chord, having most of its metal on the upper side, is weaker than one which has the metal equally distributed among the three sides, and for the weaker chord proper allowance must be made.

In "pin-connection" chords, the pin-holes must be bored with the same care as eye-bars; the *maximum* play between pins and holes not being permitted to much exceed $\frac{1}{64}$ of an inch.

From what has been said, in describing the various systems of bridge-building in use—namely, the "riveted," the "pin," and "screw-end" connections—it will be understood how it is that the two latter can be worked very close to absolute theory, thus enabling material to be disposed in the best possible way to concentrate strains at centres of sections, and distribute them in axial lines through the various parts of the structure. Further than this, the shape of material used in designing on these systems is such that proper grades of iron are readily attainable. *The riveted system has, of necessity, so many imperfections of design, of workmanship and material, in contrast with the above, that, to obtain any thing approaching equal strength on the same specification, it should only be used with a higher factor of safety.* It is probable that this difference is not less than 20 per cent; so that when a pin bridge is called for, having a factor of *five*, a riveted bridge can not be considered as approaching the same strength unless it is proportioned with a factor of *six*. The fact that a riveted bridge is stiff, or that its deflections may be small under a test, is no