Educational activities of Indian Science Centres

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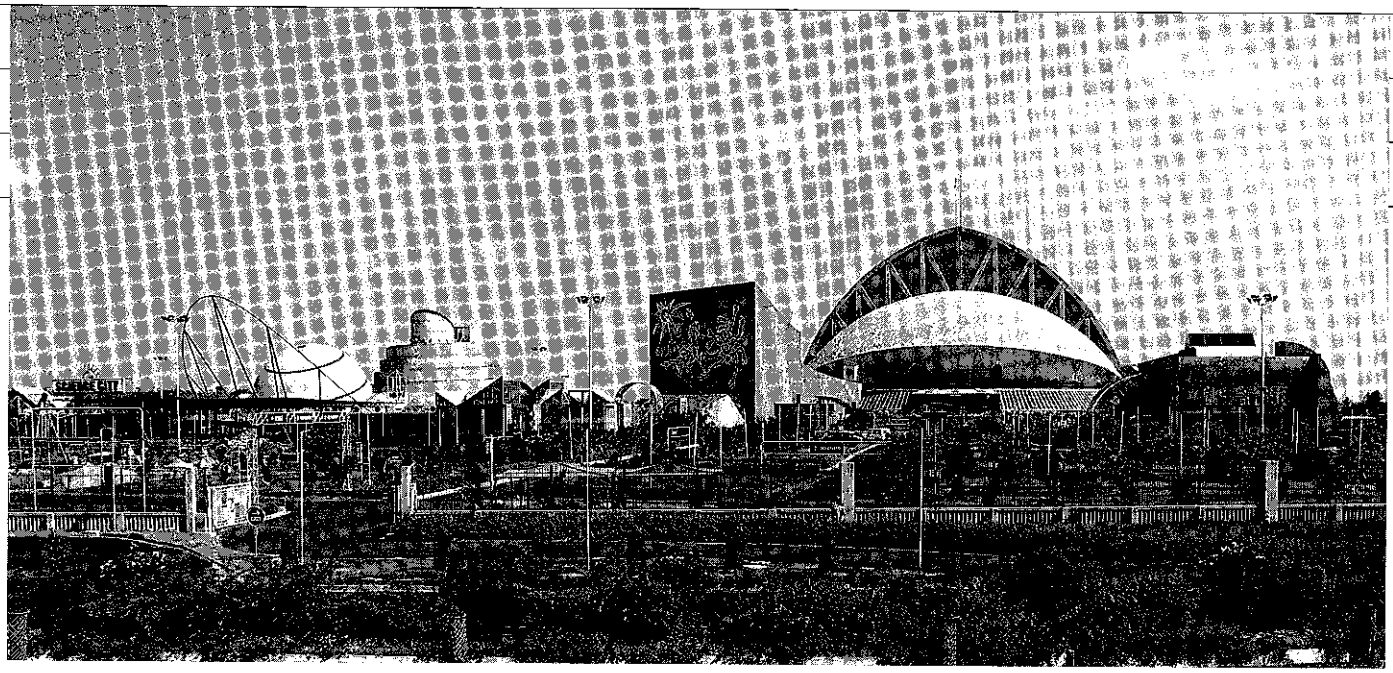
Résumé

Le mouvement de vulgarisation des sciences a pris son essor dans l'Inde indépendante, après que le gouvernement a souligné l'importance de la recherche et du développement scientifique dans le programme économique. Le premier musée de sciences adressé au grand public a été installé à Calcutta en 1959, bientôt suivi par d'autres dans plusieurs régions du pays. Parmi les aspects importants de ces musées et centres de sciences, il faut citer les activités pédagogiques, dont "l'exposition scientifique itinérante" a été la première expérience destinée à toucher la population rurale à travers tout le pays, grâce au message scientifique. D'autres activités, telles que les cours de "démonstration scientifique", les "programmes d'aptitude à la création", le "programme de formation des enseignants", le "centre d'apprentissage des sciences" etc., ont été créés aussi bien pour les étudiants que pour les communautés enseignantes. En conformité avec la politique sur l'éducation nationale décidée en 1986, près de trois cents centres d'apprentissage des sciences ont été mis en place au sein d'écoles rurales dans tout le pays. Non seulement ces centres complètent le programme scolaire en matière de science, mais ils permettent également sa diffusion dans toute la communauté. En accord avec les politiques et les priorités nationales, un grand nombre de ces musées/centres ont été installés en Inde. Ils gèrent des activités qui, certes, engendrent une conscience scientifique, mais aussi s'attachent à des problèmes actuels de la société. La nature des expositions diffèrent selon le lieu, centres de sciences dans une grande ville ou centres de quartier et centres régionaux, où il est plutôt question de thèmes locaux. La Cité des sciences à Calcutta est le plus grand centre de sciences en Inde et son approche est différente. Ici, les expositions et les activités ont été choisies de façon à servir un plus large échantillon de la société et un plus grand nombre de visiteurs.



Science City – the largest and the finest Science Centre of India.

After independence in 1947, India witnessed a great surge of interest in Science, Technology and Industry. During the 1950s, scientific research was given a tremendous boost as the country's first Five Year Plan laid stress on industrial development. To meet the growing need of trained technical manpower in the country, great emphasis was given to establishing scientific and technological institutions; the Universities were strengthened for research in science and technology; foundations were laid for various national laboratories for conducting research in different fields of science and technology; and there was a growing realization that science had to be propagated and popularized amongst the masses, so as to improve the quality of life for the people and to make the common man aware of the power that science can wield in overall national development. Science museums were a natural corollary to all these.

The science museum movement in India started with the setting up of an industrial museum in 1954 on the campus of the Birla Institute of Technology and Science in Pillani, about 200 kms south-west of Delhi. This was followed by a *nucleus* science museum set up in the National Physical Laboratory (NPL) in New Delhi in 1957. While the Central Museum in Pillani remained confined to its limited audience, the *nucleus* science museum in NPL became an instant hit with the visitors who were primarily students and people from the scientific community. Unfortunately, the novel experiment of NPL had to be abruptly closed due to the heavy rush of visitors to the *nucleus* science museum which impeded the research work at the Laboratory.

The first science museum to cater to the country's general public opened its doors in Calcutta on March 2, 1959. The Birla Industrial and Technological Museum was set up under the auspices of the Council of Scientific & Industrial Research, Government of India, to portray the following:

- the standard of technology in the present century,
- the contribution of science and technology to the activities of mankind,
- the propagation of modern methods of technology in the Indian industries.

Within a few years, it was felt that these objectives were too narrow and inadequate for a science and technology museum. It was also realised that the science museum of a developing country like India should focus more on the needs of contemporary society. The exhibits of the museum were, therefore, built with a strong pedagogic approach.

Armed with the experience gained and the inhouse infrastructural facilities developed, the Museum in Calcutta undertook the task of setting up the country's second science museum in Bangalore, some 2,000 kms south-west of Calcutta, which was opened in 1965. It was only after 12 years that the third such institution came into being in Bombay (now Mumbai); but this time it was a science centre.

The Industrial & Technological Museums in Calcutta and Bangalore went through radical changes in 1965-70 when they provided the necessary infrastructure for launching a massive outreach programme through mobile science exhibitions, science demonstration lectures, teachers' training programmes, creative ability centres and other educational programmes. With the advent of the Science Centre in Mumbai in 1977 the Museums were gradually transformed into dynamic institutions, vibrant with activities. More and more people were attracted to their non-formal teaching and learning processes through interactive exhibits and hands-on activities.

The first attempt to reach the country's rural interior was through mobile science exhibitions. These are sets of 24 working or animated exhibits on specific themes such as agriculture, the environment, nutrition, electricity, energy, water etc., mounted on specially designed buses which move around the country for nine months a year holding three-day exhibitions at each site in school compounds. The distance between two exhibition sites ranges from 25 to 35 kms. The exhibitions are not held during school vacations. Accompanying the exhibits is an experienced lecturer who is conversant with giving demonstration lectures on different topics related either to the school curricula or to subjects that are relevant to fighting the superstitions and obscurantism still prevailing in the country. The basic purpose of introducing such mobile science exhibitions is to bring science closer to the common people – who are otherwise unable to visit museums located in the cities – and thereby create a taste for science in the community. India at present has 25 such exhibition units which criss-cross the length and breadth of the country throughout the year.

The first and so far the most popular school programme has been the Science Demonstration Lecture (SDL) that was launched during the mid-1960s. The essence of this programme was to popularise classroom teaching of science through demonstrations; a dramatic presentation which left a long-lasting impression in the minds of the students. To train the school teachers in the development of demonstration kits and teaching aids made out of inexpensive materials another programme was subsequently introduced, the Teachers' Training Programme (TTP). This programme not only trained the teachers to handle the common tools and equipment required for model making but also instilled in them new ideas on science kits and educational aids which are useful for classroom teaching. The third successful programme in this series was the Creative Ability Centre (CAC) aimed at generating

sufficient kits and aids in the schools through students' hobby centre type activities to help sustain the "demonstration" method of teaching. The success of the SDL, TTP and CAC trio provided a perfect setting for launching yet another programme, School Science Centre, for the underprivileged schools in far flung areas.

With the adoption of the National Policy on Education in 1986, which stressed the need to carry the fruits of planning to the grassroots, the concept of setting up School Science Centres in the country's predominantly under-privileged areas took a definite shape. These small science centres are characterised by their two-pronged activities – the school science programme and the community science programme. While the former envisages improvement of the quality of science education in schools by the application of the "demonstration" method of teaching, the latter aims at creating awareness of science and an understanding of its general principles among the rural community so as to help them apply the methods of science in their day-to-day life. These very low budget centres are intended to build up resource materials through joint ventures of students and teachers, and to instil a spirit of *Service Before Self* while disseminating science to the rural community. So far over 300 such centres have been set up across the country. It is expected that the centres will attain a self-generating status around a set of *nucleus* kits, teaching aids and audio visuals initially supplied by the National Council of Science Museums (NCSM).

Apart from such activities to supplement formal education in schools, the Indian science centres organise various activities in the areas of non-formal education, general awareness and science communication. On the one hand they involve students and teachers in curriculum related activities, while on the other they encourage young children as well as adults to get involved in wide-ranging activities of general interest. Activities now also extend to farmers, workers in small industries, tribal groups, jobless housewives, school dropouts and physically handicapped persons.

It is interesting to note that the developmental plans of Indian science museums have closely followed the national policies and priorities in a very significant manner. The country's first full scale Industrial and Technological Museum was set up when the priority for national development was shifted from agriculture to heavy industries. Again, during the 70s when serious attempts were made nationwide to take science to the villages, science museums were considered as effective tools and useful platforms for imparting non-formal science education, and accordingly an elaborate plan was drawn up for the systematic development of science museums in the country. The National Council of Science Museums was formed in 1978 to build a chain of science centres all over the country in the quickest possible time by pooling all available expertise, optimising resources and cutting down avoidable experimentation. The result was 23 new science centres within 18 years.

Presentations by the museums and centres of NCSM are multidisciplinary in nature – both in form and in theme. In addition to permanent thematic exhibitions in galleries there are open-air science parks and mobile science exhibition units. Year round activities for students include programmes such as Science Seminars (elocution contests), Science Quizzes, Science Fairs, Hobby Centres, Nature Study Camps, Telescope Making and Sky Observation Programmes and others. Special programmes for older people such as Teachers' Training Programmes, Vocational Training Programmes, Seminars and Training Workshops are also held regularly. Film shows on scientific topics are held daily in all the Centres; Popular Demonstration Lectures, Science Dramas, Science Marches, and Temporary Exhibitions are some of the other programmes organised regularly for general visitors. Varied subjects are covered through exhibits and activities. One of the most important aspects of the educational programmes is that in addition to different disciplines of physical science, exhibits and activities on topics related to environment awareness, agriculture, health and hygiene, food and nutrition, water management, fighting epidemics and chronic diseases, traditional cottage industries, improvisation of techniques in handicraft and small industries and such others find due prominence in all the museums and centres especially at the Regional and District Science Centres.

Although there are certain features in common in terms of content, the Indian science museums and centres carefully avoid regimentation in concept and approach. While the major museums and centres at the four cities deal with exhibits with a national and international context, the character and format of the centres at the regional and district levels vary from one another even though certain core exhibits and activities on basic sciences are common to all of them. Utility based activities and supportive exhibits are typical of each centre. As a result of the vast territory and diversity in social and cultural patterns, requirements and relevance are different in different places. Regional and District Science Centres are therefore oriented more to specific local needs and problems.

The educational programmes and other activities of the Indian science museums and centres are generally focused towards definite target groups. This approach has undoubtedly made them buzzing hives of activity involving people from various age groups, of which the students have become the main beneficiaries. This has formed a notion in some minds that the science centres are only for students and children. To dispel this misconception the science centres are constantly devising newer and novel approaches to suit the tastes of a wide cross-section of people. The most remarkable achievement in this direction is the establishment of Science City in Calcutta which is essentially a science centre, but with a difference.

People are encouraged to visit Science City with their families and friends for a fun-filled outing. The major attractions include the Science Park comprising large outdoor exhibits on physical sciences which invite hands-on interactions, sprawling gardens with a myriad of flowers, birds, butterflies, cacti and bonsai, as well as the water fountains that dance with music. Dynamotion, one of the major indoor exhibit areas of Science City, has in it an array of aquaria with exotic fish and other aquatic animals, a well-planned *insectarium* rearing various live insects in their natural habitat (recreated) and a series of working and interactive exhibits on diverse principles of motion, transformation of energy, natural calamities and others. An intrepid visitor will also get a chance to sink into quick-sand and fly on a simulated time machine. He/she will also be awed to see the famous Dinosaur Alive exhibition comprising several life-size animated dinosaur models. Science City also has the Space Theatre which is the only one of its kind in the country, with a state-of-the-art planetarium with a multi-image projection system coupled with a large format movie projection device. The country's largest Convention Centre is also located here and provides ideal opportunities for holding a variety of programmes such as seminars, workshops, lectures and cultural performances. The Science City was opened on July 1, 1997 and in the first seven months was visited by over a million people.

The preview presented above is only suggestive, not exhaustive. Multifarious programmes are continuously being devised to meet the diverse requirements and expectations of the target groups. Consequently Indian science museums and centres are in constant pursuit of excellence. ■