than half the thrust due to the maximum load can be sustained by the abutment.

Add to this consideration, that of the practical difficulty of making the abutment act in conjunction with the means provided within the superstructure, so that the latter may not at any time be subjected to a strain they are inadequate to bear, and the apparent advantage of relying on abutments to sustain thrust, is reduced to a small amount, if not entirely annihilated.

The principle, however, may be made available for bridges of light burthen, and for others, some assistance may be derived by bracing from the abutments. But in general, for the stronger class of bridges, as rail-road bridges, &c., it appears proper to adopt the principle, that the superstructure should be self-sustaining, only requiring a direct support for its own weight and that of its load, acting by vertical pressure, from the abutments and piers.

XXXII. There is a plan, however, as we have already seen, in which every part of the weight, wherever situated, produces the same thrust at both ends. This is where each bearing point has an independent pair of braces extending from it, one to each abutment, as shewn in Article 11, Fig. 6. The objections to that plan are, that the amount of thrust is about one-third greater than on other plans, and the great length of a part of the braces; faults which very much impair, if not entirely destroy the value of the plan; at any rate, it is only applicable to short spans.

XXXIII. Having decided upon the most suitable forms and proportions for bridge trusses, I will say a few words in regard to the material best adapted to the purposes of bridge building. We have seen that the materials in a bridge truss, are principally subjected to two kinds of action, that of tension and that of thrust. The lateral action should always be avoided in the main parts of the truss.