Project Report

History of Science Museums and Planetariums in India*

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1. INTRODUCTION

The current study has been envisaged to present a comprehensive history of the development of Indian Science Museums and Planetariums, and study their exhibits and activities. Based on available documents, their impact in enhancing public understanding of science and technology has also been attempted.

Two major accounts on science museum (or science centre) movement in India, written by Dr Saroj Ghose, former Director General of NCSM (1986-1997) and Shri Ingit K Mukhopadhyay, former DG NCSM (1997-2009) and on Indian planetariums by Shri Piyush Pandey, former Director of Nehru Planetarium, Mumbai (2003-2011) though not very comprehensive in historical studies of science museums and planetariums in India has helped us a lot to prepare our document. However, there was not a single account available on the history of natural history museums in India. The 'Science Museum' has been used as a generic term to include traditional science museums, natural history museums, science centres and science cities. The 'Planetarium' on the other hand covers all forms of space theatres using projection systems like manual, opto-mechanical, hybrid and digital.

The study was carried out under the following chapters:

- I. Aim and Scope of the Study
- II. Science Museums, Science Centres and Science Cities

III. Planetariums

IV. Natural History Museums

V. Mobile Science Exhibition

VI. Interview of Pioneers of Science Museums and Planetariums

Details of the findings are presented in the following sections:

2. SCIENCE MUSEUMS, SCIENCE CENTRES AND SCIENCE CITIES

In the early years of 1950s, Pandit Jawaharlal Nehru, First Prime Minister of India, Shri G D Birla, a renowned industrialist, Prof K S Krishnan, a world renowned physicist and Dr B C Roy, a renowned physician and the then Chief Minister of West Bengal took considerable interest in establishment of Science Museums in the country. With their support and under the leadership of Shri Ved Prakash Beri, Shri Ramanatha Subramanian and Shri Amalendu Bose, three science museums, namely, Birla Museum (1954) at Pilani; Science Museum of National Physical Laboratory (1956) in New Delhi and Birla Industrial & Technological Museum (1959) in Calcutta (now Kolkata) (Fig. 1), were opened, respectively. The fourth science museum, namely, Visvesvaraya Industrial and Technological Museum (1965) was opened in Bangalore (now Bengaluru). The last two museums were set up and run by the Council of Scientific and Industrial Research (CSIR).

* Accomplished under the sponsorship of National Commission for History of Science between 20th June 2013 and 31st March 2016.

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Fig. 1. Birla Industrial and Technological Museum, Kolkata, 1959

In the early 1970s, the National Planning Commission constituted a Task Force to assess the activities of the science museums working under CSIR and to recommend the future course of growth and development. It saw an immense potential of the science museums in imparting non-formal science education to the public and creating a scientific awareness in the society. The task force felt it necessary that science museums be set up all over the country in a three-tier network and a specialized agency be formed to coordinate such activity. Thus National Council of Science Museums (NCSM) was formed in 1978 and in turn, the council initiated action to establish national level science centres in the metropolis, regional science centres in state capitals and sub-regional or district science centres in state capitals of small states or union territories or in districts.

Following are the main objectives of Science Museums, Science Centres and Science Cities in India:

- i) To portray the growth of science and technology and their applications in industry and human welfare, with a view to develop a scientific attitude and temper and to create, inculcate and sustain a general awareness amongst the people.
- ii) To popularize science and technology in cities, urban and rural areas for the benefit of students and for the common man by organizing exhibitions, seminars, popular lectures, science camps and various other programs.
- iii) To promote and enhance public understanding of the culture of science and technology.
- iv) To supplement science education given in schools and colleges and to organize various out-of-school educational activities to foster a spirit of scientific inquiry and creativity among the students.
- v) To design, develop and fabricate science museum exhibits, demonstration equipment and scientific teaching aids for science education and popularization of science.
- vi) To organize training programmes for science teachers, students, young entrepreneurs, technicians, physically challenged, housewives and others on specific subjects of science, technology and industry.

By the end of the financial year 2015-16, the country has 4 science museums, 49 science centres and 3 science cities. Out of these 56 institutions, National Council of Science Museums has set up 2 science museums, 40 science centres and a science city. Remaining 2 science museums, 9 science centres and 2 science cities were established by various other government and private agencies. The growth of science museums in India may be seen in Table 1.

Science centres are beacons of knowledge which are displayed in a perfect balance of fun and learning. Nehru Science Centre, the first national level science centre was established in Mumbai by NCSM in 1985. The centre was inaugurated by Prime Minister Shri Rajiv Gandhi. India's National Science Centre was set up in New Delhi in 1992 and dedicated to the nation by Shri P.V. Narasimha Rao, then Prime Minister of India.

Table 1. Growth of Science Museums in India

	1814- 1953	1954- 1963	1964- 1973	1974- 1983	1984- 1993	1994- 2003	2004- 2013	2014- 2016	Total
Natural History Museums or Galleries	34	8	3	6	2	4	2	1	60
Science Museums (traditional)		3	1						4
Science Centres				2	12	14	18	3	49
Science Cities						1	2		3

Shrikrishna Science Centre, the first regional level Science Centre was set up in Patna by NCSM and was inaugurated in 1978. Subsequently, NCSM had established seven more regional science centres in cities like Bhubaneswar (1989), Nagpur (1992), Tirupati (1993), Guwahati (1994), Bhopal (1995), Kozhikode (1997) and Kurukshetra (2000). Additionally, NCSM had developed eight regional science centres in the country as turn-key jobs which after inauguration are being run by respective state governments. Such centres are located in Ranchi (2010), Dharwad (2012), Jaipur (2012), Raipur (2012), Pune (2013), Coimbatore (2013), Pilikula (2014) and Dehradun (2016).

The first District Science Centre (DSC), was opened by NCSM at Purulia (1982). The council subsequently had set up sub-regional or district science centres at Dharampur (1984), Gulbarga (1984), Tirunelveli (1987), Burdwan (1994), Dhenkanal (1995), Digha (1997), Siliguri (1997) and Panaji (2001). These centres are run by NCSM. Several small science centres like above mentioned district centres were developed by NCSM which were handed over to respective state agencies. Such centres were set up at Port Blair (2003), Aizawl (2003), Dimapur (2004), Imphal (2005), Itanagar (2006), Shillong (2006), Kalimpong (2008), Gangtok (2008), Solapur (2010), Jodhpur (2013), Jorhat (2013) and Puducherry (2015).

Kerala State Science & Technology Museum, the first science centre outside the

umbrella of NCSM, was established by State Govt. of Kerala in Thiruvananthapuram in 1984. It was dedicated to the people by Shri K. Karunakaran, the then Chief Minister of Kerala. Next such centre, Periyar Science and Technology Centre, was set up in Chennai by the State Govt. of Tamil Nadu in 1990. Eminent industrialist Shri G P Birla had set up regional level science centres, namely, B M Birla Science Centre (1990) in Hyderabad and B M Birla Science & Technology Centre (1995) in Jaipur. Thereafter, five science centres were opened by the respective state governments in places like Agartala (1997), Tiruchirappalli (1999), Surat (2009), Vellore (2010) and Kavaratti (2011).

The first Science City of the country was opened by NCSM in Kolkata in 1997. Thereafter Govt. of Punjab had established Pushpa Gujral Science City in 2005 in Jalandhar and Govt. of Gujarat had set up Gujarat Science City in Ahmedabad in 2012.

Like other great science museums of the world, Indian science museums have always considered thematic galleries as the principal tool to fulfil its primary objectives. Indian science museum professional during the last sixty years or so have indigenously designed and developed more than two hundred thematic indoor galleries covering important topics like Agriculture, Astronomy, Biotechnology, Chemistry, Coal Mine, Communication, Electricity, Electronics, Emerging Technologies, Evolution of Life, Fun Science, Information Revolution, Life Science,

Fig. 2. Science City, Kolkata, 1998

Metallurgy, Mining, Motive Power, Nuclear Science, Our Science and Technology Heritage, Physics, Prehistoric Life, Space, Television, Textiles, Transport, and many more.

Science City in Kolkata (Fig. 2) is the most popular venue which was visited by 14.91 lakh persons during the year 2015-16. Further, it is a matter of pride to note that since 1998-99, Science City is running with its own steam – from the revenue it generates through activities, entry fees and by giving auditorium, exhibition space, seminar halls etc. on rent. While annual expenditure of Science City in 2015-16 was rupees 1761.35 lakh, it earned revenue of rupees 1856.34 lakh during the same period.

3. PLANETARIUMS

Planetariums have long been playing a crucial role in refining the astronomical concepts of the people of India. The country now has fifty-five planetariums (Table 2). The highest number of planetariums, which is six, is in Gujarat, Maharashtra and West Bengal. Next to them are

Karnataka, Tamil Nadu and Uttar Pradesh having four planetariums. Bihar and Assam have three planetariums, while Andhra Pradesh, Kerala, Punjab and Telangana have two planetariums. Other states like Goa, Haryana, Manipur, Madhya Pradesh, Odisha, Rajasthan and Sikkim have one planetarium. The states which do not operate any planetarium are ten, namely, Arunachal Pradesh, Chattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Meghalaya, Mizoram, Nagaland, Tripura and Uttarakhand. Out of seven Union Territories, only Delhi, Puducherry and Lakshadweep, have planetariums. Sponsors of these planetariums belong to Government Departments (17), Science Museums /Centres (13), Schools and Colleges (8), Municipalities (7), Non-Government Organizations (5), and Private Organisations (5). The growth of planetariums in India may be seen in Table 2.

The Kusumbai Motichand Planetarium, the first planetarium in India, was established in 1954 in Pune's New English School. It was set up by Walchand Group of Industries. This 9m dome planetarium with a Spitz A1 projector is still in

Table 2. Growth of Planetariums in India

	1954- 1963	1964- 1973	1974- 1983	1984- 1993	1994- 2003	2004- 2013	2014- 2016	Total
Planetariums	4	3	4	12	10	17	5	55

Fig. 3. Birla Planetarium, Kolkata, 1966

operation. Our first Prime Minister Shri Jawaharlal Nehru in 1956 had received a ZKP1 planetarium projector as a gift from Carl Zeiss of Jena, Germany. He passed it on to Dr K S Krishnan, Director of National Physical Laboratory, New Delhi, who in turn asked Shri R Subramanian to set up a 6m dome planetarium in NPL campus. The third planetarium was established in Langat Singh College at Muzaffarpur. Its projector a ZKP1 model was gifted to Dr Rajendra Prasad, President of India in 1956 by Carl Zeiss. Dr Prasad gave it to L S College where Rev. John Nitchel took all initiative to open a 6m dome planetarium with the projector in 1958. Birla Planetarium, the largest planetarium of the country was set up in Kolkata by the initiative of industrialist Shri Madhav Prasad Birla (Fig. 3). This 23.2m dome planetarium with a Zeiss Universal projector was dedicated to the nation in 1963 by Prime Minister Pt Jawaharlal Nehru. The planetarium was subsequently named after M P Birla. Thus only four planetariums were established during the first decade from 1954 to 1963.

During the second decade (1964-1973) three 8m dome planetariums with Zeiss ZKP1

projectors were established. Shri Jawaharlal Nehru Planetarium in Arya Kanya Vidya Mandir, a Girls' school, was opened in Porbandar in 1965. It was sponsored by Shri Nanji Kalidas Mehta, an industrialist. The other two planetariums were Gandhi Planetarium (1971) in Vijayawada established by the Gandhi Hill Foundation and Rotarian Aswin Mehta Memorial Planetarium (1972) in Surat founded by the Surat Municipal Corporation.

The growth of planetariums during the third decade (1974-1983) was also slow – only four were added to the chain. In 1976, Vadodara Mahanagar Seva Sadan (a Municipality) opened Sardar Vallabhabhai Patel Planetarium in Vadodara. This 12.5m dome planetarium had installed a Zeiss RFP projector. The next was the Nehru Planetarium in Mumbai. This 22.86m dome planetarium opened in 1977 had a Zeiss projector, Universal Mark IV. Two more 8m dome planetariums were established during the decade. A planetarium in Govt. College of Engineering in Salem was opened with a Zeiss ZKP1 projector in 1979. Another planetarium, called Jawahar Planetarium, having a Zeiss ZKP2 projector was

set up in 1980 by Jawaharlal Nehru Memorial Fund in Allahabad.

The first planetarium of the fourth decade (1984-1993) was again named after Jawaharlal Nehru, first Prime minister of India. Nehru Planetarium, New Delhi opened in 1984 was sponsored by Jawaharlal Nehru Memorial Fund. This 15m dome planetarium used a Zeiss projector, RFP-DP1. In 1984, the Pratap Rudra Planetarium was established by Warangal Municipal Corporation in Warangal. The 8m dome planetarium has a Zeiss ZKP2 projector. In the early 1980s, Shri Ganga Prasad Birla, an industrialist and cousin brother of Shri M P Birla, took an initiative to set up three planetariums in the country in memory of his father Shri Braj Mohan Birla. The first B M Birla Planetarium was opened in Hyderabad in 1985 which had a 12m dome. Incidentally, in India, it had used for the first time a projector (model GX) manufactured by Goto Optical Manufacturing Ltd. of Japan. The second B M Birla Planetarium was opened in 1988 in Chennai which has a 15m dome and a Goto GM II-T Starfield projector. Only after a year, the G P Birla Group opened another B M Birla Planetarium in Jaipur. Like the one in Hyderabad this planetarium has a 12m dome and Goto GX projector. In 1985, the second Spitz projector, model Spitz 512, was installed in a 15m dome at the Sri Sathya Sai Space Theatre in Puttaparthi. It was sponsored by Sri Sathya Sai Institute of Higher Learning. In 1987, Ludhiana Municipal Corporation established Nehru Planetarium in Ludhiana in an 8m dome having a Zeiss ZKP2 projector. Two years later, Shipping Corporation of India established an identical planetarium in Mumbai. In 1989, Shrimati Nirmala Birla, wife of Shri G P Birla, had set up a small 5m dome planetarium with a Goto E-5 projector in Modern High School for Girls' in Kolkata. Bangalore Association for Science Education had opened Jawaharlal Nehru Planetarium, Bangalore in 1989. The 15m dome planetarium has a Zeiss RFP-DP

projector. Two more planetariums were opened during the decade. Both were established by the Science and Technology Departments of the respective State Governments and had installed Goto projectors. Pathani Samanta Planetarium of Bhubaneswar, opened in 1990, had a Goto GX2 projector in a 12m dome. In 1993, Indira Gandhi Planetarium, Patna was opened in a 16m dome with a Goto GM-II Starfield projector.

Ten planetariums were opened during the fifth decade (1994-2003). Guwahati Planetarium, a 12m dome planetarium with a Goto GX projector was established by the Department of Science and Technology of Government of Assam in 1994 in Guwahati. Another planetarium with a Goto projector (model GS-AT), called Meghnad Saha Planetarium, was opened in 1994 at Burdwan. It was sponsored by the University of Burdwan. Also opened in 1994 was the Priyadarsini Planetarium in Thiruvananthapuram which was sponsored by the Department of Higher Education, Government of Kerala. The planetarium had a Goto GM-II-AT projector in a 15m dome. Rajkot Municipal Corporation in 1994 had established Pramukh Swami Planetarium, in Rajkot in a small 8m dome with a Zeiss ZKP2 projector.

NCSM, in 1977 had established three planetariums in Raman Science Centre, Nagpur; Regional Science Centre, Kozhikode; and Science City, Kolkata. Nagpur planetarium has an 11m dome and Zeiss ZKP3 projector. Kozhikode planetarium had installed Zeiss RFP-DP2 projector in a 15.3m dome. The Space Theatre at Science City, Kolkata has a GSS-Helios Star Ball projector along with Astrovision 70 manufactured by Goto Optical Mfg. Ltd., Japan. In 1998, Manipal University established Dr T M A Pai Planetarium on its campus. It was an 8m dome planetarium with a Zeiss ZKP2 projector. Another small dome planetarium (8.5m) with a Goto GS projector was opened at Anna Science Centre, Tiruchirappalli in 1999 by the Tamil Nadu Science and Technology Centres. The first planetarium in

the new millennium was established by the Council of Science and Technology of the Government of Uttar Pradesh in Lucknow. Named as Indira Gandhi Planetarium, this Saturn shaped building has a 15m dome and a Goto G-1518-AT projector.

As many as 17 planetariums were opened during the sixth decade (2004-2013) in India. In 2006, Council of Science and Technology of the Government of Uttar Pradesh opened Veer Bahadur Singh Planetarium, a 17.5m dome with Digistar 3 projector of Evans & Sutherland, USA. In 2007, NCSM, on behalf of Council of Science and Technology of the Government of Haryana established Kalpana Chawla Memorial Planetarium in Kurukshetra. The 12m dome planetarium has a Spitz 1024 projector along with SciDome HB digital system. Yashwantrao Chavan Planetarium, a 10m dome planetarium with a Digistar 3 projector was opened in Nashik in 2007. Pushpa Gujral Science City in Jalandhar also installed Digistar 3 along with Astrovision Ultra 70 of Goto in its 23m dome Space Theatre in 2008. Three planetariums were opened in 2009. NCSM had set up a 5m fibre glass dome planetarium in Regional Science Centre, Guwahati where a Hal-X2 Omnifocus projector manufactured by The Elumenati, USA was used. Asha Kiran Planetarium set up by Hukkeri family in Belgaum has a 12m dome with a Spherical Mirror System from Discovery Dome, USA. In 2009, Surat Municipal Corporation opened a 14.3m dome planetarium in Surat Science Centre, using Digistar 3 projection system. In 2010, NCSM opened 8m dome planetariums in its three units – North Bengal Science Centre, Siliguri; District Science Centre, Gulbarga; and District Science Centre, Tirunelveli. While planetarium at Siliguri has a Digistar 3 system, other two centres are having SX3-MK II Full Dome systems from Immersive Display, UK. NCSM's District Science Centre at Dharampur too installed an SX3-MK II Full Dome system in an 8m dome planetarium in

2011. In the same year, Dept. of Science and Technology of the Union Territory of Lakshadweep opened a 10m dome planetarium in Kavaratti using a Megastar-IIB Star Ball of Ohira Tech. Ltd., Japan, along with Definity Theater of SkySkan, USA. Two planetariums were established in 2012. Council of Science and Technology of the Government of Uttar Pradesh opened Aryabhata Planetarium in Rampur. The 12m dome planetarium used a Digistar 4 system of Evan & Sutherland, USA. NCSM opened one more 8m dome planetarium, this time at the Goa Science Centre at Panaji using SX3-MK II Full Dome systems. Two small and a medium-size planetariums were set up in 2013. Efforts Planetarium, an 8m dome planetarium with Digistar 4 was set up by Efforts Academy in Ahmednagar. An 8m dome planetarium was also set up at Jorhat Science Centre, Jorhat by NCSM using Digistar 3 system. Council of Science and Technology of the Government of Madhya Pradesh opened Ujjain Planetarium in Ujjain in a 12m dome with CRONOS-II and VERTUARIUM-II SP2 HD projection systems manufactured by Goto Optical Mfg. Ltd., Japan. Further, NCSM has opened five 8m dome planetariums during 2014-15 in Science Centres in Patna, Digha, Gangtok, Imphal and Puducherry.

Starting from 2003, ten out of above mentioned fifty planetariums have been upgraded and four planetariums are inoperative for many years. Nehru Planetarium in Mumbai is the most visited planetarium of the country.

4. NATURAL HISTORY MUSEUMS

Natural History Museums are institutions that collect, display and research materials, collected or extracted from the natural world. The multifaceted purpose of such a museum is to: (i) build or store natural history collections, (ii) conduct research and interpret the results, (iii) support the purpose of science and biological conservation, (iv) enhance public understanding

and appreciation of the natural world, and (v) collaborate with the public in deriving their own meaning from the natural heritage they encounter in the museum and in nature.

The Oriental Museum of the Asiatic Society of Bengal, established in Calcutta in 1814, had various natural history objects on display from its inception. During last two hundred years, sixty natural history museums or natural history galleries were set up in various parts of the country. The distribution of the institutions in sixteen states is as follows: Uttar Pradesh (14), Maharashtra (6), Tamil Nadu (6), Gujarat (4), Kerala (3), Karnataka (3), Uttarakhand (3), West Bengal (3), Assam (2), Bihar (2), Madhya Pradesh (2), Odisha (2), Punjab (2), Rajasthan (2), Telangana (2), Chhattisgarh (1), Manipur (1). Only two Union Territories of Chandigarh and New Delhi, are having natural history museums, one in each place. Further, if we divide said two hundred years into eight quarters of 25 years each, we find following distribution of museums: 1st quarter (1), 2nd (4), 3rd (7), 4th (8), 5th (8), 6th (14), 7th (11) and 8th quarter (7).

In India 20 natural history galleries were set up as part of general museums, who also have galleries of art, archaeology, anthropology, numismatics, crafts, paintings, science and so on. The departments of zoology, botany, geology, etc. of many colleges, universities and research institutions also have natural history museums and they are 23 in number. There are 17 fully dedicated natural history museums, but their size and collection vary widely.

The Oriental Museum of the Asiatic Society of Bengal (later named Indian Museum) was established with two major sections – one of the archaeological and ethnological materials and the other of zoological and geological specimens. With the establishment of this museum, collection and display of natural history specimens began in India. The next significant natural history display was in Government Museum and National Art

Gallery, Madras (now Chennai), which was opened in 1851. The Museum of Natural History, Economic Geology, Industry and Art was established in Bombay (now Mumbai) in 1855. Two general museums, set up in 1863, namely, State Museum, Lucknow and Central Museum, Nagpur also had added natural history galleries. Government Museum, Bangalore (1865) too has important natural history sections. Three more museums – Mahant Ghasidas Memorial Museum, Raipur (1875), Watson Museum, Rajkot (1888), and Baroda Museum and Picture Gallery, Vadodara (1894), had set up galleries on natural history in the 19th century. The next ten natural history galleries, set up as part of general museums in the 20th century, were at Patna Museum (1917), Prince of Wales Museum of Western India, Mumbai (1921), Municipal Museum, Gwalior (1922), Museum of Antiquities, Jamnagar (1946), Prabhas Patan Museum (1951), Government Museum JTC, Faizabad (1954), Bundelkhand Chhatrasal Museum, Banda (1955), Chandradhari Museum, Darbhanga (1957), Salipur Museum (1975), Government Museum, Vellore (1985) and Dinosaurium at B M Birla Science Centre Hyderabad (2000).

Since the late 19th century many Indian universities and colleges realised the importance of natural history collections in innovative undergraduate science education. As a result, departmental natural history museums were set up. Maharaj's College in Ernakulam had first such facility, a Zoology Museum in 1874. Only four more were there in that century, Natural History Museum at St. Joseph's College, Tiruchirappalli (1881), Museum of the School of Plant Morphology at Meerut College (1892), Botany Museum of Christ Church College, Kanpur (1896) and Central College Museum, Bangalore (1898). Other departmental natural history museums, spread all over the country, were established during the 20th century. They are known as, Museum of the Forest Research Institute, Dehradun (1906); Zoological Museum (1906) and

Agahrkar Museum (1923), both in Allahabad University, Botany and Zoology Museum, Isabela Thoburn College, Lucknow (1921); Zoology Museum, Annamalai University, Annamalai Nagar (1929); Museum of Plant Fossils, Lucknow (1929); Botany and Zoology Museum, Madras Christian College (1937); Botany Museums, Punjab University, Chandigarh (1947); Zoology Museums, Punjab University, Chandigarh (1948); Geological Sciences Museum, Gauhati University (1950); Geological Museum, Lucknow University (1951); Botany Museum, T D College, Jaunpur (1956); Museum of the Botanical Survey of India, Dehradun (1956); Zoological Museum, D A V College, Muzaffarnagar (1958); Geology and Geophysics Museum, University of Roorkee (1960); University Museum of Science and Culture, Aligarh Muslim University (1967); Geological Museum, Jainarain College, Lucknow (1973) and Geological Museum, Indian Statistical Museum, Kolkata (1977).

The first dedicated natural history museum was established by the Bombay Natural History Society in Bombay in 1883. Next was the Natural History Museum, set up in the premises of Kerala State Museum and Zoological Garden in Thrissur (1885), Gass Forest Museum was established in Coimbatore in 1902. Next was the Bengal Natural History Museum set up in Darjeeling in 1903. A Museum of Arthropoda was opened in Pune in 1961. A large natural history museum was opened in Thiruvananthapuram in 1964. Two natural history museums were attached to the nearest zoological gardens in Ahmedabad (1974) and Hyderabad (1979). Two natural history museums were opened in the northeast, namely, Assam Forest Museum (1983) in Guwahati and Biological Museum (1998) in Imphal. Five natural history museums with thematic galleries and extensive educational activities were established in New Delhi (1978), Mysore (1995), Bhopal (1997), Bhubaneswar (2004), and Sawai Madhopur (2014). A government natural history museum was

established in Chandigarh in 2001 and another such private museum was opened at Thar in Rajasthan (2007).

5. MOBILE SCIENCE EXHIBITION

In 1965 Birla Industrial and Technological Museum (BITM), Calcutta had launched the first ever indigenously developed travelling science exhibition called 'Mobile Science Museum' (MSM). With an exhibition unit on 'Our Familiar Electricity', the MSM was inaugurated by Shri Prafulla Chandra Sen, then Chief Minister of West Bengal, on 17 November 1965 at Narendrapur Ramakrishna Mission Ashram School, Narendrapur, about 17 kilo-meters away from BITM. Conceptualized by Shri Saroj Ghose, Curator-in-charge of BITM and developed by a team of BITM officials the unit with 30 exhibits attempted to make school children and general public familiar with electricity and its use in daily life. Each exhibit was housed in a cabinet of size 99 cm (height) x 73.4 cm (breadth) and 30 cm (width).

In 1966, BITM changed the title of the travelling exhibition from 'Mobile Science Museum' to 'Mobile Science Exhibition'. It happened so because BITM authorities realized that the MSM was not carrying any scientific artefact, typical of a museum, but was showing didactic and working exhibits. So the term 'exhibition' looked more appropriate than 'museum'. They further experienced operational difficulties in running MSM as it was a cumbersome and laborious process to pack, load, unload, unpack and set up display stands and exhibits at each exhibition site. The solution to this problem came in mid-1966 with the introduction of 'museobus' which again was conceptualized by Saroj Ghose. Venus, the first Indian 'museobus' was a specially designed structure on standard truck chassis that mounted a set of 28 exhibit cabinets of standard size in four rows, two facing outside and two facing inside.

Fig. 4. First Mobile Science Exhibition Unit, 1966

The first ‘museobus’ carrying working and participatory science exhibits on the theme ‘Transformation of Energy’ was inaugurated on December 27, 1966, in Barsul Vijnan Mandir near Shaktigarh in Bardhaman district of West Bengal (Fig. 4).

During the period between 1965 and 1976, BITM while functioning under Council of Scientific and Industrial research (CSIR) had developed 8 mobile science exhibition units. In 1978, at the time of formation of the National Council of Science Museums (NCSM), its three constituent units were operating only six museobuses. BITM with three museobuses exhibited five units, namely, Transformation of Energy, Popular Science, Light and Sight, Water – the Fountain of Life, and the Science of Motion. Visvesvaraya Industrial and Technological Museum (VITM) in Bangalore had two museobuses to exhibit units on the ‘Planet We Live In’ and ‘Water – the Fountain of Life and Popular Science’. Nehru Science Centre, Mumbai had one museobus with an exhibition unit on ‘Man Must Measure’.

Exhibits of a mobile science exhibition unit are designed by a Curator. It then moves to

the Arts section of the museum where art work of each exhibit is prepared by an Exhibition Officer. From there it goes to the workshop in-charge – a Curator or a Technical Officer. The exhibits are fabricated by technicians of different trades. During 2013-14 average cost of fabrication of 24 exhibits for an MSE unit by NCSM was Rs 6.00 lakh.

Fifteen Science Museums and Science Centres of NCSM, during last 37 years (1978-2014), had developed 52 MSE units on 40 different topics including two old subjects like Popular Science or Fun Science (12 units) and Mathematics (5 units). Some of the new topics covering a wide range of subjects include Agriculture, Biodiversity, Computers, Energy, Environment, Food & Nutrition, Invention, Man & Machine, Man the Tool Maker, Non-conventional Energy Sources, Our Universe, Time, and Water & Sanitation.

A count of only four science museums and centres outside the umbrella of NCSM are operating MSE regularly. Two of these four centres, Science Centre, Port Blair and Chhattisgarh Science Centre, Raipur received ready build museobus with exhibits from NCSM.

The other two institutions, namely, Kerala State Science and Technology Museum, Thiruvananthapuram and Periyar Science & Technology Centre, Chennai hold mobile science exhibitions regularly with their indigenously developed units. These four centres altogether use six MSE units, three of which are on Popular Science.

Generally, a mobile science unit travels 8 to 9 months a year with breaks (returns to the museum) after every forty-five days. While on tour, its activity is coordinated by an Education Assistant and he is supported by a technician and a driver.

During the year 2013-14, twenty-one NCSM units operated twenty-three MSE buses (16 units with 24 exhibits and 7 units with 20 exhibits) on a wide range of topics on science and technology. These museobuses covered a total distance of 48,050 kilo-meters in rural and suburban areas of the country and altogether held exhibitions for 2583 days at 1179 sites. More than 19 lakh 75 thousand visitors witnessed such exhibitions. That was not all, many of these MSE units carried with them kits and gadgets to organise some additional programmes like Science Demonstration Lecture, Science Quiz, Planetarium shows etc. for school students. Further, running costs of sixteen MSE units of NCSM during the same year was Rs 25.76 lakh. The average expenditure of Rs 1.61 Lakh per unit was truly nominal considering the significance of the activity.

Museobus, as the name states, is more like a body of knowledge preaching on wheels. To birth, hatch and nurture such an autonomous yet highly depended mechanism of exhibit requires a complete ministry of administration provided by the parent body. Twenty-five science museums and science centres, located in 17 States and 2 Union Territories, now operate mobile science exhibitions, throughout the year, for the benefit

of rural and suburban students. Quite importantly, 21 of these institutions are units of NCSM.

6. CONCLUSION

During the period of current study, the author had further interacted with large number pioneers and important personalities face to face or through emails. Details of such communication, however, could not be presented in the report due to paucity of space. The study emphasizes, however on the history of the development of science museums, natural history museums and planetariums in India. Brief description of almost all indoor galleries and outdoor expositions of science museums and exhaustive list of exhibits displayed therein have been furnished along with educational activities organized by these museums. In the case of planetariums, the present study encompasses parameters like dome size, projection equipment, number of seats, etc. The foot fall of visitors in these institutes has also been stated. In addition to that contribution of intellectuals, philanthropists, political leaders, and others in creating these institutions have been described in the report.

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