V. Thus we see how a weight may be sustained centrally between the banks of a river, or the extremities of a bridge. But the structure must not only provide for the support of weight at this point, but also at every other point between \( a a' \), or \( g g' \); and it is obvious that the same plan and arrangement will apply as well at any other point as at the centre, with only the variation of making the braces or chains of unequal length.

![Diagram](attachment:image.png)

This, however, would require as many pairs of braces or chains as there were points between \( g g' \), a thing, of course, impracticable, since the oblique members would interfere with one another, and be confounded into a solid mass. We therefore resort to the transverse strength and stiffness of beams, — phenomena with which all have more or less acquaintance, and without digressing in this place to investigate their principles and causes, it will be assumed as a fact sustained by all experience, that, for sustaining weight between two supporting points upon nearly the same level, a simple beam affords the most convenient and most economical means, until these points exceed a certain distance asunder, which distance will vary with circumstances;