terra-cotta. A writer in the October number of the *Magazine of Commerce* thus describes the process of manufacture :—

"Like most revolutionary inventions, the principle is simplicity itself, and is in reality adopted from nature. Natural stone is formed in the bowels of the earth from an admixture of silica, sand, alkalies, and hot water, subject to enormous superincumbent pressure. Ford stone is made on practically the same principle.

"Silica sand is absolutely indestructible, except by fluoric acid, and the durability of lime has been proved from prehistoric times. Ford's process (utilizing the enormous power of slaking lime in strong cylinders submerged in highly heated water) combines these two materials together in a few hours forming a matrix of silicate of lime. It is to the presence of silicate of lime in Roman mortar that its great strength is due.

"The first operation consists of thoroughly drying a quantity of sand. Almost any sand will do, but it has to be carefully separated so that there are at least three different grades. These are obtained by means of special separating devices. As regards the lime which has to be added, the only qualifications are that it must be good, fresh lime, and must be ground to a very fine powder, which is collected by an air separator The mixing of the two materials may be described as the second main operation. Experience has proved that, in order to obtain the best results, it is necessary to regulate very exactly the proportion of sand to lime

"The third operation is the filling of the mould with the mixed materials. The mould is a steel cylinder (very specially constructed), and it is in this cylinder that the materials are transformed into durable building stone. The packing plays a most important part in the proceedings, and is accomplished by the use of a specially adjusted machine which has a rotary movement, and acts in a manner somewhat similiar to that of a cork-screw. The steel cylindrical mould in which the mixture of sand and lime is packed is perforated all over by small holes at equal distances (about 6in) from one another. The inside of this cylinder is lined with a copper jacket, which is also perforated, but by holes of much smaller dimensions and much closer together The packing having been completed satisfactorily, the cylinder is placed in a steel boiler, in which the last operation takes place The chamber is capable of being made airtight, and from it the air is sucked by a steam pump until almost a perfect vacuum has been formed Then a tap controlling a pipe connecting the chamber with the boiler is turned on, and boiling water is admitted. Owing to the vacuum, this water rushes into the compartment under great pressure, and, percolating through the holes in the cylinder, slakes the lime which is mixed with the sand In its efforts to expand, a tremendous force is generated (so great that it would burst any cylinder not specially made to stand the strain), and it is this force which, unable to escape, reacts upon the sand and lime (then in a very highly heated state) and crystallises them into solid stone. The water is then raised and kept at a temperature of at least 350 degrees Fahrenheit for about eight hours, after which it is driven back into a reservoir The cover of the boiler is then taken off, and the mould with the stone is extracted and allowed to cool. In a few hours the mould can be taken off the stone, which is then ready for cutting or carving into any shape required

It is claimed that the stone has considerable advantages over natural building stone. Not the least of these is its comparatively low cost ; 4d to 6d. per cubic foot is stated ito be the cost of manufacture It can therefore, be sold at a much cheaper rate than even the cheapest Bath stone As for the other advantages, they form an alluring catalogue –

"The stone can be made to any required degree of hardness, and has the additional advantage that it hardens with time, commencing with the strength of Portland stone, doubling it in six months, and trebling it in the first four years alone, as has now been proved by actual exposure. Being of a less absorbent nature than ordinary building stone, it does not acquire so grimy an appearance in smoky atmospheres ; neither is it detrimentally affected, as are most natural stones by acid laden atmospheres, sea air, sea water, or frost. Its prime cost is considerably less than that of quarried stone. It is sawn, dressed and carved in the same way. Large sizes are obtainable. It is absolutely free from irregularities of structure, loose beds, veins, cracks, and other wasteful defects common to natural stone It offers a far greater resistance to crushing strain than Portland, Hollington, and similiar stones. It can be purchased in bulk, and kept in stock by the mason or builder, to be cut up for use as required."

If these statements are born out by the experience of many users of the stone it is evident that it has a great future before it.

Use kerosene oil for drilling or turning aluminium .

A man can be serious without being sour.

Australian Iron Ore.

The Commonwealth has just commenced a new chapter in its mineral history, a steamer the *Somerset*, having recently arrived in Europe with the first cargo of iron ore ever shipped from Australia It consists of 2,000 tons from the mine known as the Iron Knob, situated about 40 miles from the shores of Spencer Gulf, South Australia, which, with another mine, the Iron Monarch, is stated to be from one of the richest and most extensive iron ore deposits in the Commonwealth. The ore has been found to average over 60 per cent of iron, and like that obtained from the Blythe River, Tasmania, rivals the best Swedish in its high percentage of metal and freedom from deleterious materials The Iron Knob belongs to the Broken Hill Proprietary Company, which obtained possession of it as a means of furnishing their reduction works at Port Pirie with a supply of ore for fluxing purposes. But the rich character of the ore led to on enquiry whether, in view of the alleged depletion of the leading deposits in Sweden, Norway and Spain, it could not be more profitably utilised, and replaced at Port Pirie by ores containing a lower percentage of metal The question was speedily answered in the affirmative, the samples submitted to experts being declared the best they have ever handled, and capable of being easily converted into Bessemer and Harveyise steel The importance of this will be readily understood when it is explained that the quantity of ore forming the deposit is estimated at several million tons, and that another mine in the vicinity of the Iron Monarch, is regarded as being equally rich Hitherto the exports of iron ore from Australia have been of a most insignificant character, amounting in 1905 to only 1,050 cwt., value £98, of which Belgium took 40 cwt , Germany 560 cwt , and Japan 430 cwt The metal is distributed throughout the Commonwealth, the deposits in New South Wales being estimated at 59,307,000 tons although 80,000,000 tons and even more would be nearer the mark ; while those in Queensland are considered to be equally extensive There are also vast deposits in Tasmania and Western Australia At present the whole of the ore raised is used for fluxing purposes despite its specially rich character Should the experimental shipment by the *Somerset* prove successful, British ironmasters will find themselves in possession of a new and apparently inexhaustible ore supply of the best character —*Syren and Shipping*

A New Coke Oven.

It is claimed by those who are operating the new Rainey coke ovens at Connellsville, in the heart of Pennsylvania that the new style ovens will produce coke for at least 20 cents per ton less than the old style beehive ovens It is also claimed that the labour costs are reduced, and the time of coking is shortened by from two to five hours on each charge These new ovens, says a contemporary, are 30 feet long, and have a door at each end. They have 90 square ft of floor surface against 116 square ft in the beehive oven the coke yield, however is about the same, despite the difference in floor space, averaging 66 to 67 per cent of the charge The quality of the coke is equal to if not superior to the product of the old fashioned beehive oven The oven has a high crown with but one tunnel head in the centre There are fewer crown brick and more liners to eliminate the danger of the crown caving in on account of the larger arch. In building these ovens the use of mortars has been dispensed with, and the operators have substituted a silicious cement composed of ground lime with 10 per cent of soft clay Each brick is immersed in this bath before being placed into position This cement is infusible at the maximum temperature of ordinary practice and eliminates the possibility of the binding composition being knocked out The inventors of these ovens are now perfecting a ram which will be used in drawing the charge. Instead of breaking the coke in drawing it out, as is done with beehive ovens, the entire charge comes out intact, a body of coke 30 ft long, a trifle less than 4 ft wide, and about 24 in deep The oven ignites quickly, and retains practically all the heat of the previous charge.

Manchester Ship Canal.

Since its opening the Manchester Ship Canal has suffered from the exclusion of Manchester in sailer call for orders grain charters Some time ago the Liverpool Sailing Ship Owners' Association agreed to adopt the clause "Manchester Ship Canal above bridges excluded." The Documentary Committee has now adopted the clause "excluding Manchester Ship Canal above first bridge" This will enable Australasian grain to reach the port. The Canal Company weigh and transfer from Eastham Lay Bye, with 28 ft. of water 1,500 ft. long, to Manchester sailer grain at the same charge to merchants as though received at the elevator at Manchester. The Company has decided to construct a further 40 000 ton capacity elevator in the near future In this connection it is interesting to note that the import of grain at Manchester has risen from 14,879 tons in 1894 to 342,000 tons in 1906.—*Syren and Shipping.*

Cuba's Copper Resources.

It is likely that before many years are past there will be fresh developments in the copper industry in Cuba. Half a century ago the output of copper ore from the Cobre Mine at the eastern extremity of the island, was on a fairly large scale, but it was subsequently abandoned. A few years ago, however, a company was formed in America to open it up again, but the difficulties encountered in reaching the lower workings were of such a nature that the scheme failed, though it was ascertained that substantial bodies of copper ore had been extracted from a mineralised zone comprising three or four veins running parallel for a distance of at least 5 000ft. laterally, and actually worked to a depth of 1,200ft. About £160,000 worth of copper ore was shipped to the United States from the old workings of this property before they were abandoned. The hills in the neighbourhood of Cobre give evidence of the existence of other veins, and on the extreme western end of the island, in the Province of Pinar del Rio, there are substantial gossan outcrops from 150 to 200 ft. wide. Under this, at a depth of 40 to 50 ft., iron pyrites containing black copper occurs. These deposits promise to be extensive, and in some respects resemble the ore occurence at Ducktown. In the Province of Santa Clara there are several copper showings of sufficient merit to invite the attention of the miner. This might also be said of other locations in Cuba yet unexplored

Shipping Facilities at Newcastle, (N.S.W.)

Consul F. W Goding, writing from Newcastle, New South Wales, says that amongst experts it has been recognised for some time that the appliances for loading vessels with coal in that port of Australia were antiquated. He adds: "As an instance, in England the coal cars with a capacity of 15 tons are so manipulated that 500 tons per hour are loaded at each berth, whilst in America 2,000 tons per hour is usual. In Newcastle 1,000 tons of coal are loaded per hour at 18 berths, showing how far behind the system is The engineer in charge has evolved a system of gravitation which will allow vessels to be fed without cessation or interruption until loaded. Under this system 41 or more coal cars, of an average capacity of 7½ tons, will be unloaded at each crane per hour, two cars being handled at the same time. This means that a vessel will be fed at the rate of 640 tons per hour at each crane instead of 80 tons per hour as at present. There is a strong probability that the capacity of the coal cars will be increased to 17 tons in the near future, which would allow the handling of 1,200 tons per hour at each berth, reducing the cost of loading coal at this port by 20 per cent. The Government is determined to bring the system of loading coal here up to the highest point of efficiency, which effort all those having any connection with the commercial interests of the port heartily second."

The electric steel furnace has reached England at last In October last, a working model was recently shown in connection with the Sheffield Corporation Electrical Exhibition. The production of crucible steel without fire was in itself a feature of exceptional interest to the Sheffield man. Such a process is of particular value, says the *Electrical Magazine*, for the production of high grade steels, such as tool steels, tungsten steel, chromium steel, &c. ; the heat can be regulated to a nicety and readily maintained ; thus there is little risk of burning the charge, and, moreover, the material cannot possibly be affected by the method of heating. It is claimed that the method is economical both as regards energy, consumption, and labour. There are several of these furnaces in steady commercial use in Sweden, the first being put down in the year 1899 ; since then its great value has been fully confirmed and there is every reason to expect its early adoption in this country.