extravagant to assume that a large bridge is covered with such heavy loads. One hundred pounds per square foot is thought ample to assume for the loading of spans more than 60 ft. long, in designing the trusses or main girders. It is thought to be safe to reduce this assumed load in the case of longer spans, to the following amounts:

Length of span, ft.	Assumed load, lb. per sq. ft.
80	90
100	80
125	75
200 and over	70

With all intermediate spans in proportion.

The greatest load that is liable to be imposed on a bridge sidewalk, occurs when there is some excitement in the neighborhood, which attracts a large crowd, and for which the bridge affords an especially good point of view. In that case the crowd forms a compact mass, against the railing, not more than 4 ft. deep, making a load seldom exceeding 100 lb. per sq. ft., over a very considerable space. The remaining portion of the sidewalk may be covered by a moving crowd which can scarcely weigh more than 40 lb. per sq. ft. It may be advisable, sometimes, to so design sidewalk slabs, that if a street car or motor truck accidentally gets upon the sidewalk, it will not go through. Such accidents are so rare, that it is thought safe to allow materials to be stressed somewhat beyond the elastic limit in such cases.

Class "B" Bridges—Although it is impossible to determine beforehand, especially in the newer parts of the country, whether any given road is to be used for heavy traffic, it seems extravagant, at least in the cases of larger spans, to design bridges to carry much heavier loads than can be expected to come upon them. It is recommended that bridges of this class be designed to carry 15-ton trucks, with axles 10 ft. apart, 5 tons on the front and 10 tons on the rear axle. This will allow for a considerable overloading of existing motor trucks. It is further recommended, that only one truck be assumed to be on the bridge at one time, in designing the floor system, that it be assumed to cover a width of 8 ft. and a length of 35 ft. and that the remainder of the bridge is covered with a load of about 90 lb. per sq. ft., for spans up to 60 ft.

The longer spans, the trusses and main girders should be designed for the following loads:

Length of span, ft.	Assumed load, lb. per sq. ft.
80	80
100	70
125	65
150	60
200 and over	55

With intermediate spans in proportion.

Sidewalks should be designed to carry the same loads as in the case of Class "A" Bridges.

Special Bridges—City bridges and bridges carrying traffic connected with mines, quarries, lumber regions, mills, manufactories, etc., require special consideration and should, of course, be designed to carry any load which can reasonably be expected to pass over them, bearing in mind the likelihood of heavy traction engines and motor trucks coming into extensive use in the not distant future.

Stringer Loading.—The maximum stress in a stringer, due to a wheel load, occurs evidently when the wheel is directly over it. It is not thought proper to assume any distribution of the load to adjacent stringers, unless the bottom reinforcement in the slab is made continuous. In that case the distribution is proportional to the relative stiffness of the slab and the stringers, said stiffnesses being proportional to the moments of inertia, multiplied by the modulus of elasticity of materials and inversely proportional to the cube of the span. In determining this distribution, due account must be taken of the fact that deflection of the slab decreases toward the end of the stringers, and also of the fact, that whatever load is carried to the adjacent stringers, deflects them also. It is therefore recommended that wherever practicable the bottom reinforcement of slabs be made continuous over the stringers.

Slab Loading.—The distribution in a direction parallel to the supports of a concentrated load resting on a slab, supported at two opposite edges only, evidently depends upon the same principles as those mentioned under "Stringer Loading." The main difference being that what corresponds to the stringer in the former case is of indefinite width in the present case. Adequate theoretical investigations of this question appear to be lacking. For the present it seems fair to assume that the distribution each side of a concentrated load is equal to about one-third the length of the span, and that the cross reinforcement should be designed accordingly, which would require it to have an area of at least one-half of the principal reinforcement. The distribution of a concentrated load through earth filling on the top of a slab does not appear to be very well understood.

Bridges Carrying Electric Cars.—Electric traction is still in its infancy and nobody is able to forecast its future development. It seems probable, however, that it will not be profitable to run cars weighing more than 50 tons each, at a speed that would be permitted on any public road. If very high speeds are desired, the traction company will doubtless be required to operate over its own right-of-way. It is recommended that bridges carrying either urban or interurban electric cars be designed to carry 50-ton cars on two trucks, spaced 30 ft. c. to c., each truck having two axles spaced 7 ft. c. to c. The committee sees no reason for changing the customary practice of assuming that an axle load is distributed over 3 ties.

Loading on Arches.—The deflection of an arch being much less than that of a beam of the same length, the method recommended for determining the lateral distribution of a concentrated load over arch sheeting appears to be different from the distribution over flat slabs. It seems doubtful if the distribution in each direction can be greater than twice the thickness of the arch sheeting. This question should be investigated.

Stresses in Arches.—As all arches that are not provided with hinges act as elastic arches until cracks are formed, due to excessive tension at some point or points in the concrete, it is manifestly proper to calculate the stresses in them according to the elastic theory.

As concrete is a very poor conductor of heat, it is not thought necessary in calculating reinforced-concrete arches, to assume so much variation in temperature as is usual in designing steel structures, although the outside layers of concrete are of nearly the same temperature as the surrounding air, and those layers are stressed more heavily than any of the others, it is thought that an extreme variation of about 80° F. in the Northern States is sufficient to allow for, in any case, and that can be reduced if the arch ring is thicker or if there is much earth filling in the spandrels.