the diagonal \( 5/7 \) we have seen to be liable to a maximum stress of \( 9w'' \) from variable load, and, as we have the figure 1 at the foot of \( 5\sqrt{7} \), it shows that the weight due to the latter on account of structure is \( 1w' \), which must be subtracted from \( 9w'' \) to obtain the actual maximum to which \( 5/7 \) is liable; which is \( 9w'' - w' \).

If \( w' \) be equal to or greater than \( 9w'' \), then \( 5/7 \) is subject to no action, and may be dispensed with. As to the advantage of introducing counter diagonals, merely for the purpose of stiffening the truss, the results of my investigations will be given in a subsequent part of this work.

The maximum weight sustained by any thrust upright, is manifestly equal to the greatest weight borne by either diagonal connected with it at the upper end, since any weight borne by \( 3/5 \), for instance, being transferred to the antagonist of \( 5\sqrt{7} \), thereby diminishes by a like amount, the maximum action of the latter. Whence the upright at 5, can receive no more load from the two diagonals, than the maximum load of one, and this relation holds in general.

The reason of adding alternate figures to form the second series over the diagram, will be obvious, when it is observed that there are two independent systems of uprights and diagonals; one of which includes the uprights under even numbers in the upper series, and the diagonals connecting therewith, and the other, the remaining uprights and diagonals. Now weight applied at the nodes of either of these systems, can only act upon members of that same system; that is, weight applied at nodes indicated by even numbers in the upper series can only act upon the first above named system of uprights and diagonals, and vice versa.