portion as the consequences of a failure would be the more disastrous. The breaking of a bridge is liable, in most cases, to be a serious affair, involving hazard to life and limb, as well as destruction of property. Hence, they should be constructed of such strength as to render failure quite out of the range of probability, if not absolutely impossible.

XCI. Good wrought iron bars, will not undergo permanent change of form under a tensile strain of less than from 20,000 to 30,000 pounds to the square inch; and though they will not actually be torn asunder with a stress below 50 or 60 thousand, and often more, to the inch, any elongation would certainly be deleterious to the work containing them, even if not dangerous from liability to fracture. Hence, it is certainly not advisable to expose the material to a stress beyond the lowest limit of complete elasticity.

In the original predecessor of this work, the traditional allowance of 15,000lbs. to the square inch, was adopted as the tensile stress to which wrought iron might safely be exposed, and beyond which it was deemed improper to rely upon it. No evidences or arguments since that time, have induced a change of opinion in this respect. But in the case of a bridge, there is variety and uncertainty as to the exact amount of load, as well as in relation to the limit of safe strain for the material; and while it seemed probable that the load of a single track rail road bridge would never exceed 2,000lbs. to the lineal foot upon any part of its length, still, seeing that rail roads were comparatively a new institution, and iron bridges for rail roads almost unheard of, especially in this country, it was deemed wise, in recommending their introduction, to so adjust