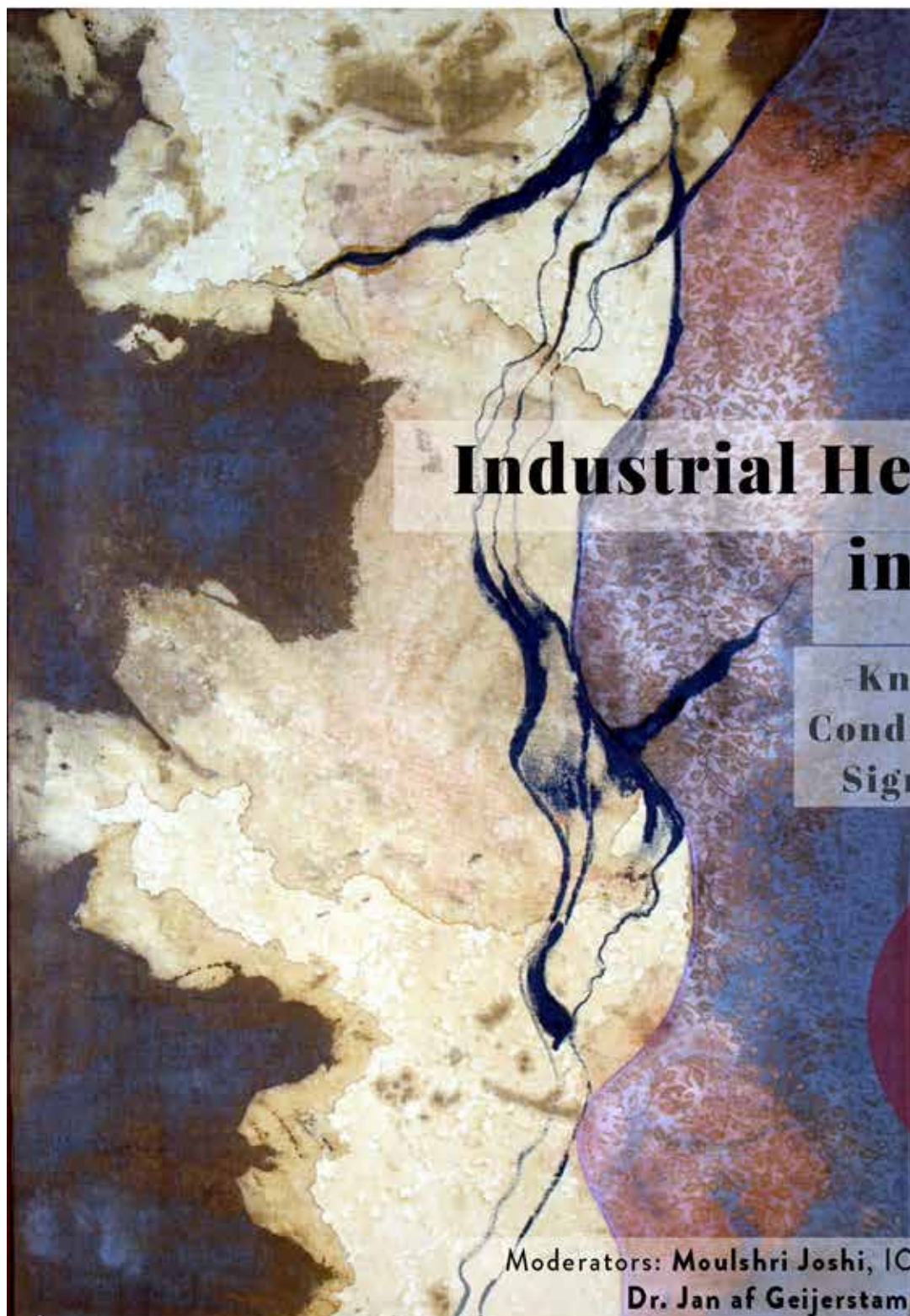




19th General Assembly & Scientific Symposium 2017
ICOMOS
HERITAGE AND DEMOCRACY
NEW DELHI, INDIA



Industrial Heritage in India

**Knowledge,
Condition and
Significance**

Conference Room,
National Institute of
Urban Affairs, 4B, India
Habitat Centre, Delhi

11th Dec
3:00-6:30 pm

Moderators: **Moulshri Joshi**, ICOMOS India and
Dr. Jan af Geijerstam, TICCIH Sweden

A River in Indigo by Taniya Vaidya

Taniya Vaidya created this painting using 5000 year old natural dyes techniques and natural dyes especially madder and indigo. Textiles and natural dyes were India's biggest exports in the ancient world till British India. The painting depicts a river in natural Indigo. Indigo is as ancient as the Harappan Civilization that prospered on the banks of the River Indus or Sindhu.

INDUSTRIAL HERITAGE IN INDIA – KNOWLEDGE, CONDITION AND SIGNIFICANCE

*Organised by National Scientific Committee on Industrial Heritage, ICOMOS India
With generous support from National Institute of Urban Affairs*

Date - 11th December 2017 (Monday)

Time - 15:00 - 18:30

Location - Conference Room, National Institute of Urban Affairs, 4B, India Habitat Centre, New Delhi

Moderators:

- **Moulshri Joshi**, ICOMOS India and National Representative, TICCIH India
- **Dr. Jan af Geijerstam**, ICOMOS Sweden and Chairman, Swedish Industrial Heritage Association/ TICCIH Sweden

CONTEXT

According to an ICOMOS Analysis of the World Heritage List (2009), there are two major imbalances in the World Heritage List. One of them is the disproportionate representation of certain types of cultural properties, while some others have been largely overlooked. Industrial Heritage along with 20th Century Heritage is one such poorly represented category on the World Heritage List. The other bias shows a dominant Euro-centric composition amongst the few Industrial Heritage sites that figure on the UNESCO World Heritage List. Industrial Heritage in India remains understudied and under-represented, its absence highlighted by the gaps implied by ICOMOS.

National Scientific Committee on Industrial Heritage (NSC-IH) was set up within ICOMOS India in 2016 with a view to report on matters related to India's industrial Heritage and to bridge the gap highlighted by ICOMOS.

BACKGROUND OF THE MEETING

The meeting was planned as a side event during the 19th ICOMOS General Assembly, making most of the opportunity of having heritage practitioners from across the country and the world in New Delhi. It was also seen as an opportunity for dialogue between NSC-IH and The International Committee for Conservation of Industrial Heritage (TICCIH), ICOMOS's scientific advisory body on all matters pertaining to Industrial Heritage. The meeting was hosted by the National Institute of Urban Affairs (NIUA) of India.

Recognition of the importance of Industrial Heritage is growing in India. An increasing number of scholars and practitioners devote their interests to the study and preservation, conservation and interpretation of Industrial Heritage. This also includes the adaptive reuse of Industrial Heritage sites which can form important additions in modern cityscapes.

However recognition of Industrial past – its tangible and intangible remains, as 'Heritage' requires a spatial and temporal distance of appreciation. Unlike the experience of Western Europe and North America, Industrialization is an ongoing process in India. The towns and cities demonstrate

various degrees of industrialization, de-industrialization, post-industrialization and in some cases re-industrialization. The recent-ness of this past makes its valuation difficult. Some sites are not a century old to fit in the basic definition of heritage, some have been in use until recently to be valued as sites of knowledge systems that are vulnerable or face destruction. These sites are not removed from our everyday urban experience. They exist within the city, embedded within the masterplan area, occupying large tracts of prime land such as the still remaining *National Textile Cotton mills of Mumbai* and *Roshanara Mills of Delhi* but remarkable by the lack of use and access. Artists, filmmakers and writers have only just begun to valorize and appropriate the aesthetic of their decay and abandonment in their works. Planners and city managers see these spaces as sites of pollution and crime that need to be integrated into the city by way of redevelopment. Architects including heritage and landscape experts see these as sites of adventure and opportunity; the 'big stuff' in various stages of decay has an immediate visual appeal and promise of exciting re-adaptation. The meeting is an opportunity to explore various ways of seeing and engaging with this past.

THE MEETING

The National Scientific Committee on Industrial Heritage (NSC-IH), a special interest group within ICOMOS India, organized the meeting. Moulshri Joshi, Coordinator of NSC-IH and National Representative, TICCIH India and Jan af Geijerstam, TICCIH Sweden were the moderators of the session. National Institute of Urban Affairs (NIUA) a premier institute for research, training and information dissemination in urban development and management in New Delhi hosted and supported the meeting. The event was a part of a range of side events supporting the ICOMOS general Assembly held in New Delhi and hosted by ICOMOS India. The meeting was open to participants of the ICOMOS General Assembly as well as general public.

Members of the NSC-IH, ICOMOS India include Moulshri Joshi, Neha Jain, Somya Johri, Smriti Pant, Sarmistha Chatterjee, Munish Pandit, Komal Potdar, Kamal Banerjee, Rima Hooja, Moushumi Chatterji, Amritha Ballal and Suditya Sinha.

Participants from 19 countries joined the meeting. The following countries were represented: Italy, Kenya, Ireland, Algeria, United States of America, Philippines, Scotland, Australia, Denmark, Netherlands, United Kingdom, Estonia, France, Germany, Iran, Taiwan, Romania, Sweden and India.

Indian participants represented the following institutions and networks:

1. The International Council on Monuments and Sites (ICOMOS) India
2. The International Committee for Conservation of Industrial Heritage(TICCIH) India
3. School of Planning & Architecture, New Delhi
4. School of Planning & Architecture, Bhopal
5. Indian National Trust for Art and Cultural Heritage, New Delhi
6. Jammu & Kashmir Tourism
7. Auroville Earth Institute, Tamil Nadu
8. Manipal Institute of Technology, Karnataka
9. Aarde Foundation, New Delhi
10. CEPT University, Ahmedabad
11. Sushant School of Art and Architecture, Gurgaon
12. Kalasalingam University, Tamil Nadu
13. Anant National University, Gujarat
14. Madhav Institute of Technology and Science (MITS), Gwalior

THE SCHEDULE

<i>Time</i>	<i>Agenda</i>	<i>Speaker</i>
3:00-3:10 pm	Welcome	Moulshri Joshi
3:10-3:20 pm	Participant introduction	
3:20-3:50 pm	An Introduction to Industrial Heritage in India	Moulshri Joshi
3:50-4:05 pm	Zinc smelting, on-site smelters, retort & debris and source mines at Zawar	Rima Hooja
4:05-4:20 pm	Dutch Factories of Vengurla	Komal Potdar
4:20-4:35 pm	Tradition and innovation in the history of iron making: An Indo-European perspective	Jan af Geijerstam
4:35-4:50 pm	Tea	
4:50-5:05 pm	Railway heritage of East India	Kamal Bannerjee
5:05-5:20 pm	Revitalization of IP Thermal Power Plant, New Delhi	Devansh Mahajan
5:20-5:35 pm	Introduction to the ship building industry of India	Priyanka Talreja
5:35-5:45 pm	Inventory of industrial heritage of India	Moulshri Joshi
5:45-6:10pm	Identifying thematic concerns: What do we have?	Vishakha Kawathekar
6:10-6:30pm	Discussion: Where do we go from here?	Munish Pandit
	Vote of thanks	

1. AN INTRODUCTION TO INDUSTRIAL HERITAGE IN INDIA AND THE INVENTORY OF INDUSTRIAL HERITAGE OF INDIA

- *Moulshri Joshi*

Taking Stock

The inventory of Industrial Heritage of India attempts to report through a small selection of sites, what exists in India under the loosely defined term 'Industrial Heritage'. For several years, there has been no national report from India. This is partly due to the newness of the concept of Industrial Heritage. Heritage practitioners are only beginning to take stock of our modern scientific and technological heritage. Knowledge and documentation of this field lies distributed across many fields – history of science and technology, conservation, archaeology, urban studies, art history – and many places – academic writing, national science museums, local history museums, print media, digital archives of films. However, disciplines and formal sources of this knowledge are secondary to the living memory of the industrial culture – its built and intangible heritage - as our cities and towns either continue to witness industry in its original use or remember it as a recent past that has not entirely passed on. The production of this inventory was therefore, essentially, a task of gathering, of bringing together information about the remains of this past from multiple sources, into a uniform format of presentation that can be put to analysis and questions such as "What do we have?" "Where do we go from here?" can be posed.

The inventory brings together 100 sites from across 18 states of India. It includes 34 sites of production and manufacturing, 37 sites of infrastructure, 4 marking industrial disasters and 10 sites that preserve and interpret industrial history as museums or educational institutions. Some sites are recognized at local or national level but most are largely unacknowledged. Only 30 of the 100 remain out of use and indicate, albeit disproportionately so, the limited extent and slowness of de-industrialization in India. This past as experienced in some other parts of the world, and way of seeing that the present affords aids the study

and reuse of its relics in a manner that is different from our experience. Here, this past has not passed on, at least not as yet. And even though former industrial mega-cities such as Bombay and Calcutta have already seen a century of steady de-industrialization, concerned disciplines have not started taking stock of its relics and legacy in a systematic manner.

Identifying Themes

The inventory opens up, in no uncertain terms, the sheer wealth of built heritage that lies within the country presenting a deep and continuous history of technological heritage. Kallanai Dam – built over 2000 years ago across 69,000 acres of fertile delta and still in operation, the rust-free, metallurgical marvel of the Delhi Iron Pillar which weights 6,000 kgs and have resisted corrosion for 16 centuries are sites that draw our attention to a past that was inventive and advanced. Terms such as ‘traditional’ or ‘proto-industrial’ may not capture its spirit entirely.

The story of Indian struggle for independence is closely linked to the story of the struggle for its workers against oppression and for self-determination. Sites like the Salt fields of Dandi and Dharsana salt factory were sites of protest against sanctions imposed by the British on indigenous production of salt. Mahatma Gandhi’s call for adopting indigenous lifestyle and rejecting British (machine-made) goods was a frontal attack on the imperial industrial economy but also a philosophical tenet co-opting people into a small, sustainable way of life. The story of how industry was used to define a sense of self-worth and identity for people fighting for independence can be told through a series of sites.

Looking back, the decades belonging to early industrial revolution in Europe coincided with the British rule in India. Vigorous trading and related expansion by the French, Danes, Portuguese and Dutch continued alongside. Some spectacular projects were envisaged and developed during this period through a partnership between the British and the people of the Indian subcontinent that was morally and practically untenable. The UNESCO World Heritage site of Victoria Terminus in Mumbai is an example of this legacy. Some three million commuters, most of them locals who still refer to it as VT, use it daily.

It must be said here that the magnificent industrialization of Colonial India fuelled by the spirit of enquiry, bringing together culture so remarkably different cannot be seen through the innocuous concept of ‘shared heritage’. The collaboration of the colonial agency with the Indian counterparts was never a marriage of equals or a partnership of mutual benefit. The industrialization of India in all its cosmopolitanism was based on the self-serving enterprise of the British fuelled by an exploited, invisible workforce. The documentation of this history is very one-sided, sometimes constructing an almost-altruistic nature of the Raj and romanticizing a heavily unequal relationship between a white man and the brown ones. Women of both colours remain conspicuously absent from these narratives. The mainstream discourse on ‘shared heritage’ is packaged in feel-good veneer, deliberately overlooking the exploitation of people, omissions of their history or turning their reality into fantastical versions. It is important that this history is re-assessed, re-written and re-told multiple times.

Relics of the British Raj include the technological vestiges of the princely states of India, provinces ruled through alliance and not annexure. These autonomous, sometimes rogue, states produced sites of significant historic importance parallel to the imperial project of modernity. The Nawab Railway Station of Rampur, private station and saloons built for the first family of the Rampur state in Northern India, is an example of provincial efforts at industrializing. Such examples are rich in

demonstrating the cross-cultural world the royals lived in and the temperament of making things provincially, of experimentation and resourcefulness within a larger and sometimes distinct narrative of colonial history outside. This group of sites presents an indigenous modernity of colonial India.

I have learnt from my experience of working at the site of the Bhopal Gas Tragedy that disasters are chronic occurrences within the industrial regime. Much like the waste produced during the production process, they may be minimized but perhaps, not entirely avoided. Coal-mines of Jharia, a storehouse of the country's prime coke coal that have been on fire for over a century, is a particularly dystopian example of this negative heritage. Estimates vary between 400-700,000 people who continue to live on and off these mines literally smouldering under their homes. Our inventories and lists need to find space to accommodate these dissonant sites.

Modern industry identifies itself as bedrock of strong nations; their heritage lends itself very well to the construction of rhetoric of nationalism. The Indian welfare state relied upon an industrial future to create the foundation of an unbounded modernity. Prime Minister Nehru, founding member of the Non-Aligned Movement, in a legendary statement appointed these sites as 'temples of modern India'. All across the country, some our biggest and finest establishments were set up in the years proceeding Independence and this industrial temperament was celebrated across arts and science, cinema to schoolbooks. Some examples are Sindri Chemical Plant, Bhakhra Nangal Dam, Apsara Nuclear Reactor and gridiron townships of Jamshedpur, Rourkela and Durgapur. Today, many of these sites are slowly on the path to privatization and de-industrialization.

Lying just beneath the surface of the industrial sites and monuments are intangible memories that need have been included in the inventory. Illustrations of processes in the manufacture of opium in Patna, Bihar by Company Painter Shiva Lal (c.1817-1887) are revealing of the Company culture and life of the Indian indentured workers. It is not hard to discern the brutality embedded in the genteel paintings commissioned by the Company. Shiva Lal's paintings are reminiscent of Sakubei Yamamoto's coal mining paintings from industrial Japan which are now listed in the Memory of the World Register of UNESCO.

Although a few, the inventory records institutions, which work in the field of documentation & preservation of this heritage. Museums such as the National Rail Museum – an immersive museum of railway heritage containing amongst other gems the world's oldest working steam locomotive in operational service and Odisha State Maritime Museum – established in 1869 and responsible for undertaking many public works projects in famine-struck states of Bengal & Odisha, serve as educational centres and are important layer in the set of sites presented in the inventory.

Going Forward

While the scope and scalability of this project is immense, the question of limits has been a constant concern. Given that the recognition of 'industry' as 'heritage' in India, is has few precedents, what will the terms of reference to include (or exclude) sites from this inventory? If the Asian experience is indeed different from the experience of the West, how do we organize it into a useful and robust rubric? What is the necessary information to ask of a site for it to be included in the inventory (will we ask if they employed child labourers in this factory?) How will we talk of sites that threaten the notion of a nation and its constitutional commitment to equity? In part, the answer to these questions, will depend on the process we take to deliberate on the concept of industrial heritage.

India has embarked on a program for economic restructuring called 'Make in India'. It is based on

the premise that a mechanic, manufacturing-led future can resolve the problems of our developing nation. This compelling political rhetoric, that we can be 'modern' through industrial transformation cashes on the exclusive narrative of a 'glorious' industrial past. If more sustainable futures need to be imagined, we need to examine our past more critically. This is an attempt in that direction.

While this inventory can be seen as an introduction to India's industrial culture and a display of the diversity, it's real promise lies 'problematizing' how we view our past. In doing that, it could make visible conflicts, power relations and concepts such as 'industry' and 'heritage' is constructed by societies. Sites such as the Union Carbide factory in Bhopal – crumbling from apathy of the government and the city at large – should gain from this deconstruction, which promises to reveal a landscape that is both spectacular and messy.

Industrial Heritage and Democracy

Looking back, I see that the experience of the ordinary Firozabad glass factory could trigger existential questions to my adolescent mind. It is the power of the industrial space that uncomfortable questions about who we are and the society we want to create could come to me while I stood watching children not much older than me, mould glass into bangles. Years later I realized the power of industrial landscapes - our most recent past and one that represents our relationship to our hands, our bodies, our collective work – has a profound and provocative connection to the society we live in and aspire to create, to justice and democracy.

About the Presenter

Moulshri Joshi is trained as an architect and currently serves as an Assistant Professor at the School of Planning & Architecture, New Delhi. She represents TICCIH: The International Committee for Conservation of Industrial Heritage in India and is a core member of mAAN: modern Asian Architecture Network. Moulshri's professional & academic works reflect her strong base in environmental, social and political concerns of urbanism. Since 2005, she has been involved in the re-mediation and revitalization of the site of the Bhopal Gas Tragedy. She has lectured extensively on the potential and problematic notion of industrial heritage in India. She is the Associate Editor of the book 'Bhopal2011 – Landscapes of Memory'.

2. ZINC SMELTING, ON-SITE SMELTERS, RETORTS & DEBRIS AND SOURCE MINES AT ZAWAR

- *Dr Rima Hooja*

The Zawar mines area (latitude 24°18'50"N & 24°22'47"N ; longitude 73°40'22"E & 73°45'08"E), 44 km from Udaipur in southern Rajasthan, covers an approximate area of 67 sq.km. The area is one of the oldest lead-zinc-silver extraction areas in India. It stretches for at least 10 kilometers along the banks of River Gomati.

Zinc is a difficult metal to handle, but at Zawar Zinc was extracted and smelted from around the 14th century CE, and maybe earlier. The archaeo-metallurgical importance of Zawar has been described by H.V. Paliwal, K.T.M. Hegde, A.K. Biswas, Paul Craddock, Lynn Willies and L.K. Gurjar in various research papers and also by J.S. Kharakwal in his book titled "*Indian Zinc Technology in Global*

Perspective", 2011.

The exact date of early mining activity in the Indian sub-continent is unclear, but it was known to the Harappan (or Indus Valley) civilization (circa 3200-2500 BCE). Evidence of ancient mines & metallurgical slag heaps and other debris may be noted in Rajasthan and adjoining areas of Gujarat, linked to certain mineral belts along the Aravalli Range. At least 145 localities have been identified with evidence of ancient mining and metallurgy. There are ancient mine openings and worked-out mine shafts on many hills in Mochia, Baroi, Balaria and Zawarmala, in the Zawar area of Rajasthan, where current mining is also on.

Radiocarbon dating of wooden remains (ladder-ways, haulage scaffolds) found in the ancient mines at Zawar, indicate that during c.4th to 1st centuries BCE (Mauryan period) mining occurred in this region and nearby parts of southern and south-eastern Rajasthan. The mining and metallurgical industry apparently went into oblivion by the end of 7th Century and was re-started /discovered in the late 14th century. Vast quantities of lead, silver and zinc were extracted and smelted. The wider Zawar area has evidence of early mining activities – open cast and tunnelling - for ore containing lead-silver-copper. Mine shafts etc. and various material remains were reported in 20th century reports. The area also has physical remains of smelting retorts, on-site kilns, hill height debris mounds and modernized working mines from which zinc continues to be extracted & smelted.

In the late 14th century, Mewar began to use its newly re-discovered mines of Zawar, which were part of a tract wrested from the Bhils of the Chhapan area. This helped in the economic prosperity of the kingdom. Vedic texts refer to the techniques of purifying the metals and use of gold, silver, copper, tin (tripu), lead and iron. Some of the over 90 chalcolithic sites ascribed to the Ahar Culture from south-eastern and southern Rajasthan have yielded evidence of copper smelting furnaces. Mining and the administrative network associated with it during the Mauryan period is described in the text, 'Arthashastra' (believed to be written by Kautilya, a.k.a. Chanakya, chief minister of Mauryan Emperor Chandragupta). This has information on ores, detailed instructions on mines organisation, and the system of revenue collection for mines and metals. The mineral resources of the earth were regarded as state property and were an important source of revenue for the Mauryan State.

In the Zawar area itself, remains of ancient mines, iron chisels and pestle-like hammers were noted in situ at ancient workings in the Mochia mine. Remains of wooden stairways, haulage scaffolds, and staging and drainage leets etc. also survive in many mines. Samples taken for radiocarbon (C14) dating from a scaffold and leet in the Zawar Mala mine have given C14 dates of 170 +/-60 BCE, and CE 30 +/-50. The dates are comparable to other ancient silver/lead workings at Rajpura-Dariba and Rampura-Aguncha, located in the same sub-region. Radiocarbon dating of charcoal from piles of charcoal and wood recovered from the ancient mines and heaps of smelting debris at Zawar, Dariba and Aguncha by the British Museum, London, has provided the main framework for the chronology, particularly for the early periods.

Apart from these radio carbon dates, there are some known historical references to Zawar and other places, as well as some monuments in the vicinity of these areas especially the ruins of fort, dam and temples, whose dedicatory inscriptions (at some places) are clearly dateable. Together these elements enable a reasonably coherent picture of the development of mining & smelting industry in the area. Zinc extraction and smelting at the Zawar mines developed into a major industry by the 16th century and continued to flourish until the late 18th century. This is attested by the vast slag heaps at Zawar Mata, 25 miles southeast of Udaipur, along with zinc retorts, disused furnace- sites etc. and remains of old structures and temples over a large area.

Survey by a British Museum team found that the mining was helped by fire-setting, evidenced by the rounded profiles of the galleries and supporting pillars the smooth surface of the rock showing few pick or chisel marks. Some of the rock faces still bear traces of burning, everything is smoke blackened and the floors are buried deep in charcoal, ash and burnt rock. At some faces, the method of fire setting could be observed.

In India various Zinc Smelting processes are described in Sanskrit texts like Rasa-Ratnakar (2nd Century CE), Rasprakash-sudhaka (12th Century CE), Rasratnasammuchchaya (13th Century CE). These texts recommend distillation and condensation techniques for extraction of mercury and zinc from their ores. The archaeo-metallurgical Investigation at Zawar discovered intact ancient zinc smelting furnaces still containing their full charge of 36 retorts . The furnaces were used to carry out one of the most sophisticated pyrometallurgical operations in vogue in this part of world before industrial revolution in the West, a process which is still basic to all high temperature distillation & condensation operations. (Craddock et.al. 1985)

Zawar mining and smelting technology apparently pre-dates other high temperature pyrotechnologies across the world. Acknowledging this, the American Society of Metals (AMS) , USA, declared Zawar as an Historical Landmark, placing a plaque at Hindustan Zinc Ltd at Zawar in February 1989.

Zawar, with its associated remains, has made a major contribution to the scientific and technological achievements of the world, and has potential for obtaining World Heritage Status. The local mining technology and its in situ evidence deserved documentation, research & analysis, and protection. Zawar also is a valuable record of industrial heritage, and should be considered for listing on the World Heritage Site Tentative List for eventual inscription, and for being getting the highest level of national protection by the Government of India.

About the Presenter

Archaeologist, historian and writer, Dr. Rima Hooja is a former Member National Monuments Authority Govt of India. A Ph.D from Cambridge University, Distinguished International Academician of Minnesota University, and Fellow of the Royal Asiatic Society, she has been Director Minnesota University's MSID India Program and Faculty Director New York State Independent College Consortium for Study in India Program. She has held several academic posts and served on various governing boards, committees and councils. She is currently the Director (Library, Archives & Research) of the Maharaja Sawai Man Singh II Museum, City Palace Jaipur; member of Central Advisory Board for Archaeology [CABA] Government of India and the member of the Permanent Technical Advisory Committee, Government of Rajasthan. She has various books, research papers, newspaper articles and conference presentations to her credit.

3. DUTCH FACTORY OF VENGURLA, MAHARASHTRA

- Komal Potdar

Heritage is a multifaceted term, having multiple values. Besides the historical, technological and architectural values, I will be presenting a case of Industrial architecture as well as a case of shared cultural heritage of the Dutch in India. Archives of the Dutch East India Company is included in the Memory of the World Register in 2003. The Dutch East India Company (Known as VOC an acronym based on its Dutch name), founded in 1602 and liquidated in 1795, was the largest and most impressive of the early modern European trading companies operating in Asia. I have drawn some

inferences from the secondary sources and from empirical observations and will be presenting the case of Dutch factory in Maharashtra, one of the few remnants of this heritage which is in dire need of attention.

The trade, both overland and overseas was dictated by three fundamental and mutually dependent processes of:

- Commercialisation
- Monetisation
- Urbanisation

Controlled by the Dutch East India Company, known as VOC), the period of vigorous trade and commerce lasted up to 1795. However, cultural engagement between the two countries continued over the next two centuries as is evident from the writings of travellers.

Historiography on Indian maritime trade in the early modern period has undergone a significant change in the last three decades or so. Contributions came from distinguished historians who worked both at micro and macro level on the four important trading zones of India, namely.

- Dutch Surat
- Dutch Malabar
- Dutch Coromandel
- Dutch Bengal

The historical legacy of the vibrant Dutch presence in India is today visible in the form of fortresses, tombs, cemeteries, grand country houses, factories, and other remains in brick, stone and plaster. Some are ruined, others are well preserved. They are scattered along the entire Indian coastline from Surat to Kolkata, including Vengurla, Kochi, Nagapattinam, Pulicat, Visakhapatnam, Baleshwar and several others.

Case of Vengurla Factory

Vengurla town lies at the southernmost tip of Maharashtra, near Goa, with a coast facing the Arabian sea. Vengurla was an important port and trading center since ancient times and many foreign powers in the modern period. In 16th CE the port town was under the rule of Bijapur Sultanate. The town was used by pirates as their retreat during that period.

A group of Dutch merchants lead by Leendart Janszons obtained a permission from those rulers to build a fort structure to be used as a store house in the year 1639. The construction was actually completed in 1655. This structure had fortlike walls and bastions and protected by guards and they used canons and guns for the purpose. There was big trench all around the fort. Inside there were various structures such as castle, store houses etc.

Due to this trade to Vengurla increase many fold and the town started receiving trading ships from many countries. Records state that the settlement was used for trade and to launch an attack on the Portuguese in Goa. In 1638 the Dutch settlement at Vengurla supplied food and stores to their ships during their eight-month blockade of Goa. The Dutch fought with Portuguese over the trade and territorial controls in Goa for which they used the base of Vengurla for supplies. But over the time Dutch lost the control due to navy of Shivaji and increasing trade capacities of the British. Due to all these reasons they left the town in 1682 and eventually the town came under the control of Khem Sawant of Sawantwadi and subsequently British.

The Factory seems to have taken cues from local architecture techniques of the Konkan region. The

sloping roof with country tiles, ventilators and double height structures for light and ventilation are a few features observed from this archival photograph.

All the rich wooden structures and its parts have been stolen over the time. In 1974 the site has been officially transferred to the Archaeological Survey of India. During the time of rule of Indira Gandhi some work was started to restore this site with the help of Dutch government but they were not pursued further and the site is in total ruins.

The University of Delft has been documenting Vengurla as the place has architecture and urban planning that has strongly been influenced by the presence of the Dutch settlement. Few historians and history buffs have taken interest on social media to create awareness. There have been news published, but has not resulted into any action so far. Smaller initiatives at NGO and institutional level have been taken up. For example, the Workshop in Bhimli (East coast-Coromandel Dutch) and in Dutch Bengal, the Chinsurah Project. Such a multi-stakeholder engagement to require to bring attention to these places of shared cultural and industrial value.

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4. TRADITION AND INNOVATION IN THE HISTORY OF IRON MAKING: AN INDO-EUROPEAN PERSPECTIVE

- *Dr Jan af Geijerstam (The Swedish Industrial Heritage Association/TICCIH Sweden)*

Iron is the one metal that has had the greatest significance for humanity. Iron and steel has been produced and worked for millennia. Its making shows independent development in different parts of the world, but basically its history is highly international. Trade and international contacts has spread the knowledge of its production and use across the world, on a global scale especially since the advent of industrialisation in the mid nineteenth century. The history of iron making in India and in Europe has multiple interconnections, and both the present and the histories of the one is part of the history of the other.

This paper uses two cases of technology transfer in the early 1860ies, from Sweden to India, to illustrate these kinds of interconnections. It puts a special stress on the fundamental importance to cross borders in order to find sources in the study of the industrial heritage.

Some notes on Iron and Steel Production in India

India has a very long history of iron making, not least shown by examples such as the Iron Pillar in Delhi and by remains of innumerable sites of traditional iron making spread all over the sub-continent. This tradition of iron production, which still might be possible to find practised, is shown at Indira Gandhi Rashtriya Manav Sangrahalaya (Museum of Man) in Bhopal.

The development of the blast furnace for producing iron was a technological shift of paramount importance. In Europe this technology can be traced back at least to the twelfth century and it became totally dominant for producing iron in the world. The process increased production many times over and saved fuel.

The blast furnace was first introduced in India under colonial rule in the early nineteenth century, but British colonial supremacy did not allow this modern technology to grow. With few exceptions (primarily Tisco in Jamshedpur) it lasted till after independence before large-scale modern iron and steel making was firmly established in India. In post-colonial India iron and steel production became an important symbol of independence.

Among the few pilot efforts to build modern iron and steel works in India were the Burwai Iron Works (Madhya Pradesh) and the Kumaon Iron Works (Uttarakhand). At both Swedish engineers were employed during the early 1860ies. The projects were pioneering. The ambitions were high and stakes big – and after only a few years the projects were closed and the Swedes returned home. In both cases the cause of the failures were basically economical/political rather than technological. Thus they also tell about the conditions for independent industrial development during colonial rule. Industrial heritage and cross-country research.

Both pre-industrial iron making and later phases of steel making have left numerous sites of industrial heritage. There is a need to use different methods as well as a multitude of sources in many countries in order to fully grasp and understand their character.

This presentation gives a number of examples of such sources, which could serve as an inspiration also for the exploration of other branches of industry. For a detailed list of printed material, sources and archives in India, Great Britain and Sweden, please refer to Geijerstam (2014), *Landscapes of Technology Transfer*.

- Field studies. The study of physical remains and of the environment into which they is placed imperative.
- Situated knowledge and oral traditions. Men and women carry a direct and deep knowledge of sites and history, especially since industrial history often belongs to a recent past.
- Drawings and plans. Contemporary plans of the layout of the works and detailed blueprints of individual buildings are essential.
- Photographs. Invaluable sources of knowledge of industrial history are archival photographs. They remain all too often unused, but shed light not only over the layout and equipment of the sites, but can also show it was used and organised – the social construction of space.
- Official records. In the case of India it should be noted that The Board of Directors of the British East India Company and, from 1858, the Government of India in Calcutta were, like the Home

Government in London, all very well informed of every step of development of many individual industrial or infrastructural projects. Note especially the Oriental and India Office Collections of the British Library, London (OIOC).

- Archives of personal origin as well as official and company archives. In the case exposed here, especially in Sweden.
- Analogies and prototypes. An approach to an understanding of the physical organisation of the works in India is to study contemporary technology in the countries of origin. Of importance are also experiences of from previous jobs and plants brought to India by individual engineers etc.

A note of Caution – Silences in the Sources

The British, and in the cases described in the paper also the Swedes, have left the decisive footprints in the archives. This strongly influence our view of the past. Even if research is intended to transcend boundaries of culture, class and gender, it easily becomes trapped in a perspective with a Eurocentric, upper class, male, bias. The biases in the sources means that Indians, the lower classes, women, the young and the elderly, belong to the groups that almost never get a voice. The unequal balance of power in a colonial setting and linguistic barriers make a change of perspective more difficult.

In his work on the construction of the Indian railways the Canadian historian Ian Kerr has noted that: “Nineteenth-century construction workers will always be mute: people spoken of, who left no first-hand accounts of their own.” This should become an exaggeration. Historical research can help give voice to seemingly mute witnesses, sometimes through the medium of other actors. Points of conflict and contradiction, which are reflected in the sources can, as one example, give a first opportunity of constructing a perspective “from below”, since by their very existence they demonstrate the presence of opposing interests.

A Note for the Future – Safeguarding a Legacy

There are strong geographical imbalances in industrial heritage studies and preservation. The focus is on the industrial histories of Western Europe and North America. There is a gap to be closed.

Neither of the sites of the Kumaon and Burwai Iron Works is acknowledged as industrial heritage sites or protected. As many industrial heritage sites of India they are silently disappearing.

“Today the industrial heritage lies unprotected and threatened.” Divay Gupta, today principal director of INTACHs Architectural heritage Division, wrote in in 2004. “This is mostly due to lack of awareness regarding the significance of this cultural resource, as well as lack of any legislations or policies and institution for the protection of Industrial Heritage.” (TICCIH bulletin, no. 25, 2004).

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About the Presenter

Jan af Geijerstam, PhD, is an independent researcher and author from Stockholm, Sweden. He is the Chairman of SIM/TICCIH Sweden. Jan has undertaken extensive research and writings in industrial heritage and the history of the iron and steel industry. His work has a special focus on India, Indo-Swedish relations and photography.

5. RAILWAY HERITAGE OF EAST INDIA

- *Kamal Banerjee*

Three coaches, each a tad smaller than a city bus, are tugged by a miniature engine running at a snail's pace of fifteen kilometre an hour. The stations are also referred to as 'halts' have no platforms almost and passengers wait alongside the tracks. This was the world of light railways, a colonial legacy once managed by McLeod & Company of the UK and Martin's Light Railways (MLR) in Bengal.

In 1870 Lord Mayo introduces meter gauge as a compromise between proposals for narrow gauges less than 3' and broad gauge, for use in areas with limited traffic. In 1880 the Darjeeling Steam Tramway (later the Darjeeling Himalayan Railway) started services on its first section, the Siliguri-Darjeeling line. While Bihar's cute, light railways had been owned and operated by Martin Burns, except Howrah–Amta and Howrah–Sheakhalla Light Railways the Bengal quartet was managed by McLeod & Co.

McLeod's Light Railways (MLR) consisted of following four 2 ft 6 in (762 mm) narrow gauge lines in West Bengal in India. The railways were built and owned by McLeod & Company, which was the subsidiary of a London company of managing agents, McLeod Russell & Co. Ltd. In 1966 the Indian Railway had taken over the operation of this narrow gauge by phases from its owner, McLeod & Company. The excessive time consumed by the narrow gauge trains to reach either of the destinations had de-popularised the services which earlier had been a lifeline in this part of Bengal. On 1 July 1967, MLR was merged with South Eastern Railway.

The oldest one opened in 1913 while the newest, Kalighat to Falta opened on 28 May 1917 from Ghoshapur in Behala to Falta and was extended to Majherhat on 7 May 1920. This line was closed in 1957, some years after the independence of India, when the British owners, McLeod, wound up their operations in India and Government of West Bengal thought it would be the best option to close down this stretch of railway tracks and to incorporate it under government arm. The reclaimed land, from where the tracks used to be, has been used to construct a road, the wide James Long Sarani in Behala. The KFR line was the first in India to use three brand new 2-6-2 side tank AK16 locomotives, built in November 1916 by W. G. Bagnall Ltd. of the Castle Engine Works at Stafford in England.

The Burdwan-Katwa-Ahmadpur continues its wheel for some 100 km though the Bengal countryside to echo the industrial prowess that once went with good quality coal at hand. Incidentally Prince Dwarkanath Tagore, grandfather of bard Rabindranath controlled the first coal bunkering of the steamboats in the Ganges. The Railway connecting Bardhaman and Katwa in West Bengal was opened to traffic on 1 December 1915. The railway was built in 2 ft 6 in (762 mm) gauge and total length was 53 kilometres. The 'AK' name stood for 'Ahmedpur-Katwa'. They employed 'Delta Class' engines. The engines were originally ordered by the Egyptian Delta Light Railways but were more successful in India and a lot many were used in the following years till 1953 when the last order was placed. One of the 1916 built Bagnall locomotives has been preserved by the Phyllis Rampton Trust in the UK. The engines chugged along at the maximum speed of thirty km per hour. The fifty two kilometers long railway section went under conversion to broad gauge in two phases.

Bankura-Damodar Railway connecting Bankura and Bardhaman districts in West Bengal was opened to traffic in December 1916 and June 1917. The railway was built in 2 ft 6 in (762 mm) gauge and total length was ninety seven kilometres (60 mi). The railway was known as Bankura Damodar Railway, as it used to terminate at Rainagar, which was on banks of Damodar River. People used to take ferries to cross river to go on other side. The standard locomotive for BDR was a powerful 0-6-4T design

but during the First World War and some 2-6-2T engines were also obtained from Stafford Company of Bagnall. The BDR services were withdrawn in 1995 after it incurred huge losses due to higher maintenance costs, falling passenger numbers as well as falling freight. In 2005, the one hundred and twenty kilometers long railway section was converted to broad gauge and train services were resumed. Extended part to Mosagram was opened in 2012 to connect Howrah Bardhaman Chord Line. There were two Sentinel locomotives and one is now preserved at the National Rail Museum, New Delhi.

The Howrah–Amta Light Railway had its origin in an agreement, dated 12 June 1889 between the District Board of Howrah and Messrs. Walsh, Lovett & Co., which was subsequently renewed with Messrs. Martin & Co., and sanctioned by Government notification in the Calcutta Gazette of 27 March 1895. The railway connecting Howrah and Amta in West Bengal was opened up to Domjur in 1897, and to Amta in 1898. An extension from Bargachhia Junction to Antpur was opened in 1904, and a further extension to Champadanga in 1908. The total length of the railway was 42 miles (68 km). Both the Howrah- Amta and Howrah-Sehakhala lines start from Telkalghat on the Hooghly River, running to Kadamtala station. Here they separate, the Howrah-Sheakhalla line running north-west along the Benares road to Shiakhala in Hooghly district. The Howrah-Amta line runs west, chiefly along the side of the Jagatballabhpur road and then goes south-west to Amta.

Howrah–Sheakhalla Light Railway

The railway connecting Howrah and Sheakhalla in West Bengal was opened in November 1897 and the Chanditala-Janai Branch Line was opened in 1898. The total length of the railway was 42 miles (68 km). Both the Howrah- Amta and Howrah-Shiakhala lines start from Telkalghat on the Hooghly River, running to Kadamtala station. Here they separate, the Howrah-Sheakhalla line running north-west along the Benares road to Shiakhala in Hooghly district. The Howrah Amta line runs west, chiefly along the side of the Jagatballabhpur road, then go south-west to Amta. The railway was converted to (5 ft 6 in) broad gauge and reopened in 1990s. The route is now part of Kolkata Suburban Railway system.

The Barasat-Basirhat Light Railway (BBLR) was a short 2ft 6in/762mm narrow gauge railway which ran from Barasat, to Basirhat. The line opened in 1905 and extended to Chingrighata in 1909. The ‘Shambasar Branch’ opened in 1910 reaching Belgatchia in 1914, giving a total length of 52 miles (83km). The Barasat-Basirhat Light Railway Company was one of several small narrow gauge concerns owned and worked by Martin’s Light Railways, a management company based in Calcutta The line was taken over by Indian Railways in 1952 but closed in 1955. In 1962, part of the old track was converted to broad gauge and re-opened to traffic.

These unremunerated lines remain open for what the railways describe as ‘social costs’ and it seems only a matter of time, with the swing away from international socialism, that such free loading services will get the chop. Not even the most left-leaning of passengers in Bengal considers it his right to travel free by bus.

Such mundane reckoning were soon forgotten when we cast oureyes over the railway stations Tottering, tatty and woebegone, it was everything a narrow-gauge steam lover could wish for. Grass grew between the lines that led to the loco shed and this held out the rare promise of some overlooked treasure rusting in the sidings, too modest in her scrap value to arouse the lust of railway economists. The extraordinary workmanship that went into these old steam locomotives is what sealed the bond between a railway company and a distant manufacturer.

Last but not the least, Calcutta had a full fledged system of garbage disposal through railway network. Other than the normal railways, there was also Industrial Railways in the latter half of 19th Century meant for carrying the refuse of Calcutta to a dumping ground at Dhapa, (then known as the Square Mile). Commonly known as 'Rubbish' or 'Garbage' train, this Railway system was officially known as "The Municipal Railway, Calcutta".

There were six platforms on the system where refuse was transferred from carts to railway wagons. The system opened in 1868 when there were eight miles of track. By 1895 there were 23 miles of track, including sidings. As well as carrying the city refuse and offal from the slaughterhouse, the system was also used to deliver road-building materials to various Corporation depots around the system, there were on average 15 wagons used for this purpose.

About the Presenter

Author is an independent heritage researcher and associated with INTACH Kolkata chapter. He also co-authored the compendium of 'Calcutta Built Heritage', a comprehensive guide for Calcutta researchers. A panel journalist for The Times of India, Kolkata Mr. Banerjee wrote various articles including heritage, environment, festivals etc. from time to time. His ongoing project on 'Unprotected built heritage of Malla dynasty at Joypur' has saved many Terracotta temples which were left under collective oblivion and bringing Joypur as a tourist destination. He is also working to save the relics of the light railways in the eastern India.

6. INTRODUCTION TO THE SHIP BUILDING INDUSTRY OF INDIA

- Priyanka Talreja

India with its vast peninsular coastline has a lot to offer in terms of maritime exploration and marine heritage. Tangible and intangible evidences from various centuries have brought to the light the evolution and skill development within the ship building industry. From pre historic seals and sculpture to the current Indian navy prowess, the industry has been a major contributor to the economy through its transport and trade.

Port city infrastructure, development of trade routes, the boat building craft and coastal biodiversity are aspects within the tangible heritage that need constant attention and support. Skills such as nautical science, hydrography and cultural arts are intangible aspects which must go through systematic documentation and preservation processes. Conservation efforts to safeguard the marine heritage of India are crucial to spread awareness and promote the ship building industry of India.

Other Presenters

Munish Pandit

Munish Pandit is a Conservation Architect and heads Sanrakshan Heritage Consultants Pvt. Ltd. Mr. Pandit, from past 20 years, has been actively working towards conservation of built heritage nationally and internationally. As a consultant to UNESCO, he has been providing his services in developing World Heritage Nomination for sites in Maldives. His experience ranges from preparation of Conservation Plans for heritage sites to writing of Nomination Dossiers & Management Plans for World heritage sites. He serves as a Visiting Faculty at the University of Mauritius and National Museum Institute. He is the Vice-President for International Scientific Committee on Intangible Cultural Heritage of ICOMOS. He is also coordinator for the National Scientific Committee on Intangible Cultural Heritage for ICOMOS India.

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Devansh Mahajan

An architecture graduate from School of Planning and Architecture, Delhi, Devansh Mahajan's interest in industrial heritage and adaptive reuse developed through a studio exercise of converting the IP Power Plant into an aviary and research centre. He further pursued this subject in his thesis proposal of urban riverfront development on the post industrial site of the Pragati Power Plant along the Yamuna river in Delhi. His interest in understanding the scope of industrial heritage in India and in the development proposal of the Bhopal Gas Tragedy Memorial influenced him in joining the team of Space Matters. He wishes to seek further knowledge on post disaster landscapes, industrial heritage and development of post-industrial communities from a global perspective.



Photo by Moulshri Joshi



Photo by Moulshri Joshi



Photo by Jan af Geijerstam



Photo by Jan af Geijerstam



Photo by Jan af Geijerstam



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