THE LOADS to which bridges are subjected, in addition to their own weight, are of two kinds: that produced by a uniform loading extending over the whole area of the structure, and that produced by a local concentration of weight, such as may be produced by heavy stone and timber wagons, or the transport of boilers and machinery. The effect of any loading upon a bridge is further dependent on the span, for the longer the span, the greater is the fixed or dead weight, and therefore the less is the shock from passing loads felt. From this it follows that short spans should either have a higher factor of safety than long spans, or else they should be proportioned for much heavier loads. In the United States, short-span bridges are seldom built heavy enough, while, on the other hand, long-span bridges, say of 150 feet and over, are frequently made needlessly so, involving in consequence a useless expenditure.

The circumstances of location must be very carefully considered, since it is apparent that a bridge located in a country district, subject simply to the passage of occasional loads, can never be strained like a bridge in a populous community, which may be called upon to bear the incessant traffic of a city, with its processions, and often the reckless haste of a fire service. Excepting in general terms, engineers are by no means agreed as to the exact loading for which highway bridges under different circumstances should be proportioned. The usual standard is to consider a span crowded with people, which experiments have shown