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NEWSLETTER

Diamond Jubilee CELEBRATIONS

From Director's Desk

Soon after assuming the charge of the Directorship of the Birbal Sahni Institute of Palaeobotany (BSIP) I had the privilege to plan the celebrations of the Diamond Jubilee of the organisation. At that time just over six months were left, a very short time span to plan for the Mega Event such as Diamond Jubilee of an important scientific organisation. All the planning should have been finished long ago. But I was sure that motivated people could do marvels. I had full faith in the Human Resources of the Institute and was aware of their potential and strength. The management of the BSIP decided to organise a series of events to mark the 60th Anniversary of the Institute.

Events like these deserve to be observed with commitment and sincerity of purpose. To give a fillip to the academic activities of the Institute we entered into several collaborative programmes with various institutions in the country and signed a bilateral collaborative research project with the People's Republic of China. On our proposal to infuse new blood into the research stream, Governing Body of the Institute enhanced the number of Birbal Sahni Research Scholars and also introduced a new scheme of Birbal Sahni Research Associateship. These young researchers would soon be part of the main stream of the Institute.

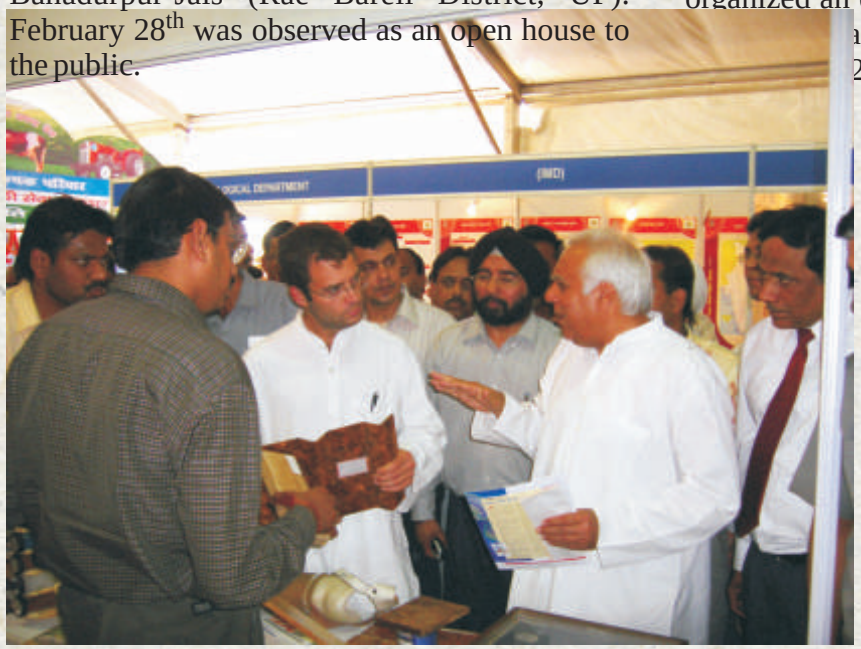
From the very beginning I was thinking that the expertise acquired by the Institute's scientists in palaeopalynology must be utilised for benefit of the society. It was only possible by establishing appropriate centre. I am happy to inform that Directorate General of Hydrocarbons has in principal agreed to support our endeavour of establishing an 'Oil Centre' at BSIP to utilise our expertise in Fossil Fuel Exploration. Besides, two scientific conferences were also planned. Diamond Jubilee National Conference was successfully organised in November 2005 and plans for Diamond Jubilee International Conference are in progress. I am sure by the time this Newsletter would be in your hands you must be enjoying the scientific deliberations with National and International Experts assembled in Lucknow to attend the conference. I seek an active participation from all the members of the BSIP family in making it front ranking scientific Institution of the Country.

Present Newsletter gives an account of various activities of the Institute for the period of 1st July 2005-30th June 2006.

N. C. Mehrotra

National Science Day and Outreach Programmes

Institute celebrated the Science Day Function for a week during February 22-28, 2006 with great zeal involving many schools of the city. Three competitions for schools, colleges and degree students were organized, besides participating in two exhibitions at Lucknow and Bahadurpur-Jais (Rae Bareli District, UP). February 28th was observed as an open house to the public.



Hon'ble Minister of State for Science & Technology Sri Kapil Sibal and Hon'ble M P Sri Rahul Gandhi at Jais Exhibition

Institute put up a pavilion in a National Exhibition at Bahadurpur-Jais during February 18-22, 2006. The exhibition was inaugurated by Hon'ble Union Minister of State for Science and Technology, Sri Kapil Sibal and Hon'ble Member of Parliament Sri Rahul Gandhi. The Institute also organized an exhibition of fossils at UP Council and Technology, Lucknow during 28, 2006. The exhibition was visited by the Vice-Chairman of the Council Sri Rajendra Chowdhary (Minister of State, Uttar Pradesh Government), Sri PL Loi (Principal Secretary, S & T, UP), Sri Maurya (Secretary, S & T, UP), Sri RN Tripathi (DM, Lucknow), Dr MJK Siddiqui (Director, UP Council of S & T), many other dignitaries and a large number of local people.

For the students of class IX to XII, an 'essay competition' was organized on the topic *To Nature, Vegetation is more important than Human Beings*. The topic reflected the present concern for

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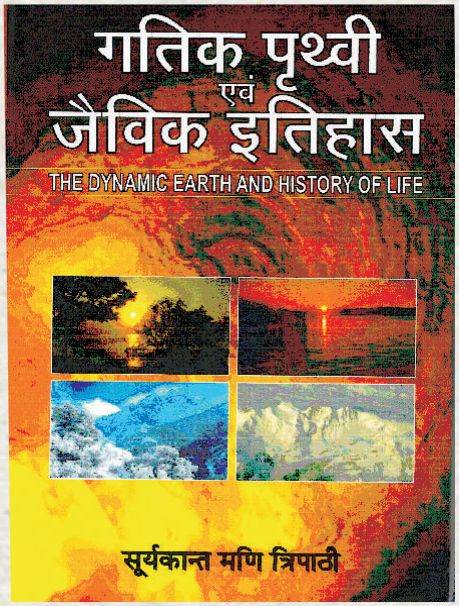
Concluding Ceremony of Science Day and participants of the speech contestants

biodiversity and environment. There were sixty four entries from ten schools for the competition. The best four essays were selected for prizes. Another event was organized on 25th February on the topic *Physics in everyday Life* for students of class VI to VIII. The topic was chosen in line with the theme for the concluding celebrations of 'Year of Physics'. A total of 47 students made collage on the topic displaying their skills. The idea behind choosing such themes was to stimulate them to think and learn science rather than creating just a work of art. A total of 7 students' entries were awarded.

I[st] Prize winner Collage by Shivi Bharti

II[nd] Prize winner Collage by Ruchika Barar

III[rd] Prize winner Collage by Supriya Nigam



Book release function and cover page of the book *Gatik Prithvi evam Jaivik Vikas*" written by Dr SKM Tripathi

On the Science Day, Institute organized a 'speech competition' for degree level students on *Nurture Nature for our Future*, the theme for the Day announced by DST. Prizes were declared for 2 entrants. Science-based cartoons by a free-lance cartoonist Sri Sandeep Bisaria were also displayed. Sri YN Saxena, Former Director General of Police UP Govt. was the Chief Guest of Outreach Programmes on 28th February. In his address, Sri Saxena lauded the Institute's efforts to focus on multifarious approaches in Palaeobotany. He said that doing work was very important but it was also equally important that the masses were appraised of what was being done in the laboratories. This, he said, is the debt scientists owe to the society. On this occasion, he also released a book "*Gatik Prithvi evam Jaivik Vikas*" written by Dr SKM Tripathi, a scientist of the institute.

Foundation Day

On September 10, 2005 the Institute celebrated its 59th Foundation Day. On this occasion Sri VK Sibal, Director General, Directorate General of Hydrocarbons, New Delhi, delivered '9th Jubilee Commemoration Lecture' on the topic "Knowledge Sharing: An opportunity for brighter Future".

On the same evening, Guest of Honour Sri Ravi Shanker, Retired Director General, Geological Survey of India delivered a popular lecture in Hindi on *Paryavaran Pradooshan Prabandhan– ek Bhuvaigyanic Pariprekshya* (Environment Management- A Geological Perspective) to mark the beginning of *Hindi Pakhwara*.

Prof M P Singh felicitating Sri V K Sibal

Professor MP Singh, Member Governing Body presided over the function. Many guests and scientists from outside the Institute attended the function.

Dignitaries lighting the lamp

Knowledge sharing—an opportunity for brighter future

In earlier times, knowledge was conventionally and orthodoxly compartmentalized into the fields of arts, science, commerce, technology, etc. Thick boundaries that existed between these disciplines, are no more visible after invention and application of computers in all spheres of life and the inter-dependence and inter-relevance of all these disciplines in the progress of mankind is very apparent.

Sri VK Sibal delivering Jubilee Lecture

The reasons for not sharing knowledge with others could be many, some of which are: (a)"Knowledge is power"; (b) "Not invented here" syndrome; (c) Lack trust; (d) Lack of time; (e) Individualism; (f) Inadequate technology; (g) Internal competition; (h) Top-down decision making, etc.

These concerns of individuals may be of social, behavioral and psychological nature. Even though the parents teach their children to share with other siblings and friends, the children fight in schools to possess them. At the office, large amount of professional knowledge is kept within the worker's head, in their computers or in their desk drawers.

Why the employee keeps his knowledge to himself, when it can benefit the organization, as a whole? Is it for job security? Is it to maintain power? Is it to gain personal advantage over those who are not in the possession of that knowledge?

Employees from other departments or remote offices of the same organization will be trying to solve problems for which answers already exist within the organization. At this juncture as an employee of the same company, one would think that there should be a mechanism for the dissemination of information. This is where the knowledge sharing comes.

Knowledge sharing is seen increasingly in the development community as an internal part of improving the quality of its work. Many innovative developments come from making knowledge connections across different disciplines and organizational boundaries. Knowledge sharing intranets tear down the figurative walls that confine within small corporate clique and makes it much more widely available to large audience.

In 21st century economy, innovation and competitive positioning depend on shared knowledge. Advances in the fields of science & technology are to harness the natural resources of the world for the benefit of human beings with least effect on the environment and the life on the earth. To attain this, an integrated synergistic teamwork of experts of different disciplines is the need of the day. For optimizing and developing or innovating relevant technologies, certain amount of knowledge sharing of all the disciplines concerned is a must.

Instead of "inventing a wheel", it is very much pertinent now to acquire the present

available knowledge and to improve further upon the same as per the requirement. This will facilitate in making our future bright.

In all earnest, all the institutions and organizations including leading-edge individuals should strive to acquire, assimilate, utilize and share knowledge in order to improve upon the knowledge they have.

As the economies are rapidly emerging as knowledge intensive economies with a revolutionary paradigm shift, the concept of a specific type of institution for the establishment and growth of the Knowledge-stock-Knowledge Hubs-is gaining acceptance worldwide. Knowledge Hubs enable scientific or technological communities to develop and extend the range of knowledge in their own research activities. The existence of an effective Knowledge Hub greatly increases the cumulative innovation capability by concretely embedding pieces of knowledge within the knowledge pool upon which future researchers can draw.

Functions of a Knowledge Hub through an Internet based knowledge management system are to:

Provide the facility to generate and deposit knowledge; Certify the fidelity of that knowledge, and Provide sustained access to researchers. International experiences have much to offer in terms of conceptualizing Knowledge Hub. It is observed that:

- Partnerships between researchers and industry are important for the creation of a Knowledge Hub, but collaborations across a whole range of institutions and organizations, nationally and internationally, are equally critical.
- In almost all cases, some form of agency of authority has been instrumental in promoting partnerships.
- Partnerships may be driven by business or by governments themselves.

Knowledge Hubs can further lead to:

- **Knowledge communities** - bringing together disparate knowledge and people in dispersed locations to advance knowledge and its exploitation in different spheres of interest.
- **Knowledge trading** - ways of valuing and trading different knowledge objects, perhaps through an IT infrastructure, whose value changes depending on time and context.
- **Futurizing** - creating more sustainable futures through new knowledge created and applied in global knowledge networks.
- Intelligent agent-creating symbiotic relation between human and artificial intelligence technology for the creation gathering of knowledge.

In this direction, Directorate General of Hydrocarbons has already taken certain steps like:

- Initiation of action in the direction of establishing "Knowledge Hub" in Energy sector with special reference to Oil, Gas, Coal Bed Methane, Gas Hydrate, etc.
- Encouraging frequent interaction between industry & academia.
- Identifying certain challenging areas of industry which can be taken up by academics.

The present e-knowledge, e-knowing and e-knowledge commerce environment are very congenial in this regard. Academia will need to become far more reflective about the knowledge–the forms, uses and sharing–if it wants to be in the race. The environment in universities/ institutions/ organisations are to be changed from "knowledge hoarding" to "knowledge sharing".

Sri Ravi Shanker inaugurating the *Hindi Pakhwara* on Foundation Day

Fellows of the Geological Society of India, who attended a Meeting of North India Chapter held at BSIP on 29th August 2005

Founder's Day

On November 14, 2005— the Founder's Day, 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 PS Goel, Secretary, Department of Ocean Development, Govt. of India, New Delhi delivered the '51st Sir Albert Charles Seward Memorial Lecture' entitled "*Excitement of Oceans*".

Dr SR Shetye, Director, National Institute of Oceanography, Goa delivered the '35th Birbal Sahni Memorial Lecture' on the topic "*Role of Ocean Processes in defining the Indian Summer Monsoon*".

Professor MP Singh, Member, Governing Body of the Institute presided over the function. Several guests and scientists from outside the Institute attended the function.

Staff paying floral tribute at Prof Sahni's Samadhi

Inaugural function of the Founder's Day

Sir Albert Charles Seward Memorial Lecture

Excitement of Oceans

Dr P S Goel delivering the 51st Sir Albert Charles Seward Memorial Lecture

Oceans offer fantastic possibilities, excitement and challenges of exploration. The lecture focused mainly on the technology hurdles that we faced in harnessing their full potential.

In the beginning, the mysteries of ocean science that never ceases to amaze us and the mind-boggling linkages it has with the environment that we live in were described. For example, the meteorologist Edward Lorenz discovered that a simple model of heat convection possesses intrinsic unpredictability, a circumstance he called the "butterfly effect", suggesting that the mere flapping of a butterfly's wing can change the weather. This means that starting the same process from two different but frequently indistinguishable initial states generally leads to completely different long-term behaviour. A perfect example of chaotic system.

The technology development approach followed by Department of Defence, illustrating the progress made under our Remotely Operated Submersible programme and the Gas Hydrates programme were elaborated. The technology challenges under our Polymetallic Nodules programme were also elaborated.

Palaeobotanists, he stressed, must be well aware of the manner in which palaeo-climatologists use clues from natural "proxy" sources such as tree rings, ice cores, corals and those obtained from ocean and lake sediments to understand natural climate variability. Dr Goel said that department has set up an excellent ice-core laboratory facilities at the National Centre for Antarctic and Ocean Research, Goa and is endeavouring to establish a new station at Larsemann Hills, Antarctica.

Birbal Sahni Memorial Lecture

Role of Ocean Processes in Defining the Indian Summer Monsoon

The climate of India is dominated by the summer monsoon which brings the rain that the country needs. This monsoon can be viewed as the time when the global-scale tropical rain-bearing belt, also known as the Inter-Tropical Convergence Zone (ITCZ), hangs over India and its surroundings. The arrival of the belt over India is a part of the seasonal north-south migration exhibited by the ITCZ.

Dr Satish R Shetye

During this time a large fraction of the Indian subcontinent receives its rainfall from the low pressure systems (LPS) that form over the Bay of Bengal. For such systems to form, the sea surface temperature has to exceed approximately 28ºC. The bay satisfies this condition making it the source of monsoon activity over India. In contrast, most of the Arabian Sea has its surface temperature well below the critical value.

Analysis of heat budgets of the Arabian Sea and the Bay of Bengal suggests that the Arabian Sea is cooler primarily because the winds there are stronger. The winds over the western Arabian Sea form a "western boundary current" in the atmosphere, a jet known as the Findlater Jet. Formation of the jet is possible because of the presence of the East African Mountains. The winds of the jet force ocean processes that cool the surface temperature. Another reason for keeping the bay warmer is its stratification: its low-salinity surface layer prevents mixing with underlying cooler waters.

Climate of a location is a consequence of a series of complex interactions of varying magnitude. In case of the summer monsoon, the ocean plays an active role in determining the extent of the precipitation belt associated with the ITCZ.

Diamond Jubilee Lecture

Birbal Sahni Institute of Palaeobotany organised a Diamond Jubilee National Conference, "Challenges in Indian Palaeobiology: Current Status, Recent Developments and Future Directions" from November 15-16, 2006. Dr Harsh K Gupta, Former Secretary, Department of Ocean Development, Govt. of India inaugurated the conference. On this occasion he delivered Diamond Jubilee Lecture on the topic "The Great December 26, 2004 Tsunami and Indian initiative for Early warning".

The Great December 26, 2004 Tsunami and Indian Initiative for Early Warning

The recent Indian Ocean Tsunami (December 26, 2004), is now established to be the strongest in the world over the past 40 years. It resulted in devastations amounting to national calamities in several parts of the Indian Ocean. As compared to the most severe Tsunamis of the past, the loss of lives in the Indian Ocean Tsunami has been higher by several orders of magnitude, thereby calling for development of a Tsunami Warning System on a war footing.

The coastal population being the victim of storm surges and tsunami, it is obvious that the systems for their mitigation have several commonalities (in terms of observational network, data base on bathymetry and coastal topography, data communication, dissemination of warnings, training and education, operational practices) and hence it is prudent and cost-effective to address them together. India is developing an integrated mitigation system for the oceanogenic disasters

Dr Harsh K Gupta delivering the Diamond Jubilee Lecture

viz., tsunamis and storm surges in the northern part of Indian Ocean region with an ultimate goal to save lives and property.

The design of the System is based on end-to-end principle, encompassing:

i. Upgrading, wherever necessary and connecting several existing seismic stations, for near-real time determination of earthquake parameters in tsunamigenic zones.

ii. Establishing observational network of 8-10 bottom pressure recorders (typically DART type system of NOAA, USA) around the tsunamigenic areas.

iii. A chain of 45-50 real-time sea level monitoring stations (tide gauges) at strategic locations in the mainland, islands and offshore platforms.

iv. Establishment of 10 radar-based monitoring stations for real time measurement of surface current and wave.

v. Establishment of a network of 8-10 deep sea current meter moorings around the Indian subcontinent.

vi. Numerical modelling for tsunami, storm surges with all associated data inputs.

vii. Generation of coastal inundation and vulnerability maps.

viii. Development of a Tsunami Warning Centre at INCOIS, Hyderabad and its operation on 24 x 7 basis for generation of timely advisories for implementation.

ix. Capacity building, education and training for all stakeholders.

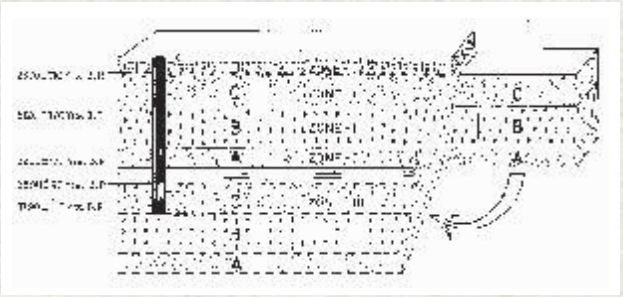
The Project is being implemented by the Department of Ocean Development through its Institutions, with active participation from (a) Department of Science and Technology, (b) Department of Space, (c) Council of Scientific and Industrial Research, and (d) University departments.

It may also be noted that the tsunamigenic zones which can produce tsunamis for the Indian coasts are also the principal source of tsunamis for the rest of the Indian Ocean rim countries. India shall be providing products of the work to all the countries and centres of research, through the mechanism of Indian Ocean GOOS or other suitable mechanisms. India shall also be interacting and coordinating with other Tsunami Warning and Research Centres globally.

Research Notes and Articles

Past Organic-Matter and Neotectonic disturbance in Himalaya

Multidisciplinary analysis (geochemical, palynological and palaeontological) supported with radiocarbon dates, of lacustrine sediments from Sukha Tal, Kumaun Himalaya has revealed a concealed natural disturbance at the region. Data generated from different investigations reflect that the investigated profile is not a continuous sequence and is divisible into two units : upper unit consists sediments from ca 8260 ± 170 years B.P. – top, while lower unit from 3790 ± 90 years B.P. – 2690 ± 90 years B.P. Presence of younger sediments below the older ones, normal order of superposition in both units (as both units consists older sediments at bottom and younger towards top), repetition of bed ranging from 3790 ± 90 years B.P. – 2690 ± 90 years B.P. in both units, and resemblance in organic matter recovered from contemporary beds of both units reflect that investigated region has concealed fault, caused possibly due to neotectonic disturbance. Study also reflects that splitting of rock took place sometime after 2690 ± 90 years B.P. and two units acquired position one above the other due to displacement of rock.



Diagrammatic cross section of a part of Sukha Tal, Kumaun Himalaya through investigated profile with extension of zones – indicating presence of concealed fault at the region.

Asha Gupta

Holocene Molluscs from Saria Tal, Kumaun Himalaya

Molluscs are useful to assess past vegetation and climate. Sedimentary profiles from Saria Tal (from bore-core and exposed-section), Kumaun Himalaya have yielded molluscan shells since around 2770 ± 135 years B.P. onwards (Figs A–C). These are qualitatively poor but quantitatively rich, showing specific distribution of taxa with variation in frequency. Their appearance, abrupt enhancement and specific distribution indicate that investigated area enjoyed watery condition near the onset of Late Holocene which continued onwards with fluctuation. Since Molluscs feed on plant material thus also reflect presence of sufficient vegetation at the region.

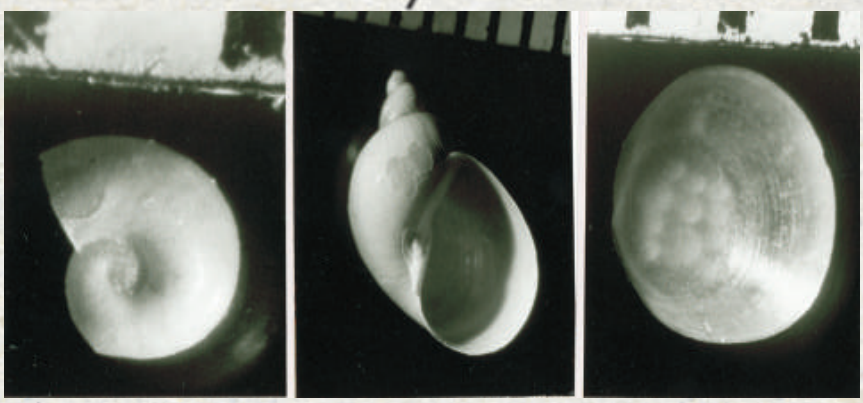


Fig. A—Planispiral Gastropod (profusely thrived); Fig. B—Conispiral Gastropod (commonly occurred); Fig. C—Bivalve (rarely encountered)

Asha Gupta

Biodiversity and species loss: a biological perspective

Consequent to the evolutionary processes, some new species continuously emerge and some become extinct. On the evolutionary scale the average life span of any species is believed to be from one to ten million years. Considering that life has been present on this Earth for the past 3.8 billion years, it is logical to assume that many species evolved and disappeared during this period. Indeed, most of the species that lived in the past are now extinct. However, fossil record shows that the average rate of speciation is slightly higher than the rate of extinction.

Evidence clearly indicate that many species disappear every day as a consequence to the human activity. Why this massive species loss? What is its impact? The biosphere is inhabited by myriads of organisms. The smallest unit of organisms is denoted by species which consists of closely related organisms. All members of a single species that live in an area make up a population. In any area we tend to find characteristic assemblage of two or more groups of interacting species. These constitute a community. A community may include any combination of animals, plants, fungi and microbes. A region with a characteristic plant community (for example - a desert or tropical rain forest) is called a biome. Communities of animals, plants, fungi and microbes together with physical environments that support it are referred to as ecosystems. All ecosystems on the Earth make the biosphere.

Changes in environment bring changes in ecosystems which in turn change the local environment. The ecosystems are therefore not static and changes in climate can cause ecosystems to move gradually to new locations. Furthermore, because ecosystems and environment interact, it may be possible for a new ecosystem to evolve without any large scale change in the environment. In such cases the initial environmental conditions support one ecosystem but interactions change the local environment leading to the evolution of different ecosystems. Ecosystems do not act as completely independent units. Each level interacting with other levels also overlaps each other. One ecosystem gradually merges with another one geographically. The boundary between the overlapping ecosystems is called as ecotone which may include entirely different assemblage that does not match with species inhabiting the either side of the boundary. It is important to remember that the term ecosystem applies to the total assemblage of species in a particular environment whereas, the habitat refers to the plant community and physical environment that supports a single species.

Species interactions—All ecosystems have common biotic structure. They all include autotrophs (the plants) and heterotrophs (animals and fungi). Autotrophs use inorganic substances in the form of nutrients and with the help of external energy, the sunlight, produce their own organic substances. Contrary to it, the heterotrophs obtain energy by feeding on organic matter produced by autotrophs. Autotrophs are categorized as producers whereas, heterotrophs are further divided into consumers**,** decomposers and detritus feeders**.** Primary consumers live on producers, secondary and higher order consumers feed on lower order consumers. Decomposers and detritus feeders feed on dead organic matter of both producers and consumers and, through the process of chemical breakdown, return nutrients to ecosystem.

Apart from the feeding strategy, the ecosystems are also characterised by mutually supportive relationships. The extreme example of this mutualism is symbiosis, a relationship in which two species are dependent on each other to the degree that neither can live alone. At the other extreme there are species that co-exist in a competitive relationship. Most species tend to adapt to a particular habitat and even in cases where potentially competitive species occupy the same habitat, each tend to develop its own particular niche.

Importance of Ecosystems—Any perturbation in one part of the system can have serious consequences to whole ecosystem. Because of interdependency among species in an ecosystem, if one species is removed, the loss of other species may follow. The magnitude of loss will depend on the role that the removed species play in ecosystem. The term keystone species is used to describe a species that plays a significant role in the operation of an ecosystem.

Extinction—Extinctions are the periodical episodes that took place throughout the Earth's history. In consequence to the human activity, this process is going on even in modern times. Modern

extinction episode began when the first human evolved, spread and colonized larger and larger areas. It is estimated that about seventy per cent of large mammals and birds of Pleistocene time are now extinct. Archaeological studies suggest that these losses coincide with the spread of human populations. In the beginning the cause of vegetation destruction was hunting but moving forward in time the reason became human habitation. Due to this reason the pace of species loss has increased dramatically. Human activity mostly involves changes in land use, resulting into habitat destruction and species loss. With few exceptions, human land use leads to reduction in biological complexity and reduced biodiversity.

Tropical Deforestation—Tropical forests are facing fastest rate of species loss. These forests enjoy highest rainfall, high mean annual temperatures and low seasonal contrasts. Most of the tropical forests are located in the areas of trade wind convergence associated with Headly circulation. Total coverage of these forests is only 6% of the land surface but it contains two-thirds of existing animal and plant species. Based on extensive survey, the Harvard University biologists concluded that about 27,000 species are lost every year from the tropics. Reducing the loss at smaller scale it comes to a loss of 74 species per day or 3 species per hour. Cause of this loss is the deforestation.

Specific studies indicate that large areas of cleared temperate forests can regenerate in about 100 years but in case of tropical rain forest it may take many more years to get back to the original state or may not even regain the old grandeur. Why it happens so? One of the reasons for this is that seeds of temperate forests are more resistant to stress and can remain dormant for longer periods. As soon as the conducive conditions are available the seeds germinate. Another significant factor favouring the early regeneration of temperate forests is that after these forest covers are cleared the grasses, shrubs and small trees start appearing soon and it promotes the rehabitation of original species in the area.

The nutrient flow between soil and plant cover plays an important role in this process. In a forest-soil system the nutrient can be housed at three places- the trees, the litter and the soil. Transfer of nutrients to the litter is controlled by the death rate of organisms, transfer of nutrients to the soil is determined by the rate of decomposition, and the transfer back to the trees depends on the photosynthetic uptake. A large fraction of the organic material in the forest is returned to the soil through the fall of litter and decay of organic matter. In due course of time this recycling produces a nutrient rich soil layer, which after the forest clearing is still available to help promote new forest growth. Consequently, after deforestation it is typically possible for temperate forests to return to something similar to the original forest cover. But in tropical rain forests the situation is different. Here little organic matter and few nutrients are returned to the soil. When trees die and decompose, the nutrients in them are returned to the living biomass very quickly. The process is controlled by an efficient nutrient recycling system in which higher temperature and moisture contents favour rapid decomposition. The extensive root systems extract the nutrients from the soil very quickly. In tropical forests therefore, due to high rate of decomposition and photosynthetic uptake cycle, the nutrients rapidly reach to soil and back to the trees, making the living biomass the major nutrient reservoir. In temperate forests the rate of decomposition and photosynthesis are lower, hence nutrients tend to accumulate in the organic litter and in the soil. In case of rain forests, after extensive clearing the organic contents of the soil are washed away due to heavy rains and a very acidic and nutrient deficient soil is left. As mentioned earlier, the seeds of rain forests are less resistant to stress in comparison to temperate forest seeds and have a tendency to germinate within a few weeks. Because of the extensive clearing of tropical forests, the germinating seeds die due to lack of shades.

Hot Spots—Although the tropical rain forests have the largest extinction rates, yet there are many other areas where species are at risk. Numerous areas world over have large number of endemic species which are threatened by loss of habitat. Eighteen such areas have been identified where habitat has been reduced to about 10% of its original cover. These regions account for only 0.5% of the Earth's land surface but they are home to 20% of the world's plant species that are found nowhere else on Earth. These species are in danger of extinction. Such areas are located in North America, South America, Africa, Madagascar, India, Sri Lanka, Malaysia, Borneo, Philippines and Australia. At the lower slopes of Himalayas an unusual mountain forests of mixed tropical and temperate species are found. These ranges cover the part of northern India across Nepal and western

province of China. The area houses 9000 plant species with 39% being endemic to the region. More than two third of the forests have been lost through logging, conversion to farmland or harvesting for fuel. Similarly sea-ward facing slope of the Western Ghats support a tropical forests covering an area about 1700 sq. km. In these forests about 4000 plant species are reported to occur out of which 40 per cent are endemic. Logging and conversion to farmland have reduced the forests by one-third. The remainder is being cleared at the rate of 2 to 3 per cent per year. The Sri Lankan forests are remnant of forests that once covered most of the Indian Continent. Out of 1000 plant species occurring in this area about half are endemic, but timber and agricultural demands have reduced the forests to less than 10 per cent of the original island cover.

Why we should care about biodiversity— Conservation of individual species is important because of its medicinal, scientific and social values. But apart from these, conservation of biodiversity is of critical importance to the modern agricultural techniques we employ to cater to the need of growing population. Farmers and agronomists of earlier days observed that some varieties of crops are more productive, more disease resistant and more draught-tolerant. Selective use of different strains or varieties results in increased productivity. In modern times with the use of biotechnology and gene splicing new crop varieties can be produced. Ability of an ecosystem to resist change is partly determined by its biodiversity. The same is true for individual species. Any food crop is likely to consist of many different strains growing together. These strains may have specialised internal characteristics. In any particular year a strain of crop will grow which is best adapted to that particular set of conditions. In due course of time environmental conditions change and pests and diseases that attack particular plant also evolve. At the same time crop plant also changes and new strains evolve that are resistant to the new conditions.

The concept of seed-bank—Different plant strains have their own genetic make-up rendering a vast natural reservoir that ensures long term health and survival of the species. The vitality of any species therefore depends on the natural diversity. In modern agricultural system the diversity is reduced to the minimum and high yielding variety of a crop is produced which is resistant to draught and particular pests and diseases. This variety flourishes for a few years until a new strain of pest or disease evolves against which it has no defense. At this stage scientists mix, match and produce another variety that is resistant to new conditions. This genetic material comes from specialised banks that have been established around the world. In fact diversity of food crops has not been destroyed but has been concentrated into a few locations which are known as seed banks.

This technique ensures storage of genes which is frozen in time representing the state of genetic diversity attained by crop when the bank was established. As a matter of fact, the disease and pest do not live in seed banks; they live in wild conditions and continuously get transformed into new strains due to mutation. In some cases the newly developed strains can not be dealt with seed bank. Under such circumstance scientists have no option but to go back to the wild conditions. If natural habitats are destroyed this recourse cannot be exploited. Despite our modern techniques, biotechnological advancements and the seed banks the health of our food crop ultimately depends on the continued survival of a diverse population of wild strains. In late 1970s rice crop of Southeast Asia was threatened by a virus disease. Scientists attempted to develop a disease resistant variety through gene banks but ultimately they found the genetic material that allowed the crop to resist the disease in a single wild species was from a valley in India. Soon after the retrieval of the material the valley was flooded due to construction of hydroelectric project.

The loss of biodiversity is extremely hazardous to the ecosystem. Imagine that suddenly all the forests are cut down. In the absence of these, the primary producers making the base of the food chain, all high order consumers, including humans, will quickly run out of food. We are not separate from rest of the Earth's biota. We are the integral part of the Earth System. Our existence depends on the continued presence of flourishing biota. Diversity enhances the health and vitality of a biota. Greater the number of the species in an ecosystem, healthier the ecosystem will be. The more diverse the ecosystem, the greater chance it can survive the disruption.

Studies have shown that biodiversity increases both productivity and stability of ecosystem. It also increases the resilience of an ecosystem, that is, how well it is able to withstand different types of stresses.

SKM Tripathi

Management of Museums- An example from Museum of Fossils

Museum is a building used for storing and exhibiting objects of historical, scientific or cultural interest. It is a depository of treasure acquired by mankind where varied objects are preserved, displayed and studied for knowledge and curiosity. Museums provide information about their holdings to the general public, students, scientists and all those who are interested in understanding them. Those institutions dealing with both plants and animals (extinct and extant) are categorised under Natural History Museums. Palaeontology is a scientific discipline that deals with the systematic study of plants and animal fossils, but a specific term Palaeobotany has been coined for the study of plant fossils. There are a large number of palaeontological museums world over but probably there is only one museum dedicated to palaeobotanical sciences. Fortunately it is situated in Lucknow, Uttar Pradesh. The credit to visualise this museum goes to Prof. Birbal Sahni FRS. It was started from the personal collections of the palaeobotanical specimens received by Prof. Sahni. Over the years it has grown into a full fledge museum. In the following paragraphs we have discussed the up-keep of such museums.

Out of all rocks which are exposed on the surface of earth nearly 70% of them are sedimentary. These rocks are Nature's own archive. Biological activities are entombed in them. The signatures of life, both large and small (plants as well as animals) are found in the form of fossils. Burial and preservation of detached parts of the organisms and in rare cases whole plants or animals are found in the sedimentary rocks.

Management of a Museum—Museums are of two types (1) museum as an organisation in itself has its own rules and regulations for e.g., Natural History Museum, New Delhi, British Museum of Natural History, London and (2) museum as a part of organisation such as the museum of Birbal Sahni Institute of Palaeobotany, Lucknow. Second type of museum is governed by the rules and regulations of the organisation to which they belong. Besides, there are a few private or personal museums such as Nizam's Museum of Hyderabad. The management of a Museum should therefore be in accordance to its type. Generally such museums have three distinct areas. (1) Display area (2) Space for reserve collection (3) and space for the consulting specimens which are in the repository i.e., specimens/slides upon which the research work is based. Depending upon the need, the members of staff may vary from museum to museum.

Display Area—In the museums where there is emphasis on fossils, information drawn from a different subjects such as Botany, Geology and Zoology should be incorporated in such a manner as to present a composite picture. The display area is a very important part of a museum and generally is either big halls or galleries. In these halls/galleries, display should be in a very systematic manner as though telling the story of the life on the planet. The display should include good fossil specimens, photographs and paintings depicting the period. Dioramas are always ideal for depicting vegetation and animal life of that time. The design of display must be made in such a way that it should attract the attention of viewers and preferably it should be kept at eye level for better viewing. The description (legends) must contain details about identification, locality, age, horizon of fossil. Attractive charts,

Fossil woods & leaves displayed in the Museum

A general view of the display hall in the Museum

Fossil specimens storage in the Museum respository

reconstructions and models improve the display. It is always advisable to have bilingual labels so that the information is easily available to local, national and international visitors. If a museum is a part of an organisation then, the display may also include the activities and achievements of that institution. In Natural History Museum Panels, the hall/galleries must be planned in specific manner. It should start with the definition of fossil, where to look for fossils, the fossilisation process, kind of fossils, factors affecting fossilisation and rock type. In case of microfossil, it would be better if translides or photographs suitably enlarged to show the structure are provided. Exhibits must be very clear. Fossils are always naturally preserved hence preservatives are not required except cleaning with the help of a soft brush. Fossil in rocks samples containing salt need protection and measures should be taken to control the humidity contents of the panel. Display area in such museum should start with the antiquity of the earth and the life it sustains. Other exciting exhibits should include the origin and evolution of life, flora and fauna of different areas and eras. Since coal and hydrocarbons are collectively known as fossil fuels, a panel would be desirable exhibiting the formation of coal and oil, and how Palaeontology help in identifying such areas suitable for their exploration and correlation of rocks.

Keeping in mind that newcomers generally visit museums, the legends should be in simple language so that the general public can understand them. It has been observed that most of the information is given in English language but it would be better if the information is given in vernacular language as well. The technical terms must be used very sparingly and if its use is must then it should be explained clearly.

To attract the visitors a space should be assigned in any corner of the museum for display of the week/month. The moving gallery is a new concept to the museum for such periodic displays. Regular changes should also be made, together with some additional activities such as monthly lectures or seminars on topical themes. Proper publicity of such events be made. Mobile exhibitions are becoming more popular these days. In such exhibitions display arrangement on a specific topic is circulated by a travelling van to remote places from the base museum.

Important areas of Display in palaeobotanical museums:

1. Origin, diversification and extinction of major plants and animals groups.
2. Origin and diversity of flowering plants.
3. Plants which formed the principal diet of dinosaurs.
4. Impact of human activity on nature.

Effective and attractive displays go a long way in popularising any museum.

Documentation—Documentation is an integral part of museum activity and it should be carried out very faithfully. Documentation is truly the nerve centre of all museum activities. Effective presentation requires an appropriate knowledge of the material, their esthetic background, the place from where they come from. Documentation has a very important role in effective control of the movement of fossils, charts, cards, exhibitions, visits and correspondence with persons. All these informations must be collected in proper files and registers. Every article or fossil, which is issued to anybody, must be recorded with date in issue register. The date of return to the museum be noted and be also recorded. The museum must maintain the record of all purchases, gifts, bequest and exchange. Fossils can be obtained through gifts, begets, exchange and from collections made by museum staff.

After acquiring any fossil its arrival must be recorded in an incoming record register of the museum with their accession number and area of collection with collector's name. At present computers and suitable programmes are at our disposal to handle the large amount of data. In accordance, it is advisable to computerise all available information. Software can be developed accordingly. With the help of computer we can do several activities such as 1. Correspondence, 2. Recording of field work data with their registration number, 3. Printing of museum labels, write-ups, 4. Storing references statements and storage of fossil with rock numbers, 5. Loans & exchange records, 6. Cataloguing.

Repository—It is not possible to display the entire collection of a museum, especially when collections are big and fossil specimens are in large numbers. Bulk collection of fossils, are stored in the general storage area, from where they are sorted out for exhibition in the galleries/display hall or where they are required. The registration of fossils must be done as soon as they are received. The relevant information has to be provided by the collector.

Entry of each fossil must be made in the registration book, it may have the following columns (1) Serial number (2) Date of collection, (3) Registration number (4) Locality of fossil, (5) Collected by, (6) Remarks. Fossils of all localities must be kept separately so that they can easily be located.

There should be a separate section for storing the specimens/slides upon which research papers are based (Type & Figured specimens). In case of microfossils, the slide containing fossils which should be kept in a slide case. All such specimens and its preparations should be properly labelled by the concerned scientist.

Marking labels

1. Marking must be sharp and legible.
2. It should not obliterate the beauty and any important part of the fossil.
3. Numerals of the language chosen in advance should be followed for times to come. It may be either in Hindi or in English.
4. Size of numbers should neither be too large or too small.
5. The choice of putting the marking depends on the fossils.
6. Marking may be done with ink, paint or in any other suitable medium.
7. On micro slides labels with relevant information should be properly fixed and on micro slides the numbers may be marked with the help of a diamond pencil /pen.

The suggestions made above may serve as guideline and changes may be made as per specific need.

Gifts—It is not possible for common individual/groups to go to the field and collect fossil specimens. So provisions may be made for gifting fossil specimens to educational institutions or to other societies those are engaged in dissemination of information about our national heritage. To avoid damage to fossil specimens in transit it should be packed carefully with the help of cotton, paper or other suitable packing material, which are easily available.

Loan—For research and exhibitions, sometime specimens are obtained on loan. The indenter should write to the concerned museum curator for loan of fossil specimens. The specimens should be returned to the museum as soon as the need is over. Every care should be taken at the time of return ensuring that the specimens do not incur any damage during transit. Museums generally follow their rules for obtaining specimens on loan. Regulations vary from museum to museum and country to country.

Precautions—At the time of planning a new building for a museum, due care should be given for proper light, ventilation and adequate safety arrangement of the specimens. For avoiding dust inside the museum, windows should be kept shut tightly or must be framed with glasses. Use of air curtains is suggested to avoid dust, spore and pollen grains. Visitors must clean their shoes etc. on the foot-mat. To avoid finger-prints on glass show cases, visitors should not be allowed to put their hands on them. It has been observed that the finger-prints on glass showcases are difficult to remove. AC halls for museum are always ideal. Drinking water facility must be provided near the hall. To avoid harm to labels from insects, few drops of acid should be added to the ink before writing.

Every effort has to be taken for making the museum friendly for physically disabled and blind persons. Staircases, with ramps, may be provided. For blind persons, a brief write up in Braille is a good idea. It would be better if brief information about the museum is provided to the visitors in the form of a pamphlet or hand out. One of the important duties of any Natural History Museum is also to educate people about the biodiversity of plants and animal life through time and space. Any mistake detected or pointed out be immediately rectified.

There is an urgent need to upgrade the teaching of the basic sciences, including palaeontology at the graduate and post-graduate levels. The front-ranking technological courses that are being given priority in the education curriculum also need support from basic sciences. In our country there are a limited number of Natural History Museums, and most of them are only exhibitors without doing any serious research. The trend is however, reverse in Europe and America, where the curators have contributed significantly to the cause of science. It will be desirable to convert the museums in India into research-oriented centres. A large number of graduate and post-graduate students are passing out every year and at least a few of them can be employed to initiate research activities in such Natural History Museums. By doing so, the academic atmosphere of such museums will get enhanced.

Sunita Khanna and Mukund Sharma

Idea, Ideal and Idol

Mysteries of the universe are unfolded using science as a tool. Science has its own limitations since it relies on senses. Beyond senses it fails to demonstrate a convincing reason, even for the origins of life and humans. Natural curiosity has drawn man to unravel many nature's wonders. Transnational efforts in recent times brought out spectacular success stories in the fields of Molecular Biology, Astronomy, Nuclear Science, Palaeontology, Biotechnology, Nanno-technology and related fields. Science has become more or less a corporate activity and cooperative ventures are forged world over to seek new answers to new problems.

Has science changed soul of society or only a partial gain has been achieved in the form of some new discoveries by noble laureates? In Indian context, the society is still in a transitory state confounded with the idea of holding strong ideology to get elevated through science and become civilized. Still we stick to easy way of idol worship to perpetuate rich cultural heritage. Both-idol and idea worship owe to an ideal to sustain belief system or to build a rational and logical system. Indian society has the distinction of holding together an idol and idea with a long tradition of multi religious, multi lingual and multi cultural ideology. Prof. Birbal Sahni rightly remarked that '….For what is it, after all, that pious men worship in a stone which they place in a temple, but an idea or ideal, a great truth, a hope or a wish for a higher existence, whether in this world or in the next?'

What relevance science has in Indian democratic set up with strong political manoeuvring? The rise of an eminent scientist to the level of first citizen of this country is a signal to world about our commitment to science. Playing with education system using once birth as a criterion and segmenting society is projected as our strong ideology to equality. Poor response to science by brilliant minds[1] and subsequent efforts by scientific institutions adapting tempting offers in the form of medals, awards, scholarships, etc. indicate our inability to cultivate scientific culture at societal level and scientific temper at individual level[2]. This apparent pessimism in modern context has born out of non-enterprising approach of science. Moreover tragedies such as tsunami, earthquakes, landslides, epidemics, accidents, human terror and associated natural hazards result in viewing science as a failure. At the time of life loss humans look for community help or governmental assistance, in both instances idol and idea hardly work.

Modern society is increasingly favoring idea generation. Economic rewards for better idea in any sphere of activity are gaining strong ground. Elitists visualise a global- village through selling an idea and claim to become more relevant in modern context. It is imperative to view science as an emerging cooperative activity with strong underlying economics. Recent spurt in intellectual property rights[3] is suggestive of an idea ruling over ideal or idol. Thus, ideologists are viewed as failures in science and idol lovers as antagonists of science.

Present system demands a new breed of Idea-creators, Idea- generators, Idea- perpetuators, Idea- disseminators, Idea- sellers, Idea- buyers, etc. all fit in to an economic jugglery. This undermines science. After all objective of science is to provide maximum benefit to maximum people though unravelling the 'truth'. We often hear one saying aggressive attitude to gain more. Aggressive marketing by giant multinationals results in ending up in courts to resolve disputes, using unfair means of product selling, manipulating and manoeuvring data to promote their own product, and unethical practices to reach to the top of ladder. This is true to science we pursue today[4]. This approach only promotes mistrust, monopolisation and mutual disrespect. This situation fails to recognise utility of a healthy competitive spirit. In the current contractual scientific realm earning has become a buzz word. If profit is the motive of scientific research why we need PhD? May be we require only mind bogglers. Leave heart to art and put mind to science. This approach segregates scientists from society. They become self centred, egocentric and make a cocoon and sit on a utopia of becoming a butterfly one day, which never happens. To them ideal and idol are taboos. But Indian society has

promoted both. Increased violence, threat of war, environmental disasters and related fears force us to look for butterflies (a metaphor to indicate successful versatile scientists) which help to perpetuate the race.

What we need today is combination of idea, ideal and idol. The paradigm of caterpillar should make way to butterfly. The latter are creative, catalyze new growth, feed and water new ideas, destroy nothing in their path, continuous learners, tenacious to travel to distant places and work on a different plain. Such breed of scientists should be nurtured. Promotion of rational consciousness goes a long way to understand changing realms.

Nascent minds in science get confounded by the present scenario. What was taught in educational institutions through books hardly reflected in real system. Life situations differ with what we learn. This restricts mind to be unbiased and students get entrapped in uncertain reality of good science. Science is either good or bad[5]. Good science is done by butterfly scientists since they perceive an underlying unity in sharing knowledge. Present day market forces dictate the way we pursue science. It is high time we develop a new and different human resource for scientific research[6].

Research and globalisation has changed relevance of national systems of reference. Evaluation and measurement criteria of science have drastically changed through time[7].

Conventional research analysis and traditional peer review should make way to an innovative system, wherein purpose of research and its typology become integral part of current wave of contractual regime. We often observe that material assets are valued more than intangible assets such as intellectual properties and scholarships[3]. Science should not grow directionally away from the society. No science is irrelevant. Pursuers make science irrelevant due to lack of commitment and resistance to change. Science grows of itself, with time, the mask changes. Societal values are reflected in the science we pursue, since scientists are embedded in the social system[8]. Fragmentation of science is suicidal. An open and honest approach shall lead to good science. Dyed colour imposed by scientific management for organisational needs may not long last. An environment of trust and sharing should be created with an inter-dependable ethos and a new paradigm of ecological attitude should be developed. There is an increasing concern to utilize 'wisdom-resource' of old generation possessing an excellent expertise to enhance quality[9].

Socially viable path for scientific innovation is possible only when scientists are encouraged to engage with other communities on the ethical, legal and social implications of science[10]. This can be achieved when we distinguish idea, ideal and idol in right perspective. Science is universal. It cannot be fragmented in to pieces based on creed, class, geography, religion, etc. It is imperative to come out of shadow of colonial past[5].

Many discoveries made in the world are outcome of either of a new fact or of a new idea. An idea unsubstantiated by facts is equally devoid of importance. An unexplained observation is of no particular significance to science. Still Metaphysics works! The creative urge of man motivates him to pursue science. Novel ideas come to youth. The elderly may guide and inspire them[11]. The idea that a scientific discovery can be made by an accident is ruled out by the fact that the accident, if it is one never occurs except to the right man. The case of Archemedes getting a new idea while bathing in a tub explains the strong role of idea coupled with strong emotion. In truth, emotion works. We have to love what we do for our living! Probably our emotions are combination of idea, ideal and idol.

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A. Rajanikanth

Collections added to BSIP Museum

Barely a few days before his sad demise, some unexamined slides were deposited to the Museum by Dr Manoj Shukla. These are available in the museum for observation and consultation. Details of the slides are as follows:

Slides of microfossils

Locality	Horizon	Remarks/no. of slides
Bakan nala Manohari Village, South Rewa Gondwana Basin, (M.P.)	Lower Gondwana Talchir/ Barakar Formations	Sixty slides
Churulia, East Raniganj Coalfield, West Bengal	Raniganj Formation	Two slides
Dorgaon, South Rewa Gondwana Basin, (M.P.)	Lower Gondwana	Eighteen slides (From a section exposed on West bank of Johilla River)
Hutar, Hutar Coalfield, Koel Valley, Bihar	Karharbari Formation	Thirty three slides
Jayanti Coal field, Bihar	Talchir, Karharbari Formations	Eighty three slides
Gopad River Bridge, Nidpur, Sidhi District (M.P.)	Lower Gondwana	Three slides
Ayrshire, Scotland	Mississipian/Devonian	Five slides of Millstone grit spore
Angus, Scotland	Lower Devonian	Six slides of Lower Devonian spores
Pelicon Hill Bore, 900 ft. Carnarrvon Basin, West Australia	Gnendna Formation	Two slides
Kimberley Downs station W. Australia	Sakmarian, Grant Formation	One slide
Ireland	-	VISE, six slides
Kaiping Ass. Hing ho, Hill Lao Shih Shan Mac. 10	Permian	Two slides
Kaiping Ass. Tong Shan Chao Ko Chwang Seam (16 Bot) Mac.8	Permian	Three slides
Kaiping Ass. De Linse Loc. Tang Shan Near Girl School SP. 84982 Mac. 9	Permian	Two slides
Hacq Nova Scotia, Canada	Horton Group	Two slides
Cromarty, Scotland	Devonian	Twelve slides
British Museum, London, U.K.	Lower Carboniferous	Three cuticle slides of *Schizoneura gondwanensis*
Hazel Hill Querry Puddle Brook, Forest of Dean,	Lower Carboniferous	Pteridophytic spores from Drybrook sst. one slide
Bot. Deptt. Glasgow	Lower Carboniferous	Spores of *Geminitheca scotia* one slide
Slides of megafossils		
Ganjra Bed, South Rewa Gondwana Basin (M.P.)	Karharbari Formation	Four cuticle slides (Carbonaceous shale sequence exposed in the vicinity of Ganjra Nala)
Handappa, Orissa	Raniganj Formation Lower Gondwana	Three rock slides
Kamtadand, near Sukni River, South Rewa Gondwana Basin (M.P.)	Lower Gondwana	One Rock slide
Karkati village, South Rewa Gondwana Basin (M.P.)	Lower Gondwana	Six slides of iron stone band (Karkati village, about 4 miles north east of Birsinghpur railway station)
Parsora, South Rewa Gondwana Basin (M.P.)	Middle Gondwana	Five slides of *Dicroidium hughesi* (Located at about five and a half miles north-east of Pali village)
Angus, Scotland	Lower Devonian	Nine slides of *Zosterophyllum* cuticle
Belgium	Middle Devonian	Four slides of *Condrusia rumex*, *Psilophyton princeps*, *Taeniocrada* sp., *Taeniocrada Langii* (one of each)
Sarka, near Prague, Czech Republic	Lower Ordovician	One slide of *L. lanvirnian*
Prague, Czech Republic	Silurian	One slide of *Orlenopora bohemica*
Konetnusy, Czech Republic	Silurian	One slide of Petrified Algae
Prague, Czech Republic	Devonian	One slide of Petrified Axes
Prague, Czech Republic	Silurian-Devonian	One slide of *Solenopora bohemica*
Lutenbo River N. Rhodesia	Permian	One Rock slide
Scotland, Hazel Hill Quarry Glaceskshire	Lower carboniferous	One slide of *Diploteridium* sp.
Mersey Basin, Tasmania	Permo-carboniferous	One slide of *Samaropsis* sp.
Yorkshire	Jurassic	One slide of *Ginkgo huttoni*

Living material

Two slides of *Asterella* sporangia (Liverwort), sporophyte of *Diplophyllum* (Liverwort), sporophyte of *Pallavicinia* sp. (Liverwort), spores of *Ceratopteris thalyctroides*, *Lycopodium clavatum*, *Marattia frexinea*, *Selaginella suberosa* and cuticle of *Podocarpus nerifolia*, *Podocarpus taxifolia*.

Madhabi Chakraborty

Participation of the Staff in Scientific/Technical Meets

RC Mehrotra

- *XVII International Botanical Congress*, Vienna, Austria, July 17-23, 2005.

NC Mehrotra, Rahul Garg, A Bhattacharyya & SK Bera

- *National Workshop on Scientific investigations during XXV Indian Antarctic Expedition*, National Centre for Antarctic and Ocean Research (NCAOR), Goa, July 21-22, 2005.

A Bhattacharyya, SK Shah & Vartika Singh

- *PAGES – 2nd Open Science Meeting on Palaeoclimate, Environmental Sustainability and our Future*, Beijing, China, August 10-12, 2005.

Asha Khandelwal

- *10th International Conference on Indoor Air Quality and Climate*, Beijing, China, September 4-9, 2005.

Archana Tripathi

- *7th International Symposium on the Cretaceous*, Switzerland, September 5-9, 2005.

SK Bera

- *Seminar on Earth Science of East Antarctica– National and International Contribution*, New Delhi, September 15-16, 2005.

Supriya Chakraborty

- *Workshop on Accelerator Mass Spectroscopy*, Inter University Accelerator Centre, New Delhi, September 23, 2005.

Rahul Garg, SKM Tripathi & Jyotsana Rai

- *3rd Seminar on Academia-Industry Interface*, INSA, New Delhi, September 23-24, 2005.

CM Nautiyal

- *Seminar on Media, Technology and Rural Development*, VBS Poorvanchal University, Jaunpur, October 22-23, 2005.

Rahul Garg, Samir Sarkar, MR Rao, Ram Awatar, A Rajanikanth, Rajni Tewari, Jyotsana Rai & Divya Srivastava

- *XX Indian Colloquium on Micropalaeontology and Stratigraphy*, Andhra University, Visakhapatnam, October 24-26, 2005.

Asha Gupta

- *International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday*, Nanjing, China, October 25-31, 2005.

Majority of Scientists

- *Diamond Jubilee National Conference on Challenges in Indian Palaeobiology– Current Status, Recent Developments and Future Directions*, BSIP, Lucknow, November 15-16, 2005.

A Rajanikanth

- *National Seminar on Advances in the Frontiers of Environmental Research*, Visakhapatnam, November 19-21, 2005.

BD Singh

- *National Workshop on Coalbed Methane*, PHD House, New Delhi, November 24-26, 2005.

RR Yadav, MR Rao, A Bhattacharyya, S Chakraborty, Anupam Sharma, B Sekar, SK Shah, Vartika Singh & Jyoti Sharma

- *DST-Brain Storming Session Workshop on Palaeoclimate*, University of Pune, Pune, November 25-27, 2005.

Mahesh Prasad

- *National Conference on Current Researches in Plants and Microbial Science*, University of Burdwan, Burdwan (WB), November 26-27, 2005.

Anjum Farooqui & SK Shah

- *3rd International Conference on Plants and Environmental Pollution (ICPEP-3)*, NBRI, Lucknow, November 28-December 02, 2005.

NC Mehrotra

- *14th Biennial Convention of Indian Geological Congress & National Conference on Earth Science– Its Relevance to Society*, Delhi University, Delhi, December 2-4, 2005.

NC Mehrotra, Samir Sarkar, SKM Tripathi, Asha Gupta, Jyotsana Rai & AK Ghosh

- *International Seminar on Northward Flight of India in the Mesozoic-Cenozoic– Consequences on Biotic Changes and Basin Evolution*, University of Lucknow, Lucknow, December 7-9, 2005.

NC Mehrotra, Rahul Garg, Alpana Singh & Vandana Prasad

- *Seminar on Synergy of Research & Development in Hydrocarbon Sector* organised by Petrotech Society, Goa, December 9-10, 2005.

NC Mehrotra, Manoj Shukla & Mukund Sharma

- *National Seminar on Sedimentary Basins of the Himalaya– Challenges for the Future & XXII Convention of Indian Association of Sedimentologists*, WIHG, Dehradun, December 21-23, 2005.

CM Nautiyal

- *Workshop on Geographical Indicators– Protection and Registration* jointly organized by CST-UP & TIFAC-DST, Lucknow, January 3, 2006.

Rakesh Saxena

- *National Seminar on Beyond Petroleum* organised by Petrotech Society & Engineers India Ltd., New Delhi, January 9-10, 2006.

DC Saini

- *Silver Jubilee Symposium on Ethnobotany in the New Millennium*, NBRI, Lucknow, January 12-14, 2006.

Chanchala Srivastava, MS Chauhan & AK Pokharia

- *International Seminar on First Farmers in Global Perspective,* Directorate of UP State Archaeology, Lucknow, January 18-20, 2006.

AK Ghosh

- Participated in the 10 days *Exposures to Scientific Labs/Institutes in Taiwan and Singapore* under DST Training Programme, May 25 to June 08, 2006.

BN Jana

- Left for Birmingham (UK) on June 09, 2006 for three months under INSA-Royal Society Exchange Programme.

Vandana Prasad

- Participated in International Conference "*Climate and Biota of the Early Palaeogene*", at Bilbao, Spain, June 12-20, 2006.

Conference and Meeting Reports

Asia Oceania Geosciences Society 2005

AOGS 2005, the Asia Oceania Geosciences Society's 2nd Annual Meeting was held in Singapore from 20 to 24 June 2005. It had attracted high profile projects and as well as scientists of national and international stature.

IP Wing-Huen, President AOGS welcomed the delegates in Opening Ceremony of the Conference and expressed great sorrow for the victims and the utter losses due to Sumatra Earthquake/Indian Ocean Tsunami. He added that only close contacts would bring scientific cooperation, common understanding and good-will. Without doing so we will be bound to encounter untold miseries far worse than that of the Indian Ocean Tsunami on December 26, 2004. It is, therefore, in the interest of more advanced countries in Asia to help those with less capability and fewer resources. Strengthening of the scientific level across the region will be essential in the development of a common front. AOGS 2005 was dedicated to the main theme of Mitigation of Natural Disasters and the Buildup of Educational Infrastructures in Earth Sciences. It is important that geoscientists of AOGS together can serve as the leading light to an integrated scientific community of great strength and harmony.

The following six sessions with many subsessions were convened**:** -

Solid Earth; Solar Terresterial; Planetary Science; Hydrological Science; Oceans and Atmospheres; Interdisciplinary Working Groups and Joint Sessions.

The conference helped in creating international exchange, research programs, and educational outreach, forging many special ties and relationships that transcend geographical, political and racial boundaries. This exciting meet provided forum for geoscientists, researchers and academia coming together to explore, discuss and present the latest trends, promote understanding and exchange results and opinions in the area of geosciences for research and applications. AOGS had been the catalyst to bring together Asian and international scientists from Europe and America who seek to develop partnership with them and to share their accumulated knowledge and experience.

The 1st AOGS 2004 and 2nd Annual Meeting AOGS 2005 were held in Singapore and 3rd Annual Meeting AOGS 2006 in succession would also be held in Singapore next year.

NC Mehrotra & Asha Khandelwal

Reports contd. on page 26

Birbal Sahni Institute of Palaeobotany

Journey through Sixty years

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(a) Department of Botany, University of Lucknow, where Institute of Palaeobotany was started in 1946 (b & c) The Bungalow, that was gifted by the Government of United Provinces for the Institute of Palaeobotany in 1948 (d) Birbal Sahni delivering the welcome speech at the Foundation Stone Laying Ceremony of the New Building of the Institute in 1949 (e) Sri Jawaharlal Nehru laying the Foundation Stone of the Institute's Building on 3rd April, 1948. (f) Samadhi of Prof. Birbal Sahni (g) Prof. Birbal Sahni (h) Staff of the Institute paying Floral Tributes to Prof. Birbal Sahni at Institute's Main Building (j) Illuminated Building of the Institute on the occasion of the 'Diamond' Jubilee celebrations in November 2005)

Reports contd. from page 23

Indoor Air 2005

Indoor Air 2005 was held in the dynamic and beautiful city of Beijing, China from September 4 to 9, 2005. The city has blend of ancient attractions with the vitality of modern metropolis. Its historical heritages and many cultural sites are very attractive. The objective of conference was to promote, progress and expansion of knowledge of indoor air sciences and technologies for the purpose of advancing our life quality in academia, industries, organisations and governments. The conference provided opportunities to exchange new ideas on indoor air sciences, to learn the state-of-the-art technologies, to identify solutions for problems related to indoor air, and to build partnerships within and between sciences such as engineering, medicine, chemistry, microbiology and architecture.

Indoor air is increasingly recognised as important to our health and well being, because we spend up to 90% of our time indoors. Since 1978, the series of Indoor Air conferences had been the premier international meeting place for scientists and professionals in the multidisciplinary field of indoor air sciences. An Academy was created to provide continuity to the Indoor Air Conference series and to select the host of the subsequent conference every three years since 1978.

About 960 papers were presented at Indoor Air Conference 2005 from September 4 to 9 in Beijing. Eight lectures during the plenary sessions provided an overview of the present and future of Indoor Air Sciences.There were 17 forums in promoting scientific interchange, stimulating discussion and debate on controversial issues, and developing new concepts or initiatives in certain indoor air environment related areas.

Asha Khandelwal

International Bryological Symposium 2005

The "International Bryological Symposium" was organised in the honour of the father of Chinese Bryology "Prof. Pan-Chieh Chen", at Nanjing Normal University, Nanjing, China, in October 25th-31st, 2005. Around 70 participants from Australia, Canada, China, Finland, Hunan, Hungary, India, Japan, Korea, Russia, Taiwan and United States of America were gathered and over 50 contributions (26 lectures and rest posters) dealt with new studies and achievements in different aspects of Bryology (including Fossil Bryophytes, Bryoflora and Bryokarst deposition, Palynology, Ecology, Diversity, Molecular Systematics, Molecular Genetics, Gene engineering, Endangered taxa, Heavy mineral and its relation with environment, etc.) were presented extensively.

Asha Gupta

Prof. Pan-Chieh Chen

Challenges in Indian Palaeobiology-Current Status, Recent Developments and Future Directions

Dignitaries lighting the Conference Inauguration Lamp

The Diamond Jubilee National Conference was organized by the institute on 15th and 16th November 2005 in continuum of Founder's day Program. This conference was a result of the concern expressed by several palaeobotanists and palaeontologists on the future of the discipline in the light of diminishing perception of the relevance and usefulness of this science and also the consequent drastic reduction in the scope of the discipline as taught at graduate and undergraduate levels. More than 100 Palaeobiologists representing 34 organisations of Industry (ONGC, OIL etc.), Universities (BHU; Delhi University; Allahabad University; Panjab University; Lucknow University; Osmania University, Hyderabad; IIT Roorkee & Kanpur etc.), Research institutions (WIHG, Dehradun; NIO, Goa; Agarkar Research Institute, Pune; French Institute, Pondicherry; ISI Kolkata etc.) and Professional organizations and Societies (Botanical Survey of India; Geological Survey of India, Geological Society of India, Bangalore; Palaentological Society of India, Lucknow; Palaeobotanical Society of India, Lucknow; Petrotech Society etc.) took part in intense discussions in 15 sessions on 6 different themes on strengths, gaps and weaknesses of the subject. They charted out new dimensions for studies, involving multi-disciplinary and multi-institutional approach

Dr Harsh K Gupta releasing the Abstract Volume of Diamond Jubilee National Conference

Dr N C Mehrotra, Director, BSIP welcoming the participants of the Diamond Jubilee National Conference

Dr D N Awasthi delivering the valedictory lecture of the Diamond Jubilee Conference

with co-operation from within and outside the country to make it more relevant to societal needs. Following major suggestions and recommendations were given by different sessional Chairmen.

1. Need for greater interaction between academia and industry, especially in the field of fossil fuel exploration studies. Academic expertise available with Institutions can help solve some of the industrial problems. Exchange of experts between Academia and Industry will benefit both and should be encouraged.
2. Greater stress on palaeoclimatic studies viz.
   - § Multi proxy, Multi parametric approaches should be emphasized with special focus on integration of biological, physical, and geo-chemical parameters and spatial synthesis of proxy data on continent wide scale and its relation to oceanic domain for the most significant Cenozoic climatic events.
   - § Reassessment of the chronological data of the last glacial cycle and selection of record with secure chronological data, and using the latter to assess the interregional variability, lag time and exploring the role of feed backs.
   - § To generate new data using high resolution records for making a quantitative assessment of millennial scale and century scale variability for the post LGM period.
   - § To intensify research on Mangrove as response systems to linked Climate and sea level shifts in the last 20,000 years.
3. India should participate in the frontier area of research in the field of early signature of chemical evolution of Origins of Life and traces of early life on earth. Studies on the Astropalaeobiology should be provided the required instrumental support. Precambrian palaeobiological studies hold great promise in the front ranking sciences.
4. Traditional palaeobiology should be strengthened along with its blending with modern computer modeling for determining the plant structure and cladistics. The structural details of fossil plants should be utilized for reconstructing the scenario, vegetation and climates of the different periods.
5. Exploratory expeditions need to be mounted for recording the diversity rich ecosystem of Himalayas and Western Ghats.
6. Palaeontology be taught invariably at Undergraduate and Post Graduate levels and UGC must be approached to revise and restore the syllabi of palaeontology and palaeobotany making it more relevant to industrial and societal needs.
7. To popularize and improve public perception different Natural History Museums can be requested to incorporate the palaeobiological inputs in their museums by introducing separate gallery. At the initial stage BSIP, other similar institutions and individuals pursuing palaeontological studies can provide exhibits.
8. Virtual museums should be created and put on the web sites and also disseminated through CDs.

Mukund Sharma

Glimpses of the Diamond Jubilee National Conference

Dr Mukund Sharma, Organising Secretary of the Conference introducing the theme of the Conference

Prof S K Tandon, Pro-Vice Chancellor, Delhi University addressing the participants of the Conference

Dr Sanjay Mishra, Queensland University of Technolgy, Australia delivering the Plenary Lecture during the Diamond Jubilee National Conference

Participants discussing a paper in a session of the Diamond Jubilee National Conference

Lectures

By Institute's Staff

NC Mehrotra

- *Application of Palynology in Hydrocarbon Exploration in the petroliferous basins of India* (Chief Guest Lecture) at University Faculty Training Programme, Delta Studies Institute, Visakhapatnam (July 30, 2005).
- *Industrial Palynology and its relevance to Society* (Keynote Address) at 14th Biennial Convention of IGC and National Seminar on Earth Sciences, New Delhi (December 2, 2005).
- *BSIP and its capabilities in Hydrocarbon Exploration* (Guest Lecture) at Petrotech Conference Synergy in R & D, Goa (December 10, 2005).
- *High-resolution palynostratigraphy in Earth Sciences with special reference to Hydrocarbon Exploration* (Invited Lecture) at Geological Society of India Meeting at WIHG, Dehradun (December 23, 2005).
- *Palynology– Today* (Prof. D.D. Pant Memorial Lecture) at Department of Botany, Allahabad University, Allahabad (February 3, 2006).

CM Nautiyal

- Anchored a Science Programme for Lucknow Doordarshan (telecast on July 6, 2005).
- *Innovations in Science Projects* at INTEL Workshop for Principals, State Institute for Science Education, Allahabad (September 15, 2005).
- *Physics in Everyday Life* at BTSI College, Kakori, Lucknow under Science Club/ UP-CST (September 27, 2005).
- *Isotopes- From Ocean to Sky* at Refresher Course for Degree and PG teachers, Physics Dept., University of Lucknow (October 21, 2005).
- *Science Communication: Quo Vadis?* (Keynote Speech) at VBS Poorvanchal University (October 23, 2005).
- A science- based serial of 10 episodes *Ambar mein Baaraat*' by AIR, Lucknow (October-December, 2005).
- *Vigyan evam Prodyogiki ke Badhte Kadam* at Maharajganj Mahotsav under the auspices of Science Club – under UP-CST (February 24, 2006).
- *Criteria for Coordinators* (Invited Lecture) at OTS, Jaipur organised by DST, Rajasthan and NCSTC Network (March 18-19, 2006).

A Rajanikanth

- *Intellectual Property Rights: Strategies and challenges* at Administrative Staff College of India, Hyderabad (July 01, 2005).
- *Past plant signatures- An environmental elucidation* at Department of Environmental Sciences, Andhra University, Visakhapatnam (November 21, 2005).
- *Plant strategies to meet changing physical environment* at AVN College, Visakhapatnam (November 22, 2005).
- *Palaeomolecularbiology* at Government Women's College, Andhra University, Visakhapatnam, (November 22, 2005).

SK Bera

- *Palynology, Palaeoclimate and Implications* at Assam Science Society, Goalpara, Assam (January 28, 2006).

A Bhattacharyya

- *Climatic Changes vis-à-vis Glacial Fluctuations in the Trans Himalayan Region* (Invited Lecture) at Geology Department, Jammu University (September 21, 2005).

Asha Gupta

- *Fossil Spores– An overview* at International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday; Nanjing Normal University, Nanjing, China (October 26, 2005).

Anjum Farooqui

- *Role of Palynology in the study of Deltaic Ecosystem* at University Faculty Training Programme, Delta Studies Institute, Visakhapatnam (July 30, 2005).

Supriya Chakraborty

- *Principle of Radiocarbon Dating and its applications* at the Department of Archaeology and Ancient History, Lucknow University (February 11, 2006).

B Sekar

- *Radiometric Dating Methods and Techniques* at UGC Staff College, University of Allahabad for Orientation Programmes for University and Degree College lecturers (November 17, 2005).

SC Bajpai

- *Solar Energy– Technology and Devices* (Invited Lecture) at Training Programme for the Officers of NEDA and different Nodal Agencies of various States, Alternate Energy Research Development and Training Centre, Lucknow (July 20 & 27 and August 3, 2005).
- *Introduction of improved Chulha under Gram Seva– An effort to reduce the drudgeries of Rural Women* at Seminar on Human Values and University Education, G.B. Pant University of Agriculture and Technology, Pantnagar (August, 2005).

By Guest Speakers

Dr ND Mitra, Retired Sr. Dy. DG, GSI & Member, Research Advisory Council, BSIP

- *Prospects of Coal Bed Methane in India* (February 16, 2006).

Prof Cheng-Sen Li, Institute of Botany, Chinese Academy of Sciences, Beijing, China

- *Discovery of Hemp (Cannabis sativa* L.*) in the Yanghai Tombs, Xinjiang, China* (February 25, 2006).

Prof Yu-Fei Wang, Institute of Botany, Chinese Academy of Sciences, Beijing, China

- *New light on Shanwang Miocene flora, Eastern China* (February 25, 2006).

Prof Yi-Feng Yao, Institute of Botany, Chinese Academy of Sciences, Beijing, China

- *Palaeovegetational and palaeoclimatic implications of Eocene palynoflora from Changchang Basin, Hainan, China* (February 25, 2006).

Staff News

Appointments

Dr Hukam Singh, Scientist 'B' w.e.f. 25.01.2006 (FN).

Dr Srikanta Murthy, Scientist 'B' w.e.f. 01.02.2006 (FN).

Sri Biswajeet Thakur, Scientist 'B' w.e.f. 01.02.2006 (FN).

Sri Sumit Bisht, Technical Assistant 'D' w.e.f. 12.07.2005 (FN).

Sri Ashok Kumar, Hindi Translator w.e.f. 11.08.2005 (FN).

Miss Manisha Tharu, Lower Division Clerk w.e.f. 03.01.2006 (FN).

Sri Dipak Kumar Dutta, Accounts Officer w.e.f. 28.03.2006 (FN).

Dr Jayendra Singh, Project Investigator w.e.f. 25.08.2005.

Miss Abha, Technical Assistant w.e.f. 27.10. 2005.

Promotions

Sri R.K. Kapoor, Section Officer w.e.f. 13.10.2005.

Sri Shree Ram, Attendant 'III' w.e.f. 11.07.2005.

Smt. Munni, Attendant 'III' w.e.f. 11.07.2005.

Sri Ram Ujagar, Attendant 'II' w.e.f. 11.07.2005.

Sri Ram Dheeraj, Attendant 'II' w.e.f. 11.07.2005.

Sri Dhan Bahadur Kunwar, Attendant 'II' w.e.f. 11.07.2005.

Sri Krishna Kr. Bajpai, Attendant 'II' w.e.f. 11.07.2005.

Sri Hari Kishan, Attendant 'II' w.e.f. 11.07.2005.

Sri Nafis Ahmed, Driver 'IV' w.e.f. 27.01.2006.

Sri C.L. Verma, Technical Assistant 'D' (Redesignated w.e.f. 30.03.2006.

Retirements

Sri RK Takru, Accounts Officer retired on 31.01.2006.

Sri VS Panwar, Technical Assistant 'E' retired on 31.03.2006.

Expired

Dr Manoj Shukla, Scientist 'F' expired on 06.06.2006.

Former Staff Members of the BSIP paying floral tribute to Prof Birbal Sahni on his Samadhi 14th November, 2005

Medals & Awards

The following Medals have been included in the Bye-Laws of the Birbal Sahni Institute of Palaeobotany, Lucknow (Notification No. BSIP/NM/2005/L-1210, Dated January 10, 2006):

1. Team Medal
2. Diamond Jubilee Medal
3. Scientific Output Medal
4. External Budgetory Resource Medal
5. Efficient Administrative Staff Medal
6. BSIP Employee Medals (Two)

Publications Released

During the Founder's Day celebrations, Institute's following publications were released by distinguished speakers and member, Governing Body.

- BSIP Newsletter 2005
- *The Palaeobotanist* 54(1-3)
- Bilingual Annual Report 2004-2005
- Abstract Volume of the National Conference

Ph. D. Awarded

Sanjai Kumar Singh has been awarded Ph D Degree on the topic **"Floral Diversity of Mahuadanr Beds, Latehar District, Jharkhand"** under the supervision of Dr GP Srivastava (Scientist 'F' Retd.), Botany Department, Lucknow University, Lucknow on December 2005.

SM Vethanayagam has been awarded PhD Degree on the topic entitled **"Studies on the efficacy of neem (*Azadirachta indica* A. Juss.) products on the control of pests, virus vectors and diseases on Agricultural crops"** under the supervision of Prof RR Choudhury, Botany Department, Lucknow University, Lucknow on June 2006.

Dr Harsh K Gupta releasing a book 'Palynology in Hydrocarbon exploration' by Dr NC Mehrotra on 14th November, 2005

Library

Library of the Birbal Sahni Instiute of Palaeobotany is a finest library on the subject in the country. It not only caters to the scientists and staff of the institute engaged in research work but also consulted by the researchers from different parts of the country. Started as a humble beginning from Prof. Birbal Sahni's personal collection of the literature at present it is a treasure of books and journals on palaeobotany, botany and geology. It has also a vast collection of general reading material and reference books. Every year it is enriched by way of new acquisitions and exchange of literature. Many leading experts have donated their personnel collections of books and journals to the library. We express our gratitude to all those persons who donated collection and establish exchange with library for the benefit of subject. This year we received a big collection of books and journals from Prof SN Bhalla, Department of Geology, Aligarh Muslim University, Aligarh. We are grateful to him and encourage similar gestures from other scientists and persons. Library is open for consultation by students and researchers. For benefit of the researchers a list of journals subscribed as well as received as gratis in exchange is given below. A list of new acquisitions by the library during preeceding year is also provided.

List of Journals subscribed

1. Aerobiologia
2. Alcheringa
3. American Journal of Botany
4. American Journal of Sciences
5. Annales de Paleontologie
6. Annales of Botany
7. Asian Agri History
8. Australian Journal of Earth Sciences
9. Boreas
10. Botanical Journal of Linnean Society
11. Botanical Review
12. Bulletin American Association of Petrolium Geology
13. Bulletin Geological Society of America
14. Bulletin ONGC
15. Cenozoic Research
16. Chemical Geology
17. Dendrochronology
18. Earth & Planetary Science Letters
19. Earth Science Reviews
20. Ecologae Geol Helvetiae
21. Envis Bulletin
22. Episodes
23. Esturine & Coastal Shelf Science
24. Facies
25. Fuel
26. Geobios
27. Geochemica et Cosmochemica Acta
28. Geology
29. Geophytology
30. Geoscience Journal
31. Geotimes
32. GFF
33. Gondwana Geological Magazine
34. Gondwana Research
35. Grana
36. Iawa Journal
37. Ichnos
38. Indian Archaeology - A Review
39. Indian Journal of Earth Sciences
40. Indian Ocean Archaeology
41. International Journal of Coal Geology
42. International Journal of Earth Sciences
43. Journal of Asian Earth Sciences
44. Journal of the Geological Society of India
45. Journal of Geological Society of London
46. Journal of Indian Association of Sedimentologist
47. Journal of Micropalaeontology
48. Journal of Nannoplankton Research
49. Journal of the Palaeontological Society of India
50. Journal of Paleontology
51. Journal of Palynology
52. Journal of Quaternary Science
53. Journal of Systematic Palaeontology (Bull. Brit. Mus. Nat. Hist)
54. Lethaia
55. Marine Geology
56. Marine Micropaleontology
57. Minetech
58. National Geographic
59. Nature
60. Neus Jb. (Palaeontology) Neus Jharbuch
61. New Phytologist
62. Newsletter Stratigraphy
63. Origins of Life
64. P.C. Quest
65. Paleobiology

66. Paleoceanography
67. Palaeontographica
68. Palaeogeography Palaeoclimatology Palaeo-ecology
69. Palaeontology
70. Palaios
71. Palms
72. Philosophical Transactions of Royal Society (Earth Sci./Biol. Sci.)
73. Phytomorphology
74. Plant Systematic Evolution
75. Precambrian Research
76. Journal of Earth System Science
77. Proceedings of Indian Science Congress
78. Quaternary International
79. Quaternary Research
80. Radiocarbon
81. Resonance
82. Revue de Micropaleontologie
83. Review of Palaeobotany & Palynology
84. Revista Espanolade Micropalaeontologie
85. Science
86. Scientific American
87. Sedimentology
88. Sedimentary Geology
89. Stratigraphy and Geological Correlation
90. Terra Nova
91. The Holocene
92. Tree Ring Bulletin
93. *Aavishkar* (In Hindi)
94. *Sampada* (In Hindi)
95. *Vigyan* (in Hindi)
96. *Vigyan Bharti Pradeepica* (in Hindi)
97. *Vigyan Pragati* (in Hindi)
98. *Vigyan Sampada* (in Hindi)

List of Journals received in exchange

1. Abhandlugen des Staatlichen Museums fur Mineralogie und Geologie zu Dresden
2. Acta Botanica Sinica
3. Acta Geologica Sinica
4. Acta Geoscientia Sinica
5. Acta Micropalaeontologica Sinica
6. Acta Palaeobotanica
7. Acta Palaeontologica
8. Ameghiniana
9. Annls. Hist. nat. Mus. natn. Hung.
10. Bangladesh Journal of Life Sciences
11. Blumea
12. Bol. IG. Inst. Geociências USP
13. Bulletin of the Botanical Survey of India
14. Bull. Indian Geologists Association
15. Bull. National Science Museum Ser. C (Geology)
16. Bulletin of Geosciences
17. Comunicacões do Instituto Geológico e Mineiro
18. Cretaceous Research
19. Documenta naturae
20. Documents des Lab. Geol. Lyon
21. Geolines
22. Geologia Colombiana
23. Geologica Carpathica
24. Geological Quarterly
25. Geological Review
26. Geologisches Jarhbuch
27. Geologia: Serie Cientifica USP
28. G.S.I. Bulletin
29. G.S.I. (Miscellaneous Publication)
30. G.S.I. (News)
31. G.S.I. (Record)
32. G.S.I. (Special Publication)
33. Hallesches Jahrbuch fur Geowissenschaften
34. Himalayan Geology
35. Institute of Geological and Nuclear Sciences Monographs
36. Isvestia Akademic Nauk USSR
37. Journal of the Asiatic Society
38. Journal of the Czech Geological Society
39. Journal of Environmental Resources
40. Journal of Indian Botanical Society
41. Journal of Stratigraphy
42. Mater. Archeologiczne
43. Memoires de La Societ Geologique
44. Memoir of the Fukui Prefectural Dinosaur Museum
45. Micropaleontology
46. Mitteilungen aus dem Museum for NaturKunde in BerLin Geowiss. Reihe
47. Munstersche Forschungen Zur geologic and Palaontologie
48. Nature und Museum
49. National Academy Science Letters
50. Oklohoma Geology Notes
51. Palaeontological Abstracts
52. Palaeontologia Indica
53. Palaeontological Research
54. Palaeontological Journal USSR
55. Palaeopelagos
56. Proc. Indian National Science Academy Part-A (Physical Sciences)
57. Proc. Indian National Science Academy Part-B (Biological Sciences)
58. Proceedings of the National Academy of Sciences, India
59. Professional Papers of Stratigraphy and Paleontology
60. Rev. del Mus. de La Plata (Bot. and Geol.)
61. Science Reports of the Kanazawa University
62. Science Reports Tohoku University
63. Sencken Bergiana Lethaea
64. Slovak Geological Magazine
65. Sovetskaya Geologiya
66. Stvdia Geologica Salmanticensia
67. Travaux de la Section Scientifique et technique
68. Thalassas
69. Tracks & Traces
70. USGS Professional Papers

New Additions to the Library 2005-2006

S.No.	Accession No.	Author/s	Title of the Book
1.	60376	Gradstein, F.	A Geologic Time Scale 2004
2.	60377	Selden, P. & Nudds, J.	Evolution of Fossil Ecosystems
3.	60378	de Groot, P.A.	Handbook of stable isotope analytical techniques
4.	60379	Stow, D.A.V.	Sedimentary Rocks in the Field
5.	60653	Bahadur, B., Reddy, P.R. et al.	Gleanings in Botanical Research
6.	60654	Bahadur, B., Reddy, P.R. et al.	Gleanings in Botanical Research
7.	60655	Mitra, A. et al.	Introduction to marine plankton
8.	60656	Sen, N. & Naskar, K.	Algal Flora of Sunderbans
9.	60657	Saxena, V.K.	Geothermal Resources of India
10.	60658	Naskar, K.	Manual of Indian Mangroves
11.	60659	Selley, R. et al.	Encylopedia of Geology, Vol. 1
12.	60660	Selley, R. et al.	Encylopedia of Geology, Vol. 2
13.	60661	Selley, R. et al.	Encylopedia of Geology, Vol. 3
14.	60662	Selley, R. et al.	Encylopedia of Geology, Vol. 4
15.	60663	Selley, R. et al.	Encylopedia of Geology, Vol. 5
16.	60665	Thomas, D.S.G.	Arid Zone Geomorphology
17.	60666	Rossiter, A. & Kowanabe, H.	Advances in Ecological Research Vol. 31
18.	60667	Shugart, H.H.	Terrestrial Ecosystems ----
19.	60703	Nagar, P.S.	Floristic biodiversity of Barda hills
20.	60704	Mathez, E.A.	Earth: Inside and Out
21.	60705	Saklani, P.S.	Himalaya (Geological Aspects) Vol. 1
22.	60706	Saklani, P.S.	Himalaya (Geological Aspects) Vol. 2
23.	60707	Saklani, P.S.	Himalaya (Geological Aspects) Vol. 3
24.	60708	Willis, K.J. & McElwain, J.C.	The Evolution of Plants
25.	60709	Oliver, J.E.	Encyclopedia of World Climatology
26.	60710	Srivastav, P.C.	Vistas in Palaeobotany and Plant Morphology
27.	60711	Srivastav, P.C.	Vistas in Palaeobotany and Plant Morphology
28.	60722	Sharma, Seema	Encyclopedia of Climatology, Vol. 1
29.	60723	Sharma, Seema	Encyclopedia of Climatology, Vol. 2
30.	60724	Naqvi, S.M.	Geology and Evolution of the Indian Plate
31.	60725	Kathiresan, K. & Qasim, S.Z.	Biodiversiry of Mangrove Ecosystem
32.	60726	Meunier, J.D. & Colin, F.	Phytoliths: Applications in Earth…
33.	60727	Romaniello, S.	Mastering Photoshop 6
34.	60728	Kurniawan, B.	Java for the Web with Servlets
35.	60729	Herrmann, E.C.	Mastering Perl 5
36.	60730	Zukowski, J.	Mastering Java 2, J2SE1. 4
37.	60731	Crumlish, C. & Chase, K.J.	Microsoft Front Page 2003
38.	60732	Crumlish, C. & Chase, K.J.	Bluetooth: the basics
39.	60812	Nagendra, R.	Cretaceous outcrop sequences
40	60813	Sharma, D.P.	Pre-Historic Art and Archaeology, Vol. 1
41	60814	Sharma, D.P.	Pre-Historic Art and Archaeology, Vol. 2
42	60815	Alverson, K.D et al.	Palaeoclimate global change
43	60816	Alexopoulas, C.J. et al.	Introductory mycology
44	60817	Pietra, F.	Biodiversity and natural product
45	60818	Guha, R. & Mondal, H.S.	Wetland phytodiversity, complete guide ….
46	60819	Cloudsley, T., J.L.	Ecology and behaviour of Mesozoic
47	60820	Ojha, D.D.	*Vigyan aur Ved* (in Hindi)
48	60821	Ramasamy, S.M.	Remote sensing in Geomorphology
49	60822	Wyman, B., Stevenson, L.H.	Dictionary of Environmental Science
50	60823	Rao, Vasant et al.	Fungi around some aquatic bodies
51	60824	Kumar, S.	Trees and Shrubs of Haryana
52	60825	Bowden, A.J.(ed.)	History of Palaeobotany
53	60826	Harper, D.A.J.	Numerical Palaeobiology
54	60827	Bharadwaj, Atul	*Dr Manmohan Singh, Aakaro ke Jadugar ka Safar*
55	60828	Kali Shankar	*Aantiriksh mein Jeevan* (in Hindi)
56	60829	Biswas, S.K.	Geology of Kutch Vol. 1
57	60830	Biswas, S.K.	Geology of Kutch Vol. 2
58	60886	Oldenburg, V.T.	The Lucknow Omnibus
59	60887	—	Manorama Year Book - 2006
60	60890	Jenkins, D.G. (ed.)	Applied Micropaleontology

BSIP Garden

BSIP Garden has participated in Flower shows, Lawn, Window and Door competitions conducted by NBRI, Rajbhavan and Lucknow Nagar Nigam, Lucknow during the year 2005-06. Altogether, 73 prizes were received from the different organisations. The details are:

A) NBRI

a) *Chrysanthemum* and *Coleus* show
   First : 5
   Second : 3
   Consolation : 2

b) Rose and Gladiolus show
   First : 7
   Second : 6
   Consolation : 6

B) Rajbhavan

a) Less than 2000 Sq. Metres (Lawn) in Office Garden—Consolation

b) Above 2000 Sq. Metres (Lawn) in Office Garden—Second

c) Window and Door decoration—First (Shield)

d) Flower Competition
   First : 1
   Second : 7
   Consolation : 9

C) Lucknow Nagar Nigam
   First : 4
   Second : 7
   Consolation : 13

Dr NC Mehrotra, Director, BSIP presenting a trophy to the members of the Garden Committee and Gardeners of the Institute

Glimpses of Bahadurpur, Jais Exhibition

हिंदी पत्रिकाएँ

राजभाषा की स्थिति

ljdkjh dke e fgnh i;kx dk c<kok nu d i;kl bl o"k Hkh tkjh jgA dk;ky;hu ,o oKkfud dk; fgnh e vf/kd l vf/kd dju d fy, LVkQ dk mRlkgon/ku fd;k x;kA lLFkku u jk dk l] y[kuÅ ¼;fuV&6½ dk lfØ; lnL; jgk] bldh 540h ,o 550h vn/k okf"kd cBdk e Hkkx fy;k rFkk fgnh dk;'kkyk, vk;kftr dju gr i'kfLr&i= Hkh ikIr fd,A =ekfld o vn/kokf"kd fjikV le; l foKku vkj ikn;kfxdh foHkkx rFkk u jk dk l] y[kuÅ dk fHktokb xbA bl o"k lLFkku dk jktHkk"kk dh l;Dr lykgdkj lfefr dk lnL; ukfer fd;k x;k rFkk fun'kd Mk- uj'k pUn egjk=k ,o jktHkk"kk dk;kUo;u lfefr d lnL; lfpo Mk- pUn ekgu ukfV;ky u ub fnYyh e 220h cBd e Hkkx fy;kA

^n ify;kckVfuLV* 'kk/k&if=dk gr 'kk/k&i=k d fgnh lkjk'k r;kj ,o idkf'kr fd, x,A okf"kd foojf.kdk fgnh e Hkh idkf'kr dh tkrh gA lLFkku dk U;tyVj nfoHkk"kh gA bl vof/k e lLFkku d vud oKkfudk u fgnh e foKku&0;k[;ku fn,] ykdfi; foKku y[k idkf'kr fd, ,o jfM;k@njn'ku ij fgnh e foKku dk;Øe ilkfjr fd,A vkdk'kok.kh y[kuÅ u Mk- pUnekgu ukfV;ky nokjk fyf[kr 10 lxk dk foKku /kkjkokfgd ^vEcj e ckjkr* ilkfjr fd;kA lLFkku d oKkfud Mk- ,l-d-,e- f=ikBh nokjk fyf[kr fgnh foKku iLrd ^xfrd iFoh vkj tfod bfrgkl* dk foekpu bl o"k jk"Vh; foKku fnol ij fd;k x;kA fgnh vuoknd dh fu;fDr dh xbA

fgnh dk;'kkyk

fgnh i;kx dk c<kok nu d fy, lLFkku e pkj fgnh dk;'kkyk, vk;kftr dh xbA 20 eb 2005 dk ^fgnh lk¶Vo;j dk d'ky mi;kx* ¼Jh ,e- egjk=k½ 19.9.2005 dk ^'kCn fuek.k dh dyk* rFkk ^Lok=;kUkj Hkkjr e fgnh dk fodkl*] ¼ik- m"kk flUgk½] 27.12.2005 dk ifjonf/kr fgnh lk¶Vo;j dk d'ky mi;kx* ¼Jh xxu 'kek½ rFkk 31.3.2006 dk ^jktHkk"kk uhfr] vf/kfu;e o fu;e* ¼Jh v'kkd dekj½ fo"k;k ij vk;kftr dk;'kkykvk e ifrHkkfx;k u oDrkvk d lkFk vPNk lokn fd;kA

fgnh i[kokMk

10 flrcj l 26 flrcj 2005 rd lLFkku e fgnh i[kokMk vR;r mRlkg d lkFk euk;k x;k] ftldk mn?kkVu lLFkku d lLFkkiuk fnol ij Jh jfo'kdj] io egkfun'kd] Hkkjrh; HkoKkfud lo{k.k nokjk ^i;koj.k in"k.k ic/ku* ,d HkoKkfud ifji{;* fo"k; ij fgnh e 0;k[;ku ndj fd;k x;kA 23 flrcj dk ,d dfo lEeyu vk;kftr fd;k x;k ftle cgr l vkef=r dfo;k ,o lLFkku d 3 dfo;k u Jkrkvk dk nj 'kke rd ck/k j[kkA bl nkjku lLFkku d lnL;k d fy, fofHkUu ifr;kfxrk, vk;kftr dh xbA Vd.k e d- l/kk djhy iFke] Jh nhid ik.M; nforh; rFkk Jh jke mtkxj rrh; jgA fuc/k y[ku e d- jhrk oek iFke] Jh riu dekj eMy nforh; rFkk Jh /khjUn dekj iky rrh; jgA ^xyrh <<k* e Jh nhid ik.M; iFke] Mk- je'k dekj lDluk o Jh vfouk'k dekj JhokLro nforh; rFkk Jh vou'k dekj rrh; jgA vUrk{kjh e Mk- ¼Jherh½ jf'e JhokLro o Mk- ¼Jherh½ jtuh frokjh iFke] Jh i"iUn dekj feJ o Jh jkt'k voLFkh nforh; rFkk Jherh 'ky flg jkBkj o d- T;kfr 'kek rrh; jg tcfd i'u&ep e 'kkfey Vhek e Jh riu dekj eMy] Jh vt; vk; o Jh /khjn dekj iky iFke] Mk- ,- jtuhdkr] Mk- ¼Jherh½ jtuh frokjh o d- vuie tu nforh; rFkk Mk- je'k lDluk] Mk- vfer dekj ?kk"k o Jherh dfork dekj rrh; jgA vfre fnu okn&fookn ifr;kfxrk gb ftle Mk- ,- jtuhdkr iFke] Jh riu dekj eMy nforh; rFkk Jherh jhrk cuth rrh; ijLdkj d fotrk FkA lekiu lekjkg e Mk- foukn fcgkjh tkgjh io ikQlj Hkkjrh; ikn;kfxdh lLFkku ¼enkl½ lekjkg d e[; vfrfFk Fk rFkk ftUgku ^vflr Åtkh cgekM e ,d ub [kkt* fo"k; ij jkpd ,o Kkuon/kd 0;k[;ku fn;kA

fgnh ikRlkgu ijLdkj

fgnh d ixkeh i;kx dk c<kok nu gr Mk- t-,l- xyfj;k o Jh jktdekj Vd: dk iFke] Mk- je'k lDluk] Jh riu dekj eMy o Jh vkb-t-,l- cnh dk nforh; rFkk Mk- ,- jtuhdkr] Jh feJh yky] Jh fot; flg iokj] Jh lrjke ;kno o Jh i"in dekj feJ dk rrh; ijLdkj inku fd;k x;kA ijLdkj forj.k lLFkku d ghjd t;rh lekjkg d mn?kkVu d volj ij 14 uocj dk fd;k x;kA

fofo/k

ljdkjh i=kpkj e fgnh i;kx dk vkx c<ku d fy, dN vkj dk;ky;&Qke o i= vufnr@nfoHkk"kh fd, x,A fgnh e i=kpkj Hkh ixfr ij gA lLFkku d dl;Vjk dk nkuk QkUV miyC/k djku d vfrfjDr bl o"k lHkh e nfoHkk"kh@cgHkk"kh lk¶Vo;j yxku dh fn'kk e Hkh ixfr dh xbA lLFkku dh fofo/k in'kfu;k e in'kk dk ifjp; fgnh e Hkh iLrr fd;k x;k FkkA bl o"k lLFkku dh leLr jcM dh egj o lhy nfoHkk"kh dj nh xb g rFkk okguk ij uke iVfVdk, Hkh nfoHkk"kh gh gA

fgUnh dk;'kkyk d mn?kkVu lekjkg dk ,d n';

fgUnh dk;'kkyk dk lckf/kr djrh gb ik- m"kk flUgk] foHkkxk/;{k] Hkk"kk foKku foHkkx] y[kuÅ fo'ofo|ky;

ifr;kfrxrk e Hkkx yr ifrHkkxh

dfo lEeyu dk ,d n';

ijLdkj xg.k djr fot;h ifrHkkxh

çkÏfrd vkinkvksa ls yM+us esa foKku dh Hkwfedk

idfr d fcuk ge thou dh dYiuk ugh dj ldrA idfr dh xkn e ge iy dj cM gkr gA idfr l ge cgr dN lh[ku dk feyrk gA ge idfr fl[kkrh g] fd ge nljk d fy, D;k dj ldr gA idfr gekjk ,d lrku dh Hkkfr ikyu djrh g ijr lc dN tkur g, Hkh eu"; idfr l NMNkM dju l ckt ugh vkrkA eu"; viu LokFk d o'khHkr gkdj idfr dk udlku igpk jgk gA QyLo:i] dN ikdfrd dkj.k l vkj dN eu"; }kjk idfr dk igpkb tku okyh gkfu d ifj.kkeLo:i le;≤ ij ikdfrd vkink, vkrh jgrh g ftul /ku rFkk tu dh vryuh; gkfu gkrh gA ikdfrd vkinkvk e ie[k g] chekjh rFkk egkekjh] lenh rQku] okrkoj.kh; in"k.k] ck<] Hkdi] vkfnA idfr ge ;g crk nuk pkgrh g fd idfr l ij dkb Hkh 'kfDr ugh gA ijUr vkt foKku dk ;x gA foKku d fodkl u dkQh gn rd ikdfrd vkinkvk l yMu e fot; ikIr dj yh gA vkt d oKkfud ;x e eu"; ikdfrd vkinkvk l yMu e l{ke gk x;k gA ikdfrd vkinkvk ij i.k:i.k fot; rk ugh ikb tk ldrh yfdu foKku }kjk bld n"iHkko dk dkQh gn rd de fd;k tk ldrk gA

chekjh rFkk egkekjh l yMu e foKku dh Hkfedk

jkx fuokj.k e foKku dh egRoi.k Hkfedk gA vkt d ;x e eu"; u eR; ij fot; rk ugh ikIr dh g] ijr og Hkfo"; e bld fy, lrr i;kljr gA vkt vud xHkhj l xHkhj chekfj;k dk bykt Hkh << fy;k x;k g ftld QyLo:i vlk/; chekfj;k dk bykt vR;r d'kyrkiod fd;k tku yxk gA oKkfudk u vud midj.kk dk vkfo"dkj dj fy;k g] tl fd ,Dl&jA bldh enn l ge 'kjhj d Hkhrj dk fp= ikIr dj ldr g] vkj chekfj;k dk irk le; jgr yxk;k tk ldrk gA vud idkj d bUtD'kuk dk fuek.k fd;k x;k g] ftll jkx ihfMr 0;fDr dh rdyhQ feuVk e nj dh tk ldrh gA vkt d le; e Nr dh chekjh tl& gtk] tdke] lyx] vkfn d bUtD'kuk dk fuek.k djd gtkjk&yk[kk 0;fDr;k dk vle; ekr l cpk;k tk ldk gA dN le; igy rd ddj [kkIh tl vlk/; jkx l gtkjk 0;fDr vle; dky d xky e lek tkr Fk vkt MkDVjk u bldk bykt << fy;k gA MkDVjk u ,d ,l inkFk dh [kkt dh g] ftld }kjk ddj [kkIh l futkr ikb tk ldrh gA ;g inkFk g ^,jkLikfju*A bld vfrfjDr vkt Nr d jkxk tl lyx] [kljk] rifnd] vkfn dk bykt Hkh feVVh l ikIr inkFkk }kjk dju dh dkf'k'k dh tk jgh gA dlj l ihfMr 0;fDr dh vlguh; ihMk dk nj dju d fy; igy ekQhu d bUtD'ku fn, tkr Fk tk fd vQhe l cur Fk vc ehVhiku uked vk"kf/k dk fuek.k fd;k x;k g tk fd jkx l yMu e dkQh dkjxj gA dN le; igy rd dlj d jkxh d bykt e jfM;e dh fdj.kk dk i;kx fd;k tkrk Fkk ijr vkt jfM;k/keh dkcktYV dh fdj.kk dk bLreky gku yxk tk fd jfM;e dh fdj.kk l db xuk vf/kd iHkkoh gA bl idkj ge dg ldr g] fd foKku d c<r dnek u fpfdRlk d {k= e egRoi.k miyfC/k ikIr dh g ftll dN gn rd egkekjh rFkk chekfj;k l yMu e lQyrk feyh gA

Hkkjr d rVh; {k=k dh lenh vkink, rFkk mul fuiVu e foKku dk ;kxnku

Hkkjr dh turk cMh l[;k e rVh; in'kk d fdukj fuokl djrh g] ftld QyLo:i o LokHkkfod :i l lenh vkinkvk l iHkkfor gkr jgr gA /ku] tu dh vikj gkfu gkrh g rFkk lenh vkink, rVorh bykdk dk tyeXu dj nrh gA dN ie[k lenh vkink, bl idkj g%

1- lukeh rjx ;k lukeh ygj 2- pØokr egkfe 3- len e Tokj 4- iout rjx 5- vkdfLed rjx

lukeh ygj& len dh rjxk e gypy gku d dkj.k ty d foLFkkiu d QyLo:i ;g ygj vkrh gA ;g vR;r Hk;dj ikdfrd vkinkvk e l ,d gA ; 500 fd-eh- l Hkh vf/kd dh j¶rkj l pyrh g rFkk budh yckb 50 l 100 eh- rd gk ldrh gA jkLr e dkb ck/kk u gku d dkj.k ;g nk efty Hkou rd dh Åpkb ikIr dj yrh gA bud }kjk /ku] tu dh vikj gkfu gkrh g] ;g lEi.k rVh; in'kk dk rgl&ugl dj Mkyrh gA vHkh gky gh e 26 fnlEcj] 2004 dk bMkuf'k;k e vk, Hkdi d QyLo:i lukeh vkb ftle 70,000 l vf/kd ykx dky d xky e lek x,A bll lcl T;knk {kfr bMkuf'k;k e gb ;|fi Hkkjr e Hkh de gkfu ugh gbA Hkkjr e bldh dkb io prkouh u feyu d dkj.k vR;r tu] /ku dh gkfu gbA vkt tc fd oKkfudk u lukeh io lpuk i.kkyh LFkkfir dh g] ;fn Hkkjr bldk lnL; gkrk rk ,d nk?kV io lpuk feyu l bruh vf/kd /ku] tu dh gkfu ugh gkrhA gukb e 1965 e LFkkfir lukeh io lpuk i.kkyh jfM;k] ,o VyhQku }kjk 100 tyLrj fuxjkuh dUnk l tMh gb gA vejhdk vkj tkiku tl n'k bldk ykHk cgr igy l y jg gA vejhdk rFkk tkiku e lukeh dh vR;kf/kd lHkkouk jgrh gA vkt Hkkjr dk Hkh pkfg, fd og lukeh io lpuk i.kkyh dh lnL;rk y vkj ikdfrd vkinkvk l gku okyh gkfu dk dN gn rd fu;kftr dj ldA

pØokr egkfe& len e m".k dfVc/kh; pØokrk d QyLo:i gh pØokr egkfe vkrh gA ;g ygj vR;r ?kkrd gkrh gA len rVorh {k=k dk ;g i.krk tyeXu dj nrh gA bul Hkh tu&/ku dh vikj {kfr gkrh gA bul fuiVu d fy, egkfe io lpuk i.kkyh LFkkfir dh xb g ftld }kjk bldh io lpuk feyu l bll gku okyh gkfu dk de fd;k tk ldrk gA

len e Tokj& Tokj dh mRifÙk pUnek }kjk iFoh ij len d ty dh lrg rFkk ry ij yxu oky cyk dh fHkUurk d QyLo:i gkrh gA bl idkj cgr lh ikdfrd leL;k, g ij foKku ikdfrd vkinkvk l fuiVu e egRoi.k Hkfedk fuHkkrk gA

okrkoj.kh; in"k.k fuokj.k e l{e thok.k dh mi;kfxrk& vkt d vk|kfxd ;x e okrkoj.k e in"k.k d QyLo:i xhu gkÅl xlk dh ek=k c<u l okrkoj.k inf"kr gk jgk gA okrkoj.k e gku oky ifjoru d dkj.kk dk v/;;u vfr vko';d gA okrkoj.k e gku oky ifjoru d vkdMk dk ge ^l{e thok.k* d v/;;u l tku ldr gA bll okrkoj.k e gku oky ifjoru dk vueku yxk;k tk ldrk gA ;g ^l{e thok.k* len e ryNV e ik;k tkrk g] jfM;k dkcu dkyfu/kkj.k fof/k l ml ifjoru d le; dk irk yxk;k tk ldrk gA

unh] ck< l mRié vkink& unh] ck< l mRié vkink e Hkh foKku egRoi.k Hkfedk fuHkk jgk gA unh] ck< l fuiVu d fy, oKkfudk }kjk ,l ck/kk dk fuek.k fd;k tk jgk g] ftll fd ck< dk jkdk tk ldA Hkty oKkfudk d v/;;u }kjk Hkh bll fuiVu e lQyrk feyh gA

ekle foKku d c<r pj.k ¼ekle dk iokueku½& vkt d oKkfud ;x e eu"; u dkQh gn rd ikdfrd vkinkvk ij fot; ikIr dj yh gA tl fd rQku dh prkouh] o"kk dk iokueku] vkfnA vkt eu"; ekle dh tkudkjh igy l ikIr dj yrk gA vkfFkd vkj df"k {k= d fy, ;g iokueku vfr vko';d gA vkt ekle d iokueku d fy, vud mixg i{kfir fd, x, g] ftue l dN bl idkj g%

Hkkjrh; lpkj mixg (INSAT)- bul njlpkj] rQku dh prkouh] o"kk dh io lpuk] vkfn ikIr gkrh gA bUlV 3D-bUlV 3D ey:i l ekle lc/kh tkudkjh miyC/k djkrk gA betj ¼ifrfcEcd½ ,o lkmMj& bUlV 3D e[;r% ekle d v/;;u d fy, gA ble j[kk betj iFoh dh lrg dk ekuhVj djrk g o len e mRié fLFkfr dk voykdu djrk gA ;g cknyk e vknrk dk irk yxkrk gA lkmMj& lkmMj nh?k rjx y?k rjx dk foHkkftr djrk gA mixg ukok (NOAA)-vejhdh mixg ukok Hkh ekle lc/kh tkudkjh miyC/k djkrk gA ekle dh io lpuk gku l ge ekle l lcf/kr vkinkvk ij fu;=.k ik ldr gA ikdfrd vkinkvk l fuiVu e oKkfud lj{kk rduhdh dh Hkfedk:

ckl Vd& ;g fgeL[kyu vkfn l iHkkfor {k=k dh tkudkjh miyC/k djkrk g ftll fgeL[kyu jkdu e dkjxj mik; [kkt tkr gA

Mh-vkb-,Q-vkj- (DIFR) - vfXu l lj{kk inku djrk gA vfXu l gku okyh {kfr dk jkdu d ckj e ykxk dk tkudkjh miyC/k djkrk gA

Hkdi&Hkdi ,d Hk;dj ikdfrd vkink g] ftld }kjk vR;f/kd /ku rFkk tu dh gkfu gkrh gA xtjkr d Hkt e 26 tuojh] 2001 e vk, Hkdi u Hk;dj rckgh epkbA vkt Hkdi l fuiVu d fy, oKkfudk u i;kl ikjEHk dj fn; gA tl fd Hkdi jk/kh ?kj cukukA oKkfud Hkdi l gku okyh gkfu dk ydj xHkj g vkj fujrj ,l i;kl dj jg g fd bl ij fu;=.k ik;k tk ld ,o vle; gku okyh ekrk vkj vkfFkd {kfr;k dk de fd;k tk ldA bl idkj ge dg ldr g fd vkt d le; e foKku ikdfrd vkinkvk l yMu e i.k:i l l{ke gA dkQh gn rd ikdfrd vkinkvk l gku okyh {kfr dk de fd;k tk ldrk gA bl foKku dk peRdkj gh dgk tk ldrk gA ;|fi ikdfrd vkinkvk dk jkdk rk ugh tk ldrk yfdu foKku d fodkl d QyLo:i bld }kjk gku okyh {kfr dk dkQh gn rd de t:j fd;k tk ldrk gA

jhrk oek

❖ ❖ ❖

f}rh; ijLdkj ikIr

iLrkouk

ikxfrgkfld dky d ikjEHk l gh ekuo ikdfrd vkinkvk l Mjrk jgkA fojkV idfr d fouk'kdkjh Hkdik] Tokyke[kh mnxkjk] vkdk'kh; mYdkikrk] pØokrh rQkuk vkfn d fodjky:i dk og Hk;Hkr gkdj n[krk jgkA idfr mld fy, ck/kxE; ugh FkhA ikdfrd vkinkvk dh fodjkyrk u mld le{k vfLRo dk ldV mRiUu dj fn;k] ftldk mlu efLr"d ,o vU; bfUn;k dk i;kx djd lkeuk fd;kA 'ku% 'ku% og ,d ftKkl ekuo d:i e fodflr gku yxkA viu fodkl Øe e mlu loiFke idfr d lkFk rknkRE; LFkkfir fd;kA idfr dh fodjkyrk mld fy, vc mruh Hk;kog u jg xbA /kh&/kh og idfr d jgL;k dk tkuu o le>u e vkufUnr gku yxkA xgu euu&fpUru] vnE; /k; ,o vFkd xo"k.kk l og ikdfrd vkinkvk l yMu e l{ke gk x;kA idfr dh Hk;kogrk vc mld fy, lekIr gk pdh FkhA idfr dk tkuu o le>u dh ftKkIk rFkk le>uk gh foKku gA le; d lkFk&lkFk foKku dk Hkh fodkl gvkA u;&u; oKkfud

vkfo"dkjk u ekuo dk ikdfrd vkinkvk l yMu d fy, u;&u; midj.kk] lpkj ek/;e] llk/kuk] vkfn l yl dj fn;kA vk/kfud midj.kk rFkk vfHk;kfU=dh dh lgk;rk l ekuo u dkQh gn rd ikdfrd vkinkvk ij dkc ik fy;kA vkt df=e ekle mixg] lnj lonu lpkj i.kkyh] Hkkxkfyd lpuk rU=] vkfn fnu&jkr blh fn'kk e dk;jr gA

çkdfrd vkink,

ikdfrd vkink l] pkg fdlh Hkh idkj dh gk] lEifÙk dh cgr {kfr gkrh gA py ,o vpy lEifÙk d vfrfjDr tk tu&gkfu gkrh g] og dgh vf/kd ân; fonkjd gA ikdfrd vkinkvk dk fuEufyf[kr oxk e foHkDr fd;k x;k g%

Hkdi & iFoh d vkUrfjd cyk rFkk vkUrfjd rkih; n'kkvk d dkj.k pVVkuk l gkdj xtju okyh nkyudkjh rjxk dk Hkdi dgr gA 26 tuojh lu 2001 e dPN ½xtjkr½ e tk Hkdi vk;k Fkk og vjfc;u lyV rFkk bfM;u lyV d lpyu l mRié gvk FkkA ble gtkjk ykx dky dk xkl cu FkA

ck< & Hkkjh o"kk d dkj.k ufn;k mQku voLFkk e vk tkrh g vkj fo'kky Hk&Hkkx yxkrkj db fnuk rd tyeXu jgrk g] ty dh fudkl h ugh gk ikrhA ,l h fLFkfr dk ck< dgr gA tl k gky gh e eEcb dh ck<A bld dkjd bl idkj g& ogn viokg {k=] m".k dfVcU/kh; fo{kkHk] oukUeyu] enk vijnu] pØokr] Hkkjh o"kk] Hkdi] HkL[kyuA

l[kk & tc 75 ifr'kr l de o"kk gkrh g rk l[k dh fLFkfr mRié gk tkrh gA leLr df"k u"V gk tkrh gA bld dkjd] ekulu dk foyEc l vkuk vkj tYnh py tkuk gA vYi o"kk] oukUeyu] Hk&ty Lrj e fxjkoV] vkfn d dkj.k ;g fLFkfr gk ldrh gA

e:LFkyhdj.k & tc l[k dh fLFkfr yEc le; rd cuh jgrh g rk Hk&Hkkx e:LFky e ifjofrr gk tkrk gA bld Hkh ogh dkjd g tk l[k d gA

vU; ikdfrd vkink, Hkh g tl Tokyke[kk] fgeL[kyu] HkL[kyu] oukfXu] llk/ku ldV] ty ldV] pØokr] vkfnA

çkdfrd vkink rFkk ekle e lc/k

fdlh LFkku fo'k"k dh] fdlh fo'k"k le; ij] ok;e.My dh fLFkfr dk ekle dgr gA ^fLFkfr* l vfHkik; ok; nkc] rki] ox] ok; dh fn'kk] vknrk] vkfn l gA fdlh LFkku dk ekle fnu e db ckj cny ldrk g] ijUr tyok; cnyu e gtkjk o"k yxr gA ikdfrd vkinkvk rFkk ekle e cgr xgjk lc/k gkrk gA vr% ikdfrd vkinkvk l yMu d fy, ekle dk xgu ,o ;tukc) v/;;u vfr vko';d gA blh mí'; l ekle lc/kh mixg i{kfir fd; tkr gA ikjEHk e xe ok; d xCckjk l gh ;g dk; fd;k tkrk FkkA vc lnj lonu lpkj rU=] Hkkxkfyd lpuk rU= rFkk lij dEl;Vj d vk tku l ;g dk; lxerk l gk tkrk gA

vkink icU/ku e foKku dh Hkfedk

ikdfrd vkinkvk l yMuk gh vkink icU/ku gA bl N% pj.kk e foHkDr fd;k x;k g ;Fkk&¼v½- vkinkvk dk iokueku ¼c½- vkinkvk d iHkko dk de djuk ¼l½- vkink io r;kjh ¼n½- vkink vku ij dkjokb ¼i½- vkink jkgr ,o iuokl ¼Q½- vkink ,o fodkl A

v- vkinkvk dk iokueku& ;g dk; oKkfud ;fDr;k }kjk fd;k tkrk g tk fd Hkkfrdh rFkk jl k;u 'kkL= d fl)kUrk ij gh dk; djrh gA ,l h dN oKkfud ;fDr;k ,o mud dk; bl idkj g%

ok; nkc ekih& bldk vkfo"dkj loiFke Vkfjlyh uked oKkfud u fd;k FkkA ble ;fn ikj dk LrEHk vpkud fxj tkrk g rk ;g vk/kh ;k rQku dk bfxr djrk gA

rki ekih & ;g ok;e.My e fdlh Hkh LFkku d rki dk 'k)rk l eki ldrk gA ck;y rFkk pkyl u ok;nkc] rki rFkk vk;ru e egRoi.k lc/k LFkkfir fd,A ,MeM gyh dk Hkh egRoi.k ;kxnku jgkA gyh u gh ^gyh&dkeV* [kktk FkkA mijkDr dk; iUngoh l l=goh 'krkCnh d e/; g, FkA vk/kfud ;x e vkinkvk dk iokueku ekle&mixgk }kjk fd;k tkrk gA ble jfM;k llj] ftUg ^jfM;klkM* dgr g] yx gkr gA ; fnu&jkr cknyk d fp= ,o vU; vko';d lpuk, iFoh ij oKkfudk dk if"kr djr jgr g tk bUg lij dEl;Vj dh lgk;rk l fo'yf"kr dj vkinkvk d vku dh io lpuk nr gA vefjdk e pØokrh rQku ^dVjhuk* d vku l pkj fnu io ekle foKkfu;k u bldh lpuk ukxfjdk dk n nh FkhA blh dkj.k {kfr de gbA blh idkj v.Meku&fudkckj rFkk lek=k }hi e lukeh ygjk d vku dh Hkh io lpuk yxHkx 2 ?kV igy n nh xb FkhA ijUr lpuk i"k.k e deh rFkk ykijokgh d dkj.k ykxk dk eju l cpk;k ugh tk ldkA

c- vkinkvk d iHkko dk de djuk&ol rk io lpuk feyu ij bld iHkko dk dkQh de dj fn;k tkrk gA ykxk dk vU;= foLFkkfir dj] eju l cpk fy;k tkrk gA igkMk ij vojk/kd yxkdj HkL[kyu d iHkko dk de fd;k tkrk gA ck< rFkk l[kkxLr {k=k dk lnj&lonu rduhdh rFkk Hkkxkfyd lpuk rU= }kjk fpfUgr dj mudk lEi.k ekufp= r;kj fd;k tkrk g ,o mlh d vk/kkj ij vkinkvk d iHkko dk de dju dh fn'kk e dke fd;k tkrk gA

l- vkink io r;kjh&vkink ?kVu l io gh mll fuiVu dh ijh r;kjh dj yh tkrh g ftll vkink vku ij rjr dkjokb dh tk ldA cM ck/kk dk fuek.k] tyk'k;k dk fuek.k] nokb;k] jl k;u ,o gyhdkVj lc igy l gh r;kj jgr gA l[k {k=k e ,l h Qly ckb tkrh g ftUg de ikuh dh vko';drk gkA bu {k=k dh yxkrkj fuxjkuh Hkh mixgk d ek/;e l gh dh tkrh gA

n- vkink vku ij dkjokb&vkink vku ij vfoyEc dkjokb djuh pkfg, vU;Fkk tMh gb leL;k, mHkju yxrh gA

dk; ;ktuk rk igy l gh r;kj gkrh g] cl ml rjr dk;kfUor djuk gkrk gA vkink fdl idkj dh g] mlh d vulkj dkjokb Hkh djuh pkfg,A tyeXu {k=k e ekVjckV ,o gyhdkIVjk }kjk jkgr lkexh igpkb tkrh gA ekckby&lpkj i.kkyh bl dk; e cgr gh egRoi.k Hkfedk fuHkkrh gA njHkk"k bruk dkjxj ugh gkrk D;kfd ^rkj;Dr* lpkj rU= fNé&fHké gk tkrk gA ekckby Qku] mixg d ek/;e l tM jgr gA ;g jfM;k ,o fo|k pEcdh; rjxk ij vk/kkfjr g ftUg lpkfjr gku d fy, fdlh Hkkfrd ek/;e dh vko';drk ugh gkrhA

i- vkink jkgr ,o iuokl&bl dk; e lkQ lQkb dk ijk/;ku j[kk tkrk gA Mh-Mh-Vh-] xeDlhu rFkk vU; jlk;uk dk mfpr fNMdko fd;k tkrk g rkfd egkekjh u Qy ldA vLFkkb f'kfojk e Hkh xUnxh u iuiu ik; bldk mfpr /;ku j[kk tkrk gA LoPN [kkuk rFkk ikuh dk mfpr icU/k jgrk gA ;g lc foKku l gh lEHko gA D;kfd bl dk; e rfud ykijokgh Hkh tkuyok fl) gk ldrh gA

Q- vkink ,o fodkl&vkinkvk l fodkl dk; ;k rk eUn iM tkr g vFkok fofu"V gk tkr gA iu% fodkl dju e dN phtk ij /;ku nuk vko';d gA tl& Hkdi iHkkfor {k=k e Hkdi jk/kh edkuk dk fuek.k djuk pkfg,A vkink icU/ku e e[;r% fuEu oKkfud ;fDr;k dk i;kx gkrk g ;Fkk& jfM;k] ekckby] njn'ku] lnj lonu lpkj mixg] fMÝf'k;y Xykcy ikft'kfux flLVe] vYVk lonh ok"i fMVDVj] jfM;kehVj] lkbtekxkQ] ok;nkc ekih] vkfnA

uru ikdfrd vkink,

tyok; ifjoru] xhu gkml iHkko] fo'o rkiu] vktku {k;hdj.k] enk vijnu] vkfnA

milgkj

idfr e Hkdi] ck<] pØokr] l[kk] vkfn vkink, ikjEHk dky l gh ekuo rFkk tho&tUrvk dk {kfr igpkrh jgh gA fo'o d yxHkx lHkh n'kk e fdlh u fdlh :i e ikdfrd vkink vkrh jgrh g vkj djkMk ykxk dk ;g vc rd fuxy pdh gA ifjokj VV tkr g] cPp vukFk gk tkr gA pkjk vkj nn'kk ,o l=kl dk n'; mRié gk tkrk gA dN ykx vkthou fodykxrk dk vfHk'kki >yr g rk dN ykx dik"k.k dk f'kdkj gk tkr g tk db ihf<;k rd >yr jgr gA ikdfrd vkinkvk d idki dk ,dne lekIr djuk vlEHko g] ijUr oKkfud fof/k;k }kjk bld iHkko dk de vo'; fd;k tk ldrk gA LVuQkM fo'ofo|ky; d oKkfud LVhQu ukbMj dh cgpfpr iLrd ^yckjVjh&vFk* d vulkj] ^^tyok; ifjoru d bl pØ dk lekIr dj ikuk ukeefdu g] ijr dN lko/kkfu;k cjru l bld iHkko dk de vo'; fd;k tk ldrk gA vrh% ge idfr dh vkj okilh dk eye= viukuk gkxkA ifl) enk oKkfud Mk- jkekjko u enk vijnu dk ^jxrh gb eR;* dgk gA blh idkj vUrjk"Vh; 'kk/k if=dk ^U; lkbfVLV* d vulkj] ^^lu 2035 rd fgeky; d lc fgeun fi?kydj fge >hyk e ifjofrr gk ldr g ftld ifj.kkeLo:i Hk;dj ck< dh fLFkfr mRié gk ldrh gA** ,d oKkfud lo{k.k d vulkj lu 2050 rd ok;e.My e dkcu MkbvkDlkbM dh ek=k nxuh gk tk,xhA mijkDr rF; Hkkoh ih<h d fy, vR;r xEHkhj ,o fpUrktud gA

riu dekj e.My

❖ ❖ ❖

rrh; ijLdkj ikIr

ikdfrd vkink; vke rkj ij vkdfLed ,o xHkhj gkrh gA bud ifj.kke dkQh ân; fonkjd ,o Hk;kog gkr gA ikdfrd vkink; vke rkj ij lkekftd ,o vkFkd <kp] llk/ku] Hkkxkfyd ,o lLdfr ij Hkh iHkko Mkyrh gA tc ikdfrd vkink; vkrh g] o u doy ekuo eu e cfYd fo'kky tuleg ,o ljdkj e ng'kr Qykrh g ,o lc dN u"V dj nrh gA ,lh vkink; vfr ikphudky l gkrh pyh vk jgh gA mYdkvk dk fxjuk] Tokyke[kh QVuk ,o HkdEi] fgeL[kyu] Hk&L[kyu] ck< bR;kfn d dkj.k iFoh d ljpukRed ,o Hkkxkfyd r= dkQh iHkkfor gkr jg gA

çLrkouk

ckj&ckj vke ykxk d tgu e ;g ckr vkrh g fd ; ikdfrd vkink; g D;k\; D;k vkj dl gkrh g\ vkj D;k fouk'kdkjh :i xg.k dj yrh g\ vkj ;fn dkb Hkfo";ok.kh lHko g rk n[k fd gekj oKkfud D;k dj jg g\

fo'kydk; ck/kk dk fuek.k dj eu"; u iFoh ij vlryu dh fLFkfr ink dj nh gA c<h gb tul[;k d fy, [kk| vkifr gr Hk&mi;kx dj ekuo Hkfe dh mojk 'kfDr dk {kh.k dj jgk g ftll vud ikdfrd vkink; mRiUu gk jgh gA ekuo u dpjk ,o vif'k"V inkFkk d dkj.k ty in"k.k ,o ty d vR;f/kd nkgu d dkj.k i;ty dh leL;k mRiUu dj nh gA vxj bUg fu;fU=r ugh fd;k x;k rk nfu;k dh 40% dh vkcknh oky yxHkx 80 n'k i;ty d ldV e iM tk,xA

ikdfrd vkink; vke rkj ij vkdfLed ,o xHkhj gkrh gA bud ifj.kke dkQh ân; fonkjd ,o Hk;kog gkr gA ikdfrd vkink; vke rkj ij lkekftd ,o vkFkd <kp] llk/ku] Hkkxkfyd ,o lLdfr ij Hkh iHkko Mkyrh gA tc ikdfrd vkink; vkrh g] o u doy ekuo eu e cfYd fo'kky tuleg ,o ljdkj e ng'kr Qykrh g ,o lc dN u"V dj nrh gA ,lh vkink; vfr ikphudky l gkrh pyh vk jgh gA mYdkvk dk fxjuk] Tokyke[kh QVuk ,o HkdEi] fgeL[kyu] Hk&L[kyu] ck< bR;kfn d dkj.k iFoh d ljpukRed ,o Hkkxkfyd r= dkQh iHkkfor gkr jg gA

çkdfrd vkinkvk d idkj

idfr d dkj.k gku okyh ikdfrd vkink; fuEu g%&

1. HkdEi, 2. lukeh ygj, 3. Tokyke[kh, 4. pØokr,

5. ck<, 6. l[kk, 7. e:LFkyhdj.k, 8. HkL[kyu, 9. ,yfuuk, 10. llk/ku ldV, 11. fgeL[kyu, bR;kfn

yfdu gky d o"kk e ekuotkfr inRr vud uru ikdfrd vkink; Hkh mHkju yxh g%&

1. tyok; e ifjoru, 2. xhu gkÅl rFkk fo'o rkiu iHkko, 3. vktku {k;hdj.k, 4. vEyh; o"kk, 5. in"k.k, 6. ty ldV, bR;kfnA

ikdfrd vkinkvk d dkj.k ,oa iHkko

idfr e dgh u dgh] fdlh u fdlh :i e ikdfrd vkink; ?kfVr gk jgh gA tc iFoh d uhp nk foorfud lyV vkil e Vdjkrh g rk rjx mBrh gA ; rjx vxj Fky Hkkx e gkrh g rk HkdEi dgykrh gA yfdu len e g, foorfud ?kVukvk d ifj.kkeLo:i tUeh ygjk dh vkink dk lukeh dgr gA ; vR;Ur fouk'kdkjh ,o iy;dkjh gkrh gA Tokyke[kh dk idki tehu d vUnj d xe ykok d fuLlj.k d dkj.k gkrk gA tc iFoh d Hk&Hkkx ij ty dk ldV gkrk g rk og ^l[kk* ,o tykf/kD; dh fLFkfr ^ck<* dgykrh gA bld iHkko l tkueky dh {kfr Hkh gkrh g ,o Qly Hkh cckn gk tkrh gA

vHkh gky&fQygky llk/ku ldV d dkj.k vud ikdfrd vkinkvk dk lkeuk ekuo tkfr u fd;k gA llk/ku vFkkr iFoh ij fo|eku ikdfrd [kfut inkFk] Hk&vkdfr] ty] ou] df"k ;kX; Hkfe bR;kfn d HkMkj lhfer gA yfdu eu"; u viuh vko';drkvk dh ifr gr idfr dk vlryu dh fLFkfr e ykdj [kMk dj fn;k gA vf/kd ouk d dVu] vkokl d fy, df"k ;kX; Hkfe dk mi;kx] rho vk|kfxdhdj.k d dkj.k llk/ku ldV dh leL;k mRiUu gk jgh gA

gky d o"kk e oKkfud ,o rduhdh ixfr d n"iHkko d :i e xhu gkÅl iHkko tfur rkiu ,o vktku {k;hdj.k gk jgk gA i;koj.k Hkh inf"kr gk jgk gA vxj bUg fu;f=r ugh fd;k x;k rk ekuo thou dk vfLrRo ,o idfr [krj e iM ldr gA

ikdfrd vkink dk idki bl dnj Hkh gk ldrk g fd og lc dN cckn dj nA bldk iHkko 0;kid :i e gkrk gA ; tku&eky dh {kfr d lkFk&lkFk ikdfrd llk/ku d lkrk dk Hkh u"V dj nrh g tk fd fdlh jk"V d fuek.k ,o ixfr e lgk;d gkr gA

ikdfrd vkinkvk dk icU/ku

tc ikdfrd vkink ;k ekuotfur dkj.kk l vkink dk vkxeu gkrk g rk mll cpko rFkk fouk'k dk de dju dk ^^vkink icU/ku** dh lKk nh tkrh gA

vkink icU/ku d e[;r% N% pj.k gkr g%&1. vkinkvk dh jkdFkke, 2. vkinkvk e deh ykuk, 3. vkinkvk l fuiVuk, 4. vkink d ckn dk;okgh djuk, 5. vkink jkgr ,o iuokl, 6. vkink vkj fodkl A

1. vkinkvk dh jkdFkke & vkinkvk dh jkdFkke d fy, ogn ;ktukc) rjhd l r;kj jguk pkfg,A igy l ,df=r lpukvk ¼tl Hk&vkdfr½ ,o iokueku d }kjk jkdFkke dh tk ldrh gA
2. vkinkvk e deh ykuk & vkinkvk e deh ykuk] vkink icU/ku dk ,d fgLlk gA bld fy, lpuk ,o prkouh r=] Hk&vkdfr ekufp=] VyhQku] ok;jyl ,o vkinkvk e bLreky gku oky midj.k d }kjk vkinkvk e deh ykb tk ldrh gA
3. vkinkvk l fuiVuk & vkinkvk l fuiVu d fy, ;ktukc) rjhd l jkT; Lrj] [k.M Lrj ,o xke Lrj ij ykxk dk vkink d ckj e crkuk ,o cpko d rjhd dk dk;kfUor djukA
4. vkink d ckn dk;okgh djuk & vkink vku d ckn rjUr dk;okgh dh tkuh pkfg,A ugh rk mld ckn egkekjh mRiUu gku dh vk'kdk Hkh jgrh gA dk;okgh Rofjr xfr l dh tkuh pkfg,A
5. vkink jkgr ,oa iuokl & vkink icU/ku dk e[; fgLlk g vkink jkgr ,o iuokl dk;ØeA bl dk;Øe d vUrxr vkink l iHkkfor ykxk tl c<] cPp] efgyk,] vix] fo/kok] bR;kfn dk [kk|kUu ,o LokLF; dh lfo/kk, eg;k djokuk gkrk gA bld ckn mud jgu d fy, ?kj cuokuk ;k jkgr f'kfoj ;ktuk, pykuk gA lkekftd rkj ij ;g g fd budh ekufld n%[kn fLFkfr dk /;ku e j[kdj bUg vud rjg l jktxkj fnykuk bR;kfn gA
6. vkink ,o fodkl & ;g lcl egRoi.k fgLlk gA vkink ,o fodkl ,d nlj d ijd gA bld fy, jk"Vh; Lrj ij fofHkUu ;ktuk, tk fuEufyf[kr e=ky;k@lLFkkvk }kjk lpkfyr gkrh g%

¼d½ ljdkjh e=ky; & oL= e=ky;] j{kk e=ky;] df"k e=ky;] vkfnA

¼[k½ 'kf{kd ,o vul/kku & vkb-vkb-Vh- #MdhA

¼x½ xj ljdkjh & vkink 'keu lLFkku] vgenkckn(dYio{k] i.kA

¼?k½ vrjk"Vh; Lrj ij & fo'o cd] ;fulQ] jMØkl lklk;Vh] vkfnA

¼3½ ikdfrd vkinkvk l yMu e foKku dh Hkfedk& oreku e oKkfud ,o rduhdh fodkl u bruh ixfr dj yh g fd ikdfrd vkinkvk l fuiVkjk fd;k tk ldrk gA ble foKku dh vge Hkfedk gA

foKku d {k= e ^^Xykcy ikft'kfux** uVod fodflr

fd;k x;k g tk {k= dk fu;eu n'kkrk gA bld vfrfjDr ^^ty ok"i fMVDVj** dk i;kx ekle dk #[k Kkr dju e fd;k tk jgk gA lcl vge Hkfedk g Hkkxkfyd lpuk r= ,o lnj lonu rduhdh dhA bud }kjk fdlh Hk&vkdfr dk fo'y"k.k djd iokueku yxk;k tk ldrk gA vc rk mixg lnj lonu i.kkyh fodflr gk xb g ftll vrfj{k l Hk&vkdfr] tyok;] Hk&L[kyu] bR;kfn dh tkudkjh Kkr dh tk ldrh gA Hkkjr u bl Øe e lkr mixg i{kfir fd, g ftue IRS (IA, IB, IC, ID, P, P2) ftue IRS AIID e iUØkefVd dej yx g, g ftll l{e l l{e tkudkfj;k Kkr dh tkrh gA bld vykok lenh rjx lonu i.kkyh fodflr dj yh xb g ftldk uke g vk'ku jfM;kehVjA bud vfrfjDr jMkj] lkukxkQh] VyhQku] bR;kfn tk dkQh fnuk l bLreky gk jgk gA ckn dh fLFkfr e IRS (LISS I, LISS II, LISS III) mixg i{kfir fd;k x;k g ftll ck< ij dkc ik;k tk ldrk gA vc rk ufn;k dk tkMu dh ifj;ktuk; Hkh pykb tk jgh g tk dkQh ennxkj lkfcr gkxhA blfy, foKku d ;kxnku l llk/ku ldV ,o ikdfrd vkinkvk l NVdkjk ik;k tk ldrk gA

milgkj

tc rd idfr g] rc rd ikdfrd vkink, vkrh jgxh] cl t:jr g mud dkjdk ij fu;U=.k j[kuk rFkk mul gku oky fouk'k dk de djukA ikdfrd vkink, tl HkdEi ,o ck< ,lh g fd ; dc vk,xh fdlh dk irk ughA yfdu vko';drk g bul gku oky tku&eky d udlku ,o ikdfrd llk/kuk dk u"V gku l cpkuk] blhe eu"; dk fgr gkxkA

^^tc rd idfr g] rc rd vkink, g]

tc rd fouk'k g] rc rd fodkl gA**

/khjUn dekj iky

दिनकर

शिरोमणि

og uj gh ugh uj f'kjkef.k]
Hkkjr d ckjgo jk"VifrA
Ukke g mudk vCny dyke]
fo'o e mudh g igpkuA
cPpk d g og ijefe=]
;okvk d fy, g fo'okfe=A

ge lcdk mu ij ukt g]
jk"V dk og ljrkt gA
n'k d uo&fuek.k e mlu]
thou viuk U;kNkoj fd;kA
iFoh] vfXu] vkdk'k] f='ky]
mud thou d eU= eyA

ukx] vtu vkj j{kk fdV]
fd;k jk"V dk lefirA
/ku"kdkfV dk tfUVy eu]
cu x;k rch l felkby euA
ifrHkk iyk;u vkj pkVdkfjrk]
l mudk g uQjr HkhA

mud 'kCnk e ^cu Mu*]
g ogh u ftle fut n'k ieA
fu"ik.k yc e ik.k Qddj]
foKku Økfr dk fcxy ctk;kA
dkb xe ugh u dgyk; ifr]
dgyk; Hkkjr d jk"VifrA

ine Hk"k.k] ine foHk"k.k]
vkj ^Hkkjr jRu* l lEekfurA
fy[ku dk rk g 'kCn vud]
ij ^y[k* ugh ;g] foo'k gA
tu&tu e g cl ,d uke]
MkDVj ,-ih-t- vCny dykeA

riu dekj eMy

संग्रहालय एवं शिक्षा

lxgky; e lxfgr ,o inf'kr ikn'k ;k fofHké inf'kr oLr, n'kdk d fy, j[kh tkrh g rkfd n'kd ;k tulk/kkj.k mu oLrvk l dN lh[k ;k dN tkudkjh ikIr dj ldA ;gh lh[kuk ;k tkudkjh ikIr djuk gh f'k{kk gA pkg og f'k{kd d }kjk nh tk, ;k Lor% ikIr dh tk,A lxgky; e ;g f'k{kk eukjtu d lkFk&lkFk nh tkrh gA pkg lxgky; vfr ikphu gk ;k vk/kfud] lHkh dk ;gh ,d fo'k"k mí'; g eukjtu o f'k{kk vFkkr vukipkfjd f'k{kkA

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Birbal Sahni Institute Of Palaeobotany, Lucknow

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

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NEWSLETTER

Diamond Jubilee CELEBRATIONS

From Director's Desk

Soon after assuming the charge of the Directorship of the Birbal Sahni Institute of Palaeobotany (BSIP) I had the privilege to plan the celebrations of the Diamond Jubilee of the organisation. At that time just over six months were left, a very short time span to plan for the Mega Event such as Diamond Jubilee of an important scientific organisation. All the planning should have been finished long ago. But I was sure that motivated people could do marvels. I had full faith in the Human Resources of the Institute and was aware of their potential and strength. The management of the BSIP decided to organise a series of events to mark the 60th Anniversary of the Institute.

Events like these deserve to be observed with commitment and sincerity of purpose. To give a fillip to the academic activities of the Institute we entered into several collaborative programmes with various institutions in the country and signed a bilateral collaborative research project with the People's Republic of China. On our proposal to infuse new blood into the research stream, Governing Body of the Institute enhanced the number of Birbal Sahni Research Scholars and also introduced a new scheme of Birbal Sahni Research Associateship. These young researchers would soon be part of the main stream of the Institute.

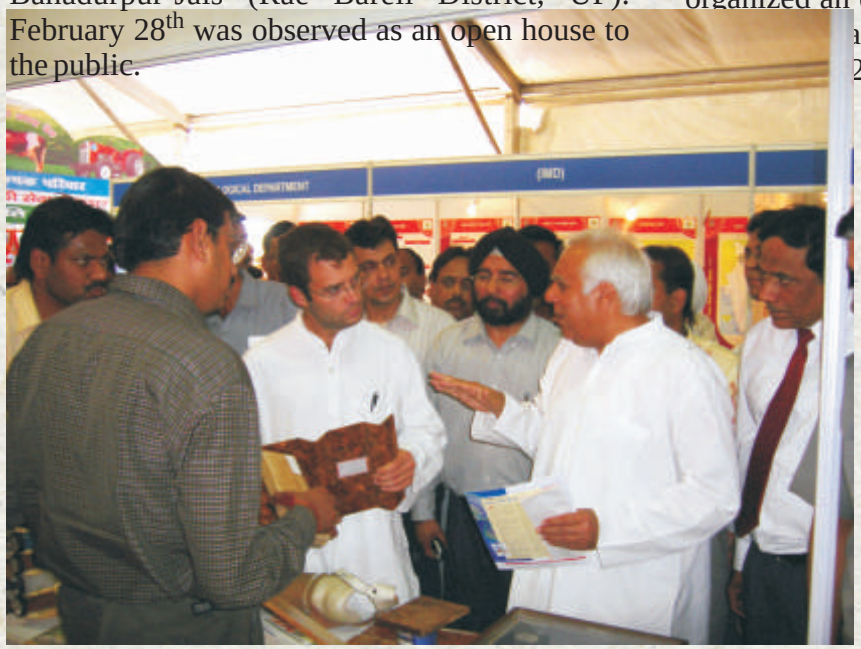
From the very beginning I was thinking that the expertise acquired by the Institute's scientists in palaeopalynology must be utilised for benefit of the society. It was only possible by establishing appropriate centre. I am happy to inform that Directorate General of Hydrocarbons has in principal agreed to support our endeavour of establishing an 'Oil Centre' at BSIP to utilise our expertise in Fossil Fuel Exploration. Besides, two scientific conferences were also planned. Diamond Jubilee National Conference was successfully organised in November 2005 and plans for Diamond Jubilee International Conference are in progress. I am sure by the time this Newsletter would be in your hands you must be enjoying the scientific deliberations with National and International Experts assembled in Lucknow to attend the conference. I seek an active participation from all the members of the BSIP family in making it front ranking scientific Institution of the Country.

Present Newsletter gives an account of various activities of the Institute for the period of 1st July 2005-30th June 2006.

N. C. Mehrotra

National Science Day and Outreach Programmes

Institute celebrated the Science Day Function for a week during February 22-28, 2006 with great zeal involving many schools of the city. Three competitions for schools, colleges and degree students were organized, besides participating in two exhibitions at Lucknow and Bahadurpur-Jais (Rae Bareli District, UP). February 28th was observed as an open house to the public.



Hon'ble Minister of State for Science & Technology Sri Kapil Sibal and Hon'ble M P Sri Rahul Gandhi at Jais Exhibition

Institute put up a pavilion in a National Exhibition at Bahadurpur-Jais during February 18-22, 2006. The exhibition was inaugurated by Hon'ble Union Minister of State for Science and Technology, Sri Kapil Sibal and Hon'ble Member of Parliament Sri Rahul Gandhi. The Institute also organized an exhibition of fossils at UP Council and Technology, Lucknow during 28, 2006. The exhibition was visited by the Vice-Chairman of the Council Sri Rajendra Chowdhary (Minister of State, Uttar Pradesh Government), Sri PL Loi (Principal Secretary, S & T, UP), Sri Maurya (Secretary, S & T, UP), Sri RN Tripathi (DM, Lucknow), Dr MJK Siddiqui (Director, UP Council of S & T), many other dignitaries and a large number of local people.

For the students of class IX to XII, an 'essay competition' was organized on the topic *To Nature, Vegetation is more important than Human Beings*. The topic reflected the present concern for

In This Issue

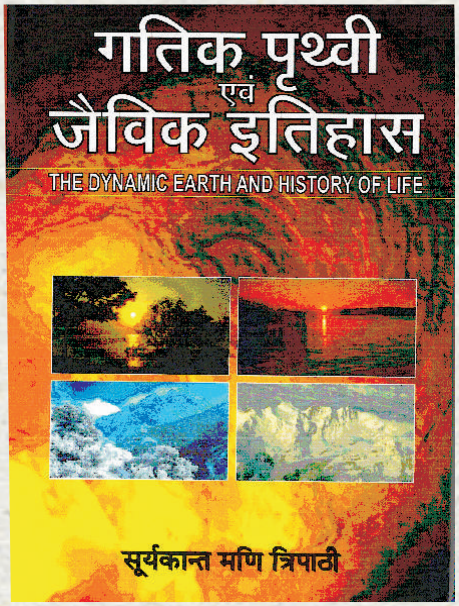
Concluding Ceremony of Science Day and participants of the speech contestants

biodiversity and environment. There were sixty four entries from ten schools for the competition. The best four essays were selected for prizes. Another event was organized on 25th February on the topic *Physics in everyday Life* for students of class VI to VIII. The topic was chosen in line with the theme for the concluding celebrations of 'Year of Physics'. A total of 47 students made collage on the topic displaying their skills. The idea behind choosing such themes was to stimulate them to think and learn science rather than creating just a work of art. A total of 7 students' entries were awarded.

I[st] Prize winner Collage by Shivi Bharti

II[nd] Prize winner Collage by Ruchika Barar

III[rd] Prize winner Collage by Supriya Nigam



Book release function and cover page of the book *Gatik Prithvi evam Jaivik Vikas*" written by Dr SKM Tripathi

On the Science Day, Institute organized a 'speech competition' for degree level students on *Nurture Nature for our Future*, the theme for the Day announced by DST. Prizes were declared for 2 entrants. Science-based cartoons by a free-lance cartoonist Sri Sandeep Bisaria were also displayed. Sri YN Saxena, Former Director General of Police UP Govt. was the Chief Guest of Outreach Programmes on 28th February. In his address, Sri Saxena lauded the Institute's efforts to focus on multifarious approaches in Palaeobotany. He said that doing work was very important but it was also equally important that the masses were appraised of what was being done in the laboratories. This, he said, is the debt scientists owe to the society. On this occasion, he also released a book "*Gatik Prithvi evam Jaivik Vikas*" written by Dr SKM Tripathi, a scientist of the institute.

Foundation Day

On September 10, 2005 the Institute celebrated its 59th Foundation Day. On this occasion Sri VK Sibal, Director General, Directorate General of Hydrocarbons, New Delhi, delivered '9th Jubilee Commemoration Lecture' on the topic "Knowledge Sharing: An opportunity for brighter Future".

On the same evening, Guest of Honour Sri Ravi Shanker, Retired Director General, Geological Survey of India delivered a popular lecture in Hindi on *Paryavaran Pradooshan Prabandhan– ek Bhuvaigyanic Pariprekshya* (Environment Management- A Geological Perspective) to mark the beginning of *Hindi Pakhwara*.

Prof M P Singh felicitating Sri V K Sibal

Professor MP Singh, Member Governing Body presided over the function. Many guests and scientists from outside the Institute attended the function.

Dignitaries lighting the lamp

Knowledge sharing—an opportunity for brighter future

In earlier times, knowledge was conventionally and orthodoxly compartmentalized into the fields of arts, science, commerce, technology, etc. Thick boundaries that existed between these disciplines, are no more visible after invention and application of computers in all spheres of life and the inter-dependence and inter-relevance of all these disciplines in the progress of mankind is very apparent.

Sri VK Sibal delivering Jubilee Lecture

The reasons for not sharing knowledge with others could be many, some of which are: (a)"Knowledge is power"; (b) "Not invented here" syndrome; (c) Lack trust; (d) Lack of time; (e) Individualism; (f) Inadequate technology; (g) Internal competition; (h) Top-down decision making, etc.

These concerns of individuals may be of social, behavioral and psychological nature. Even though the parents teach their children to share with other siblings and friends, the children fight in schools to possess them. At the office, large amount of professional knowledge is kept within the worker's head, in their computers or in their desk drawers.

Why the employee keeps his knowledge to himself, when it can benefit the organization, as a whole? Is it for job security? Is it to maintain power? Is it to gain personal advantage over those who are not in the possession of that knowledge?

Employees from other departments or remote offices of the same organization will be trying to solve problems for which answers already exist within the organization. At this juncture as an employee of the same company, one would think that there should be a mechanism for the dissemination of information. This is where the knowledge sharing comes.

Knowledge sharing is seen increasingly in the development community as an internal part of improving the quality of its work. Many innovative developments come from making knowledge connections across different disciplines and organizational boundaries. Knowledge sharing intranets tear down the figurative walls that confine within small corporate clique and makes it much more widely available to large audience.

In 21st century economy, innovation and competitive positioning depend on shared knowledge. Advances in the fields of science & technology are to harness the natural resources of the world for the benefit of human beings with least effect on the environment and the life on the earth. To attain this, an integrated synergistic teamwork of experts of different disciplines is the need of the day. For optimizing and developing or innovating relevant technologies, certain amount of knowledge sharing of all the disciplines concerned is a must.

Instead of "inventing a wheel", it is very much pertinent now to acquire the present

available knowledge and to improve further upon the same as per the requirement. This will facilitate in making our future bright.

In all earnest, all the institutions and organizations including leading-edge individuals should strive to acquire, assimilate, utilize and share knowledge in order to improve upon the knowledge they have.

As the economies are rapidly emerging as knowledge intensive economies with a revolutionary paradigm shift, the concept of a specific type of institution for the establishment and growth of the Knowledge-stock-Knowledge Hubs-is gaining acceptance worldwide. Knowledge Hubs enable scientific or technological communities to develop and extend the range of knowledge in their own research activities. The existence of an effective Knowledge Hub greatly increases the cumulative innovation capability by concretely embedding pieces of knowledge within the knowledge pool upon which future researchers can draw.

Functions of a Knowledge Hub through an Internet based knowledge management system are to:

Provide the facility to generate and deposit knowledge; Certify the fidelity of that knowledge, and Provide sustained access to researchers. International experiences have much to offer in terms of conceptualizing Knowledge Hub. It is observed that:

- Partnerships between researchers and industry are important for the creation of a Knowledge Hub, but collaborations across a whole range of institutions and organizations, nationally and internationally, are equally critical.
- In almost all cases, some form of agency of authority has been instrumental in promoting partnerships.
- Partnerships may be driven by business or by governments themselves.

Knowledge Hubs can further lead to:

- **Knowledge communities** - bringing together disparate knowledge and people in dispersed locations to advance knowledge and its exploitation in different spheres of interest.
- **Knowledge trading** - ways of valuing and trading different knowledge objects, perhaps through an IT infrastructure, whose value changes depending on time and context.
- **Futurizing** - creating more sustainable futures through new knowledge created and applied in global knowledge networks.
- Intelligent agent-creating symbiotic relation between human and artificial intelligence technology for the creation gathering of knowledge.

In this direction, Directorate General of Hydrocarbons has already taken certain steps like:

- Initiation of action in the direction of establishing "Knowledge Hub" in Energy sector with special reference to Oil, Gas, Coal Bed Methane, Gas Hydrate, etc.
- Encouraging frequent interaction between industry & academia.
- Identifying certain challenging areas of industry which can be taken up by academics.

The present e-knowledge, e-knowing and e-knowledge commerce environment are very congenial in this regard. Academia will need to become far more reflective about the knowledge–the forms, uses and sharing–if it wants to be in the race. The environment in universities/ institutions/ organisations are to be changed from "knowledge hoarding" to "knowledge sharing".

Sri Ravi Shanker inaugurating the *Hindi Pakhwara* on Foundation Day

Fellows of the Geological Society of India, who attended a Meeting of North India Chapter held at BSIP on 29th August 2005

Founder's Day

On November 14, 2005— the Founder's Day, 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 PS Goel, Secretary, Department of Ocean Development, Govt. of India, New Delhi delivered the '51st Sir Albert Charles Seward Memorial Lecture' entitled "*Excitement of Oceans*".

Dr SR Shetye, Director, National Institute of Oceanography, Goa delivered the '35th Birbal Sahni Memorial Lecture' on the topic "*Role of Ocean Processes in defining the Indian Summer Monsoon*".

Professor MP Singh, Member, Governing Body of the Institute presided over the function. Several guests and scientists from outside the Institute attended the function.

Staff paying floral tribute at Prof Sahni's Samadhi

Inaugural function of the Founder's Day

Sir Albert Charles Seward Memorial Lecture

Excitement of Oceans

Dr P S Goel delivering the 51st Sir Albert Charles Seward Memorial Lecture

Oceans offer fantastic possibilities, excitement and challenges of exploration. The lecture focused mainly on the technology hurdles that we faced in harnessing their full potential.

In the beginning, the mysteries of ocean science that never ceases to amaze us and the mind-boggling linkages it has with the environment that we live in were described. For example, the meteorologist Edward Lorenz discovered that a simple model of heat convection possesses intrinsic unpredictability, a circumstance he called the "butterfly effect", suggesting that the mere flapping of a butterfly's wing can change the weather. This means that starting the same process from two different but frequently indistinguishable initial states generally leads to completely different long-term behaviour. A perfect example of chaotic system.

The technology development approach followed by Department of Defence, illustrating the progress made under our Remotely Operated Submersible programme and the Gas Hydrates programme were elaborated. The technology challenges under our Polymetallic Nodules programme were also elaborated.

Palaeobotanists, he stressed, must be well aware of the manner in which palaeo-climatologists use clues from natural "proxy" sources such as tree rings, ice cores, corals and those obtained from ocean and lake sediments to understand natural climate variability. Dr Goel said that department has set up an excellent ice-core laboratory facilities at the National Centre for Antarctic and Ocean Research, Goa and is endeavouring to establish a new station at Larsemann Hills, Antarctica.

Birbal Sahni Memorial Lecture

Role of Ocean Processes in Defining the Indian Summer Monsoon

The climate of India is dominated by the summer monsoon which brings the rain that the country needs. This monsoon can be viewed as the time when the global-scale tropical rain-bearing belt, also known as the Inter-Tropical Convergence Zone (ITCZ), hangs over India and its surroundings. The arrival of the belt over India is a part of the seasonal north-south migration exhibited by the ITCZ.

Dr Satish R Shetye

During this time a large fraction of the Indian subcontinent receives its rainfall from the low pressure systems (LPS) that form over the Bay of Bengal. For such systems to form, the sea surface temperature has to exceed approximately 28ºC. The bay satisfies this condition making it the source of monsoon activity over India. In contrast, most of the Arabian Sea has its surface temperature well below the critical value.

Analysis of heat budgets of the Arabian Sea and the Bay of Bengal suggests that the Arabian Sea is cooler primarily because the winds there are stronger. The winds over the western Arabian Sea form a "western boundary current" in the atmosphere, a jet known as the Findlater Jet. Formation of the jet is possible because of the presence of the East African Mountains. The winds of the jet force ocean processes that cool the surface temperature. Another reason for keeping the bay warmer is its stratification: its low-salinity surface layer prevents mixing with underlying cooler waters.

Climate of a location is a consequence of a series of complex interactions of varying magnitude. In case of the summer monsoon, the ocean plays an active role in determining the extent of the precipitation belt associated with the ITCZ.

Diamond Jubilee Lecture

Birbal Sahni Institute of Palaeobotany organised a Diamond Jubilee National Conference, "Challenges in Indian Palaeobiology: Current Status, Recent Developments and Future Directions" from November 15-16, 2006. Dr Harsh K Gupta, Former Secretary, Department of Ocean Development, Govt. of India inaugurated the conference. On this occasion he delivered Diamond Jubilee Lecture on the topic "The Great December 26, 2004 Tsunami and Indian initiative for Early warning".

The Great December 26, 2004 Tsunami and Indian Initiative for Early Warning

The recent Indian Ocean Tsunami (December 26, 2004), is now established to be the strongest in the world over the past 40 years. It resulted in devastations amounting to national calamities in several parts of the Indian Ocean. As compared to the most severe Tsunamis of the past, the loss of lives in the Indian Ocean Tsunami has been higher by several orders of magnitude, thereby calling for development of a Tsunami Warning System on a war footing.

The coastal population being the victim of storm surges and tsunami, it is obvious that the systems for their mitigation have several commonalities (in terms of observational network, data base on bathymetry and coastal topography, data communication, dissemination of warnings, training and education, operational practices) and hence it is prudent and cost-effective to address them together. India is developing an integrated mitigation system for the oceanogenic disasters

Dr Harsh K Gupta delivering the Diamond Jubilee Lecture

viz., tsunamis and storm surges in the northern part of Indian Ocean region with an ultimate goal to save lives and property.

The design of the System is based on end-to-end principle, encompassing:

i. Upgrading, wherever necessary and connecting several existing seismic stations, for near-real time determination of earthquake parameters in tsunamigenic zones.

ii. Establishing observational network of 8-10 bottom pressure recorders (typically DART type system of NOAA, USA) around the tsunamigenic areas.

iii. A chain of 45-50 real-time sea level monitoring stations (tide gauges) at strategic locations in the mainland, islands and offshore platforms.

iv. Establishment of 10 radar-based monitoring stations for real time measurement of surface current and wave.

v. Establishment of a network of 8-10 deep sea current meter moorings around the Indian subcontinent.

vi. Numerical modelling for tsunami, storm surges with all associated data inputs.

vii. Generation of coastal inundation and vulnerability maps.

viii. Development of a Tsunami Warning Centre at INCOIS, Hyderabad and its operation on 24 x 7 basis for generation of timely advisories for implementation.

ix. Capacity building, education and training for all stakeholders.

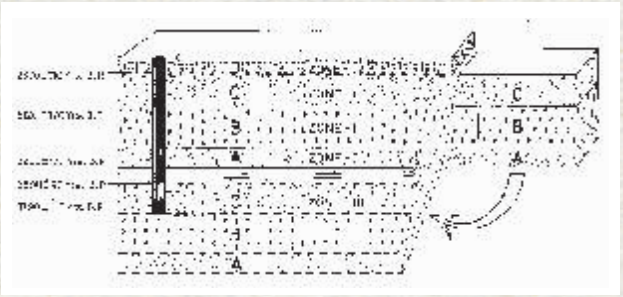
The Project is being implemented by the Department of Ocean Development through its Institutions, with active participation from (a) Department of Science and Technology, (b) Department of Space, (c) Council of Scientific and Industrial Research, and (d) University departments.

It may also be noted that the tsunamigenic zones which can produce tsunamis for the Indian coasts are also the principal source of tsunamis for the rest of the Indian Ocean rim countries. India shall be providing products of the work to all the countries and centres of research, through the mechanism of Indian Ocean GOOS or other suitable mechanisms. India shall also be interacting and coordinating with other Tsunami Warning and Research Centres globally.

Research Notes and Articles

Past Organic-Matter and Neotectonic disturbance in Himalaya

Multidisciplinary analysis (geochemical, palynological and palaeontological) supported with radiocarbon dates, of lacustrine sediments from Sukha Tal, Kumaun Himalaya has revealed a concealed natural disturbance at the region. Data generated from different investigations reflect that the investigated profile is not a continuous sequence and is divisible into two units : upper unit consists sediments from ca 8260 ± 170 years B.P. – top, while lower unit from 3790 ± 90 years B.P. – 2690 ± 90 years B.P. Presence of younger sediments below the older ones, normal order of superposition in both units (as both units consists older sediments at bottom and younger towards top), repetition of bed ranging from 3790 ± 90 years B.P. – 2690 ± 90 years B.P. in both units, and resemblance in organic matter recovered from contemporary beds of both units reflect that investigated region has concealed fault, caused possibly due to neotectonic disturbance. Study also reflects that splitting of rock took place sometime after 2690 ± 90 years B.P. and two units acquired position one above the other due to displacement of rock.



Diagrammatic cross section of a part of Sukha Tal, Kumaun Himalaya through investigated profile with extension of zones – indicating presence of concealed fault at the region.

Asha Gupta

Holocene Molluscs from Saria Tal, Kumaun Himalaya

Molluscs are useful to assess past vegetation and climate. Sedimentary profiles from Saria Tal (from bore-core and exposed-section), Kumaun Himalaya have yielded molluscan shells since around 2770 ± 135 years B.P. onwards (Figs A–C). These are qualitatively poor but quantitatively rich, showing specific distribution of taxa with variation in frequency. Their appearance, abrupt enhancement and specific distribution indicate that investigated area enjoyed watery condition near the onset of Late Holocene which continued onwards with fluctuation. Since Molluscs feed on plant material thus also reflect presence of sufficient vegetation at the region.

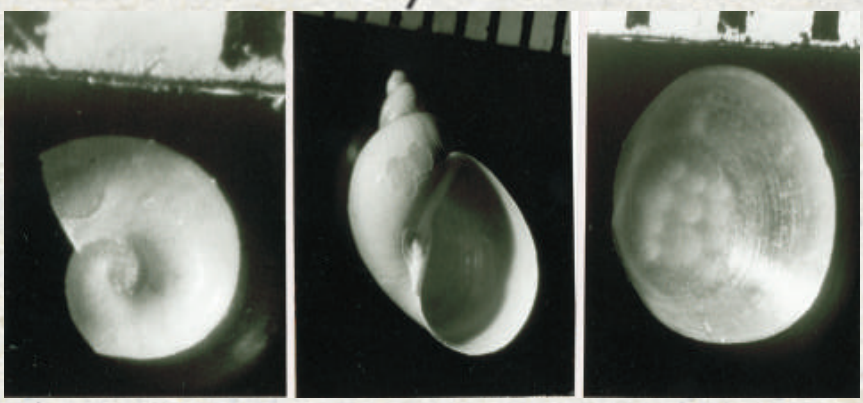


Fig. A—Planispiral Gastropod (profusely thrived); Fig. B—Conispiral Gastropod (commonly occurred); Fig. C—Bivalve (rarely encountered)

Asha Gupta

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Dr. NC Mehrotra, Director, BSIP, paying floral obeisance at Late Prof Birbal Sahni's Samadhi

We are grateful to the Department of Science & Technology, Government of India, New Delhi; to the Chairman and Members of the Governing Body, Research Advisory Council and Finance & Building Committee of the Institute for continued support and encouragement. I am grateful to all scientists, technical and administrative staff for their kind co-operation.

With Best Compliments

Dr NARESH CHANDRA MEHROTRA
Director

Chief Editor	:	N.C. Mehrotra
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Correspondence	:	Director, Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow 226 007 (India)
Phone	:	91-522-2740008/2740011/ 2740399/2740413
Fax	:	91-522-2740098/2740485
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