upon the masonry, has sustained the whole weight. Besides, to the casual observer, who has never studied bridge construction, this combination presents at least an appearance of great strength and solidity, which do not in fact exist.

That the simple truss without the arch has failed in some instances, is unquestionably true; but while many of these failures have been caused from inattention to, or ignorance of, the laws regulating the composition and resolution of forces, by far the greater number have arisen from the inferior quality, or lack of the requisite amount of material, or from inferior workmanship, or perhaps from all combined, either of which would produce the result, for it is the perfection of all these points which constitute a reliable structure.

The acknowledged failure of the "Burr Truss," as applied to railroad purposes, led to the invention of several other plans, all of which were based upon the abandonment of the arch, and were aimed at perfecting a truss, which, of itself, would be sufficient to meet the emergencies of the case. This was in pursuance of what was considered a very reasonable hypothesis, viz.: that one system properly proportioned, must prove much superior to any method or arrangement in which the attempt was made to combine two distinct principles, in their nature heterogeneous.

Among the most prominent plans presented at this juncture of affairs, was one invented by Col. Stephen H. Long, of the United States army, a gentleman of great research and high scientific attainments. This plan of bridge was composed of lower and upper chords, posts and braces, similar in outline and general arrangement to the "Burr Truss," but differing from it in detail. An efficient system