To adapt this plan to a greater or less span than 20 ft.,
the cross section of parts acting by tension should be
varied in the same ratio as the length of span. Those
acting by thrust, should be varied at a rate between the
simple and the duplicate ratio of the variation in length.

I prefer a reference to general facts and principles, to
rules and formulae, the reasons for which can not be
taken in at a view. I have given illustrations of the
modes of determining the maximum forces of every kind
to which each piece in the truss is liable; also, the power
of resistance of the material in the various circumstances
in which it may be placed. I will here add the following
general directions, which, if attended to in arranging the
proportions of a bridge, will be pretty likely to ensure its
sufficiency for the purpose it is intended for.

Estimate the kind and amount of force to which each
piece is liable. If it be tension, see that there be at least
1 square inch of unbroken fibres, for every 1000 lbs. of
tension. If a negative or crushing force, parallel with
the fibres, consider the length between supported points,
and the least diameter of the piece, and then see whether
the strain per square inch, is greater than the amount
given in the table of safe negative resistance of timber,
for pieces of such proportions, and if necessary, change
the dimensions accordingly. See that the pressure upon
the end of the grain, be not more than 1000 lbs. to the
square inch, and at right angles with the grain, from 150 to
500 lbs., according as the pressure is upon the whole, or
only a small portion of the surface.

As a piece can only be made to act with tension, by
cutting a portion of its fibres, and applying the force to
the reversed ends, be sure that at least an inch area of
fibres thus cut, for every 1000 lbs. of tension, be opposed
to the pressure of the straining force.

Where an iron pin secures one piece between two oth-
ers, acting in the directions of the fibres throughout, see
that the diameter of the pin be about \(\frac{4}{3}\) the thickness of