

**LONG-SPAN RAILWAY BRIDGES;
COMPRISING INVESTIGATIONS OF THE
COMPARATIVE, THEORETICAL
AND PRACTICAL ADVANTAGES OF THE
VARIOUS ADOPTED OR PROPOSED TYPE
SYSTEMS OF CONSTRUCTION**

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Long-Span Railway Bridges; Comprising Investigations of the Comparative, Theoretical and Practical Advantages of the Various Adopted or Proposed Type Systems of Construction by B. Baker

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B. BAKER

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COMPREHENDING

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WITH

NUMEROUS FORMULÆ AND TABLES,

GIVING

THE WEIGHT OF IRON OR STEEL REQUIRED IN BRIDGES
FROM 300 FEET TO THE LIMITING SPANS.

BY

B. BAKER.

*(Reprinted from ENGINEERING. The whole carefully revised and
extended.)*



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P R E F A C E.

THE contents of the following pages have already appeared in the columns of *Engineering*. The purpose of this "*replica*" is to present the revised results, and tables, in a more accessible form than they could attain scattered in a desultory manner through successive numbers of a periodical.

The subject, in its present form, was suggested by the discussion, at the Institution of Civil Engineers, following Mr. Barlow's paper on the Clifton Suspension Bridge; when the absence of any simple generalisation of the question was evidenced. Prior to that time, however, the consideration of "Long-span Railway Bridges" devolved upon the author in the course of his professional duties, and some valuable data had accumulated. On proceeding with the investigation, it was at once seen that a strictly mathematical treatment of the subject would entail lengthy and involved formulæ, and absorb

far greater space than was available for the purpose; indeed, the works of Gaudard and Schwedler, treating on the same subject, but within very narrow limits, plainly illustrated this fact. Accordingly, the various hypotheses, which it is absolutely necessary to make in an inquiry of this nature, are framed as comprehensively as possible; and in many instances the result of a careful balancing of probabilities is given without exhibiting the process by which it has been evolved. In short, elimination, and not elaboration, has been the aim throughout.

B. B.

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LONG-SPAN RAILWAY BRIDGES.

ACCORDING to Dr. Johnson, a bridge is "a structure to carry a road across a watercourse;" and although this interpretation of the word is not sufficiently comprehensive to include all cases in the present progressed stage of the art of building, yet, if we limit its application to *long* spans alone, we may even render it still more explicit, and with very little liability to error define a long-span bridge to be a structure for carrying a *railway* across a watercourse. The reasons why this is the case are sufficiently obvious: in the first place, the condition necessitating the adoption of a long span is generally either that a certain width of opening must be provided clear of all obstructions, or that the expense of carrying up a number of lofty piers is, owing to some difficulty in obtaining secure foundations, so great as to render it more economical to reduce the number of individual supports, and so concentrate the resulting greater load