pounds, which corresponds to a modulus of rupture, in cross breaking, of 48,600 to 52,200 pounds per square inch.

Cast in chilled molds, this iron offered a remarkable depth of chill on the test blocks. It had become so hard that drills or chisels of the hardest steel would not touch it. Its resistance to attrition was exceptional. For many obvious applications these properties would open a very extensive use for this iron as pig metal. Pieces of machinery requiring special hardness were cast from this material and were subjected to particularly hard and trying conditions of wear. They have been found, after a year's service, in good order yet.

By mixing with irons showing a breaking load of 3350 pounds per square inch and a chill on the test pieces of 1·125 inches small percentages of this titanic pig metal, we increased the resistance to breaking to 3900 pounds and more, corresponding to a modulus of 70,000 pounds per square inch. The depth of the chill was increased to 1·375 inches. It compared favourably for resistance with other mixtures into which entered certain metallic elements, mixtures much more costly, and with which the chill dropped to 0·81 inch, and in some cases to 0·062 inch, making them unfit for the purposes for which they were intended, strong though they were. Hence the simple addition of this titanic pig metal, not more expensive, practically, than any other cast iron, to ordinary mixtures used for specific purposes, though increasing the hardness and the chill of the product in a remarkable manner, considerably increased also its resistance to cross breaking, bringing it to equal the strength obtained by much more expensive mixtures of which the cost would industrially exclude the use, and which, to all purposes, destroys the chill, an essential factor in the case considered. Industrial products were manufactured from these titanic metal mixtures to be submitted to the regular tests for strength, which they stood with very satisfactory results. The experiments were repeated many times and under different conditions. They dealt with a number of different mixtures, but they are of a more private character, and what we have quoted from them is sufficent, we believe, for the purpose of this present article.

Referring again to the two papers mentioned above for qualities of the iron and steel obtained from this pig metal, we see that either as such, or as a transformed product, the metal obtained from titaniferous ores could command numerous and important applications owing to its special qualities.