BARROW IN FURNESS, LANCASHIRE, ENGLAND.

The enormous development of the iron trade, which has taken place in the last twenty years, has been as noticeable in England as in this country. In this time the whole district of Middlesbrough has come into existence as an iron field; the works in the neighborhood of Glasgow have been increased with astonishing rapidity; and on the west coast of Lancashire, a new town has lately sprung up, which, from the extent and quality of its production, is as remarkable as either of the other industrial centers.

The Cumberland iron ores, which abound in the neighborhood of Barrow, had been but little worked previously to the establishment of Mr. Bessemer's system; but they are now found to be the mineral particularly adapted for the production of Bessemer metal, or "low steel," as it is sometimes called. This fact, and the enterprise of many local manufacturers, aided by the capital of two territorial magnates, have created a town, which, in 1847, had a population of 325, which commenced its corporate existence only in 1867, and now has 30,000 inhabitants and produces 5,000 tuns of metal, chiefly steel, weekly. On the opposite page we give a birdseye view of this interesting and important town.

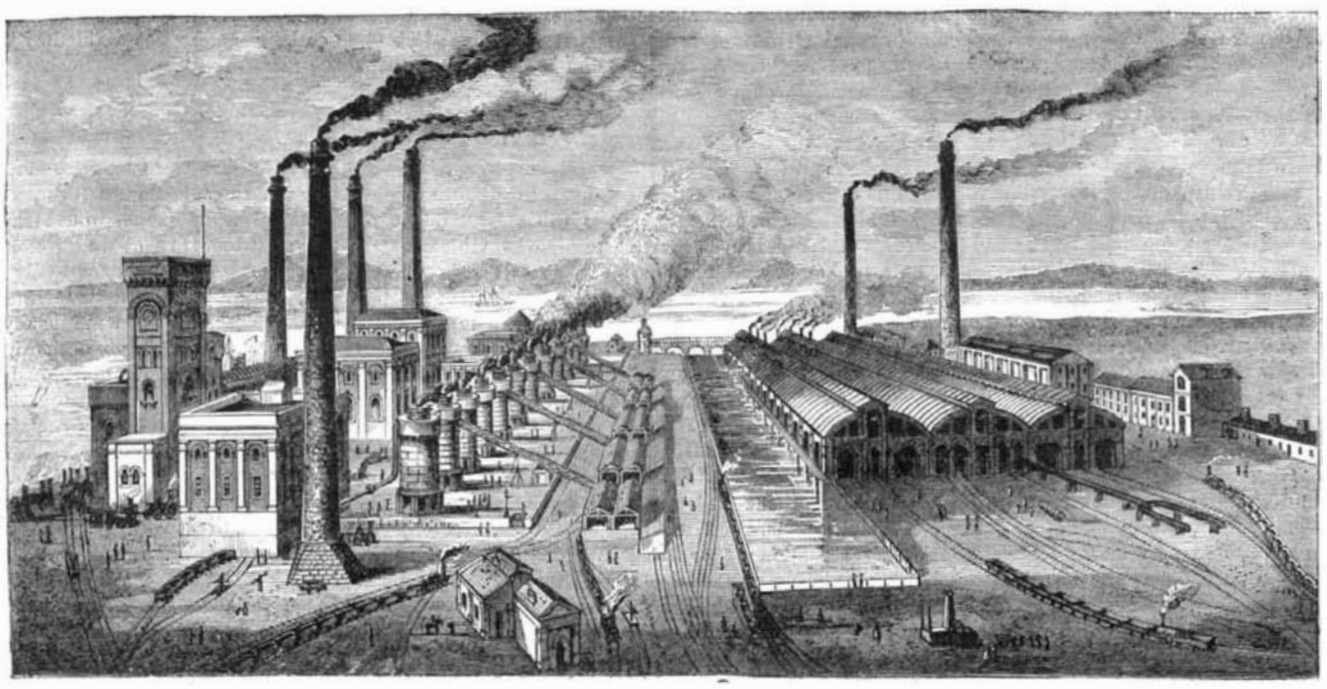

Fig. 1.—BARROW HEMATITE STEEL WORKS.

In 1864, Mr. James Ramsden, manager and secretary of the Furness Railway Company, projected and formed the Barrow Steel Company, which erected large works for the purpose of converting the produce of those furnaces into Bessemer steel, and then manufacturing the valuable material into rails, axles, tyres, and the other hundred forms in which Bessemer steel is now used. It very soon after became apparent that the two operations of smelting the ore and converting it into steel were so nearly allied in interest as well as in locality that an amalgamation was proposed between these works and those owned by Messrs. Schneider and Hannay, and was effected in 1866 under the title of The Barrow Hematite Steel Company (Limited). The Duke of Devonshire became chairman, and Mr. Ramsden managing director, and it was virtually only an offshoot of the original enterprise of the railway company. They now possess twelve blast furnaces complete, and in connection with these one of the largest Bessemer steel works in the world. These twelve furnaces stand close to the sea shore, being arranged in one straight line, but forming two groups of different sizes. The slag is tilted direct into the sea, and has already given a large increase of land on the sea side, upon which whole series of stores, workshops, and other accessory buildings, have been erected. For the present weekly production, the quantities of 10,000 tuns of ore and limestone and about 5,000 tuns of coke are needed. What would poor Dud Dudley (asks the *Practical Magazine*, from which we extract the engravings), who first introduced the use of coal for smelting purposes into England, have said to this, when, scarcely more than 200 years ago, he writes complainingly: "Some of the now going Furnaces with Charcole do make two or three Tun of Pigg or cast iron in 24 hours, . . . which quantity of cast iron, with pit cole and Sea cole at one Furnace I desire not but am contented with half the proportion!"

The Barrow steel works, shown in our Fig. 1, are the largest Bessemer steel works in Great Britain; and the company own several productive mines. It is believed that their profit in 1872 was not much under $3,750,000.

At the time Mr. Ramsden was first mooting the idea of the steel works, his mind was engaged also on an undertaking of but little less magnitude and utility, namely, the formation of such docks as should make Barrow altogether unrivalled as a seaport town on the large seaboard between Liverpool and the Clyde. The construction of two large docks was commenced in 1864. They were formed simply by inclosing the channel separating the town from Barrow Island by an extensive quay, forming the dock wall on the main land side. The cost of actual formation was, owing to the natural facilities of the site, only $1,000,000. All these enterprises had given an immense impetus to the growth of the town. Private enterprise has not been slow in utilizing the advantages of the new docks. There is a line of ocean steamships from Barrow to Montreal, and another between Barrow and Rotterdam. Timber is imported at the rate of one hundred cargoes annually.

The Devonshire dock is thirty acres in extent, the Buccleugh dock thirty-three, and outside of this latter there is a splendid timber pond. The entrances are sixty feet in width, and the depth of water maintained twenty-two feet. The stone quays are one and a half miles in extent; the wharves adjoining, one hundred acres, while there are at least ten miles of railway sidings. Cranes and capstans worked by hydraulic power were supplied by Sir William Armstrong, and the original warehouses, having a floor area of 17,000 square yards, have more recently been augmented by the erection of a gigantic warehouse by the side of the Devonshire dock, divided into two blocks, each block five stories in hight, and each possessing a floor area of 5,000 square yards, the two being separated by a glass-covered transit shed.

It was thought that some employment should be afforded to the numbers of women and children who congregated idly and uselessly in a town where employment had only been provided for the male members of the community. With a view of opening another branch of industry, Mr. Ramsden, towards the close of 1869, matured plans for the Barrow Flax and Jute Company (see Fig. 2), having for its object the erection of works at Barrow for the purpose of spinning and weaving flax and jute, and the manufacture of coarse cloths, sacking, bagging, wrapperings, etc. The scheme was soon successful, and at present the mills, employing some fifteen hundred hands, form one of the most conspicuous architectural ornaments of the town. Business reacts upon business, one trade upon another, and the establishment of this manufactory has now a very beneficial effect upon the commercial interests of the port. The company have for some time regularly imported their own jute direct from India, and are about to establish a regular service from Calcutta. Dundee must look to it, or it will needs have to take ashes with its sackcloth.

The year in which the jute mills were regularly opened for business also saw the establishment of another large industry, scarcely inferior to the steel works in outlay or ambition. This was the Barrow in-Furness Iron Shipbuilding Company; and in this, as in all the other enterprises, Mr. Ramsden was the leading and directing spirit. The company secured a large tract of land on Old Barrow Island, admirably adapted for launching purposes; while on the Devonshire dock side, the site was immediately connected with the railway system. There is here accommodation for the construction of from twelve to fifteen vessels at one time. A graving dock is now in process of completion, which will afford the company the means of making repairs in a more substantial manner than was hitherto possible. These works already employ more than two thousand hands, and will, when in full movement, demand at least six or seven thousand men. The company have already contracted with the Barrow-in-Furness Ocean Steamship Company for six first class steamers, each of which will be about 400 feet in length, of 4,000 tuns burthen, and 500 horse power. They are also building five steamships for the Ducal line of steamers trading to India, Ceylon, and the East generally, the inauguration of which line has taken place so recently and so successfully. These vessels will be about 380 feet long, 38 feet beam, and 26 feet depth of hold, 500 horse power, and 4,000 tuns burthen.

Corn mills, rolling stock factories, railway shops, newspaper offices, theatres, bath houses, a yacht club, and other indications of rapidly increasing population and public spirit, have followed. The public baths were built by Mr Ramsden at his own expense, and presented to the town.

A stroll through the works and streets of Barrow gives one as true a picture as may be of a teeming hive of modern industry. "Not 'arms and the man,' but tools and the man, is the true epic of modern times!" says Mr. Carlyle; and here we have the very nursery of tooldom. Tall chimneys all around us, with their clouds of black, dense smoke; huge furnaces pouring out by day and night their wealth of fiery molten iron; the heavy thud of the steam hammer; the sharp, ringing clangor of conflicting metals; the perpetual puffing and whistling of the locomotives, and the rattling of the railway wagons laden with hematite and coal. These, and more than these, tell us something of the power and the achievements of the Age of Iron.

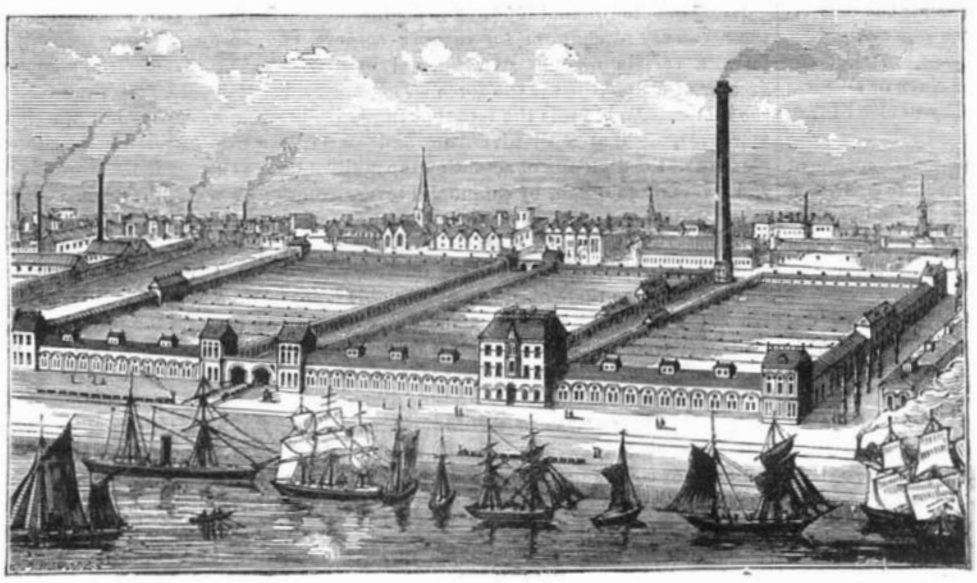

Fig. 2.—BARROW FLAX AND JUTE MILLS.

A New Exploration of the Libyan Desert.

Two baggage wagons recently passed through Leipsic *en route* to Trieste, the enormous hight and unusual appearance of which attracted general attention. They were destined for the expedition which has just begun the arduous labor of exploring the great Libyan desert. Among other odd fittings, the two vehicles carried some five hundred empty iron boxes, intended for water tanks. Each vessel is enameled inside and has a capacity of about fourteen gallons, so that a supply can be transported, sufficient to render the travelers independent of the casual finding of wells or springs.

The Viceroy of Egypt, it is understood, is to defray the expense of the expedition, and this in addition to the large sums, amounting to some $500,000 yearly, which he has given for some time past to aid the labors of Sir Samuel Baker, the German traveler Schweinfurth, and the zöologist Hoekel. As to results, it is probable that our geographical knowledge of the eastern portion of the Desert of Sahara will be materially increased, and that the characteristics of an untraveled portion of the globe, as large as the whole of central Europe, will be made known.

The party left Egypt during the beginning of December, starting for Tarafieh. The objective point is Koufra, in the center of the desert, which, it is expected, will be reached by the last of January.

Preserving Brickwork.

The exclusion of damp from brickwork has long been an important problem with builders. It is stated that one of the most effective methods of accomplishing this object is the following: Three quarters of a pound of mottled soap are dissolved in one gallon of boiling water, and the hot solution spread steadily with a flat brush over the outer surface of the brickwork, care being taken that it does not lather; this is allowed to dry for twenty-four hours, when a solution, formed of a quarter of a pound of alum dissolved in two gallons of water, is applied in a similar manner over the coating of soap. The soap and alum form an insoluble varnish, which the rain is unable to penetrate, and this cause of dampness is thus said to be effectually removed. The operation should be performed in dry settled weather.

Another method is to use eight parts of linseed oil and one part of sulphur, heated together to 278°, in an iron vessel.

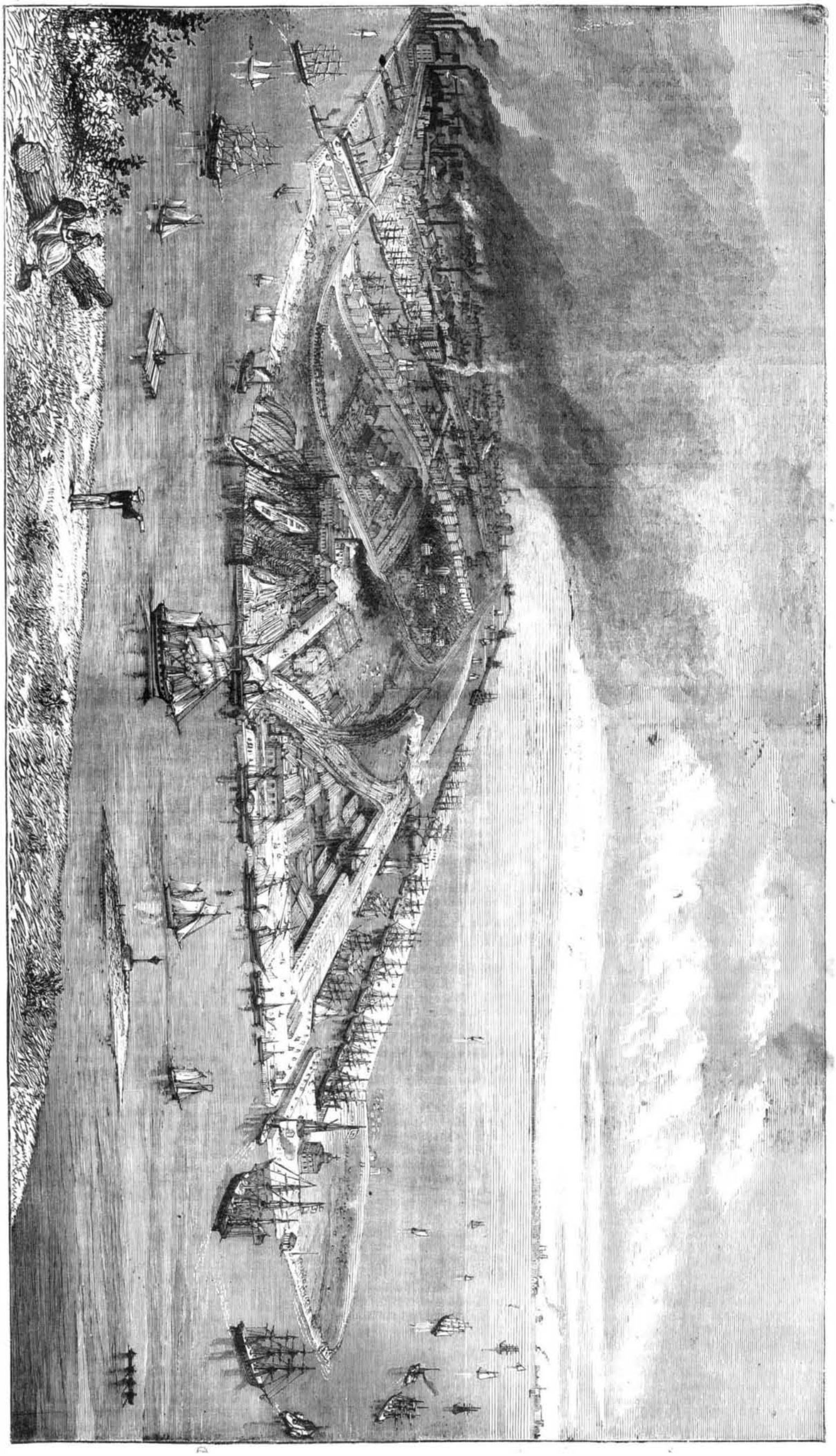

FIG. 3.—BIRD'S EYE VIEW OF BARROW-IN-FURNESS, LANCASHIRE, ENGLAND.