subject, and to ascertain and point out the best general plans and proportions, for the main longitudinal trusses, or side frames of bridges, and the relative stresses of their several parts.

The side trusses may be regarded as vastly the most important parts of the structure, and the strength and sufficiency of these being secured, there is much less difficulty in arranging the remaining parts, the forces to which they are exposed being much less than those acting upon the trusses. I propose now to enter more into details, and give such practical explanations and specifications as to the strength of materials, the methods of connecting the several parts or pieces, both in the main trusses, and other parts of the structure, illustrated by the necessary plans and diagrams, as, it is hoped, will enable the young engineer and practical builder to proceed with judgment and confidence in this important branch of the profession.

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**IRON BRIDGES.**

**STRENGTH OF IRON.**

LXXXVI. Iron has the power of resisting mechanical forces in several different ways. It may resist forces that tend to stretch it asunder, or forces which tend to compress and crush it; the former producing what is sometimes called a *positive*, and the latter, a *negative* strain. It may also 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 the ends, is made to sustain a weight in the middle, which tends to stretch the