

## ESSAY NO. II.

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In the preceding Essay, to which the following is intended as a supplement or continuation, I have endeavored to give a short and comprehensive general view of the subject, and to ascertain and point out the best general plans and proportions for the main longitudinal trusses or side frames of Bridges, and their several parts. The side trusses may be regarded as vastly the most important parts of the structure; since the strength and sufficiency of these being secured, there is little difficulty in arranging the remaining parts. I propose now to go more into the details of the matter, and give such practical explanations and specifications as to the strength of materials, the methods of joining or connecting the several parts or pieces, both in the main trusses and the other parts of the structure, illustrated by the necessary diagrams and plans, as, it is hoped, will enable the young engineer or the practical builder to proceed with judgment and confidence in this important branch of the profession.

I will first take up the subject of

### **Iron Bridges.**

XXXVIII. Iron has the power of resisting mechanical forces in several different ways. It may resist forces that tend to stretch it asunder, or forces that tend to compress and crush it; the former producing what is usually called a *positive*, and the latter, a *negative* strain. Or it may be exposed to and resist forces tending to produce rupture by extending one side of the piece, and compressing the opposite side; as where a bar of iron supported at its extremities in a horizontal position, is made to sustain a