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## BOOK REVIEWS.

**Artistic Bridge Design.**—A Systematic Treatise on the Design of Modern Bridges according to Aesthetic Principles. By Henry Grattan Tyrrell, C.E., Bridge and Structural Engineer. Chicago: The Myron C. Clark Publishing Co. Cloth; 6 x 9 in.; 294 pages; 242 figures (about 80 full-page half-tones). Price, \$3.00 net.

Reviewed by C. R. Young, B.A.Sc., Consulting Engineer.

Although several comprehensive discussions of bridge aesthetics have appeared in the transactions of the great engineering societies and as chapters in general treatises on bridge design, Mr. Tyrrell's book is the first one in English, as far as the reviewer is aware, to be given over entirely to the consideration of this subject.

The author's purpose, as disclosed in the sub-title, is a commendable one, and, broadly judged, he has treated the subject well. Such criticisms as a careful reader may make are largely those of detail, and cannot be said to challenge the value of the book as a whole.

After a splendidly-written introduction by Mr. Thomas Hastings, of Carrère & Hastings, the well-known architectural firm, of New York, the author justifies his choice of subject by showing the importance of bridges, their effect on civilization and progress, and the necessity for artistic bridge construction. He then proceeds to establish "Standards of Art in Bridges," stating and discussing the following five:—

1. Conformity with environment.
2. Economic use of material.
3. Exhibition of purpose and construction.
4. Pleasing outline and proportions.
5. Appropriate but limited use of ornament.

In the fourth chapter, which, it would seem, in the interests of logical arrangement, should have preceded the one just mentioned, the author effectively sets forth the "Causes for Lack of Art" in bridges. Chapter V., entitled "Special Features of Bridges," is given to the consideration of bridges carrying buildings, memorial arches, towers, etc., but rather curiously, it has been made to include also the very general subjects of the kinds of bridges from the standpoint of the material employed and the selection of the bridge type. Eight "Principles of Design" are elaborated in Chapter VI., which if followed would, it is inferred, satisfy the "Standards of Art" established in Chapter III. In Chapters VII. to XI., inclusive, are discussed the various aesthetic points which come up for consideration in designing "Ordinary Steel Structures," "Cantilever Bridges," "Metal Arches," "Suspension Bridges" and "Masonry Bridges." Then, constituting Chapter XII., but not so indicated in the text, is a series of some 83 fine half-tone illustrations, most of which occupy a full page each. On the page facing each illustration is a brief description of the bridge shown, but, strangely enough, the descriptions concern structural features, dimensions, costs and history, and very little in the way of aesthetic comment is offered in this part of the book, where it would be most effective.

Some of the artistic judgments of the author will undoubtedly be questioned by bridge engineers who have given thought to the question of aesthetics. His dictum (p. 45) that

"there is no greater jar to æsthetic feeling than to see a bridge in which this principle (symmetry) is violated with large spans at one end and smaller spans at the other, or with the principal span noticeably out of centre" is scarcely supported by reference to an elevation of the Walnut Lane bridge at Philadelphia. Lack of symmetry is, of itself, not a source of disappointment if the reason for it is **distinctly** apparent and does not arise from sub-aqueous conditions. Nor is disappointment occasioned if a part of the bridge is obscured from view, or if the bridge is so large that the whole structure cannot be seen in elevation at any one time. Again, the alleged necessity of indicating in some way on the surface the absence of spandrel filling where spandrel curtain walls are used (p. 22) is not defensible if the arch ring is accentuated in proportions consistent with a spandrel-filled arch. It might further be pointed out that the three designs for girder bridges by the author, shown on pages 51 and 52, are not wholly free from the defects which commonly mar such structures. In two of them the abutments lack face batter, thus giving an impression of instability; in all of them an even, rather than an odd, number of fascia panels are employed; and in one the turned balusters are large enough to effectually dwarf the girder itself.

There is a certain looseness of expression in portions of the book, indicating undue haste in writing. For example, the author speaks of certain buildings being "adorned with art" and stone bridges displaying "an amount of art . . ." Trusses are said to resist bending "by the counteracting moments in the upper and lower chords."

One regrettable feature of the book is the paucity of references to the work of those who have done most to shape and define the aesthetic principles which the author is able to re-state, possibly in improved form. Of the fourteen foot-notes, twelve refer to the work of the author and two other sources of information. The critical reader will scarcely believe that the division of honors in the references bears a proper relation to the division of labor in the development of the subject.

Apart from these and certain other criticisms which might be made, the value of the book is unquestionable and everyone who is responsible for the design of bridges should own, or have access to, a copy.

**The Metallography of Iron and Steel.**—By Albert Sauveur. Published by Sauveur & Boylston, Cambridge, Mass. 450 pages; size, 7½ x 10½; fully illustrated. Price, \$6.00, post-paid.

Reviewed by T. R. Loudon, B.A.Sc., Metallurgical Engineer.

Metallography has in the past few years received a great deal of attention in the literature of the day. One would not be far astray in saying that more attention has been devoted to the metallography of iron and steel than to any of the other metals, and, indeed, it is only to be expected that this would be so when the complexity of the composition of iron and steel is taken into account, together with the commercial importance of iron and steel. It is readily seen, however, that the very fact that a great deal has been written on the subject constitutes the main difficulty that is encountered by the student or the engineer who wishes to get authoritative opinion along these lines, and who, not