

definite values. It is even possible the figures given for tensile strength may be revised. Howe says phosphoric steels are liable to break under very slight tensile strength if suddenly or vibratorily applied. Much as phosphorus diminishes ductility it diminishes toughness to shock steel more, thus rendering it unfit for all purposes. "The effect on ductility seems to be very capricious, for we find many cases of high phosphoric steel which show excellent elongation, contraction and even fair elastic ratio, while side by side with them are others produced under apparently similar conditions, but brittle." The excessive variation of the points plotted in Figure 4 bears out this statement. It is also possible that the chemical analysis may often be returned incorrectly when dealing with such small traces of phosphorus.

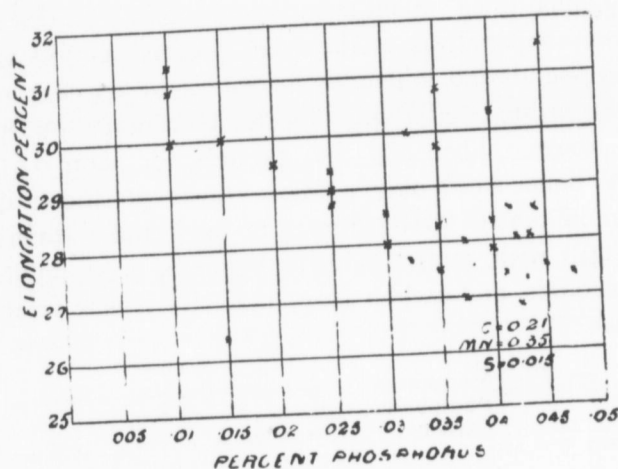


FIG. 4.

So far as at present determined the ratio of elastic limit to tensile strength appears to depend principally on the amount of carbon present on the steel. The milder the steel the higher the ratio. Its value for the mildest steel is approximately seventy per cent., and decreases until it reaches a minimum in cast steels.

From certain tests made by several authorities on torsion the behavior of the metal appears to be similar to that in tension. The twist is proportional to the stress until the limit of elasticity of the outer fibres is reacted. After this point the twist increases faster than the stress.

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