books, and making the correct allowance for the difference in price of strut and tie iron. To be perfectly fair there should be the same number of panels in each truss, and the most economic depth in each case should be used. The common number of panels employed in America for a 160 foot span is eight; and, English opinion to the contrary, this gives a greater economy than does any larger number. The economic depth for the Pratt truss of this span and number of panels I have proved by actual design to be twenty-four feet; that for the Isocles is somewhat less—perhaps twenty-one feet.

A check upon the correctness of the assumed economic depths can be had after the calculations are finished by noting whether the total weight of the web is about equal to the total weight of the chords. That this is a condition of economic design can be demonstrated by mathematics based on fairly accurate assumptions; moreover, I have proved its approximate correctness from the weights of over one hundred trusses actually designed.

In order to save time and trouble we will assume a depth of twenty-one feet for both the Isocles and Quadrangular trusses, although such an assumption will militate against the latter.

Let the live load per lineal foot of the truss be assumed to be one thousand pounds, and the corresponding dead load six hundred pounds, of which one third is supposed to be concentrated on the top chord and two-thirds on the bottom chord. The panel live load will then be ten tons (of 2,000 pounds) and the panel dead load six tons, of which two tons will be concentrated above and four tons below. The stresses in all the main members of both trusses will then be as given in Tables I. and II. The lengths of the members in these tables are those from panel point to panel point. The value of $f$ assumed is four tons, but as this quantity affects the results in both cases in the same proportion, it might have been taken at any other value. Where two stresses of opposite kinds can occur in the same panel or in the same member their amounts are added together. This method agrees with the old American practice; and, although improved upon of late years, it is correct enough for the present purpose, and affects both truss weights to almost the same extent. In the next comparison a more accurate method will be used.