

WEEKLY INDUSTRIAL RECORD.

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HOW INDUSTRY IS CREATED BY THE DEVELOPMENT OF WATERWAYS.

The Convenient Highway for Transporting Low Grade Freight.

The great benefit of improving the natural waterways of the United States, especially to the South, is well known in a general way, but the importance of these waterways in creating industry merely is perhaps not appreciated as much as it should be. The many classes of what is termed low grade freight—articles that can be transported by water instead of by rail without being affected by the longer time than in shipment by water—are so varied that they comprise a very large tonnage of our domestic, also export trade. Such material as coal, ore, metals of various kinds, grain, cotton and other farm products can all be classed as in the tonnage which can be shipped to market by water where the proper facilities are afforded.

The deepening of the river or the excavation of the artificial canal, however, is a great incentive to the manufacturer if he can secure a site on it near the source of the raw material upon which he must depend. While the waterway may not be used exclusively for shipping his output, it is of great value in acting as a lever in forcing the railroad companies whose lines may reach the towns along the water route to carry freight at a fair rate. If the waterway is protected by suitable legislation so it cannot be controlled by the land transportation companies, it is of importance even if not a vessel passed over it for the reason referred to.

By the fact that the gateway, natural or artificial, is a great developer of industry is proved beyond question by Great Britain and the Continental countries. It is needless to say that so far as natural waterways is concerned, England, France, Germany, Holland and Belgium, for example, do not compare with this country in facilities for transportation. Their only water courses are not only small, but in many sections are obstructed by rapids so that it has been necessary to construct locks or other artificial channels for vessels at a great expense. Yet no expense has been spared in any of these countries to improve and enlarge the rivers and other streams wherever they have been considered possible for navigation while the mileage of artificial canals excavated entirely through the land formation, is so great as to seem almost incredible. Perhaps the most notable illustration of how waterways have expanded European industry is in the valley of the Rhine in Germany. The people of the empire have contributed millions of dollars into the improvement of this stream and, as a consequence, the Rhine Valley has been converted into one vast workshop. Mannheim, more than 300 miles from the sea, has a dredged harbor of 550 acres, three miles of docks and nine miles of improved

shores. The equipment includes 129 cranes for handling cargoes, 16 grain and 26 coal elevators, 110 storehouses and 17 petroleum tanks. Fifteen million dollars have been spent on this single harbor since 1886, and similar sums on some twenty other harbors from 100 to 350 miles from the ocean. Hockfeld-Duisberg-Ruhrort, 100 miles up the Rhine, is one of the great harbors of the world, its tonnage having increased from 2,900,000 tons in 1875 to 13,000,000 in 1900. The tonnage passing Emmerich, on the Dutch-German frontier, amounted to 21,000,000 tons in 1905.

Turning to little Belgium, its greatest seaport is no less than 160 miles inland from the ocean, connecting with it by a river which flows through a low flat country and whose channel must be continually excavated to keep it from shallowing with the deposits of sediment continually carried down stream. Yet Antwerp is not only one of Europe's greatest shipping points, but one of the greatest in the world.

To the engineer the admirable plan of the quays at once attracts attention. Constructed at a cost of \$7,500,000, they extend along the river bank with a depth of water sufficient to permit the largest craft entering the harbor to moor at the docks, thus avoiding the use of lighters for transferring cargo. Constructed with sea walls of massive masonry, space has been provided for railway tracks so that trains can be run alongside of the vessels. In addition to the railway tracks, however, additional tracks have been laid on which have been placed a series of loading and unloading cranes. These are so situated that their arms or jibs can be swung over the ship's hatches and over the railway tracks, thus enabling the unloading to be performed entirely by mechanical means or cargoes to be removed from the cars to the vessel in the same manner.

On the river front alone are about 150 cranes having a lifting capacity ranging from 2 to 25 tons. The quays extend along the river for a distance of nearly three miles. They are separated into what might be termed blocks, each block containing a large warehouse incased in sheet iron with a steel framework rendering it practically fireproof. The warehouses are located between the railroad tracks on the quays and another set of tracks which extend in the rear of them, all being connected with the Belgian State railways. These warehouses are devoted entirely to the storage of general merchandise and forty large ships can be unloaded and cargoes stored in them at one time. No petroleum or other material considered dangerous can be unloaded on this section of the quays. Facilities have been provided for handling naphtha, benzine and oth-

er inflammable oils further up the river where a series of pumps have been installed for emptying tank steamships into storage reservoirs.

The basins excavated from the land form an important addition to Antwerp harbor. All of these have a minimum depth of 35 feet of water, enough to float ships conveying 15,000 tons of cargo. They are constructed with cranes capable of handling the heaviest weights taken in ship board so that all of the cargo may be loaded or unloaded mechanically if desired. What the basin and quay system means in the commerce of Antwerp can be realized when it is stated that the Kattedyke basin alone is 2,150 feet long and 110 feet wide and that at present wharf frontage is provided for no less than 500 ocean going vessels.

At present about 5,000 vessels aggregating 4,000,000 tons dock at Antwerp in a year resulting in a congestion of shipping which the city authorities have had to contend with. As a result plans have been prepared and are now being carried out which will undoubtedly make the city the world's leading seaport in point of capacity for docking and transporting cargoes to ships. It may be needless to say that the country on either side of the Scheldt is low and flat, in many places being below the river itself and protected from inundation by levels or dykes. This is notably the case in the vicinity of Antwerp and arrangements have been made to form an entirely new ship channel by dredging which will not only serve the present system of quays and basins, but no less than nine additional basins. These will range from 600 feet to 3,600 feet each in length and of corresponding width and are to be deep enough to float vessels drawing 38 feet of water—the largest that have yet been built. As fast as completed they will be provided with cranes and railroad tracks. It is expected to have all of them excavated as well as the new ship channel within the next five years. Then no less than a thousand ships of 5,000 tons and upward will be enabled to berth in Antwerp's harbor—a greater number than in any other of the world's seaports.

A large percentage of the cargoes sent from Antwerp to the markets of the world originates not only in Belgium, but in and about the city itself, for investors have been stimulated by the splendid commercial advantages to erect mills and factories, the output of which is intended merely for the foreign trade. In most cases the raw material comes from a long distance, but owing to the low rates of transportation by water it is profitable to manufacture it possibly thousands of miles from the source of supply. One il-

lustration of this is rubber. A large tonnage of the crude rubber which comes all the way from Africa is converted into articles of commerce in Antwerp to be sent to not only the United States and Europe but South America as well.

Of special interest in connection with the textile industry of this country is the history of England's great industrial center—Manchester. When the Manchester ship canal was conceived at a cost running far into millions of pounds, it was regarded by financiers and shippers as absurd, the argument being made that the expense of maintaining the canal and other outlay would prevent it from earning its bond interest, saying nothing of paying for the original cost. It has shown, however, that this single canal less than 36 miles in length has really created Manchester as it is today—the greatest textile manufacturing center in the world. The reason can be given in a few words—the cotton from India, America and Africa comes direct to the city docks by the ship load and within sight of the mills, Steamships sailing to practically all of the large ports of the world, also tie up at these docks, which are six miles long, and cargoes of cotton goods of all varieties and of every quality can be placed on board the vessel, hauled by wagons from the plants to the docks, the vehicles unloaded by mechanical conveyors at a minimum expense.

As yet we have no illustration in the United States showing the great value of the inland navigable waterway such as these instances present, but the people of the North and West are rapidly realizing what the waterway means in commerce and industry. The creation of the steel city in Indiana known as Gary, is an instance of this fact. In the building of Gary it was necessary to literally dig out a great area of the prairie land on which it was located, forming a harbor which is entirely artificial. Had this not been done, Gary would not be in existence today, because all of the immense tonnage of iron ore necessary to supply the great smelters which have been erected comes from the Minnesota ranges by water since it can be transported so much more cheaply than by rail. On the other hand a considerable proportion of the steel manufactured at this place is shipped by water for the same reason. When it is remembered that this project represents an investment of no less than 75 million dollars, the significance of it can be appreciated.

Turning to the south it is unnecessary to say that it is intersected with waterways which can be deepened enough to allow sea going vessels to go far inland

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