tain distance assunder, which distance will vary with circumstances, but in bridge-building will seldom be less than 10 to 14 feet, where timber beams are employed. Hence, for bridges of a length of 12 or 14 feet, usually, nothing better can be employed than a structure supported by longitudinal beams, with their ends resting on abutments or supports upon the sides of the stream. Of course, I shall not be understood here, as having any regard to stone or brick arches. For though these are advantageously used for short spans, and in deep valleys, where the expense of constructing high abutments for supporting a lighter superstructure would exceed or approximate to that of constructing the arch, it is my purpose to speak only of those lighter structures, composed mostly of wood and iron, and supported by abutments and piers of stone, or by piles, or frames of wood.

Having then, adopted the use of beams for supporting short distances, it is only necessary on longer stretches, to provide support for a point once in 10 or 14 feet, by braces, &c. from the extremities, and for the intermediate points, depend on beams or joists extending from one to another of the principal points provided for as above.

VI. For a span of 20 or 30 feet, it would seem that no better plan could be devised, than to support a transverse beam midway between abutments, by two pairs of braces or suspension chains, one pair on each side of the road-way; this transverse beam affording support for longitudinal beams extending therefrom to the abutments. When suspension chains are used, it is usually called a suspension bridge. If braces be employed it is termed a trussed bridge.

VII. Before advancing further, it will be proper to refer to a fact which has not yet been taken into account, though one of the utmost importance.

The sustaining of a weight by oblique forces, gives rise to horizontal forces for which it is necessary to provide counteraction and support, as well as for the weight