power of a material is destroyed is called its limit of elasticity, which, when once exceeded, final rupture is simply a question of time. The true measure of value, therefore, of a material is its elastic limit, and the real factor of safety is from one half to one third the values employed when the factor is referred to breaking strength, since (so far as bridge material is concerned) about that proportion exists between the force necessary to attain the elastic limit and that which produces final rupture.

When we speak of a factor of six, in the ordinary acceptation of the term, it must not be understood that a given structure can be destroyed only when it is loaded with six times the load for which it has been proportioned. While it may not absolutely break down until that loading is reached, its value as a structure is impaired the moment the material commences to be strained beyond its elastic limit, which may be the case with only double the extreme load which it has been proportioned to carry. Custom, however, has so long made use of this term, "factor of safety," with reference to ultimate strength, that in order to avoid confusion it will be used in that sense throughout the following pages, and if only the preceding explanation is kept in view, it makes no difference how the factor is expressed. Factors of safety usually range from four to six, the most common one being five, and it is good practice to design a bridge with two or more factors, particularly in long spans, for the reason that certain parts can only be strained