

proper quantity of fuel and the right amount of air in the foundry when melting iron, if we wish to get the best results and the best castings. Then following on this line of reasoning by adding hydrogen, 2 parts will combine with every 1 part of oxygen, or it will go on and combine with the nitrogen and form  $NH_3$ . ammonia gas, this element then combining with sulphur becomes ammonia sulphhydrate which, having a greater affinity for sulphur than what iron has, is carried off by the heat instead of being absorbed by the iron and retained in the casting. And much the same result is secured in the case of phosphorus, only not to the same extent, as has been proved by analyses both in England and America.

That this process will admit of a lower and cheaper grade of iron and coke being used has been demonstrated both in this country and Europe, beyond a question of doubt. It will also admit of a very inferior grade of badly oxidised scrap being used and at the same time produce a very fine resultant casting which excels in strength and texture that made from the very best brands of pig iron melted in the old way, and in this respect alone, can be of immense value to every foundryman in the world who adopts it.

I am quite aware that new facts and the mode of regarding them are most favorably received by the public when in strict accordance with old and recognized views. The new fact may be very far removed from those to which it is referred and belongs to an entirely different order of analogies, but this cannot then be known because its co-ordinates are wanting and it is quite possible for the public mind to be so moulded by past events that it is very difficult to convince the world of a new view, and very many new and valuable discoveries have been lost because the public mind has proved antagonistic to their reception. We can only receive the new discovery just in proportion as our minds are educated and our knowledge broadened in that particular sphere to which they belong. Thus the founder should, if he desires to become a master of his avocation, study the principles that promulgate thought and investigation in the science of metallurgy and chemistry of iron, because it cannot be discussed along any other line. The average founder up to the present time is not as well posted in the chemistry of iron as he might be. He knows when his castings are soft and workable or hard and unworkable, as the case may be, but he does not know the cause and effect of the different compounds that go to produce such undesirable conditions in the metal, and to him the mere mention of chemistry is a mystery, and the result is he has to rely upon the iron broker to furnish him with an iron which in his opinion is suitable for his product, and in many cases the selection