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# NAVIGABLE INLAND WATERWAYS.

BY SIR E. LEADER WILLIAMS.

I.

The important question of maintaining and increasing the industries of Great Britain against the severe competition now existing with other countries led the Association of the Chambers of Commerce a the United Kingdom in January, 1901, to request the Foreign Office to obtain reports from our consuls ins France, Holland, Belgium, Germany, and Austria with reference to tine internal navigable waterways of those countries. This request was the outcome of a resolution of the Chambers of Commerce, passed at their Paris meeting, urging the necessity for utilising and improving tine internal waterways of the United Kingdom. A deputation of nearly twenty members of Parliament, and also other gentlemen, had also waited upon Mr. G. Balfour, the President of the Board of Trade. They stated that the international competition of the next twenty years was likely to be much more formidable than in the past, and they believed that the heavy industries wore handicapped by the backward condition of our inland waterways. They therefore urged that an inquiry should he held on the subject. The reports of our consuls are now published (Commercial No. 7), and contain detailed information with regard to the waterways of the countries in question. Extracts from these reports are given below. It will be seen from these valuable reports that nearly all the important waterways in the countries in, question have been constructed, improved, and maintained at the cost of the State, the tolls or dues charged on vessels or goods are low, and on some navigations no tolls are levied. Our foreign competitors are thus able to get raw materials delivered cheaply at their works, which in many cases are situated on the canal or river banks, and their manufactures are carried thence at low rates to their ports for shipment.

The expenditure to produce this result falls generally on the taxpayers, but it is considered that the greatly improved trade brought about by cheap seater carriage benefits all classes and justifies the cost. The same principle is adopted in America and Canada, where the Governments take charge of the inland waterways. It may be said that canal improvements should be left to private enterprise, but the Manchester Ship Canal, which has proved of such great benefit to all the surrounding districts, has returned hitherto no interest to the ordinary shareholders. Unless we use the means adopted by our competitors in trade we shall not gain the advantage they possess in inland carriage, as the effect of excessive transit charges is precisely the same as that produced by the operation of hostile tariffs. To gain trade in Central Africa the Uganda Railway has been constructed, at a cost of five millions. On what principle can a similar sum be denied to assist the trade of this country by improving the main lines of inland navigation? The railway companies have been allowed to become owners of 1,138 miles of canal out of a total length in the United Kingdom of 3,906 miles, and it cannot be expected that they will improve their canals. Yet some means should be found to enlarge the main lines of navigation which lead from the manufacturing districts to the principal ports, and all parties may well agree at least on this subject, which ought to be remembered as part of the present "fiscal inquiry."

Hitherto there has been no result from Parliamentary inquiries into inland navigation with regard to their improvement, yet so long ago as 1872 a Joint Select Committee of both Houses of Parliament on Railway Company Amalgamation reported that "competition by river and canal exists to a partial and limited extent only, and many important links of canal navigation are in the bands of railway companies, whose interest it often is to depreciate them. It is important that an effort should be made to maintain the competition which now exists; and it is still more impatient, whether competition is maintained or not, that the capacities of inland navigation should be fully utilised and developed." Since the date of this Report, our foreign competitors have "fully developed and utilised " their inland navigations. In 1880 a Royal Commission was appointed " to inquire and report upon the extent, nature, and probable causes of the depression now or recently prevailing in various branches of trade and industry, and whether it cans be alleviated by legislative or other measures." The Commissioners reported that " among the causes which are said to have aggravated

the prevailing depression scarcely any have been so persistently put forward as the difficulties connected with the transport of goods. After dealing with railway charges, they reported (in 1880),—

We think that measures should certainly be adopted both to permit of the free development of canals wherever they are likely to be useful, and to prevent their being controlled by the railway companies, as appears to be the case in many parts of the country. This " free development of canals" has yet to come, although recommended by a Royal Commission as a means of alleviating depression in trade. This Commission might reasonably have expected some assistance from a Select Committee appointed in 1883 " to inquire into the condition and position of the canals and internal navigation of the country, and to make such recommendations as may appear necessary." This Committee sat eleven days and heard much valuable evidence on the subject. They then reported that they could not conclude the investigation in the present session, and recommended "that the Committee should be reappointed in the next session of Parliament." Why was not this recommendation carried out. Nothing has been done; we have the evidence in print and no Report.

How and to what extent should our canals be enlarged? I propose to consider these questions in another article.

The following is a summary of the Consular Reports referred to in Sir E. Leader Williams's article:—

AUSTRIA.

In Austria there are about 4,000 miles of waterways, but only 800 miles are navigable for steamers not exceeding 6½ft. draught. Since 1848 about £11,000,000 has been spent upon river regulation—principally in connection with the Danube, for improving the navigation by deepening the channels; where this does not give satisfactory results canalisation is adopted. The Report states.—

"It has become evident, in the face of the ever-increasing traffic, that the railways are not in a position to grant those cheap rates which economic interests demand, more especially for the carriage of bulky merchandise of small value. Consequently, by the law of 11th June, 1901, £7,000,000 is to be devoted between 1904 and 1912 to the construction of a network of canals; on the expiration of this term a new credit will be demanded for the completion of the scheme."

The river shipping traffic of Austria responds to the efforts made by the State to facilitate it. The traffic of the Danube Steamship Company for 1886-90 amounted to: 1,263,731 tons; in 1901 alone to 1,470,407 tons.

The navigable waterways of Hungary posses an approximate length of 3,082 miles, but only 1,904 miles are available for steamers. In Hungary, as in Austria, except at the Iron Gates, no navigation tolls are levied; the capital being expended for the common weal, "no direct interest on the invested capital is looked for."

BELGIUM.

Sir C. Phipps gives "a memorandum which the Ministry of Finance and Works has courteously prepared for the information of our Chambers of Commerce. It give. the expenditure on navigable waterways and harbours from 1875 to 1900 as £16,000,000.

The greater part of the waterways are under the administration of the State, the remainder are administrated by the provinces or municipalities. The tolls are low, and only partly reimburse the State for the working expenses. The Report goes on to state:-

It may be just claimed that in providing the country with a system of navigable waterways and cheap transport, in multiplying the points of contact between the road, rail, and water, in rendering the seaports easier access, and in stimulating the direction of numerous commercial and manufacturing. establishments, this work of improvement has been one of the principal factors of the commercial prosperity of the country.

FRANCE

For seven years following the Franco-German war, 1871 to 1878, France, notwithstanding the strain thrown on her finances, spent £9,640,000 on the improvement of her waterways and ports. From 1879 to 1900, £18 million was appropriated to enlarging the waterways so as to accommodate barges of 300 tons burthen: the total length of first class waterways was increased from 906 to 2,930 miles, including 401 miles of newly constructed canals: the remaining waterways effectively available for navigation are 7,456 miles long. The government plans for the future are an expenditure in the next 16 years of about £2,400,000 in the works of improvement, and no less than £19,160,000 on new works on waterways. Practically the whole of the waterways are the property of the state, which maintains them out of public funds free of all tolls. The great improvement affected in the French waterways since 1878 has been attended by a large reduction in the cost of transport, and the total work carried out has risen from 20,000,000 tons in 1878 to 32,000,000 tons in 1898 almost the whole increase has been absorbed by the first-class waterways. The Report states the obvious truth:-

"Where, as in France, the waterways are enabled to compete with the railways, they not only provide cheap transport themselves, but also tend to lower the railway rates: the canal barges, by loading and unloading directly from seagoing ships, affect a large economy in the cost of manipulation involved in the case of the railways, and the barges also offered a cheaper means of storage than the railway warehouses."

GERMANY.

The length of the inland waterways in the German Empire in the year 1900 was: – Rivers 5,776, canalised rivers 1,451, canals 1,510, total 8,737 miles. The Kaiser Wilhelm, the Dortmund Ems, and the Elbe Trave canals have been constructed and opened for traffic since 1894 at a total cost of £12,340,635. Mr W H Gastrell reports: –

"The Prussian government have always been of the opinion that an extensive and growing canal system is not opposed to the interests of the state railway system, but that, on the contrary, the two complete one another, and should work well together in the interests of the public. Assistance of the waterways was necessary to the railways, in order to be able to deal with the rapidly increasing traffic…

The general practice as regards the levying of dues is to leave the navigation on the open river free, while imposing charges on in many cases for the use of harbours and wharves."

THE NETHERLANDS.

Mr. Robinson reports manta that the amount spent on rivers, 1862-1901, was £11,542,777, and on State canals, 1878-1901, £5,265,361, and that 'with the exception of the relatively insignificant charges for bridge and locked use, all the navigable waterways of this country are free from tolls.' The chief competing waterway constructed for goods traffic of late years is the so-called Merwede Canal, connecting the port of Amsterdam with the Rhine. The canal was opened in 1892, when the traffic was 1,420,257 tons, and it had increased in 1899 to 4,433,357 tons.

"On the whole it's maybe stated that the waterways have profited to a much greater extent, proportionately, by the general increase in goods traffic than the railways. Much of this is owing to the great improvements in the manner in which the water traffic is now carried on. The number of small goods steamers and tugs employed on the waterways immensely increased, and saving in time employed in transport has been correspondingly great. At present we seem to be on the verge of a revolution in water courage, owing to the introduction of the cheap, small, and practical petroleum motors, which can be fitted to almost every description of craft, and which are at present so much in demand for this purpose that it is impossible to secure delivery of new motors for several months to come."

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In continuation of the article on this subject (Manchester Guardian, October 6) I propose to deal with some of the principal waterways in England with reference to their possible improvement. Our navigations may be divided into two classes – namely, canalised rivers and canals. River navigations were improved before canals were constructed, and they have the advantage of ample water supplies of water, a matter of great importance in connection with any scheme for the enlargement of existing canals or the increase of the size of the locks.

On the Severn Navigation large locks were constructed in 1844 to enable coasting vessels or trains of barges to be towed by steam power, and on the next work on which the writer was engaged, the Weaver Navigation, the same course was adopted in 1872. The Weaver locks allow a steamer carrying 260 tons of salt and three towed barges of similar capacity to pass through them together. The steamer tows the barges to Liverpool, where they discharge their cargoes into ships without encumbering the quays: but it is only on river navigations that such large locks could be used, because only rivers afford to sufficient supply of water for their working. Canal locks are necessarily smaller. When Brindley designed the Bridgewater Canal he made it of sufficient width and depth to take barges of from 40 to 50 tons, which could navigate the Mersey to Liverpool; but few canals were subsequently constructed of this size, many being only suitable for narrow canal boats. Consequently some of the through routes over different canals can only boo navigated by small boats.

On the continent the canals are divided into two classes – principal canals of large size for main lines of communication to the ports, and subsidiary or branch canals of less dimensions. The English canals may serve for the purposes of the latter class, but to enable our manufacturers and merchants to compete with foreigners in cheap cost of travel courage the main lines of canals must be improved. The necessity is illustrated by the following case:- Mr. Morton, of the firm of Fellows and Morton, very large canal carriers, in his evidence before the Committee on Canals in 1883 stated that 90% of the traffic from the Midland districts was for export at our ports. He also stated that if he could use steam barges capable of carrying 80 tons he could reduce the rate of courage by 50%, for under the existing conditions to take 80 tons to London involves the employment of two steamers, two boats, and 14 men. The Grand Junction Canal is the principal link in the chain of canals between Birmingham and London. The locks on the through route are of various sizes, and of course only boats suitable for the smallest locks can traverse the whole distance. Regent's Canal can be navigated by barges of 80 tons burthen, and the Grand Junction Canal is being improved: but the canals near Birmingham and Wolverhampton remain as they were originally constructed, with locks only 7 feet wide.

The same want of uniformity prevails throughout the various canal routes from the Midland districts to the north, south, or west; but since the improvements of the Severn Navigation Birmingham only requires the enlargement of the Worcester and Birmingham canal, 30 miles long, to have good water communication with Bristol, Gloucester, and all the South Wales ports.

The Trent Navigation has been greatly neglected. If improved it, would serve Derby, continued from Burton to Birmingham it would give a through communication to Hull and the other Humber ports. From Burton the North Staffordshire Canal, which passes through the Pottery districts, might be enlarged, and by a junction with the Weaver Navigation it would gain access to the Manchester Ship Canal, and the china clay and other materials used in the manufacture of earthenware would be conveyed in steam barges at a much cheaper rate than at present. The Aire and Calder Navigation has its own port at Goole and also a large trade to Hull and Grimsby. It may be taken as a good main canal; it is 85 miles long, and although originally only 3ft. 6in. deep, with small barge locks, it has been greatly improved by Mr. W. Bartholomew. The canal has been deepened and enlarged, and locks 215ft. long by 22 ft. wide, with 9ft, of water on the sills, have been con- structed. A branch canal of similar size is now being made, which will open out the South Yorkshire coalfields. The enlargement of this navigation and the employment of steam towage has greatly reduced the cost of haulage, bringing down the expense to 1-34d. of a penny per ton per mile. The writer's experience on the Bridgewater Canal of the work of the steam tugs which he introduced on that navigation was

the lowering of haulage expenses by 45 per cent and the carrying on of the traffic with greater regularity and speed.

If, this country is to have efficient main canals, then the existing ones in most cases must be enlarged and adapted for steam towing. They require to have larger sectional areas, with long locks that will admit a steamer carrying cargo and towing at least two other barges. Where the levels of the land require a number of locks close together vertical lifts or inclines should be adopted, for they not only save water but time. The Anderton lift at Northwich has been working for thirty years without giving any trouble; it saved the construction of five locks, and it works without any waste of water. The same system has been used on the recently constructed canals in France and Belgium, where some of the lifts are capable of raising vessels of from three to four hundred tons. Another alternative to flights of locks may be seen at Foxton, in Leicestershire, where an incline has lately been constructed by Mr. Thomas for the Grand Junction Canal. It successfully takes the place of a staircase of ten locks which were required to overcome a difference of level of 75ft. As in the case of the Anderton lift, the barges are water-borne, and the saving of time is over one hour.

Electric haulage is being successfully used on the Bourgone Canal in France and on the Charleroi Canal in Belgium. The electric cur- rent is taken from overhead wires and is also used for working the locks and the cranes at the canal wharfs. Canal lifts could also be worked from the same wires. Petrol motors. afford another means of propulsion which is now being tried with good results on the Dutch canals.

Canal navigation has suffered from the periodical stoppages of traffic for the purpose of removing silt that has been washed in from the side slopes owing to the wash from steamers or boats. Improved canals, therefore would have their sides protected by stone or brick walling, which would prevent the accumulation of mud at the bottom of the canal and the consequent reduction of the navigable depth. The walls, by enabling the removal of all or portions of the slopes, would give the additional great advantage, of widening the bottom of the canal. The increased sectional area thus obtained would naturally enable wider boat, to pars each other, would diminish the cost of haulage, and would also increase the speed of the traffic by enabling steam power to be used efficiently. The Aire and Calder Navigation has a minimum sectional area of nearly 500 square feet, three times the size of most English canals; and the enlarged section not only enables larger craft to use the canal but makes it possible for trains of 700 to 900 tons to be towed by steam power to Goole conveying coal in compartment boats. The compartments are separately lifted by hydraulic power and their contents discharged down shoots into the holds of seagoing steamers. On an improved system of inland navigation uniformity in the width of locks would be most important, for a large barge should be able to pass throughout. The length of the locks might vary with the necessities of traffic, for locks can be lengthened if necessary, but widening means entire reconstruction. With intermediate gates a steamer alone or with its train could pass without waste of water any lock of sufficient length.

It would be taking a narrow view of the subject to suppose our railways would ultimately suffer by the competition with improved water communication. Their dividends have not been increased, but have been reduced, by the doubling their lines to provide for additional goods trains. They have obtained their powers from Parliament not merely for the benefit of their shareholders, but for the public good. Their receipts are always taken as one of the gauges at the state of trade; and if trade languishes from competition with other countries the railway revenues will suffer correspondingly. The consular reports lately published show that the large expenditure on improved inland navigations abroad has not only rendered the sea-ports easier of access, but has been one of the principal factors in the commercial prosperity of the Continental countries, a prosperity in which their railways share. These advantages have been proved before Parliamentary Committees, and there is no dispute that main canals leading to the ports should have the first consideration. Nothing, however, has been done. The difficulty of carrying out the work arises from the fact that canal companies, with few exceptions, cannot raise the capital necessary, and Parliament has allowed some of the canals to

pass into the hands of railway companies, who have bought them for the purpose of extinguishing their competition and care little or nothing for their usefulness and efficiency.

Parliament alone has the power to effect the improvement of the neglected canals on the main lines of communication. To enable the Gloucester and Berkley Canal to be completed in 1827 the Government, in accordance with the Act of 1817 for granting loans in aid of public works, guaranteed Exchequer bonds for large sums, and it is probable that some canal companies would improve their navigations to-day if the funds required could be provided at the low rate of interest that Government security would ensure. Private enterprise cannot deal effectually with a canal system partly in the hands of railway companies. On the Continent, in America, and in Canada the Governments or States have undertaken and carried out the work of providing facilities for inland navigation. If this country is to gain the advantages which our competitors in trade now enjoy in this connect there seems no alternative but to secure Government aid in the improvement of our waterways.