

Capsule 30

JUL-SEP 1993

'Global Changes' is an interactive exhibition depicting the environmental changes our planet has experienced through the ages and highlighting the Earth's plight owing to deteriorating environmental conditions that may lead to catastrophe for the human race in the foreseeable future. The human race has acted as an agent to hasten this

resources on Earth for food, energy and shelter. In the process, our atmosphere and water resources have been polluted.

Since its birth, this planet has had many catastrophes leading to major geological and climatic changes. As a result large forests have turned into barren ice-fields, ocean beds have turned into lofty mountains and thriving biological species have become extinct. But all these changes took place through slow natural mechanisms allowing considerable long time for the major changes to take place. The average time-span for which species tenant the earth is about five million years; indicating that 98 per cent of the half of a billion or so species that appeared, since the advent of life on earth, have disappeared. This explains that extinctions in the past were a totally natural phenomenon. In the present times, however a variety of extraneous factors have been resulting into species loss.

The explosive growth of the human race has vigorously accelerated the slow process of natural changes. To satisfy the human needs, large tracts of green cover over the Earth have been felled, million year old stratas of oil and coal deep inside the Earth have been extracted; all these have triggered new mechanisms of change. The polluted air we breathe now or the polluted water that flows down our rivers or the chemical fog often seen

over our megacities are all indications of the swiftly changing environment around us.

Natural extinction, in itself, was a loss but with artificial extinction, the loss has become irreparable. The speed with which it has occurred, has prevented the development of an alternative life form to replace the extinct form; vacating an



Global Changes exhibition on display at RSC, Tirupati

doomsday when the unique life forms on this planet will cease to exist. Environmental protection, therefore, has to be a major parameter in planning for development.

In this vast universe, the Earth is just a tiny speck of dust. But its location in the solar system, its temperate climate, its spin on its own axis, abundance of free oxygen and water have made the Earth a very unique place. This is the only known planet where life forms of diverse nature exist. The human race is ruling supreme among them.

The insatiable thirst for progress and well being has forced the human race to recklessly tap all available



Two panels of the exhibition

ecological niche and disrupting the equilibrium of the process of energy transfer in the food webs.

The Greenhouse Earth

The intelligence of our race has churned out millions of products for human consumption and also tons of dangerous chemicals and harmful byproducts. These chemicals add to the traditional pollutants like carbon dioxide, methane, nitrous oxide and sulphur dioxide that accumulate high up in our atmosphere creating a trap for the heat radiation emitted from the earth's surface. These gas layers do not allow the long wavelength, low energy heat

(Continued on page 6)

WORLD ENVIRONMENT DAY

Poverty and Environment - Breaking the Vicious Circle, was the theme for World Environment Day (June 5) 1993. According to Gro Harlem Brundtland, "many critical, survival issues are related to uneven development, poverty and population growth ... the downward spiral of poverty and environmental degradation is a waste of opportunities and resources...". And so this year, most organisations, while celebrating World Environment Day emphasised on programmes that were socially and environmentally sustainable.

Birla Industrial & Technological Museum, Calcutta organised a month-long programme to observe World Environment Day. An open house quiz on Environment and Ecology, a costume parade, poster competition on the themes, Wildlife preservation and Man & Environment, and an elocution contest on the topic 'World is at Peril in view of Green House Effect and Ozone Hole', were the programmes involving participation from over a 100 school students, between June 5 and 10.

On June 16, Prof A K Sharma inaugurated the exhibition entitled 'The Past of the Green World'.



A glimpse of The Past of the Green World

Originally developed by Regional Science Centre, Lucknow the exhibition is a tribute to the birth centenary celebration of Prof Birbal Sahni, an eminent botanist with valuable contribution to the study of palaeobotany in India. Covering a floor area of about 3000 sq ft, the exhibition contained photographs, specimens, exhibits that explained : (i) evolution of plant life, (ii) science of palaeobotany, and (iii) life and works of Birbal Sahni. The exhibition was on till June 30 and was well attended till the last day.

BITM also arranged for two



Poster making on Environment Day

collaborative programmes. In association with the Dept of Science and Technology, Govt of West Bengal, a workshop and exhibition was arranged between June 5 & 7. Entitled "Pollution Control Technologies", the programme was inaugurated by Dr Ambarish Mukherjee, Minister for Environment and Forest, Govt of West Bengal.

On June 5, in collaboration with Science for Society, a technical seminar was arranged where participants discussed various environmental issues and ecological problems. Indian Inst of Chemical Engineers (Calcutta Regional Centre) and Indian Science News Association also collaborated in this programme.



Nourishing the Green, RSC, Nagpur

In collaboration with the office of the Conservator of Forest, Wildlife Division, Govt of Maharashtra, **Raman Science Centre, Nagpur** arranged for a popular science lecture that was followed by the screening of two excellent films. S Javed Iqbal, Asst Conservator of Forest (Wildlife), Nagpur delivered a lecture on "Wildlife in Maharashtra and Protected Areas". The 120 strong audience enjoyed the lecture as well as the films 'Ranthambore Tiger Reserve' and 'Animals at home in the desert'.

The various programmes by **Regional Science Centre, Guwahati**, on environmental awareness, held throughout the week, between June 5 and 11, were well accepted. But none could equal the enthusiasm that was generated by the children at the inauguration of the Pet Club.



Children signing up at Pet Club

WORLD ENVIRONMENT DAY

There were also programmes like inter-school quiz and essay competitions, screening of films on environment, pollution control and forests, popular lectures on 'Environment Pollution and Control' and 'Management and Breeding of Rabbits'.

Regional Science Centre, Lucknow observed World Environment Day from June 5-7 through a variety of programmes and activities. A philately exhibition on Pollution was inaugurated by the District Magistrate, Ashok Priyadarshi. Along with the exhibition, there were special exhibitions and stalls contributed by Dept of Social Forestry, Integrated Child Development Scheme, Vasundhara, Mahila Kalyan Samiti. During the celebration, a seminar on the topic "Pollution and Poverty - an unending chain", role of voluntary, non-government and government organisations were discussed. Speakers in the seminar stressed on the need to develop environmental awareness, particularly in village and slum areas and proposed that the government, semi-government and voluntary agencies should work in cohesion with each other to achieve this objective.

As a part of the celebration, an Essay Competition among the school students on the topic "The future of the Planet Earth" was held where 55 students of different school took part. On June 6, special film shows on Environment were screened and on June 7, a Training-cum-Workshop was organised to



Celebrating Environment Day

educate the balwadi and anganwadi workers in pollution control measures in their respective areas. The programme was organised in collaboration with a voluntary organisation called 'Vasundhara'.

In collaboration with Nehru Yuva Kendra, Tamil Nadu Forest Dept, Rural Welfare Centre, and SMART Society, District Science Centre, Tirunelveli organised an interesting week-long programme. Inaugurated on June 2 by R Mathivanah, Youth Coordinator, Nehru Yuva Kendra, most of the programmes were held at the Science Centre itself and one lecture was held at the Rural Welfare Centre. The popular lectures centred around explaining the basic concepts of environment and its relationship with the human world, T Pandian, Research Officer, Project Tiger, spoke on the environment; Director of SMART Society explained what is environment; Dr M R Balasubramaniam spoke on Man and Environment while Dr Shanmugam discussed on Health and Environment. Other programmes included film and video shows, sing-a-song competition for schools, environmental jatha and environmental field trips.

District Science Centre, Purulia in collaboration with Nature and Wildlife Conservation Club organised a well planned celebration of World Environment Day. A day-long exhibition was put up on the theme 'Nature and Environment' and the souvenir published by Nature and Wildlife Conservation Club was inaugurated. Biswajit Roy Chowdhury of NEWS, Calcutta delivered a popular lecture. There was an interesting demonstration on 'anti-superstition', quiz and film shows for children.

District Science Centre, Dharampur took the participants of World Environment Day programme to Nature herself to make them realise the impact of the environment on human perceptions. In collaboration with Environment Awareness Club of South Gujarat and Mani Gram Panchayat, a nature trail through Mani forest and a trekking through Mani-Chichpada Forest was organised where participants bird-watched and identified medicinal herbs. Other programmes included lectures on Perception, screening of wildlife film and tribal cultural art programme.

An interesting essay competition on the theme "Poverty and Environment - Release from Vicious Circle", inter-school and open-house quiz on the theme Ecology and Environment, were the highlights of the World Environment Day celebration organised by District Science Centre, Gulbarga in collaboration with Karnataka State Pollution Control Board, Gulbarga.

SCIENCE CENTRE NEWS

The summer Vacation Hobby Camp was organized at **Birla Industrial & Technological Museum, Calcutta** between May 17 and 29 for students of classes VIII to X in and around Calcutta. Five camps were held on the subjects Physics, Chemistry, Electronics, Aero-modelling and Ship-building. These were attended by 145 students from 31 schools.

A seminar on 'Two Decades of Tiger Census & Wildlife of West Bengal' was organised by the Calcutta Wildlife Society in collaboration with BITM on



Chemistry Camp

April 24. The objective of the seminar was to highlight the Tiger Census - past, present and future; application of computer and other statistical devices in census; procedures and the role of NGOs in conservation of wildlife. P K Das, Computer Analyst, Dr A K Ghosh, Director, Zoological Survey of India, Prof B Bhattacharya, Dept of Zoology, Vidyasagar College, S K Das, Dy Conservator of Forests, Govt of West Bengal spoke on the occasion. Nearly seventy persons from various organisations participated in the seminar.

A special popular lecture for school students delivered by Dr A P Mitra, FRS, Bhatnagar



Anniversary Celebration

Fellow, CSIR on, 'Looking at Earth and Space through radio window' was arranged at BITM, Calcutta on April 28. The lecture was a part of the 34th Anniversary Celebration of BITM.

The finals of the new format Science Quiz competition was held at the auditorium. In the primary level, there were 35 teams from 18 schools and in the secondary level, there were 70 teams from 25 schools. The Primary level quiz was won by La Martiniere (Boys) School while Patha Bhavan won the secondary level quiz. There were 225 visitors to the programme.

The Pet Club at BITM is becoming increasingly popular. Any student reading in classes III to VII can become a member, free of charge. The members are not only encouraged to watch and study the behaviour, food habits, etc. and maintain an Activity Sheet, but are also encouraged to write stories or poems on the pets, draw them or make animal crafts. Right now mostly birds are loaned along with guineapigs, rabbits and a few fishes. It is hoped that the pet club will inculcate a love for nature among the members while making them familiar with the behaviour of animals and their

living habits. If any school is interested in starting a pet club, the pet club at BITM will provide all possible help.

Between Mar 31 and Apr 3, the training programme 'Repair and Maintenance of Sewing Machine' was imparted by **District Science Centre, Tirunelveli** to rural women. Held in collaboration with Venus Electricals, the participants were made aware of the possible defects and the rectification of the same. 28 women were trained.



Learning to maintain a sewing machine

The Vacation Hobby Programme held between Apr 15 and May 24 at the Science Centre involved local students in gaining practical experience in the subjects they have been studying at school. There were 184 participants.

The Vacation Hobby Programme held between May 24 and May 31 was conducted at Vikaasa School, Ambasamudram, on the subjects Electronics and Astronomy. The 69 participants prepared models to display their understanding of the subjects.

At the SCAD Centre, Cheranmahadevi, DSC, Tirunelveli held a teachers' training programme. The programme was inaugurated on June 7 by Prof L Janakiraman.

SCIENCE CENTRE NEWS



Vacation Hobby Camp

The Vacation CAC, held between May 4 and 14, by **Raman Science Centre, Nagpur** was attended by students from seven local schools. The participants also took part in Taramandal shows, Sky observation programmes and science film shows.



Vacation Hobby Camp

On Apr 22, Earth Day was celebrated with a programme-packed function through the joint efforts of **Regional Science Centre, Bhubaneswar** and Indian Society of Remote Sensing, Bhubaneswar Chapter. Beside the various addresses by the eminent speakers, prizes were distributed to winners of science quiz and art competition on 'Remote Sensing of Mother Earth' was also organised.

District Science Centre, Gulbarga, in collaboration with Indian Association of Family

Physicians, organised a popular science lecture on the theme 'Contraception Update' on Apr 7. The speaker was Dr M G Hiremath, Asst Prof, OBG, KMC, Hubli. The programme was co-sponsored by INFAR (India) Ltd.

Entitled 'Knowledge Camp', the programme was held through an interesting mix of subjects between May 9 and 15. Experts from the respective fields spoke on the topics - Banking, Computer, Journalism, Railway, Cinema, Radio and Career Guidance. A.V.B.P., Gulbarga Chapter, collaborated in hosting the programme. Special programmes were also arranged for the benefit of 10+2 students.

The 9th anniversary of the **District Science Centre, Dharampur** was organised between Apr 21 and 27 with lots of programmes that elicited a keen interest from both the participants and the spectators. Nearly 500 school and college students participated in the various competitive sections. While a total number of 118 children and nursing mothers took the benefit of medical check-up in the Anaemia Detection Camp, another 70 people turned up for the popular science lecture on Anaemia and Preventive Measures, delivered by Dr P V Mehta, Mother and Child Hospital, Bombay. The Science Park was also inaugurated during this period (details on page 6).

A special course on Personality Development was organised, in collaboration with Swami Vivekananda Cultural Society between May 29 and



Anaemia Detection Camp

June 5. Experts from Govt Library, Dharampur and Jaycee's Club, Valsad assisted in holding of the course.

On May 7, **Regional Science Centre, Lucknow** in collaboration with Central Water Commission, Lucknow observed 'Water Resources Day - 93'. As part of the celebration, a seminar was organised on the topic "Water Resources Development - Performance Overview" S A Char, Chief Engineer, Central Water Commission was the chief Guest.

RSC, Lucknow held an exhibition on the life and works of three eminent Indian scientists - Satyendranath Bose, Meghnad Saha and P C Mahalanabis - whose birth centenaries are being celebrated in 1993. On June 16 the exhibition was inaugurated by Prof M S Soda, VC, Lucknow University.

Between May 18 and 24, **District Science Centre, Purulia** collaborated with Hasi Khushi Club of Purulia to celebrate Museum Week. There was a sit & draw competition and the meritorious entries were put up for exhibition. There were planetarium shows and sky observation

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radiation to escape into space. The result - an increasing green house effect that will one day melt the polar ice caps and raise the level of water in oceans to inundate coastal regions.

Some other man-made chemicals like CFC (Chlorofluorocarbons), move very high up in the atmosphere and act as catalysts to destroy the protective ozone layer in the upper atmosphere. Harmful ultra-violet rays from the sun, so far protected by the ozone layer shield, pass through the holes induced by the CFC and cause immense harm to the body cells of human beings and other animals.

Rapid urbanisation and industrialisation have created immense economic welfare for some nations. In acquiring such wealth, huge quantities of natural resources have been exploited to bring forth very large amount of riches to very few groups of people. Today the whole world suffers for such indiscriminate exploitation of nature. In the last decade of the 20th century, 25 per cent of the human population in economically advanced countries produced 80 per cent of the harmful pollutants. Progress has been achieved at the cost of deforestation, depletion of energy resources, emission of harmful gases. The time has come to act consciously for the protection of our environment. The exhibition aims to awaken people to the perils of the Earth. It is hoped that the exhibition will raise the consciousness of the people and guide the coming generation in developing a more bio-friendly lifestyle.



Children inaugurating the Park

Science Park, Dharampur

The august gathering for the evening's function found no ministers, no eminent personalities on stage. Instead there were three little girls of the town who cheerfully smiled on the gathering. And it was these three little girls - Saroj, Saloni and Deepavati - who inaugurated the Science Park at Dharampur, on the eve of the ninth anniversary of the District Science Centre. It was through this single gesture of inaugurating the Science Park by the best girl-child participants of the contests held during the anniversary week celebration, the organisers bridged closer the relationship between the science centre and the common people. Moreover, the entire inaugural function was conducted by primary school students of Dharampur block. Science centres all over the country aim at spreading scientific learning among young people. Involving children in their activities, DSC, Dharampur has put the right step forward in fulfilling the aim.

Inaugurated on April 24, the new Science Park occupies an area of 11321 sq mtrs. There are 33 park exhibits along with aviaries, rockeries, a cage for monkeys, an economic flora zone and a lawn for picnics. With the opening of the Science Park, it is hoped that more

and more children will be attracted to the DSC, thus enabling a better propagation of scientific learning among students.

In the International Year of the Child, in 1979, the first Science Park in the country was opened in Bombay. And ever since it has been one of the most friendly methods of bringing together children and science. Accommodated in open areas and fitted with exhibits that speak of time, motion, energy, power and work, the Science Park satisfies the curiosity of children explaining the phenomena they observe in their daily lives. The animal cages and aviaries make the science park different from the amusement parks. So while the children experience the growth of science and technology or learn to love the living world, the germ of scientific learning is nurtured in the minds of these children, and that is what makes the Science Park a success.



Explaining a display

INDO-US SCIENCE EXHIBITION

An exhibition entitled 'Structures', jointly organised by the Indo-US Sub-Commission on Education and Culture and the National Council of Science Museums was opened at New Delhi recently by the Dy Minister for Education and Culture, Km Selja. The exhibition, dealing with various forms of structures, is in two parts. The first part explains the principles and mechanics of different structures and has been developed by Franklin Institute of Philadelphia, named after the

as possible, the exhibition uses models, illustrations and participatory devices to examine and experience the relationship between the architectural form and the associated mechanics.

The principles and mechanical part of the exhibition consists of six basic sections : what is a structure? evolution of the arch; structures in compression and tension; cantilevers and domes; dynamic loads; suspension bridge and building.

Here one got to know what is pre-stressed beam by direct handling. There is a miniature Gothic arch, a flying buttress and a dome to be assembled and voussoir arch to be set up. Tension and compression in beam can be felt in another hands-on exhibit. The fabric structure reveals the 'strength through form' in a structure. The importance of triangulation in structures and the role of trusses in bridge formation has also been demonstrated. Most of the exhibits in this section have been inspired by Western architecture, primarily European and American.

The part named 'Structures : Indian Heritage' had on display some fascinating aspects of the design and development of structures as is reflected by the

archaeological findings in India. The inherent scientific approach in design and construction is there for all to see. All this is presented in six sections : foundation, ground plan and super-structure, arches and domes, columns and spans, materials, and bonds.

Thanks to the exhibits and the ability to handle them. The visitor is able to comprehend the fact that an arch can sustain more load than a straight lintel structure. The cause and effect in the legendary Shaking Minaret of



A ministerial appreciation for the Structures

famous scientist Benjamin Franklin. The second section developed by the National Science Centre, Delhi portrays the evolution of architecture in the Indian perspective during the ancient and the medieval periods.

From the nomad's tent to the latest skyscraper - the 10,000 year old history of architecture has witnessed a revolution in design and technology. One part of the exhibition deals with the relationship of architectural form and the study of mechanics. The other deals with the evolution of technology in the Indian perspective during the ancient and the medieval periods.

In a bid to make structural engineering techniques as simple



At the Structure Exhibition

Ahmedabad is also demonstrated with the help of a dial gauge. According to the accompanying write-up, the explanation given for this phenomenon lies in the possible use of a flexible standstone - Ita Colomite - as a foundation cushioning both minars.

Herein also lies an opportunity to assemble a Shikara - a characteristic of North Indian Hindu temples - and the Gol Gumbaz. The part of the exhibition has been mounted by the National Science Centre, a unit of the NCSM. The displays have been made in the form of a travelling exhibition. After its stint in Delhi, it will be moved to the Council's other 22 centres.

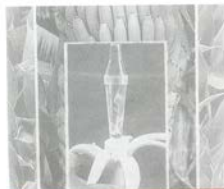


Inauguration of the exhibition

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programmes. Students participated in a software development programme. Film shows and cultural programmes were the other highlights.

In collaboration with several institutions of repute, **Visvesvaraya Industrial & Technological Museum, Bangalore** organised a seven-day workshop entitled 'Tissue Culture' during May 17 and 23 for university students. Here students were introduced to the principles of Plant and Animal Tissue Culture by way of lectures with



Tissue Culture

slides, demonstration through video and a couple of simple laboratory experiments.

Biotechnology/Plant Tissue Culture can be called the "Second Agricultural Revolution" in the context of fast changes in Agriculture. The Green Revolution in Asia was in a sense a Wheat Revolution: several other important crops did not get the benefit of the Green Revolution. If Biotechnology has to bring about a Gene Revolution or a second Green Revolution, it must be targeted to improvement of the primary food sources such as rice, legumes, potato, cassava, oil seeds and sugar cane.

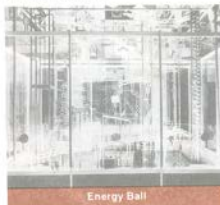
Energy Ball at Calcutta

The exhibit Energy Ball is primarily based on the principle of transformation of mechanical energy. A number of nylon balls of 2" diameter gives the exhibit its life. The balls are lifted, one by one, upto a height of about 10 feet by a bucket conveyor and a screw conveyor operating simultaneously. After gaining the potential energy, they are guided through different tracks to perform a variety of acrobatics before reaching the ground potential. The balls, while performing the acrobatics, transform part of their potential energy into different other forms. One can observe in this exhibit the process of transfer of momentum as a result of elastic collision between two balls. The role of centripetal force in keeping a ball moving in a vertical circular loop is also demonstrated. A trolley rolling downhill with a pair of balls on it and playing a note on a xylophone, the ball moving from one track to another by wheel on a see-saw, are

some of the exciting functions shown here.

Apart from these, there is another interesting point worth noting in this exhibit. It is the way in which the balls operate the wicket gates. It clearly demonstrates the principle of logic gates which are very widely used in computers.

The exhibit is located in the BITM, Calcutta



Energy Ball



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