

The earth contains a large number of metals which are useful to man. Any carbon content above that percentage is present in the form of flaky graphite. A certain number of non-ferrous metals, including aluminium and zinc, are also important, but even today the majority of our engineering products are of iron or steel. The process of smelting consists of heating the ore in a blast furnace with coke and limestone, and reducing it to metal. These non-metallic constituents of cast-iron include carbon, silicon and sulphur, and the presence of these substances affects the behaviour of the metal. The non-metallic constituents of the ore combine with the limestone to form a liquid slag. We can melt this down again in another furnace – a cupola – with more coke and limestone, and tap it out into a ladle or directly into moulds. Iron which contains a negligible quantity of carbon, for example wrought-iron, behaves differently from iron which contains a lot of carbon. Moreover, iron possesses magnetic properties, which have made the development of electrical power possible. The ore becomes molten, and its oxides combine with carbon from the coke. Steel contains no free graphite, and its carbon content ranges from almost nothing to 1 1/2 %. This is cast-iron.