horizontal or vertical moment, as the case may be. The condition that a load covering the whole bridge may not produce the greatest moment in the bottom chord pins is either when there is a single counter coupled at the centre of the pin, or a main diagonal coupled at a distance from the member that takes up its stress. As a rule, single counters and single beam hangers are to be avoided, on account of the unnecessarily large bending-moments they produce. The size of pin for the hip joint depends greatly upon the arrangement of the bars which it couples. In a double-intersection bridge, where there are two hip verticals, two long diagonals, and two short ones, the best arrangement is to put one pair of diagonals on the outside of the chord, and the other pair inside, close to the bearing; the verticals coming next, and being kept apart by a filler. Sometimes it is not advisable to couple outside of the chord, in which case the moment would become so great, that it would necessitate the employment of a pin whose diameter would make the heads of the eye bars too large for the space allotted them. In such a case, a steel pin can be used to advantage. Hinged ends at the hip joints require large pins, for the entire stresses in both chords and batter braces come upon them with great leverage, due to the necessarily large bearing-surface. Such a connection is not advantageous: it is better to allow the channels to abut. Such hinged ends are a great convenience in erection, but usually necessitate an increase in the sizes of the batter braces and the top chords at the end panels. A detail to obviate this necessity will be given in Chapter XIII.

It is not necessary to consider the bending-effect of the stresses in the lateral rods upon the chord pins, for the wind and the live load are not supposed to act simultaneously.

Lateral rods should always be so connected to the chord pins, that the effect of the stress in the outer one will be to diminish the horizontal component of the moment on the pin; i.e., if the tendency of the chord and web stresses is to bend the pin convex to the middle of the bridge, the outer lateral rod should point towards the middle; but, if it be to bend the pin concave to the middle of the bridge, the outer lateral rod should point towards the nearest end of the span.