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INAUGURATING THE BRIDGE AT SUKKUR

A COMPLEMENT TO THE RECORDS[1]

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EPIGRAPH

"I do not know whether this is the spot where Alexander breakfasted with his Superintending Engineers – Perdiceas and Hephaestion- but neither do I know that he breakfasted elsewhere, so that perhaps to enhance the solemnity of the occasion, we may take it for granted that we are seated on the very same spot on which Alexander sat several centuries ago. (Laughter and cheers) (SB, 1889, p. 11).

Excerpts from :
(*SB*, 1889), *The Sukkur Bridge*. *Description of the North Western Railway Bridge over the Indus at Sukkur*
Lahore , N.W. Railway Printing Press, 1889.
A main source for this brief synthesis

See also *The Times of India*, April 3rd, 1889. "Opening of the Sukkur Bridge".

A. THE WORK

PHOTOGRAPHS N° 1, 2, 3, 6, 7. © F. DASQUES

The British project :

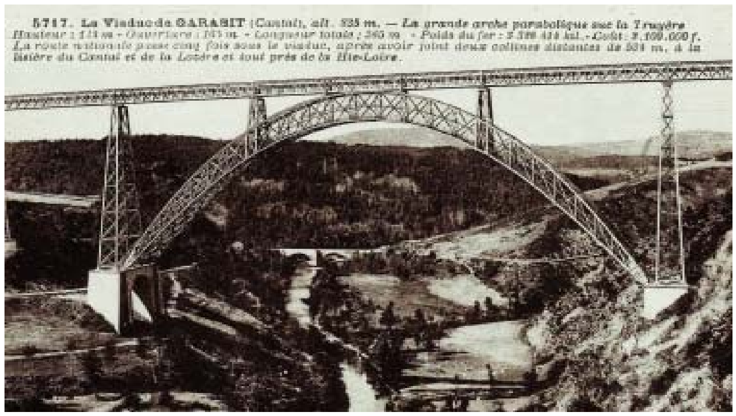
[1] RESEARCH ON THE SUKKUR BRIDGE HAS BEEN MADE POSSIBLE THANKS TO THE HELP OF THE COMMISSIONER OF THE SUKKUR DIVISION, SINDH, PAKISTAN, MUHAMMAD ABBAS BALOCH.

. "Realizing a security and protective objective".

"Lessening the frailty of the position in that part of the Empire, susceptible to western invasions".

After the construction in 1871 of a railway (the Indus Valley State railway), a bridge is planned. The Lansdowne bridge will be a fortified bridge.

"Surveys were made between 1872 and 1874, for a



general settlement of the question of site. The site is discussed, as well as the constructing materials (span in iron or steel), and the type or style of the work. […] Finally it was decided to adopt a design prepared by Sir Alexander Rendel on the cantilever principle."

"The work will start in the course of the winter of 1883-84 and will be finished in March 1885". Unfortunately… "little could be done till the bed plates for the Bakkar cantilever arrived, at the end of May 1887, and a full supply of iron work for the Bakkar cantilever was not received till September 1887".

"The span was originally calculated by triangulation, and checked by an instrument for measuring with a wire, invented and made for the bridge over the Sutlej at Adamwahan (Punjab) by Mr. J. R. Bell. This instrument will detect an error of ¼ inch in the span of 820 feet."

"A padlock was designed by J.L. Kipling, Principal of the Mayo School of Art, Lahore".

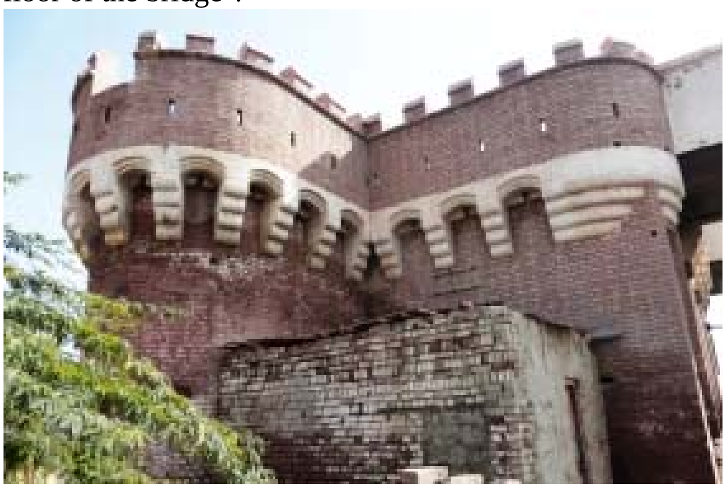
B. THE TEAM

PHOTOGRAPHS N° 4, 5. © F. DASQUES

"The work in India and the mode of, and appliances for erection were designed and supervised by Mr. F. E. Robertson, Supdg. engineer. Mr. M.S.N. Hecquet (*French*) was in sole executive charge throughout, with one European Overseer, Mr. A.D. Hecquet (*French*), and one Native Sub-Overseer, Faiz Mahomed.

Messrs. P. Duncan, R. Egerton, and J. Adam, were also associated with the work as Assistant engineers at different times".

"The completion of the bridge in spite of the difficult places, in which the men had to work, has fortunately been accomplished without accident, except to four men who fell at different times and were killed, and two who were killed by tools falling from a height. None of those who fell were engaged in a hazardous occupation; one indeed fell off the main floor of the bridge".

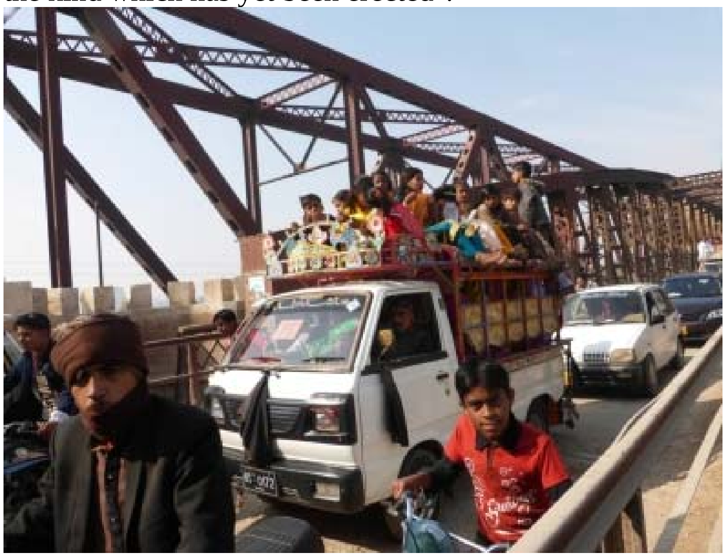


C. INAUGURATING "THE GREAT STRUCTURE OVER THE INDUS".

A blessing was delivered by the bishop of Lahore : "May this bridge be a highway of peaceful communication" (*SB*, 1889, p. 10).

The work was opened by Lord Reay, Governor of Bombay, representing the viceroy of India, Lord Lansdowne (1888-1894).

"And the cumbersome iron gates swung slowly back on their powerful hinges, opening to traffic the largest structure of the kind which has yet been erected".

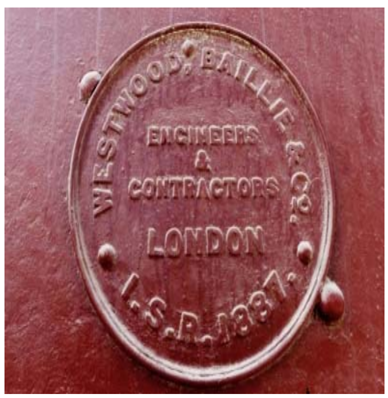


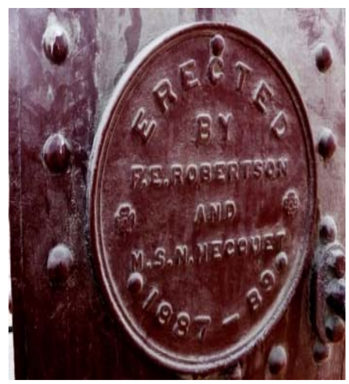
THE SPEECH

"Sind is essentially what I venture to call an Engineers' Paradise. (Laughter). It is difficult to realise what Sind would be without engineers. (Laughter and cheers). We certainly should not have irrigation and consequently no land revenue: we should not have any railways: we would not have any accessible harbour at Kurrachee: but what we certainly should be able to enjoy to our hearts' content would be the capricious operations of the Indus. We owe it, in the first place, to our engineers that the Indus, from being an uncontrollable factor in the situation, has become comparatively a subdued and fertilising agent, although requiring constant attention to prevent his giving us the slip. But we cannot forget that the

Indus is link in the chain of our defences, which aim at creating a sense of security by invulnerability.

One of the first conditions of progress is the sense that you will be allowed to reap what you are sowing. This bridge over the Indus and the railways which are connected by it, are intended to reduce our vulnerability to a minimum, and to raise our peaceful advance along the whole line of industrial, artistic and scientific progress to a maximum. Without a strong front there could and there would be no progress in the rear. (Cheers). Therefore, we are justified in looking at these great works of civil and military engineering skill as bulwarks of progress, behind which other pioneers of Western civilization are allowed steadily and safely to improve the condition, moral and material, of the people of this great Empire. (Cheers).

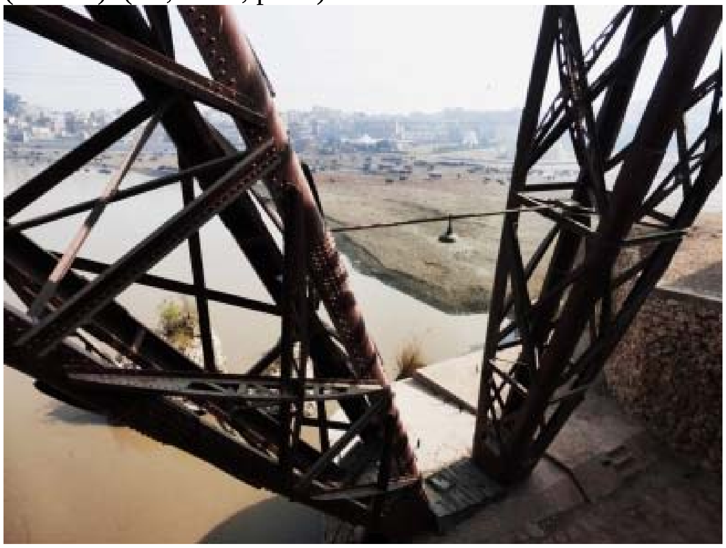




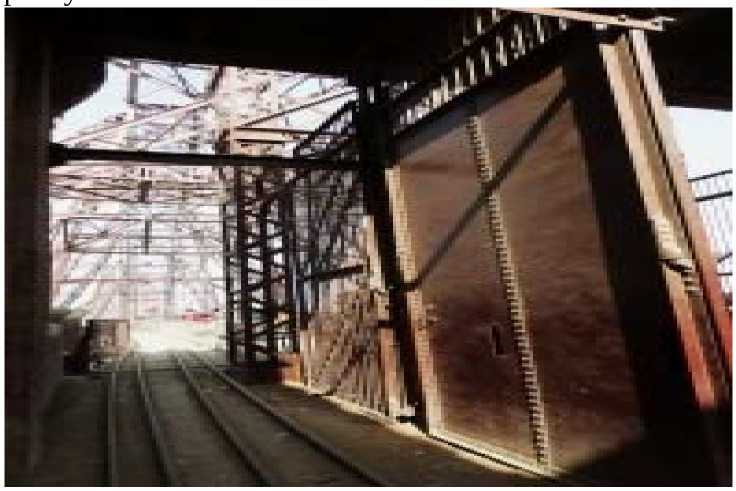
We have been told lately by a great authority that in India arithmetic was first developed. The numerals 1 to 9 came from India, and also that quantity which in mathematics is so important – O. Well, if we received from India the knowledge of arithmetic; I think we are to-day reciprocating the compliment, because without arithmetic there would certainly have been no (p. 13) Lansdowne Bridge – (cheers) – and the use which has been made of arithmetic by our friend, Mr.

Robertson, is best illustrated by the fitness of his executive work. (Cheers). (*SB*, 1889, p. 12, 13).
[…]

There is another very satisfactory factor which I ought not to omit, and which perhaps Mr. Robertson will allow me to connect with the name of his indefatigable colleague, Mr. Hecquet, who on this occasion represents in the most happy fashion our historically of former days of co-operation between the two great Western Powers *(Britain and France*). (Cheers). We owe it to Mr. Hecquet that the number of fatal accidents in connection with the construction of this bridge has been limited to six, which number, as compared with the casualties in other works of the kind, represents an unusually low percentage, and reflects the greatest credit on those in charge of the work. (Cheers). (*SB*, 1889, p. 13).



When I began, I alluded to this bridge as being one of the chief links of what I ventured to call the chain of invulnerability of our Empire. But there is another aspect. This bridge will also contribute materially to promote commerce and industry, and in that respect also it will materially add to our safety. If we can, over this bridge, establish a permanent current of imports and exports to and from our neighbors in Afghanistan, we may thereby cement our friendship with that Power, and obtain the same results which have been brought about by the introduction of railways in the frontier country accompanied by the skilful policy of Sir Robert Sandeman.



It is from that point of view also that we must look at the juxtaposition of these two great factors of trade –the railway and the river; because, though of late years water traffic has been rather at a discount in comparison with railway traffic, still we cannot forget that as our trade increases in volume, it may be necessary again to make some advances to that discarded suiter, because the capacity of railways is, we are told, only one tenth of the capacity of carriage by water. That consideration has led the French to pay special attention to their canals. That day may, therefore, not be far distant when the volume of our trade will be such that we shall have to ask, as we are now doing in England with the Manchester Canal, for the relief of canals, and we shall then have to turn our attention again to the stream flowing under this bridge. (*SB*, 1889, p. 14).

The chief engineer, Robertson, delivered a few words (although "The profession of an engineer was not one which usually called for the display of any special oratorical powers. An engineer did not as a rule require to choose his words so as to conceal his meaning –he simply required to express his meaning in the fewest and lost direct terms".)

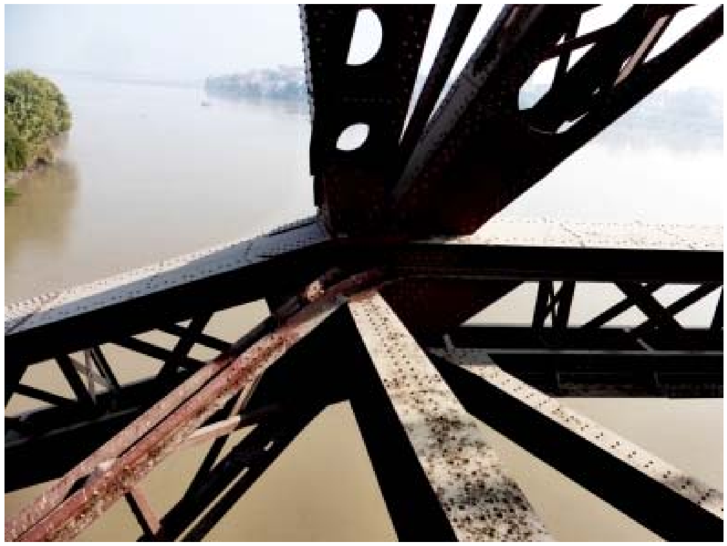
Robertson ... "He must thank the Locomotive Department for the vast help rendered by them, especially when so much work was lying in their own shops. He also had to acknowledge the services of a department that usually got more blame than praise –he meant the Stores Department. (Cheers). Their space at Bakkar was so limited that every piece of iron used in the construction of the bridge had to be stored at Kurrachee and sent to the scene of operation piece by piece as it was wanted." (*SB*, 1889, p. 16).

D. EPILOGUE : ON THE STRUCTURE

"The Sukkur Bridge was designed by Sir A.M. Rendel (*annex I*), and constructed by Messrs. Westwood and Baillie of Poplar, London (*annex II*)."

The Rohri or big span... will be as present much the largest span of rigid bridges in the world ; the next in size being the Poughkeepsie Bridge of 548 feet span, (New York, over the Hudson river, 1889, *annex III*)) and the Garabit Viaduct, a steel arch of about 540 feet span across a valley in the south of France (1880's ; photograph, FRENCH GARABIT BRIDGE BY G. EIFFEL. F. Dasques' collection).

The Sukkur Bridge is based on the cantilever principle *(annex*



E. Remaining investigation on the French engineers involved in the Lansdowne bridge operation.

Research on the two French engineers who collaborated to the erection of the Lansdowne Bridge is in process. Hecquet is a creole name from Pondichéry. They The two Hecquet (father and son ?) seem to have worked (been trained ?) at the local Ponts et Chaussées (French PWD), during the last third of the 19th. c., when the *comptoir* was a French dependency.

Various French engineers took part in a number of colonial works of art in India, mainly buildings and bridges. Others were involved in what we could call the PWD technical laboratory. We are presently working on the French technical and formal influence in 19th. c. Indian construction.

Related information, selected from Wikipedia, the free encyclopedia

Annex 1.

Sir Alexander Meadows Rendel (3 April 1828, Plymouth – 23 January 1918, London), English civil engineer.

Rendel was born in Plymouth. He was educated at The King's School Canterbury and Trinity College, Cambridge.

"Rendel was the engineer of the London Dock Company in 1856, and was responsible for the Shadwell Basin, the Connaught Tunnel and the Royal Albert Dock in London, the Albert and Edinburgh Docks in Leith, Workington Dock and Harbour. In 1857-1858 he visited India, and was consulting engineer to the India Office, the East India Railway and other Indian railways, and was a member of the Commission to determine narrow gauge for Indian Railways, in 1870. He designed the Lansdowne Bridge, Rohri at Sukkur over the Indus River, which when it was completed in 1889 was the largest cantilever bridge in the world. The climax of his bridge-building career was considered to be the Jubilee Bridge allowing trains to cross the Hooghly River near Calcutta; this was opened on 21 February 1887."

Alexander Rendel died at 51 Gordon Square, London on 23 January 1918.

Source : Wikipedia.

ANNEX II.

"Westwood, Baillie and Co was a Victorian engineering and shipbuilding company based at London Yard, in Cubitt Town, London."

"The company was set up in 1856 by Robert Baillie and Joseph Westwood, previously managers of Ditchburn and Mares shipyard."

"For much of its life the company produced iron and steel work for bridges. In 1887 the company made the girders for the Lansdowne Bridge over the Indus River, then the longest rigid girder bridge in the world. Work on a more modest scale included a railway footbridge that can still be seen at Romford railway station, and the 1879 swing bridges over the Royal Albert Dock."

Source : Wikipedia.

ANNEX III.

Poughkeepsie bridge, New York.

"The bridge was designed by Charles Macdonald and Arthur B. Paine. As is typical for cantilever bridges, construction was carried out by constructing cribwork, masonry piers, towers, fixed truss sections on falsework, and finally cantilever sections, with the final cantilever interconnection (suspended) spans floated out or raised with falsework."

"The bridge was considered an engineering marvel of the day and has seven main spans."[…] "It is a multispan cantilever truss bridge." […] "All spans were built of newly available Bessemer Process "mild" (between 0.16% and 0.29% carbon) steel, while the two approach viaducts were built of iron." […] " The first train crossed the bridge on December 29, 1888, and it was formally opened for scheduled passenger service on January 1, 1889."

Source : Wikipedia. Annex V

"A cantilever bridge is a bridge built using cantilevers, structures that project horizontally into space, supported on only one end. For small footbridges, the cantilevers may be simple beams; however, large cantilever bridges designed to handle road or rail traffic use trusses built from structural steel, or box girders built from prestressed concrete. The steel truss cantilever bridge was a major engineering breakthrough when first put into practice, as it can span distances of over 1,500 feet (460 m), and can be more easily constructed at difficult crossings by virtue of using little or no falsework."

[…]

"Heinrich Gerber was one of the engineers to obtain a patent for a hinged girder (1866) and is recognized as the first to build one. The Hassfurt Bridge over the Main river in Germany with a central span of 124 feet (38 meters) was completed in 1867 and is recognized as the first modern cantilever bridge."

Source : Wikipedia