the rods in the truss will vary from that in each and all the rods connecting the arch with the lower chord.

3d. This combination is exceedingly liable to maltreatment, from the careless or ignorant.

4th. And even if it were everything in practice that is claimed for it in theory (which is not the fact), it involves a constant expenditure for adjustment, which must continue during the existence of the bridge itself.

The Burr Truss, Fig. 1, with all its defects, can be made superior by far to the "Improved Howe Truss," Fig. 3. For in the former, there may sometimes be a yielding and compression between the parts of the truss and those of the arch, producing a certain degree of united action; while in the Howe Truss, everything depends upon the length of the rods, which must always change with the temperature, and thus render an approach even to perfect adjustment, a matter of extreme delicacy.

But in either Fig. 1 or Fig. 3, it is clearly evident that, in order to have a structure absolutely safe, the arch and the truss—each of itself, independently of the other—should be of sufficient strength to sustain the whole load, that the strain may be borne alternately by each separate system.

Herman Haupt, Esq., in his "Treatise on Bridge Construction," page 174, giving a calculation of the strength of the Howe Truss and Arch Bridge, built across the Susquehanna River, on the Pennsylvania Railroad, in spans of 150 feet clear, remarks as follows:

"Before we proceed to calculate upon the parts which compose this truss, it is necessary to state distinctly the principles upon which such calculation must be made.

"It is evident that where two systems are connected in the same truss, each capable of opposing a certain resistance, it will be very difficult so to proportion the weight