their proportions as to meet almost any possible contingencies.

This could be accomplished either by assuming a greater possible load for the bridge, or a lower limit to the stress of materials with the smaller load, with the same ultimate result. And, perhaps the former would have been the more consistent course, as avoiding the seeming absurdity of the assumption that iron could safely stand a strain of 15,000 lbs. in a common bridge, but only 10,000 lbs in a rail road bridge; and the no less seeming absurdity of assuming that the same material could stand 50 per cent more strain in a bridge composed partly of wood, than in one entirely constructed of iron. Now, instances in great numbers could be pointed out, of rail road bridges of wood and iron, where 2,000 lbs. to the lineal foot would produce a stress considerably exceeding 15,000 to the inch upon certain bolts of wrought iron.

* The author had occasion several years ago to refer to the following instances in corroboration of the statement above made, in this wise:
  * The best evidence that exists as to the capacity of a material to bear a strain with safety, is derived from experience as to the strain it has been exposed to in works, and conditions similar to those in which it is proposed to employ it, and where it has by long usage, proved itself adequate to the labor required of it. If wrought iron, for example, has been used in railroad bridges for a great number of years, in numerous and repeated instances, where a given load, in addition to the weight of structure, would produce upon it a tension of 15,000 lbs. to the square inch, and has withstood such usage without cases of failure not caused by manifest defects in the quality of material, or by casualties which such structures are not expected to be proof against; it may be fairly assumed to be reasonably safe and reliable in other railroad bridges where a similar gross load can not produce a greater stress; and much more so, where a like load can only produce a stress one-half, or two-thirds as great.

Now, it is provided in the plan herewith presented, that a load of 2,000 lbs. to the lineal foot upon each pair of rails, on the whole, or any part of the length of the bridge, can not produce upon any part of the wrought iron work in the trusses, a tension exceeding 10,000 lbs. to the square inch; and, to show that such provision is eminently safe and liberal, I proceed to give some examples of what the same material is liable to with the same load in other structures, where long and severe usage has fully proved its sufficiency.