M. S. Carter & Co., without hand-rail	57,386
" " " with "	62,166
Massillon Bridge Company, No. 1.....	71,760
" " " No. 2..... ..	76,440

The above proposals are all accompanied by plans and specifications.

Of the above proposals those of C. J. & W. C. Bates, Cunningham and Keepers and the Missouri Valley Bridge Co. have been withdrawn, the latter company being the lowest bidders; but owing to their plans having been figured to a greater compressive strain than was specified in the advertisement inviting proposals, I did not canvass them further or consider them fairly in competition with other bidders figuring up to the requirements specified. In order to determine upon some one of the plans and proposals submitted, I concluded it would be fair and just to all parties in competition to commence the canvass by considering the proposals in the order of their prices, commencing with the lowest bidder, and taking them in their order until we find one that comes within the limits of the specified requirements. The next lowest bidder I find to be the Wrought Iron Bridge Company of Canton, Ohio. This company submit propositions embracing eight sets of specifications and strain sheets, the prices of which range from $46,500 to $60,000. These propositions are designated as A, B, C, D, 1, 2, 3 and 4. The first four, A to D inclusive, I find to be figured upon the basis of 40,000 pounds per square inch in compression, instead of 36,000, as specified, consequently do not meet the requirements. Propositions 1 to 4 I find to be properly figured, and taking them in their order I will describe them as follows:—

No. 1 is a nine panel single intersection; height of truss, 27 feet; price, $60,000.

No. 2 is a nine panel double intersection; height of truss, 25 feet; price, $56,000.

No. 3 is an eight panel single intersection; height of truss, 27 feet; price, $56,500.

No. 4 is a nine panel double intersection; height of truss, 27 feet; price, $53,800.

If any of the above are adopted I would recommend the adoption of plan No. 3, as being (in my opinion) the most desirable structure, and one that would fully meet the requirements of a growing city like ours. You will find hereto annexed a detailed strain sheet of plan No. 3, showing the sizes and sectional areas of members of the trusses with their actual and required sectional areas; also giving formulas adopted in computing strength of compression members. I find the members generally in excess of their requirements, and believe the details to be good and sufficient. I do not consider it necessary to enter into the full details of the specifications at this time as they will show for themselves. In determining upon the strength of a bridge to replace the present wooden one, I have kept in view the necessity of having one that would answer the requirements of a growing portion of our city, and one that in the not distant future will undoubtedly be required to carry the traffic of a first-class city bridge. I herewith submit a report of the watchman of said bridge, showing the number of teams crossing it between the hours of seven and twelve, one and six, October 25th, 1880: lumber teams, 95; brick and stone, 22; wood carts, 35; ordinary vehicles, 482; making a total of 634 teams per day of ten hours. This will tend to show that the present bridge is doing considerable work, and it is only fair to suppose that within the next eight years that the ratio of increase will be much greater than during the past eight. But it is not my purpose to argue the necessities of an iron bridge, but merely to give my reasons for advertising for a structure of the strength and proportions I have. According to undoubted authority (a committee of experts of the Society of American Civil Engineers), a bridge proportioned to carry a line load of eighty pounds per square foot of roadway surface, with a span of 150 feet, is considered as a first-class highway bridge, and in determining upon the strength of the iron to be used, I have required its breaking strength to be not less than 50,000, 36,000, and 32,000 pounds per square inch in tension, compression, and shearing, respectively; the bridge to have a factor of safety of five, using iron of the above-mentioned strength. This is a somewhat higher factor than is usually required in ordinary highway bridges, a factor of four, with the above ultimate strengths, being usually deemed sufficient for highway bridges. By adopting a factor of five, we allow no iron to be strained more than 10,000, 7,200, and 6,400 pounds per square