The time required to design a truss varies from half an hour to four or five hours according to the length of span—the one hundred cases required over three hundred hours.

Professor Alexander appears to insinuate that I do not use concentrated loads in designing my bridges; but, if he will look at the Memoir, he will find that in this he is mistaken.

One might interpret him to say that I do not distinguish between live and dead loads; but I do more than this by dividing the dead load between upper and lower panel points. The uniform live load of one thousand pounds per lineal foot, that I used in the examples in my last letter, was not only concentrated at panel points, but was assumed to be an advancing load when calculating web stresses. Moreover, in the Memoir I make an allowance for shock equal to twenty-five per cent. of the calculated live load stresses in proportioning the floor system.

The "different factors of safety," or, as I prefer to express it, "the varying intensities of working stresses," are used by all American engineers, and, if I am not mistaken, by the leading engineers of Germany.

The use of long panels gives an economy not only in the trusses, but also, Professor Alexander to the contrary, in the floor system. Thus in a one hundred foot span, as now built in this country, there are eighteen moderately heavy floor beams and two rows of light iron stringers; while, according to my designs, there are four heavy floor beams and two rows of heavy stringers. *For the same strength* the latter method requires less iron and offers greater resistance to shock, because each piece is much heavier. For the same reason the parts of the web in American bridges are heavier and therefore better calculated to resist the shock of "heavy, swift, incessant traffic" than are the corresponding parts in English bridges.

The leading engineers of both Germany and America provide for both "positive and negative recurring strains."

The stiffness of a bridge, other things remaining constant, increases directly with the truss depth; for stiffness and deflection under load are inverse functions of each other.

One would think from Professor Alexander's letter that rectangular trusses are not of American origin. On this point let me quote from Bender's "Principles of Economy in the Designing of Metallic Bridges," p. 38:—"The modern quadrangular trusses, or girders with parallel chords and upright posts, were orginated by American engineers."

The "stiffness from bay to bay," that Professor Alexander very properly states to be necessary, is amply provided for in American bridges by well proportioned, substantial, yet economical floor systems; and undue vibration of the structure as a whole is prevented by horizontal and vertical sway bracing, thus making these "spider's web" bridges stiffer, stronger, lighter, better, and cheaper than bridges of the English type.

Professor Alexander has advanced many opinions that are in direct variance with those of Baker and Bender, obtained from their practical experience and investigations, and with those of Professor Kernot deduced from actual experiments.