grade these new techniques with the traditional optical microscopy in terms of usefulness in their research work. Optical Microscopy remained the leader (97%) with CLSM (94%), Raman (88%) and SIMS (81%).

In the concluding session Professor J.W. Schopf presented a nice abbreviated genealogy of the science tracing the history and development of Precambrian palaeobiology. All the participants were asked to contribute the research work for publication in special volume of the Journal Precambrian Research to be edited





Participants of the World Summit on Ancient Microscopic Fossils

by JW Schopf and DJ Bottjer. Participation of all the scientists was fully supported by the CSEOL and NAI. From India four scientists VC Tewari, V Rai, Purnima

Srivastava and myself were invited to participate in the Summit.

Mukund Sharma



Facets of Palaeobotany

IN-HOUSE LECTURE SERIES

BSIP organised an interactive lecture series for newly appointed research scholars and scientific staff of the institute during November 25, 2008 to January 23, 2009. In this lectures series, following experts delivered 36 lectures and demonstrated various aspects of research activities in the labs providing an opportunities of hands on training to fresh students and scientific staff. The concluding session of the lecture series was organised on 12th February, 2009 a date close to the Bicentennial Birth Anniversary of famous scientists Charles Darwin.

Title	Speaker	Date
Birbal Sahni Institute of Palaeobotany: the Founder and the Vision	H.P. Singh	25 Nov., 2008
Palynology in Biostratigraphy and Fossil Fuel Exploration	N.C. Mehrotra	28 Nov., 2008
Stratigraphic Principles and Geologic Time Scale	R.K. Saxena	1 Dec., 2008
Fossil Calcareous Algae and their palaeoenvironmental studies	Amit K. Ghosh	5 Dec., 2008
Terminology for Fossil Microbialites	Mukund Sharma	8 Dec., 2008
Early land plant developments: Global progress and Indian priorities	K.J. Singh	10 Dec., 2008
Gondwana Biodiversity: Lower Gondwana	A.K. Srivastava	11 Dec., 2008
Gondwana Megaspores-Morphology, Evolutionary Trend and Study Techniques	Rajni Tewari	12 Dec., 2008
Permian Palynostratigraphy, Dating and Correlation of coal bearing horizons	Neerja Jha	15 Dec., 2008
Lower Gondwana – Palynology, Palaeozoic Spores	Ram Awatar	16 Dec., 2008
Permian-Triassic (P/Tr) Mass Extinction: Palynological perspective	Vijaya	17 Dec., 2008
Indian Coals and their relevance to Coal Bed Methane	O.S. Sarate	18 Dec., 2008
Futuristic trends in Coal Petrological Investigations	Rakesh Saxena	19 Dec., 2008
Deccan Intertrappean Flora of India	Rashmi Srivastava	22 Dec., 2008
Early Angiosperm through Palynological Window	Archana Tripathi	23 Dec., 2008
Evolutionary innovations in Mesozoic Flora	A. Rajanikanth	24 Dec., 2008
Palaeogene Megaflora	R.C. Mehrotra	30 Dec., 2008
Neogene Megaflora	J.S. Guleria	31 Dec., 2008
Mass Extinction & Climatic Extremes during Cretaceous - Palaeogene: Examples from the Marine Realm	Rahul Garg	2 Jan., 2009
Palynological preparation techniques	S.K.M. Tripathi	5 Jan., 2009
Nannofossils – Morphotaxonomy and Biostratigraphy	Jyotsana Rai	6 Jan., 2009
Fossil Dinoflagellates: Morphology and stratigraphic significance	K. Ateequzzaman	9 Jan., 2009
Sedimentary Organic Matter: Proxy for Depositional Environments	Madhav Kumar	9 Jan., 2009
Evolutionary trends in Precambrian Microfossils and Acritarchs	Rupendra Babu	12 Jan., 2009
Pollen and Quaternary Palaeoclimate	M.S. Chauhan	13 Jan., 2009
Mangrove Palynology	Asha Khandelwal	14 Jan., 2009
Differential Pollen Production, Dispersal & Accumulation in the light of exotic pollen	S.K. Bera	15 Jan., 2009
Dendrochronology – Proxy in Palaeoclimatology	A. Bhattacharyya	16 Jan., 2009
Pollen: Taxonomy and Morphological attributes	R.S. Singh	19 Jan., 2009
Farming and Domestication	C. Srivastava	19 Jan., 2009
Environmental Magnetism and Palaeoclimatology	Binita Phartiyal	20 Jan., 2009
Geochemistry and its application	Anupam Sharma	21 Jan., 2009
Mesozoic Mega Flora: Morphology and Evolutionary Aspect	Neeru Prakash	22 Jan., 2009
Isotopes in Stratigraphy and Palaeoclimatology	C.M. Nautiyal	22 Jan., 2009
Rules of Botanical Nomenclature (as pertinent to Palaeobotany)	R.K. Saxena	23 Jan., 2009

Elementary Geology Orientation Programme

The Palaeontological Society of India conducted a short Elementary Geology Orientation Programme for the research scholars and newly recruited scientists of the BSIP. RAC has recommended a suitable Geological Course for research scholars and staff members not having geological background. Specially designed course was imparted to these scholars and scientist. It is considered that this course will be helpful in their future research work. The details of the course and field work is given below.

Title	Speaker	Date
Introductory Lecture	Dr K.K. Agarwal	21.4.2009
Geomorphology (weathering erosion)	Dr R. Bali	22.4.2009
Folds, parts of folds, direction, etc.	Dr K.K. Agarwal	23.4.2009
Fluvial system	Dr R. Bali	24.4.2009



Title	Speaker	Date
Faults	Dr K.K. Agarwal	25.4.2009
Glaciers	Dr R. Bali	27.4.2009
Unconformities/contacts	Dr K.K. Agarwal	28.4.2009
Glaciers, Winds	Dr R. Bali	29.4.2009
Igneous Bodies	Dr K.K. Agarwal	1.5.2009
Sedimentary Geology	Dr Munendra Singh	4.5.2009
Sedimentary Geology (Contd.)	Dr Munendra Singh	5.5.2009
Marine sediments & its classification	Dr Munendra Singh	5.5.2009
Sedimentary cycle of sandstone	Dr Munendra Singh	5.5.2009
Grain morphology, sedimentary texture	Dr Munendra Singh	5.5.2009
Nature and Terminology of Bedding & laminations	Dr Munendra Singh	5.5.2009
Palaeontology, Fossilization	Prof A.K. Jauhri	6.5.2009
Stratigraphy & Principles of Stratigraphy	Prof N.L. Chhabra	7.5.2009
Sedimentology	Prof A.K. Jauhri	8.5.2009
Problems related to map and location of site in map	Dr D.D. Awasthi	11.5.2009
Mineralogy	Prof M.P. Singh	14.5.2009
Sedimentology	Dr Munendra Singh	15.5.2009
Mineralogy	Prof M.P. Singh	18.5.2009
Sediment transportation	Dr Munendra Singh	19.5.2009
Mineralogy	Prof M.P. Singh	20.5.2009
(local field trip to Chandrika Devi Temple area)	Field	21.5.2009
Mineralogy—Quartz family	Prof M.P. Singh	22.5.2009
Mineralogy-Feldspar family	Prof M.P. Singh	23.5.2009
Mineralogy-Felspathoid family, Garnet family	Prof M.P. Singh	25.5.2009
Sandstone, Mudstone, classification of sediments	Dr Munendra Singh	26.5.2009
Grain size analysis, Fluvial environment	Dr Munendra Singh	26.5.2009
Alluvial-Fluvial environments	Dr Munendra Singh	26.5.2009
Mica family, Pyroxene family	Prof M.P. Singh	27.5.2009
Classification of carbonate rocks, concept of facies	Dr Munendra Singh	28.5.2009
Walthers law, sedimentary basins	Dr Munendra Singh	28.5.2009
Amphibole family	Prof M.P. Singh	29.5.2009
Folds and faults (revision)	Dr K.K. Agarwal	30.5.2009
Earthquake, volcano	Dr R. Bali	1.6.2009
Sediments into rocks	Dr Munendra Singh	1.6.2009
Depositional environment (Desert)	Dr Munendra Singh	1.6.2009
Depositional environment (Glacier)	Dr Munendra Singh	1.6.2009
Depositional environment (Delta)	Dr Munendra Singh	1.6.2009
Lacustrine environment	Dr Munendra Singh	1.6.2009
Deltaic environment	Dr Munendra Singh	1.6.2009
Depositional environment (Estuary)	Dr Munendra Singh	1.6.2009
Tidal Flat sequence	Dr Munendra Singh	1.6.2009
Marine environment	Dr Munendra Singh	1.6.2009
Sequence stratigraphy Walther's law of facies, sea level fluctuation	Dr Dhurv Sen Singh	2.6.2009
Optical Mineralogy	Prof S. Kumar	3.6.2009
Optical Mineralogy	Prof S. Kumar	4.6.2009
Principles of Stratigraphy, Stratigraphic unit	Prof N.L. Chhabra	5.6.2009
Folds and faults	Dr K.K. Agarwal	9.6.2009
Petrology, Igneous rock	Dr D.D. Awasthi	10.6.2009
Scope, procedure & Principles of stratigraphy	Prof N.L. Chhabra	11.6.2009
Palaeogeography & important extinction events of Palaeozoic & Mesozoic time	Prof N.L. Chhabra	12.6.2009
Petrology	Dr D.D. Awasthi	15.6.2009
Petrology	Dr D.D. Awasthi	16.6.2009
Geo-environment	Prof S. Kumar	17.6.2009
Film show on climate change PPT on: Easter Island		20.6.2009
Biosphere II		20.6.2009
Environmental system		20.6.2009
World water bodies		20.6.2009
Climate change		20.6.2009



Practical Training

1. Maps Topographic, structural, geomorphic
2. Identification of rock types
3. Identification of fossils
4. Identification of minerals
5. Identification of minerals in thin section
6. Use of clinometer, topographic map & GPS
7. Construction of litholog
8. Grain size analysis

Local Field Trip

Date 21.5.2009

Place Near Chandrika Devi Mandir
Main channel of Gomti River
Nature of fluvial depositional environment

Field Trip to Solan, Himachal Pradesh

- 5.7.2009 Traverse to Solan bypass, Dharampur
Orientation of Toposheets
Bearing & back-bearing
Lithology of Infra Krol, Krol A & Subathu Formation
Sharp contact between Infra Krol & Krol A
Identification of Sandstone & Limestone
- 6.7.2009 Traverse to Barog-Kumarhatti (Dagshai)
Dharampur

Dagshai Formation (Maroon & grey sandstone)
Red facies of Subathu
Mottled coloured sandstone filling is occupied by bioturbation Bivalves

7.7.2009

Traverse to Kasuali
Represented by greenish, greyish, micaceous sandstone sandy shale dirty white, silt stone
Plant fossil in dirty white sandy shale
Outcrops of fossil (leaves)

8.7.2009

Traverse to Kandaghat
Krol B - Represented by purple shale
Chert nodule found in Kandaghat
Giri Thrust in Kandaghat
Traverse Kandaghat-Chail Road
Blaini boulder bed seen with quartz, pebble silt and limestone

9.7.2009

Traverse to Shimla
Black micaceous sandstone with shale parting
Absence of quartzites in comparison to Infra Krol

DOCTORAL DEGREE AWARDED



Deepima Sinha

Subject : Geology
Date of Award : 23 April, 2009
University : Pt. Ravishankar Shukla University, Raipur, Chhattisgarh
Supervisor : Prof Rajeeva Guhey
Co-Supervisor : Dr Mukund Sharma
Title of Ph.D. Thesis : Proterozoic columnar stromatolites from Jagdalpur Formation, Indravati Basin: Palaeo-environmental and stratigraphic implications

The Indravati Group is one of the important Purana Basins adjacent to Proterozoic Chhattisgarh Basin. The

thesis presents the systematic study of stromatolites of Jagdalpur Formation, Indravati Basin and how they are useful to understand the depositional environment of the basin and age. In systematics, stromatolites varieties observed in Jagdalpur Formation are described. For the identification of varieties three dimensional reconstruction was done and thin sections were also studied to see the microstructure. On the basis of morphological features, three dimensional reconstruction and thin section studies four varieties of stromatolites have been identified. They are *Colonnella laminata*, *Gymnosolen furcatus*, *Kussiella enigmatica* and *Boxonia pertaknura*. These forms are described in detail. Among the identified forms *Colonnella laminata* occurs abundantly while *Gymnosolen furcatus* occurs rarely. In Indravati Basin out of four, three stromatolites are formed in subtidal and one in intertidal zone. Stromatolites formed in Bastar are less dolomitized and towards Gupteshwar area the dolomitization increases. Stromatolitic columns are small in Bastar but in Gupteshwar column size increases which show that in Bastar stromatolites were formed in intertidal condition and in Machkot-Tiria-Gupteshwar they were formed in subtidal condition. The present assemblage supports the Upper Riphean age of Jagdalpur Formation based on stromatolitic assemblages. It also indicates their usefulness in biostratigraphic zonation and environmental implications for Indravati Basin.



LIBRARY

List of Journals Subscribed

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| 1. Aerobiologia | 29. IAWA Journal | 54. Palaeogeography, Palaeoecology & Palaeoclimatology |
| 2. Alcheringa | 30. Indian Archaeology - A Review | 55. Palaeontology |
| 3. American Journal of Botany | 31. Indian Journal of Earth Sciences | 56. Palaeoworld |
| 4. American Journal of Sciences | 32. Indian Journal of Science Communication | 57. Palaios |
| 5. Annals of Botany | 33. Indian Ocean Archaeology | 58. Palms |
| 6. Annales De Paleontologie | 34. International Journal of Coal Geology | 59. Philosophical Trans. of Royal Society (Earth Sci./Biol. Sci.) |
| 7. Asian Agri History | 35. International Journal of Earth Sciences (Geologische Rundschau) | 60. Phytomorphology |
| 8. Australian Journal of Earth Sciences | 36. International Journal of Plant Sciences | 61. Plant Systematic Evolution |
| 9. Boreas | 37. Journal of Asian Earth Sciences | 62. Precambrian Research |
| 10. Botanical Review | 38. Journal of Earth System Science | 63. Quaternary International |
| 11. Botanical Journal of Linnean Society | 39. Journal of the Geological Society of India | 64. Quaternary Research |
| 12. Bulletin American Assoc. of Petroleum Geology (Instt. Membership) | 40. Journal of the Palaeontological Society of India | 65. Radiocarbon |
| 13. Bulletin Geological Society of America | 41. Journal of Quaternary Science | 66. Resonance |
| 14. Chemical Geology | 42. Journal of Systematic Palaeontology | 67. Review De Micropaleontologie |
| 15. Dendrochronologia | 43. Lethaia | 68. Review of Palaeobotany & Palynology |
| 16. Earth & Planetary Science Letters | 44. Marine Geology | 69. Science |
| 17. Earth Science Reviews | 45. Marine Micropaleontology | 70. Scientific American |
| 18. Swiss Journal of Geoscience | 46. National Geographic | 71. Sedimentology |
| 19. Episodes | 47. Nature | 72. Sedimentary Geology |
| 20. Estuarine & Coastal Shelf Science | 48. Neus Jharbuch Palaeontology | 73. Stratigraphy & Geological Correlation |
| 21. Facies | 49. Origin of Life | 74. Terra Nova |
| 22. Fuel | 50. P.C. Quest | 75. The Holocene |
| 23. Geobios | 51. Paleobiology | 76. Tree Ring Bulletin |
| 24. Geochemica et Cosmochemica Acta | 52. Palaeoceanography | 77. Vegetation History & Archaeobotany |
| 25. Geophytology | 53. Palaeontographica | Magazines |
| 26. GFF | | 78. Aavishkar (in Hindi) |
| 27. Gondwana Research | | 79. Minetech |
| 28. Grana | | 80. Vigyan Pragati (in Hindi) |

List of Journals received in Exchange

- | | | |
|--|--|---|
| 1. Abhandlugen.des Staatlichen Museums fur Mineralogie und Geologie zu Dresden | 27. G.S.I. Bulletin | 50. Oklohoma Geology Notes |
| 2. Acta Botanica Sinica | 28. G.S.I. (Memoir) | 51. Palaeontologia Indica |
| 3. Acta Geologica Sinica | 29. G.S.I. (Miscellaneous Publication) | 52. Palaeontological Research |
| 4. Acta Geoscientia Sinica | 30. G.S.I. (News) | 53. Palaeontological Journal USSR |
| 5. Acta Micropaleontologica Sinica | 31. G.S.I. (Record) | 54. Proceedings of the Indian National Science Academy, Part A (Physical Sciences) Part B (Biological Sciences) |
| 6. Acta Palaeobotanica | 32. G.S.I. (Special Publication) | 55. Proceedings of the National Academy of Sciences, India |
| 7. Acta Palaeontologica Sinica | 33. Hallesches Jahrbuch fur Geowissenschaften | 56. Professional Paper of Stratigraphy and Palaeontology |
| 8. Annls. hist. nat. Mus. natn. Hung. | 34. Himalayan Geology | 57. Rev. del Mus. de La Plata |
| 9. Blumea | 35. Institute of Geological and Nuclear Sciences Monographs | 58. Science Reports of the Institute Geoscience University Tsukuba |
| 10. Bulletin of the BSI | 36. Ivestia Akademik Nauk USSR | 59. Science Reports of the Kanazawa University |
| 11. Bull. Indian Geologists Association | 37. Journal of the Asiatic Society | 60. Science Reports of the Tohoku University |
| 12. Bull. National Science Museum Ser. C (Geology) | 38. Journal of the Czech Geological Society/Journal of Geosciences | 61. Scripta |
| 13. Bulletin of Geosciences | 39. Journal of Indian Botanical Society | 62. Senckenbergiana Lethaea |
| 14. Comunicoes Serve. Geol. Port. | 40. Journal of Stratigraphy | 63. Slovak Geological Magazine |
| 15. Cretaceous Research | 41. Kwartalnik Geologiczny | 64. Sovetskaya Geologiya |
| 16. Documenta naturae | 42. Mater Archaeologiczne | 65. Stratigraphy |
| 17. Documents des Lab. Geol. Lyon | 43. Memoires de La Societe Geologique de France (SGF) | 66. Studia Geologica Salmanticensia |
| 18. Earth Evolution Sciences University of Tsukuba | 44. Memoir of the Fukui Prefectural Dinosaur Museum | 67. Travaux de la Section Scientifique et Technique/Collection Ecologie |
| 19. Folia | 45. Micropaleontology | 68. Thalassas |
| 20. Fossils the Palaeontological Society of Japan | 46. Mitteilungen aus dem Museum for Natur Kunde in Berlin Geowiss. Reihe | 69. Tracks & Traces |
| 21. Geolines | 47. Munstersche Forschungen Zur geologic and Palaontologie | 70. Tsukuba Geoenvironmental Sciences |
| 22. Geologia Colombiana | 48. Nature und Museum | 71. USGS Professional Papers |
| 23. Geologica Carpathica | 49. National Academy Science Letters | |
| 24. Geological Review | | |
| 25. Geologisches Jarhbuch | | |
| 26. Geologia: Serie Cientifica USP | | |



New Additions to the Library 2008-09

S.N.	Accession No.	Author/s	Name of the Book
1.	62315	Schieber J <i>et al.</i> (ed.)	Atlas of Microbial Mat features preserved within the siliciclastic rock record
2.	62316	Dash SK	Climate change: An Indian perspective
3.	62317	Dwivedi HP	<i>Banbhatt ki Aatmakatha</i>
4.	62318	Joshi MS	<i>Kuru-Kuru Swaha</i>
5.	62319	Agrawal P	<i>Nij Brahma Vichar: Dharam, Samaj Aur Dharametar Adhyatm</i>
6.	62320	Merh SS	Geology of Gujarat
7.	62322	Raju AJS	Advances in Pollen Spore Research
8.	62323	Subramanian AP & Balakrishna S	Advancing frontiers in Geology and Geophysics
9.	62324	Chaurasia OP <i>et al.</i>	Ethnobotany and plants of trans-Himalaya
10.	62325	Sharma V & Srinivasan MS	Geology of Andaman-Nicobar the Neogene
11.	62326	Roberts K (ed.)	Handbook of Plant Science Vol. 1
12.	62327	Roberts K (ed.)	Handbook of Plant Science Vol. 2
13.	62328	Nagamani A <i>et al.</i>	Handbook of Soil Fungi
14.	62329	Trivedi PC	Palaeobotany to Modern Botany
15.	62331	Bastia R	Geologic settings and petroleum systems of India's East Coast offshore Basins: concepts and applications
16.	62332	Bastia R	Proc. of the 1 st Conference and Exhibition on Strategic Challenges and Paradigm shift in Hydrocarbon Exploration with special reference to frontier basins, vol.-1
17.	62333	Bastia R	Proc. of the 1 st Conference and Exhibition on Strategic Challenges and Paradigm shift in Hydrocarbon Exploration with special reference to frontier basins, vol.-2
18.	62334	Raju DSN <i>et al.</i> (eds.)	An overview of Litho-Bio-Chrono- sequence stratigraphy and sea level changes of Indian sedimentary basin
19.	62335	Zutshi PL & Panwar MS	Geology of Petroliferous Basin of India
20.	62336	Mukhopadhyay DK	Structural Geology for Petroleum Geoscientists
21.	62337	Bhandari LL	Manual of Field Geology
22.	62338	Sahay B	Petroleum Exploration and Exploitation Practices
23.	62339	Sahay B	Oil Scenario of the 21 st Century
24.	62355	Raturi RD <i>et al.</i>	Indian woods: their identification Vol.-IV
25.	62594	Blum MD <i>et al.</i> (eds.)	Fluvial sedimentology VII
26.	62595	Joshi MS	<i>Kasap</i>
27.	62596	Agrawal P	<i>Sanskrit: Varchaswa Aur Pratirodh</i>
28.	62597	Agrawal P	<i>Pratinidhi Kavitaen (Narayan Kunwar)</i>
29.	62598	Agrawal P	<i>Vichar ka Anant</i>
30.	62599	Keshari S	<i>Yagavalkya se Bahas</i>
31.	62601	Scott DB <i>et al.</i>	Monitoring in coastal environment using Foraminifera and indicators
32.	62602	-----	India 2008
33.	62603	-----	Bharat 2008
34.	62604	Bhattacharya AR & Agrawal KK	Himalayan Orogen-Foreland Interaction
35.	62605	Farooqui MIH	Dictionary of Indian plant gums, resin, dyes and related products
36.	62608	Singh V	Phytotherapeutic wisdom of Indian rurals Aborigines
37.	62609	Miller W III (ed.)	Trace fossils concepts, problems, prospects
38.	62610	Mishra Anup	Beyond pots and pans: A study on chalcolithic balathal
39.	62611	Elias SA (ed.)	Encyclopedia of Quaternary Science Vol. I
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41.	62613	Elias SA (ed.)	Encyclopedia of Quaternary Science Vol. III
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43.	62615	L' Annunziata MF (ed.)	Handbook of Radioactivity Analysis 2 nd edition
44.	62662	Benzecri JP	Correspondence Analysis Handbook
45.	62663	Brenchley PJ & Harper DAT	Palaeoecology: Ecosystems, Environments and Evolution
46.	62664	Vickers-Rich P & Komarower P (ed.)	The rise and fall of the Ediacaran Biota
47.	62665	Fedonkin MA <i>et al.</i>	Rise of animals evolution and diversification of the Kingdom Animalia



SPONSORED PROJECTS TENABLE AT THE INSTITUTE

Sl. No.	Name of the Project	Funding Agency	Name of PI and Co-PI	Project Sanction No. Project Starting Date, Project Cost
1.	Palynological Dating and Correlation of Gondwana sediments in Godavari Valley Coalfield, Andhra Pradesh	GM Exploration SCCL	Dr Neerja Jha	CRP/ESP/B32/1783, Dated 01.09.2004, Total Grant Rs. 2,95,500/- completed October 2008
2.	Analysis of palaeoclimate of Hominin bearing Quaternary sediment of central Narmada (M.P.)	DST	Dr M.R. Rao	SR/54/ES-138/2005, Dated 18.01.2006, Total Grant Rs. 12.12 lacs for three years
3.	Quaternary Sedimentary records of Baroda Window, mainland Gujarat, Multidisciplinary approach	DST	Dr Anupam Sharma	SR/S4/ES-21/Baroda Window/PI, Dated 24.01.2006, Total Grant Rs. 11.62 lacs for three years
4.	Preparation of Treatise of microfossils and their role in understanding evolutionary Precambrian Palaeobiology and Biostratigraphy	DST ILTP	Dr Mukund Sharma	INT/ILTP/B-256, Dated 04.04.2006, Total Grant Rs. 19.19 lacs for three years. Completed 31.03.2009
5.	Late Holocene Climate Records from the Himalayan Region: High Altitude Tree Ring and Pollen Proxy Records	DST	Dr R.R. Yadav	SR/S4/ES-181/05, Dated 07.11.2006, Total Grant Rs. 15.00 lacs for three years
6.	Development of high resolution long-term tree proxy Climatic Records from the eastern Himalayan Region, India	DST	Dr R.R. Yadav Dr B. Seker	ES/48/ICRP/005/05, Dated 07.11.2006, Total Grant Rs. 10,87,200/- lacs for three years
7.	Late Quaternary vegetational and climatic oscillations as deduced from radiocarbon dates and palynodata of older alluvium sediments on the south bank of the Brahmaputra plains (Tinsukia & Dibrugarh Districts) in East Assam North East India	DST	Dr S.K. Bera	SR/S4/ES-21/ Brahmaputra-I/2005, (P-8) Dated 15.03.2007, 25.04.2007 Total Grant Rs. 8,52,000/- for three years
8.	Palaeobotanical Studies on Indian and Brazilian sedimentary basins with special reference to marine dinoflagellate cysts, Gondwana flora and their applications	Indo-Brazil Research Project	Dr N.C. Mehrotra	DST/INT/Brazil/RPO-24/2007 Dated: 22.01.2009 Total Grant Rs. 11,71,800/- for three years
9.	Cenozoic Vegetation and Climate changes in China and India and their response to the Himalayan uplift	Indo-China Research Project	Dr N.C. Mehrotra	DST/INT/PRC/Proj-1/2008 Dated 11.09.2008, Total Grant Rs. 5,74,000/- for two years
10.	Magnetostratigraphic, palaeontological and sedimentological studies of some selected sections of Bhuban Formation of Tripura-Mizoram accretionary Belt	DST	Dr R.C. Mehrotra	ESS/16/254(4)/2005, Dated 29.06.2007 Total Grant Rs. 8,16,000/- for three years
11.	Fluctuation of Zemu Glacier, Eastern Himalaya based on multi-proxy records Tree Ring, Pollen and Isotopic data	DST	Dr A. Bhattacharyya	ESS/91/38/2005, Dated: May, 2008, Total Grant Rs. 12,35,911/- for three years



Sl. No.	Name of the Project	Funding Agency	Name of PI and Co-PI	Project Sanction No. Project Starting Date, Project Cost
12.	Senior Research Associate under the Scientists Pool Scheme CSIR	CSIR	Dr Shantanu Chatterjee	13(8033)/2005-06-Pool Dated: 08.09.2005 Completed date 13.9.2008
13.	Late Pliocene-Palynochronostratigraphy in north-eastern part of Cauvery Delta : Implication in Palaeoclimatic and sea-level studies	DST	Dr Anjum Farooqui	SR/S4/ES-264/2007, Dated 30.09.2008 Total Grant Rs. 7,14,800.00 for three years
14.	Survey Mapping Documentation of Floristic Diversity and Antiquity of vegetation in Lucknow and Adjoining areas	U.P. State Biodiversity Board	Dr D.C. Saini	68/S.B.B./Project/2008-09, Dated 21.01.2009, Total Grant Rs. 7,47,840.00 for one year
15.	Glacier Morphology and Quaternary Glacial history of Durung Drung Glacier, Zasker, Laddakh (J & K State)	DST	Dr R.K. Ganjoo, Department of Geology, Jammu University, Jammu Dr A. Bhattacharyya	ESS/91/21/2003, Dated 15.10.04, Total Grant Rs. 40,59,500/- for three years Rs. 5,10,000/- for BSIP extended upto 15.10.2010
16.	Concept in Quaternary Climatic Studies with Emphasis on Palynology and Dendrochronology	DST	Dr A. Bhattacharyya	SR/S4/ES-289/2007, Dated 05.12.2008 Total Grant Rs. 3.50 lacs
17.	Analysis of Climatic Change in North-East India and Tree-Ring Data under the guidance	DST	Dr A. Bhattacharyya	SR/S4/ES-15/2002 Dated 14.7.2003 Total Grant Rs. 12.92 lacs Completed 16.2.2009
18.	Analysis of climatic changes since LGM from south-west continental margin of India using multi-proxy data: pollen, diatom and tree-ring data	ISRO	Dr A. Bhattacharyya	Dated 9.1.2009 Total Grant Rs. 9,46,500/- for three years



हिंदी परिशिष्ट राजभाषा की स्थिति

संस्थान ने नगर राजभाषा कार्यान्वयन समिति की बैठकों में भाग लिया तथा प्रशिक्षण कार्यशालाओं में प्रशिक्षण हेतु स्टाफ सदस्यों को नामित किया गया। अखिल भारतीय राजभाषा संगोष्ठी के दौरान केन्द्रीय औषध एवं अनुसंधान संस्थान, लखनऊ में डॉ. चन्द्र मोहन नौटियाल ने ब्रह्माण्ड में जीवन विषय पर व्याख्यान दिया। संस्थान की वार्षिक विवरणिका हिंदी में प्रकाशित की गई। संस्थान के अंतर्राष्ट्रीय जर्नल 'द पैलियोबॉटनिस्ट' में शोधपत्रों के सारांश हिंदी में प्रकाशित किए गए।

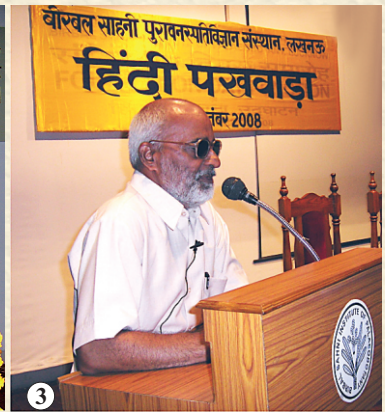
हिंदी पखवाड़ा

संस्थान में 10 सितंबर से 25 सितंबर तक हिंदी पखवाड़ा मनाया गया। पखवाड़े के उद्घाटन के दौरान 'कार्यक्षेत्र में अभिप्रेरणा: कुछ विचार' विषय पर विज्ञान प्रौद्योगिकी विभाग की उपसचिव डॉ. सुमन केशरी अग्रवाल ने लोकप्रिय व्याख्यान दिया। पखवाड़े के दौरान कवि सम्मेलन का आयोजन भी किया गया जिसमें संस्थान के तीन सदस्यों ने भी भाग लिया। पखवाड़े में गलती दूढ़ो, टंकण (कंप्यूटर), निबंध, टिप्पण, अंत्याक्षरी एवं प्रश्नमंच प्रतियोगिताएं आयोजित की गईं। समापन समारोह में श्री अवध किशोर पाठक 'वैरागी' मुख्य अतिथि थे।

डॉ. अर्चना त्रिपाठी एवं डॉ. आशा खंडेलवाल को प्रथम,

डॉ. रजनी तिवारी, डॉ. आशा गुप्ता एवं श्री धूमसिंह को द्वितीय तथा श्रीमती सुनीता खन्ना, श्रीमती रीता बैनर्जी, श्रीमती पी. थॉमस, सुश्री चित्रा चैटर्जी एवं कु. मनीषा थारु को तृतीय राजभाषा प्रोत्साहन पुरस्कार प्रदान किए गए।

'हिंदी में विज्ञान संप्रेषण एवं दक्षिणी ध्रुव की यात्रा' (डॉ. ध्रुवसेन सिंह, लखनऊ विश्वविद्यालय), 'कार्यक्षेत्र में अभिप्रेरणा: कुछ विचार' (डॉ. श्रीमती सुमन केशरी अग्रवाल उपसचिव, विज्ञान प्रौद्योगिकी विभाग) तथा 'कार्यालयीन हिंदी' (श्री अशोक कुमार, बी.सा.पु.सं. लखनऊ) विषयों पर हिंदी कार्यशालाओं का आयोजन भी किया गया।



हिंदी पखवाड़े की गतिविधियां

1. हिंदी पखवाड़ा के उद्घाटन समारोह का एक दृश्य।
2. डा. सुमन केशरी अग्रवाल 'कार्यक्षेत्र में अभिप्रेरणा: कुछ विचार' विषय पर लोकप्रिय व्याख्यान देते हुए।
3. श्री अवध किशोर पाठक 'वैरागी' मुख्य अतिथि समापन समारोह के अवसर पर संबोधित करते हुए।
4. पखवाड़े के दौरान आयोजित कवि सम्मेलन का एक दृश्य।
5. हिंदी पखवाड़े के समापन समारोह का एक दृश्य।





सावित्री साहनी महिला समिति

एक और सफल वर्ष



सावित्री साहनी महिला समिति ने विगत दो वर्षों की भाँति इस वर्ष भी अनेक सामाजिक कार्यों में सहयोग दिया एवं संस्थापक दिवस तथा राष्ट्रीय व सांस्कृतिक पर्वों को उल्लासपूर्वक मनाया। संस्थान के संस्थापक दिवस 14 नवम्बर 2008 के अवसर पर समिति द्वारा सांस्कृतिक कार्यक्रम का आयोजन किया गया जिसका संयोजन सांस्कृतिक सचिव डॉ. रश्मि श्रीवास्तव ने किया। इस अवसर पर राष्ट्रीय ख्याति प्राप्त स्थानीय बाल कलाकारों तथा संस्थान की शोध छात्राओं एवं युवा वैज्ञानिकों (श्रीमती अनुमेहा शुक्ला, कु. शिल्पा सिंह, कु. नेहा गोयल (नृत्य), कु.वर्तिका सिंह, श्रीमती योगमाया शुक्ला, कु. दिव्या श्रीवास्तव एवं डॉ. वेदनायगम (गायन) द्वारा नृत्य तथा गायन प्रस्तुत किया गया। जिसे समारोह में उपस्थित चीनी

वैज्ञानिक दल तथा इंग्लैंड से पधारे श्रीमती एवं डॉ. राबर्ट स्पाइसर सहित संस्थान में कार्यरत सभी लोगों ने सराहा। समिति की संरक्षिका श्रीमती रेनू मेहरोत्रा एवं संस्थान के निदेशक डॉ. नरेश चन्द्र मेहरोत्रा ने कलाकारों को स्मृति चिन्ह तथा प्रशंसा पत्र प्रदान किये।

दीपावली (2008) के पावन अवसर पर “आशा ज्योति” संस्था के शारीरिक रूप से विकलांग बच्चों द्वारा निर्मित दिये, मोमबत्ती, खाद्य सामग्री, मेजपोश, इत्यादि समिति के सदस्यों द्वारा क्रय करके उनकी सहायता की तथा मनोबल बढ़ाया। दीपावली पर समिति के सदस्यों को उपहार भेंट किये गए जिसका श्रेय समिति की संरक्षिका को जाता है। इस अवसर पर डॉ. रजनी तिवारी ने लीलावती मुंशी निराश्रित गृह, मोती





नगर, लखनऊ में बालिकाओं के उपयोग में आने वाली आवश्यक वस्तुओं का वितरण किया।

संस्थान में विज्ञान दिवस के अवसर पर फरवरी माह में समिति की सांस्कृतिक सचिव तथा डॉ. चन्द्र मोहन नौटियाल के सहयोग से विज्ञान विजय प्रतियोगिता का भी आयोजन किया गया जिसमें शहर के लगभग 12 स्कूलों के 200 बच्चों ने उत्साहपूर्वक भाग लिया। जूनियर तथा सीनियर वर्ग के विजयी प्रतिभागियों को पुरस्कृत किया गया।

होली के अवसर पर समिति ने पुष्प सज्जा प्रतियोगिता का आयोजन किया जिसमें संस्थान की शोध छात्राओं ने भाग लिया। जिसमें प्रथम स्थान पर कु. शिल्पा सिंह, द्वितीय स्थान पर श्रीमती अनुमेहा शुक्ला, कु. नेहा गोयल तृतीय स्थान पर रहीं एवं श्रीमती पूनम वर्मा तथा कु. दीपा अग्निहोत्री को सांत्वना पुरस्कार प्रदान किया गया। इस प्रतियोगिता में डॉ. दिनेश चन्द्र सैनी तथा श्री प्रमोद कुमार बाजपेई ने निर्णायक की भूमिका निभाई।

समिति के उद्देश्यों के अनुरूप इस वर्ष ग्रीष्म ऋतु में कुछ सदस्यों जैसे डॉ. आशा खण्डेलवाल, डॉ. अंजुम फारूखी, श्रीमती कविता कुमार तथा कु. शिल्पा सिंह ने प्रागनारायण मार्ग स्थिति राजकीय शिशु गृह में फलों का वितरण किया।

समिति की महत्वपूर्ण गतिविधियों के अंतर्गत संरक्षिका श्रीमती रेनू मेहरोत्रा तथा अन्य सदस्यों (डॉ. नीरजा झा, डॉ. रजनी तिवारी, डॉ. रश्मि श्रीवास्तव, डॉ. माधवी चक्रवर्ती तथा श्रीमती कविता कुमार) ने लखनऊ के छत्रपति शाहूजी महाराज चिकित्सा विश्वविद्यालय के कृत्रिम अंग विभाग के प्रो. अशोक अग्रवाल से रोगियों की आवश्यकता के बारे में जानकारी हासिल की। डॉ. अग्रवाल ने बताया कि गरीबी रेखा के नीचे के

रोगियों की शल्य चिकित्सा तथा अन्य व्यय प्रदेश सरकार उठाती है किन्तु कृत्रिम अंग तथा उपकरणों के लिये उन्हें स्वयंसेवी संस्थानों तथा अन्य स्रोतों से सहायता लेनी पड़ती है। समिति द्वारा तीन कुष्ठ रोगियों श्री राधा मोहन तथा अन्य दो व्यक्तियों को बैसाखी एवं जिला बस्ती के श्री कृष्ण मुरारी जिनका एक पैर दुर्घटना में कट गया था, उनको कृत्रिम पैर हेतु रु. 6000 की धनराशि प्रदान की गई। वहाँ जाकर सदस्यों का हृदय करुणा से द्रवित हो गया और सदस्यों ने डॉ. अग्रवाल से भविष्य में भी आवश्यकता पड़ने पर आर्थिक सहायता तथा श्रम अनुदान का आश्वासन दिया।

विज्ञान के प्रचार व प्रसार के लिए डॉ. रश्मि श्रीवास्तव, श्रीमती कविता कुमार तथा कु. वर्तिका सिंह, ने पायनियर माण्टेसरी स्कूल, राजाजीपुरम शाखा, लखनऊ में संस्थान के बारे में जानकारी दी तथा कु. वर्तिका सिंह ने “अलौकिक अंटार्कटिका” पर अत्यंत रोचक व्याख्यान दिया। अंटार्कटिका के रोचक चित्रों तथा चल-चित्रों आदि से अनेक जिज्ञासु विद्यार्थी इतने प्रभावित हुये कि उन्होंने वहाँ की जलवायु तथा जीव-जन्तुओं के बारे में अनेक प्रश्न पूछे। जिनका कु. वर्तिका सिंह ने बड़े ही सरल व सहज ढंग से उत्तर दिया। प्रधानाचार्या श्रीमती शर्मिला सिंह एवं अध्यापक/अध्यापिकाओं से छात्रों को संस्थान के संग्रहालय देखने हेतु आग्रह किया।

भविष्य में भी समिति अपने प्रयासों से सामाजिक व सांस्कृतिक कार्यों में संलग्न रहेगी ऐसा हमारा विश्वास है।

(डॉ. रश्मि श्रीवास्तव)

सांस्कृतिक सचिव
सावित्री साहनी महिला समिति





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