be called the detached, and the latter, the concrete mode of construction.

The detached plan is probably the best adapted to wrought and cast iron bridges, and also, at least, equally adapted to bridges entirely, or essentially constructed of wrought iron, when vertical thrust uprights are employed.

But it can hardly be regarded as advisable to construct iron bridges with independent members, without thrust verticals. For, although as we have seen, [xlvi.] the latter plan shows a trifle less action upon the material than the plan with verticals, the oblique thrust members in the web, are 40 or 50 per cent longer (according to inclination), as well as being in greater number, and sustaining less average action to the piece.

The 7 panel truss, Fig. 12, has 4 compression verticals, liable to an average action of $8w''$; while truss Fig. 13, has not less than 6 diagonals, liable to an average compression of $4w'' \sqrt{2}$ (when the inclination is $45^\circ$), equal to $5.65w''$. In the mean time, these members being over 40 per cent longer, and sustaining only about the same aggregate amount of action, can not be so economically proportioned to perform their required labor, when acting independently, as the fewer and shorter uprights.

Still, the Trapezoid with individual members is practicable, probably with about the same economy of material without verticals as with them; and, if it be deemed expedient to adopt the former, the modes of forming and connecting the various parts may be so nearly like those already described for the latter, that particular specifications will not be given in this place.

The essential conditions to be observed, are, besides proportioning the parts to the kind and degree of strain