sulphide of iron. Referring to Fig. 1, the isolated points in the steels with 0.23 per cent. carbon contained sulphides of iron. It is evident that traces of sulphide of iron increases the tensile strength. Its action on the steel is of the same nature as phosphorus, but much more active. Tests show that the addition of manganese tends to prevent sulphur steels from passing into the more treacherous sulphides. When the sulphur is low a high silicon will not affect the steel.

I have found for all the basic steels examined that by extending the carbon curves, such as Fig. 1, to zero carbon and then subtracting the increase of tensile strength due to manganese, phosphorus, sulphur and silicon, the resulting tensile strength is constant at 34,600 pounds, with a probable error of fifty pounds. Hence to find the tensile strength of any basic steel (normal) from $\frac{3}{8}$-inch to $\frac{9}{16}$-inch thick, rolled from ingots similar to the above, and having given the analysis of the steel, proceed as follows: To the base 34,600 pounds add 80 pounds for each 0·01 per cent. manganese. Multiply the ordinate of Fig. 2 by the percentage phosphorus and add to the above. Then add 850 pounds for each 0.01 per cent. carbon. As boiler steels only contain traces of silicon and sulphur their action on tensile strength may be neglected. Referring to the steels of Fig. 1 with composition, manganese, 0.35; sulphur, 0.015; phosphorus, 0.020, and carbon (say) 0·20, its tensile strength would be as follows:

		34,600
Manganese,	35 × 80 =	2,800
Phosphorus,	1,500 × 2 =	3,000
Carbon,	850 × 20 =	17,000
		57,400

The results thus far shown have been entirely on the tensile strength. An attempt has been made to plot results on elastic limit but so far no satisfactory or reliable results have been obtained as the elastic limit is not obtained with the same accuracy as the ultimate tensile strength, similar steels giving conflicting results. The results of tests on the relations of chemical composition to the elastic limit are of more importance to the engineer than those on tensile strength, but nothing has been done on this line.

Several curves have been plotted with the elastic limits for different percentages of phosphorus and carbon. Figure 4 is one with phosphorus as the variable. The elongation increases with a decrease of phosphorus and of carbon, but it is yet impossible to give