opinions that are even yet entertained, and from the errors frequently committed by practical men in the construction of bridges, he would be inclined to infer, that of few arts of equal practical importance, are the principles so little understood.

The best works on the subject of construction, that have fallen into the hands of the writer, contain but little that will furnish the means of calculating the strains upon the timbers of a bridge truss, or of determining their relative sizes; and they do not furnish information as to what constitute the elements of a framed truss, or the most advantageous disposition of these elements to attain the maximum strength and stiffness with a given quantity of material.

In the following pages, the object has been, not so much to detail particular plans, as to establish general principles.

An attempt has been made to explain the mode of action of the parts of structures, and their mutual influence when combined; to point out the ways by which the strains can be estimated, and the relative sizes of the timbers accurately determined; new combinations of the elements in the construction of bridge trusses have been suggested, the defects of many plans in general use pointed out, and several simple means proposed for remedying these defects and adding to the strength of structures.

Unable to procure satisfactory information in any other way, the writer, in the spring of 1840, commenced a course of experiments on models, and examined many existing structures, for which his occupation at that time as a civil