

THE LAKE ERIE AND OHIO RIVER SHIP CANAL.

BY WILLIAM GILBERT IRWIN.

The present is an age of waterway development, and while the move to cheapen and facilitate internal communications is general, it is as marked in no other section as in the Ohio Valley. But few sections of our country are so eminently adapted to the construction of artificial waterways, hence this unusual activity in this particular region. The question of internal water communication is no new one to the people of the Ohio Valley, for as early as 1770 no less a personage than George Washington visited this section and examined the country with a view to the establishment of communications between some of the streams. During the years intervening between 1820 and 1850 the country between the Ohio and Lake Erie was permeated by a network of canals, and in those days of the towpath Pittsburg and other towns in this section saw busy days.

But the advances of latter day civilization have wrought many changes. The great question now occupying the attention of the people of the Ohio Valley and those of other sections of our country is the construction of canals whereon great freighters and large passenger boats may speed on their great mission of disseminating the manifold products of commercial activity. Nowhere else have capital and labor already wrought such mighty wonders as here in the Ohio Valley. From a commercial standpoint Pittsburg really controls the Ohio Valley. Within her borders and at her doors this great manufacturing city has storehouses of treasures such as are rarely met with on the face of Mother Earth. The real source of the greatness of Pittsburg lies in her vast fuel supply, and as a result she has grown to prominence in varied fields of industry.

Through the excellence of her natural waterways Pittsburg has thus been able to maintain with comparative ease her relative foremost position in the varied manufacturing fields in which she is engaged. While Pittsburg is, indeed, a city of many industries, it is in the iron and steel manufacturing industry that she has attained pre-eminence. From the great iron ranges of Minnesota and Michigan come the raw ores which enable Pittsburg to retain her censorship on this vast industry. The cost of transporting hither these ores has long been a perplexing one to the Pittsburg manufacturers. The expense of a long water voyage from Duluth to Ashtabula, together with the docking and added to this the cost of transporting the ores from the docks by rail to Pittsburg, is at the present day one of the most troublesome obstacles with which the Pittsburg manufacturers have to contend.

From carefully compiled statistics, it is found that the approximate through traffic of the railroad lines traversing the country between Pittsburg and Cleveland, through which the new canal is to pass, consists annually of 7,000,000 tons of iron ore, 7,000,000 tons of coal, 2,000,000 tons of coke, 1,000,000 tons of heavy manufactured products, and 1,500,000 tons of lumber and general merchandise. This gives a grand total of 18,500,000 tons, and from this we can safely base an estimate on 13,000,000 tons as the probable annual tonnage over the cheaper water route immediately after its completion. The present cost of ore from Lake Superior to Pittsburg is \$1.95 per ton, of which 80 cents is for the lake shipment of 761 miles and \$1.15 for the railroad shipment of 128 miles. The rate per ton on the old canal which connected Lake Erie with Pittsburg over the same route which the ship canal will traverse was 13 cents, and added to this were lockage charges of 38 cents per ton. Were the old rates to be revived on the new canal a saving of 77 cents per ton on iron ore would be made. In the same manner the tariff on coal may be reduced from the present rate of \$1.05 to 33 cents, a saving of 72 cents per ton. Thus Pittsburg coal can be delivered at Chicago for \$1.67 per ton, at Duluth for \$1.50, at New York for \$1.75, and at Montreal for \$1.60, at corresponding reductions for all points reached by the lake connections.

Let us apply these economies to the traffic of the section in question as it exists to-day. Omitting, too, the inevitable increase of traffic resulting from the radical reduction of rates, we still have an annual saving of \$4,496,082 on iron ores shipped into the Pittsburg district and also a saving of \$4,868,561 on the return cargoes of coal, and of \$1,414,044 on those of coke, or a total reduction in the cost of iron ore, coal, and coke of \$10,778,687. The resultant economy from the construction of the canal in the six great lake ports would be \$11,852,876 for coal. The canal district would save \$4,496,082 for iron ore and the lake district \$1,414,044 for coke. Thus the annual economy resulting from the construction of this commercial highway would be more than one-half the estimated cost of the work were we to take into consideration but these three leading commercial products.

The above figures are specific ones. To a great extent the whole shipping interests of the Great Lakes, and those of the Ohio and tributary streams, would be benefited by the opening of this internal water-

way. From the latest obtainable official figures, the Great Lakes are credited with an annual tonnage of 53,424,482 tons, the Ohio River with 15,600,439 tons, and the Monongahela with 4,275,504 tons. To this we can add 953,406 tons credited to the Allegheny River. This gives the canal direct connections with waterways which carry 74,253,881 tons of commercial products annually. The vastness of these figures might well arouse one's skepticism. While it is not to be inferred that the traffic of the canal will approach anything near these figures they go to show the marvelous extent of the water communications which the canal will establish. The length of these commercial highways is many thousand miles.

To the traffic of these waterways add the railway traffic of the sections in question. The traffic of those roads centering in Pittsburg is not excelled elsewhere in the country. In spite of the fact that Pittsburg is eminently adapted to water traffic, and that the city has fine water communications, yet its railway traffic has grown to proportions most marvelous. In 1895, the roads of the Pittsburg district hauled 1,989,236 cars of freight with a tonnage of 39,784,730 tons. Add to this the tonnage of the roads centering in the lake region at the northern terminus of the canal, and you will have some idea of the railway traffic now engaged in here in this region. Add to this the water traffic as given above and you will have some idea of the universal import the construction of this canal bears to this country and to the world.

The vast commercial traffic of the region to be benefited by this internal improvement speaks most eloquently of the industrial development attained here in the Ohio Valley and in the lake sections to be affected by the canal. Another point which must not be lost sight of is the extent of population of the region in question. Taking the great cities to be connected by this ship canal and giving each a radius of sixty miles, which is approximately the district which centers in such a city, we have a population as follows: Pittsburg, 1,608,964; Chicago, 1,565,360; Cincinnati, 1,168,308; St. Louis, 967,578; Buffalo, 917,028; Cleveland, 800,181; Detroit, 662,192; St. Paul, 644,309; Milwaukee, 581,713. These nine commercial centers, which will be connected through the Lake Erie and Ohio River Ship Canal, have a combined population of 8,915,633. But all these figures cannot fully convey to the mind the import of this new canal.

It is but fitting that the typical city of Pittsburg should take the initiative step toward the construction of this internal waterway. After having been agitated for some years, the work was finally taken up by the Pittsburg Chamber of Commerce in 1894, and through funds raised by subscription a preliminary survey has already been made. The canal has also been chartered and its construction is now assured. But private instead of public capital will accomplish this boon to internal commerce.

The route to be traversed by the canal lies through western Pennsylvania and eastern Ohio. According to the most practicable proposed route, the length of the canal will be 122.16 miles from Pittsburg to Ashtabula. This route is as follows: From the Davis Island Dam in Pittsburg Harbor to the slack-water of the Beaver River, 23.26 miles; thence up the Beaver and Mahoning Rivers by a slackwater system of pools and dams 46.26 miles to Niles; thence by canal 8.74 miles to plateau 900 feet above the tide and 200.08 feet above the Pittsburg Harbor; thence 31.25 miles across the summit; thence descending in a distance of 12.55 miles to the level of the lake, 572.86 feet above tide.

The 23.26 miles of the canal which traverses the Ohio River has been improved by the United States government, which leaves but 98.9 miles to be constructed. It must be remembered that it is proposed to carry on this canal lake freighters of 2,000 tons or of even a greater capacity. This will necessitate a 15 or 20 foot channel. The thirty-three locks of the canal will have a length of 270 feet and a width of 45, and a 15 or 20 foot channel.

The estimated cost of this internal improvement is, in round numbers, \$33,000,000. Its estimated revenue from tolls on coal, coke, and iron is \$3,169,049 per annum, and deducting from this the cost of maintenance and operation, there still remains a net annual revenue of nearly \$3,000,000. The canal will furnish cheaper ores and cheaper foods to the great manufacturing centers. To the Great Lakes it will furnish cheaper fuel, and as a cheaper avenue of commercial communications between the Great Lakes and the Ohio and Mississippi Rivers the canal will prove to be of the highest economic value.

THE rapid rise of the land about Hudson Bay is said to be the most remarkable gradual upheaval of an extensive region ever known. Driftwood-covered beaches are now 20 to 60 or 70 feet above the water, new islands have appeared, and many channels and all the old harbors have become too shallow for ships. At the present rate, the shallow bay will disappear in a few centuries, adding a vast area of dry land or salt marsh to British territory in America.

DR. JOHN HOPKINSON.

The scientific world has been greatly shocked by the tragic death of Dr. John Hopkinson. A few days ago, accompanied by his son and daughter, he essayed the ascent of the Dent de Veisivi. The party started early from Arolla, and as Dr. Hopkinson was an expert mountaineer and as the ascent is not considered difficult, no guide was taken. When the party failed to return, search parties were organized and at daybreak the bodies of the distinguished electrician and his children were discovered still roped together on a moraine at the foot of the cliffs. At points on the ascent the footing is difficult, and it is surmised that one of the party must have slipped and all four fallen from rock to rock a distance of several hundred feet. Electrical engineering suffers a severe loss in the death of this brilliant English electrician. He combined, in a rare degree, the qualities of the mathematician with the skill and resources of the engineer. There is scarcely a branch of electrical work that does not owe something to him, and his work was theoretical as well as practical. His greatest invention was an improvement on the Edison dynamo, which is known as the Edison-Hopkinson machine. In 1882 he filed his famous three-wire patent, which he afterward sold to the Westinghouse Company for nearly \$100,000.

MOUNT YLLIMANI ASCENDED.

Sir William Martin Conway, the explorer, cables from La Paz, Bolivia, that he has successfully ascended Mount Yllimani, or Illimani, one of the loftiest mountains of the Bolivian Andes, about twenty-five miles east of La Paz. Sir William says that the ascent of 22,500 feet occupied five days. On the fourth day the Indian porters employed to carry the expedition's baggage ran away. The party suffered great weakness during the last hour they were on the summit, but none of them were injured. Their experience was like that of Mr. Fitzgerald, who ascended Aconcagua.

Sir William was accompanied by the guides who ascended Mount St. Elias, in Alaska, with the Duke of Abruzzi, in 1897.

Mount Yllimani is a serrated ridge with four principal peaks. The snow part of the East Cordillera begins with the gigantic mass of Mount Yllimani, and proceeds in a continuous line of snow-clad peaks to the group of Vilcanota, where it unites with the Cordillera of the coast. On its north side it has glaciers above the height of 16,350 feet. On it also is the Lake of Yllimani, 15,950 feet above the sea.

Sir William Conway is the son of a clergyman, and has traveled much in Europe, Asia, the Arctic regions, and South America. In 1892 he explored the Himalaya Mountains, reaching an altitude of 23,000 feet. In 1894 he traversed the entire range of the Alps, and in 1896 and 1897 he explored the interior of the island of Spitzbergen, and discovered that its central portion is a vast icy plateau. He is the author of several books on mountaineering, and is regarded as an authority on the subject.

SOAP AS A DISINFECTANT.

The use of soaps containing a disinfectant of some kind has become so general that observations on the practical value of such combinations cannot fail to be of interest. Dr. Reithoffer has recently published the results of some experiments carried out by him with various kinds of soap, having for object to determine their value as microbicides. He used the ordinary mottled soap, white almond soap perfumed with nitrobenzine, and hard potash soap. He found that these soaps were very inimical to the cholera microbe, a 1 per cent solution killing them in a short space of time, while a 5 per cent solution of the potash soap killed them in five minutes. We are, therefore, at liberty to infer that, as in washing the hands the strength of the soap solution is never less than 5 and may go as high as 45 per cent, this method of disinfecting the hands, as well as the clothes, etc., is fairly trustworthy. Much stronger solutions are required, however, to destroy the bacilli of typhoid, the colibacillus, etc., not less than 10 per cent being sufficient. None of the soaps experimented with appeared to have any effect on the pyogenic microbe. The practical result of these investigations is that it is always preferable to use soap and water first of all, rinsing the hands in the disinfectant solution afterward. This is an important point which merits to be generally made known.—Medical Press.

Congress on Public Art in Belgium.

The first International Congress on Public Art will meet at Brussels, September 24-28, 1898. The Belgian Minister says that he is instructed by the Minister of Foreign Affairs in Belgium to invite the government of the United States to send delegates to this congress. Many eminent persons have consented to act as presidents and honorary members. According to the circular, the programme will have three divisions: public art from the standpoint of law and regulations, from the social standpoint, and from the technical standpoint.