occasions had almost a clean furnace after a day's "blow," and a few minutes only sufficed to get ready and make up the furnace for the next "blow." And the quality and quantity of scrap iron possible to use was also most pronounced in favor of the Doherty system and these without any deleterious effect upon the castings produced, and there is no doubt that when oxide of iron is present, it is thoroughly reduced by this process instead of passing into the slag as in the ordinary process.

### COKE YIELDS.

I never attempted to reduce the quality of the coke and always obtained for foundry purposes, both in England and in India, the best possible, but I understand that Mr. Doherty, in his tests at Garston, used an admixture of 50 per cent. inferior quality, this being too soft and too full of sulphur to use in ordinary practice; saving thereby 4 shillings per ton on this item alone. He would probably have saved quite as much in quantity had he used the best, but no doubt was anxious to make good his claims in every respect, including that of using a commoner quality of coke.

### SPEED OF MELTING.

The new process increased the power of the cupola 25 per cent. in each case over the normal output and moreover, Mr. Doherty reduced the air pressure from 14 ozs. at the tuyeres to 10 ozs., reducing the speed of the blower by 50 per cent., although the melting speed of the cupola was improved by 25 per cent. In all cases I kept at 12 ozs. pressure, preferring to take no risks of getting the metal down too stiff, at the same time there is great danger in having it too hot, as I have known good castings, to all appearances, utterly fail on the test bar, through melting at too high a temperature.

### CHEMICAL EXAMINATION.

Mr. Doherty, I understand, submitted samples to Messrs. Pattenion & Stead, of Middlesborough, for examination, from which it would appear that most of the elements contributed to the combustion in a greater degree than obtains in ordinary practice. From a 30 per cent. mixture of Middlesborough pig (high in phosphorus, about 1.60) and 70 per cent. scrap (also high in this element) he obtained a very useful soft malleable product of the following analysis:—

| | |
|---|---|
| Combined carbon | .58 |
| Graphite carbon | 2.47 |
| Manganese | .44 |
| Silicon | 2.25 |
| Sulphur | Trace |
| Phosphorus | 1.34 |