THE CLEVELAND INDUSTRIAL DISTRICT OF ENGLAND.

An Area of Specialized Industry—Iron and Steel.

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The Cleveland Industrial District is located along the lower reaches of the River Tees around Middlesbrough in northeast Yorkshire. It is interested primarily in the production and fabrication of iron and steel, and is one of the chief producing areas in the United Kingdom. (Fig. 1.)

The relative importance of the Northeast Coastal Area, of which the Cleveland District is the most significant part, so far as iron and steel production is concerned, is shown in Figures 2 and 3. In 1924, it was the leading producer of pig iron in Great Britain and ranked second to South Wales in the making of steel. In 1913, its position was still more dominant. Approximately 30% of the pig iron and 20% of the steel output of the country is produced normally in the Northeast Coastal Area. This industry is concentrated largely in the Cleveland District, where 80% of the blast furnaces and the most up-to-date steel mills are located. (Fig. 4.)

The production of iron and steel like all the major manufacturing industries of Great Britain is concentrated on the coalfields, and particularly on those adjacent to the coast where good harbors provide easy access to the sea. Generally speaking, blast furnaces rather than steel mills predominate in the coastal areas where the local supply of iron ore, so frequently associated with British coalfields, can be supplemented easily by imported ores. (Fig. 1.)

The outstanding advantages offered by the Cleveland District, where practically all the most up-to-date iron and steel plants in the country are located, are (1) nearness to abundant supplies of high grade coking coal, to the Cleveland ironstone deposits upon which the industry was based originally, and to limestone deposits suitable for flux, (2) tidewater sites along a navigable waterway accessible to large vessels, (3) the accessibility to supplies of foreign ores carried in returning colliers which can be unloaded directly on the wharves of many of the blast furnace plants, (4) cheap and abundant shipping facilities

FIG. 1.—The coalfields of Great Britain. The Cleveland District lies near the southern edge of the Durham coalfield around Middlesborough. Courtesy of the "Manchester Guardian."

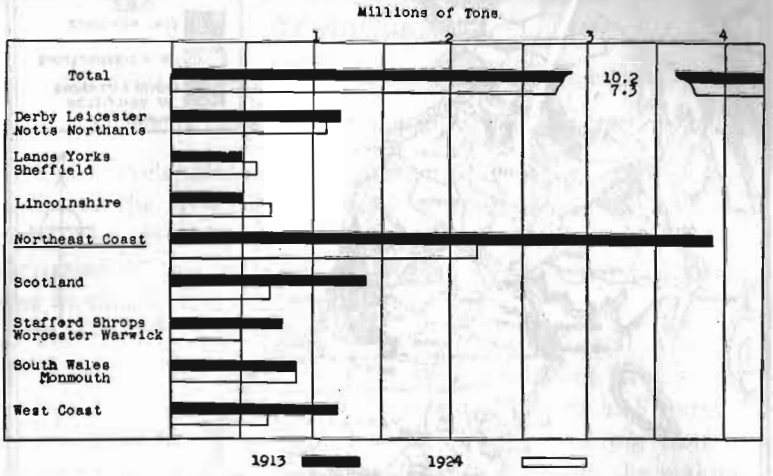

FIG. 2.—The chief Pig Iron producing areas in Great Britain. From data published by "The National Federation of Iron and Steel Manufacturers," London, 1926.

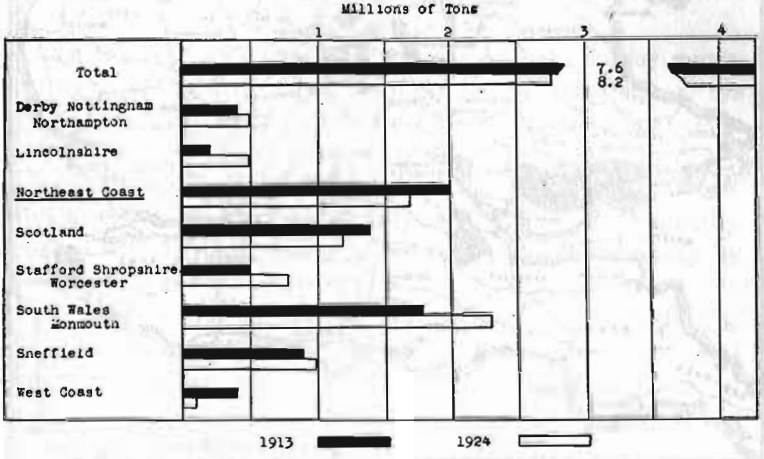

FIG. 3.—The chief Steel producing areas in Great Britain. From data published by "The National Federation of Iron and Steel Manufacturers," London, 1926.

offering direct communication with all parts of the world, (5) excellent railroad communications with all parts of Britain, and (6) abundant space well suited to the needs of this type of industry.

Location of the Area with Reference to Raw Materials.

Iron Ore: The chief source of iron ore in the United Kingdom is the oolitic escarpment which stretches from the Severn to the Tees. This low upland belt terminates in the Cleveland Hills a few miles south of the Tees estuary in an abrupt north-facing scarp along which the iron stone out-

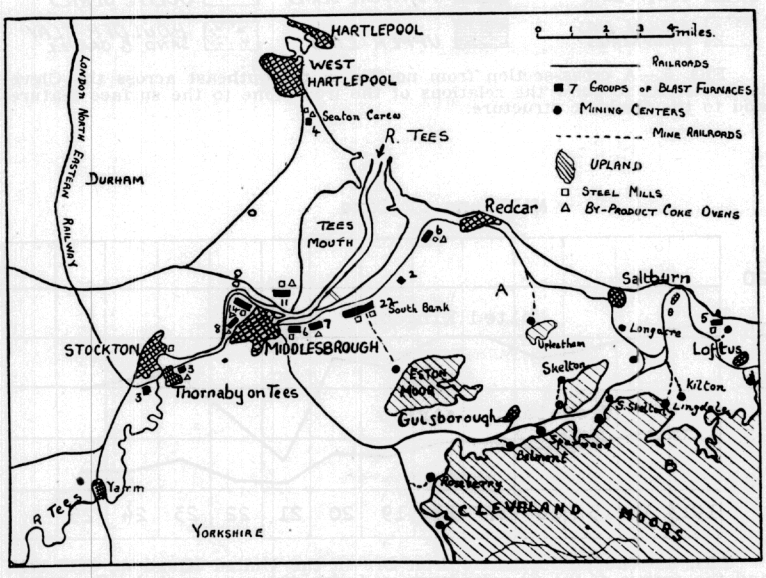

FIG. 4.—The Cleveland Industrial District showing the distribution of Blast Furnaces and Steel Mills and their relation to the R. Tees and the Cleveland Iron mines.

Adapted from Ll. R. Jones, "North England," p. 41.

crops. Figure 4 shows the chief mining centers and their relation to Tees-side. Owing to the rather dissected character of the upland, the iron is relatively near the surface in many places and quite frequently drift mining methods can be employed. The main seam varies from 5 to 12 feet in thickness. Figure 5 shows a cross section of the area from northwest to southeast and indicates the relation between the iron stone and the surrounding rocks.

It was the proximity of this supply of iron stone to the mouth of the River Tees, necessitating only a very short haul, mainly down grade, together with nearby supplies of coal, that encouraged the beginning of iron smelting there in the middle of the nineteenth century. The low cost of assembling these commodities at the mouth of the Tees offset the low grade of the iron stone.

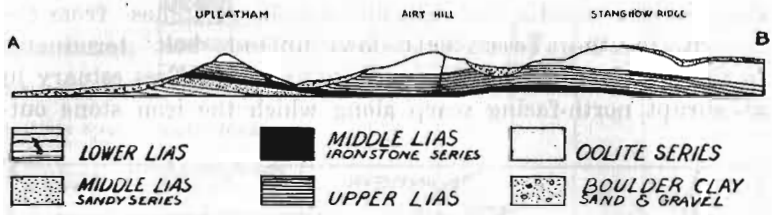

FIG. 5.—A cross-section from northwest to southeast across the Cleveland District to show the relations of the iron stone to the surface features and to the Geologic structure.

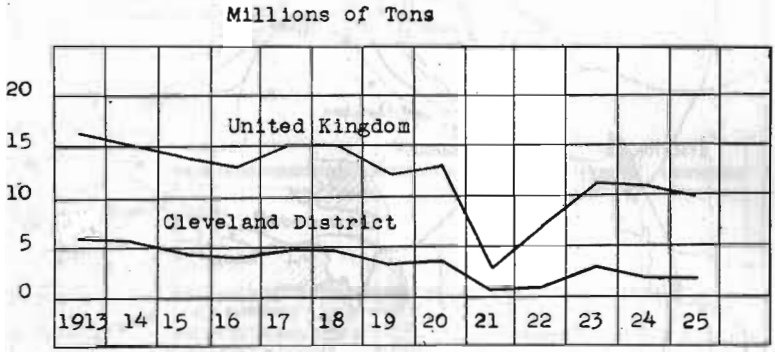

FIG. 6.—The production of Iron Ore in the United Kingdom, 1913-1925, and the output of the Cleveland mines during the same period. From data published by "The National Federation of Iron and Steel Manufacturers," London, 1926.

At the present time the more accessible and higher grade iron stone in the Cleveland District has been exhausted. The average distance from the mines to the riverside furnaces is less than twenty miles although formerly it was much less. The iron content is slightly below 30%. In 1924, the production amounted to 2,200,000 tons, only one-third that of 1913 when 6,000,000 tons were mined. (Fig. 6.) The mining industry there provides employment for some 4,000 men. The present production is inadequate for the needs of the Cleveland

District and economic conditions make the use of higher grade ores imperative. In 1924, almost 2,000,000 tons of foreign ores were imported by Tees-side smelters, practically one-third of the total British importation. (Fig. 7.) Some plants use foreign ores almost exclusively.

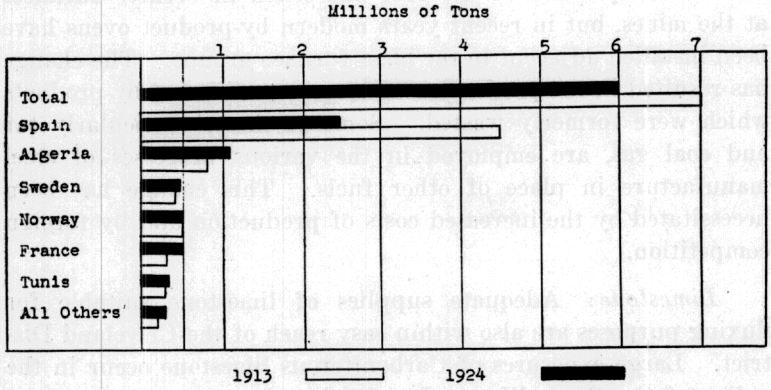

FIG. 7.—The tonnage and sources of Iron Ore imported into Great Britain. The Cleveland District receives approximately one-third of these ores. From data published by "The National Federation of Iron and Steel Manufacturers," London, 1926.

The trend in the production of Cleveland ore is shown by the graph in Figure 6. Although production has declined steadily since 1913, the tonnage of imported ore has remained more or less constant, indicating the increasing importance of foreign ores to the British iron and steel industry.

The sources of the imported ores are shown in Figure 7. Spain, Algeria, Sweden, and Norway supply the largest quantities. Present indications point to a great increase in the consumption of Algerian and Tunisian ores in the Cleveland District. These are of almost equal quality to the Rubio ores of Spain, but offer a slight advantage in price and freight. The extensive use of these foreign ores is practicable mainly because of (1) cheap water transportation, (2) the tide-water location of the furnace groups, (3) the higher iron content, and (4) the relatively low price of the ores.

Coal: The Cleveland Industrial District is adjacent to the southern edge of the Durham coalfield which produces a high grade coal suitable for making metallurgical coke. The rail haul from the mines to the blast furnaces averages only 25 miles. The seams average from three to five feet in thickness.

The largest as well as the deepest mines are located within easy reach of good harbors, where coastwise shipping is available to move the coal to the great industrial centers of northeastern England which utilize much of the iron and steel produced in the Cleveland District, and to foreign countries. (Fig. 1.)

Formerly much of the coal was coked in beehive furnaces at the mines, but in recent years modern by-product ovens have been installed adjacent to the blast furnace groups. The change has resulted in the production of large quantities of by-products which were formerly wasted. Some of these, particularly tar and coal gas, are employed in the various processes of steel manufacture in place of other fuels. This change has been necessitated by the increased costs of production and by foreign competition.

Limestone: Adequate supplies of limestone suitable for fluxing purposes are also within easy reach of the Cleveland District. Large exposures of Carboniferous limestone occur in the valley of the River Wear. In addition there are exposures of magnesian limestone in which beds of almost pure limestone occur. The chief producing areas are around Darlington and Sunderland. Owing to the high phosphorous content of the Cleveland ores the furnaces yield a highly phosphatic slag. This, when ground fine, makes an excellent fertilizer and is widely used. Slag bricks are also manufactured on a large scale and constitute another important by-product of the steel industry.

Local Conditions Favor Iron and Steel Production.

Sites Adjacent to a Waterway: Owing to the bulky and heavy nature of the commodities that are handled, all the processes of iron and steel manufacture are confined to single storied buildings. Consequently, the area required for a complete installation is large. The abundance of vacant, flat, and often marshy land, much of which consists of reclaimed tidal marshes, fronting the river, affords excellent sites for iron and steel plants and has encouraged their concentration there. (Fig. 4.)

In order to make the Tees estuary accessible to large vessels and thereby foster industrial growth, extensive harbor improvements have been made. The entrance was blocked originally by a sand bar which was covered by only three and a half feet of water at low tide. The river followed three winding chan-

nels through extensive mud flats which were exposed at low tide. Navigation, therefore, was hazardous and restricted to small boats. The Tees Conservancy Commissioners have dredged a deep waterway and provided numerous deep-water berths with a minimum depth of 25 feet at low water. The steel companies have their own wharves adjacent to their plants and can receive ore and ship iron and steel products with a minimum of delay. In addition a 26 acre dock has been provided at Middlesbrough to handle the world wide commerce of the Cleveland District.[1] In carrying out these improvements large areas of tidal foreshore have been reclaimed for industrial purposes.

Labor Conditions: As a result of the industrial development of the district a great urban development has taken place. From a sparsely populated agricultural district the area has become a densely populated urban area with some 400,000 people living in a number of thriving cities. Middlesbrough, the chief industrial and commercial center, has a population of 140,000, and some 84,000 live in the twin cities of Stockton and Thornaby. A very large proportion of this population is engaged in the local iron and steel trades. Excellent railroad communications link the district with the densely populated industrially developed northern counties as well as with all parts of Britain. Consequently, there is an abundant supply of labor assured at all times. The urbanized belt is largely confined to the southern side of the estuary and extends from Tees-Bridge to Redcar. Middlesbrough, Stockton, Thornaby, South Bank, and Redcar are the most important centers. North of the river there are fewer cities because there has been less industrial growth there. West Hartlepool and Seaton Carew, near the mouth of the Tees, have also developed as a result of their iron and steel industries which are based almost entirely at the present time on imported ores. (Fig. 4.) As in most industrial areas the population has expanded into the surrounding country-side where living conditions are much more pleasant. Consequently, there is a large suburban development which has been facilitated by the extensive railroad and street car net.

Products and Marketing Aspects.

The Cleveland District normally produces a large surplus of pig iron and steel for shipment to other parts of England,

[1] T. A. Bulmer & Co., Middlesbrough Shipping Facilities, pp. 23-32.

to Scotland, and to foreign countries. The location of the plants at the mouth of the Tees, adjacent to deep water, readily permits the shipment of a large tonnage of these bulky products by water. The railroads handle the bulk of the distribution to inland centers, chiefly Sheffield and the Midlands. The Clyde District is the largest market for Cleveland pig iron.

In 1924, from a total production of 2,000,000 tons of pig iron the Cleveland District shipped approximately one-fifth or 443,000 tons. Of this 170,000 tons were shipped coastwise or by rail to other centers in the United Kingdom and 273,000 tons were exported. In 1913, the total shipments were much greater, being 1,247,000 tons, or about one-third of the output. The marked decline in shipments was due to the general stagnation of the industry, to foreign competition, and to the increased local consumption.[2]

Much of the Hematite pig iron that is produced from imported ores is sent by rail to the Sheffield District for manufacture into special high grade steels which are used chiefly for tools, alloy products, cutlery, guns, and naval equipment. A small tonnage is sent to South Wales.

In recent years there has been a greater utilization than formerly of both pig iron and steel within the Cleveland District itself for the manufacture of more finished products. Approximately four-fifths of the total pig iron production in 1924 was converted into steel and used in the local rolling mills. The specialties of the district are, plates and other shipbuilding material, structural steel of all kinds, steel rails and other railroad equipment, sheets, and tubes.

The shipbuilding industry is without doubt the most important single user of Cleveland products. This is carried on locally at Stockton and West Hartlepool. Newcastle and Sunderland are, however, the great shipbuilding centers of Northeastern England, normally producing about half the total tonnage launched in the country. Marine engineering and boiler making are subsidiary industries along the Tees.

The great engineering industries of Northeastern England constitute a very large nearby market for a wide range of manufactured and semi-manufactured products of the Cleveland District. The chief manufacturing centers are located along the

[2] U. S. Dept. of Commerce, Iron and Steel Division, Report No. 209121, pp. 41-42.

lower Tyne from Newcastle to the sea forming one continuous industrial area, and at Sunderland at the mouth of the River Wear. These can be conveniently supplied by coastwise steamers from Tees-side plants. Numerous inland centers such as Darlington, largely interested in engineering can receive their requirements readily by rail since the London and North Eastern Railway serves the whole area.

Intensive mining operations throughout the northeast create a demand for machinery, pipes, and tubes, which are made in considerable quantities in the Cleveland District.

Only slightly more distant are the other great manufacturing areas of Northern England. The Sheffield and Midland districts are primarily interested in the making of iron and steel products. The manufacture of machinery there is associated with the great textile industries of Yorkshire and Lancashire and much of the material is supplied from Cleveland plants. Throughout the whole region there is a large demand for all kinds of structural steel, mining equipment, and railroad material. This extensive and varied market can be reached readily from Middlesbrough.

The export trade has been an important factor in the expansion of the Cleveland industries practically all of which are associated with iron and steel. In addition to the export of pig iron which goes mainly to Belgium, Germany, Holland, and the United States, there is normally a large movement of manufactured iron and steel products to the British Colonies, South America, India, and the Far East. In 1924, these exports amounted to 647,000 tons, one-sixth of the total British iron and steel exports. Compared with 1913 the exports had decreased by 27% owing to the capture of many overseas markets by foreign competitors.

The prosperity of the Cleveland District is bound up with the iron and steel industry. At the present time foreign competitors are producing these materials more cheaply and underselling Cleveland products even in the home markets. To meet this every effort is being made to reduce costs. Plants have been modernized and more attention is being given to the production of high grade finished products than formerly. Probablye the most significant fact so far as this district is concerned is the decreasing significance of Cleveland ironstone and the increasing dependance upon imported ores.