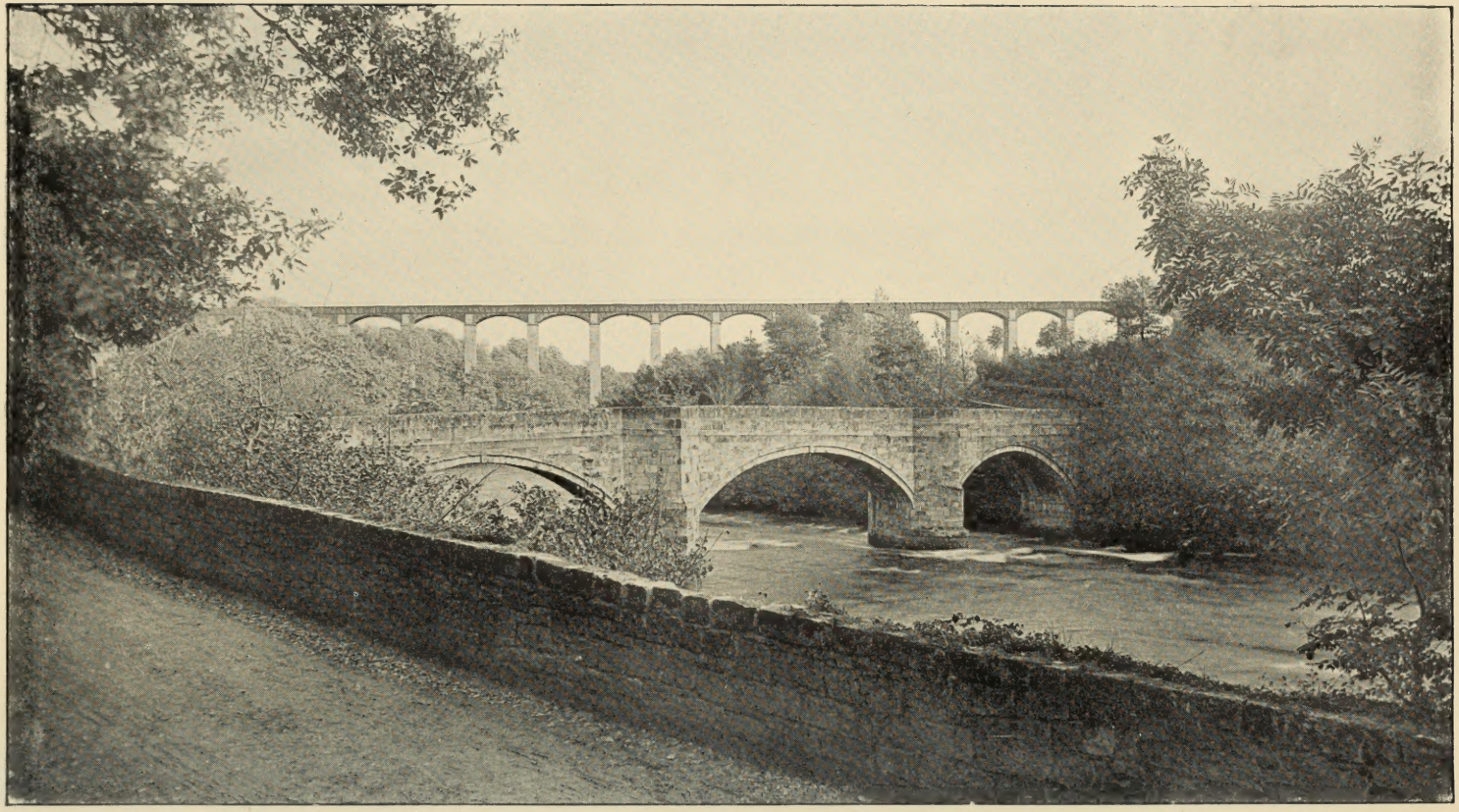
# BRITISH CANALS



AQUEDUCT AT PONTCYSYLLTE (IN THE DISTANCE).

(Constructed by Telford to carry Ellesmere Canal over River Dee. Opened 1803. Cost £47,000. Length, 1007 feet.)

[*Frontispiece.*

# BRITISH CANALS:

## IS THEIR RESUSCITATION PRACTICABLE?

BY EDWIN A. PRATT

AUTHOR OF "RAILWAYS AND THEIR RATES," "THE ORGANIZATION OF AGRICULTURE," "THE TRANSITION IN AGRICULTURE," ETC.



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# PREFACE

THE appointment of a Royal Commission on Canals and Waterways, which first sat to take evidence on March 21, 1906, is an event that should lead to an exhaustive and most useful enquiry into a question which has been much discussed of late years, but on which, as I hope to show, considerable misapprehension in regard to actual facts and conditions has hitherto existed.

Theoretically, there is much to be said in favour of canal restoration, and the advocates thereof have not been backward in the vigorous and frequent ventilation of their ideas. Practically, there are other all-important considerations which ought not to be overlooked, though as to these the British Public have hitherto heard very little. As a matter of detail, also, it is desirable to see whether the theory that the decline of our canals is due to their having been "captured" and "strangled" by the railway companies—a theory which many people seem to believe in as implicitly as they do, say, in the Multiplication Table—is really capable of proof, or whether that decline is not, rather, to be attributed to wholly different causes.

In view of the increased public interest in the general question, it has been suggested to me that

the Appendix on "The British Canal Problem" in my book on "Railways and their Rates," published in the Spring of 1905, should now be issued separately; but I have thought it better to deal with the subject afresh, and at somewhat greater length, in the present work. This I now offer to the world in the hope that, even if the conclusions at which I have arrived are not accepted, due weight will nevertheless be given to the important—if not (as I trust I may add) the interesting—series of facts, concerning the past and present of canals alike at home, on the Continent, and in the United States, which should still represent, I think, a not unacceptable contribution to the present controversy.

EDWIN A. PRATT.

LONDON, *April* 1906.

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# BRITISH CANALS

## CHAPTER I

### INTRODUCTORY

THE movement in favour of resuscitating, if not also of reconstructing, the British canal system, in conjunction with such improvement as may be possible in our natural waterways, is a matter that concerns various interests, and gives rise to a number of more or less complicated problems.

It appeals in the most direct form to the British trader, from the point of view of the possibility of enabling him to secure cheaper transit for his goods. Every one must sympathise with him in that desire, and there is no need whatever for me to stay here to repeat the oft-expressed general reflections as to the important part which cheap transit necessarily plays in the development of trade and commerce. But when from the general one passes to the particular, and begins to consider how these transit questions apply directly to canal revival, one comes at once to a certain element of insincerity in the agitation which has arisen.

There is no reason whatever for doubt that, whereas one section of the traders favouring canal revival would themselves directly benefit therefrom, there

is a much larger section who have joined in the movement, not because they have the slightest idea of re-organising their own businesses on a water-transport basis, but simply because they think the existence of improved canals will be a means of compelling the railway companies to grant reductions of their own rates below such point as they now find it necessary to maintain. Individuals of this type, though admitting they would not use the canals themselves, or very little, would have us believe that there are enough of *other* traders who would patronise them to make them pay. In any case, if only sufficient pressure could be brought to bear on the railway companies to force them to reduce their rates and charges, they would be prepared to regard with perfect equanimity the unremunerative outlay on the canals of a large sum of public money, and be quite indifferent as to who might have to bear the loss so long as they gained what they wanted for themselves.

The subject is, also, one that appeals to engineers. As originally constructed, our British canals included some of the greatest engineering triumphs of their day, and the reconstruction either of these or even of the ordinary canals (especially where the differences of level are exceptionally great), would afford much interesting work for engineers—and, also, to come to commonplace details, would put into circulation a certain number of millions of pounds sterling which might lead some of those engineers, at least, to take a still keener interest in the general situation. There is absolutely no doubt that, from an engineering standpoint, reconstruction, however costly, would present no unsurmountable technical difficulties; but I must confess that when engineers, looking at the

problem exclusively from their own point of view, apart from strictly economic and practical considerations, advise canal revival as a means of improving British trade, I am reminded of the famous remark of Sganerelle, in Molière's "L'Amour Médecin"—"Vous êtes orfévre, M. Josse."

The subject strongly appeals, also, to a very large number of patriotic persons who, though having no personal or professional interests to serve, are rightly impressed with the need for everything that is in any way practicable being done to maintain our national welfare, and who may be inclined to assume, from the entirely inadequate facts which, up to the present, have been laid before them as to the real nature and possibilities of our canal system, that great results would follow from a generous expenditure of money on canal resuscitation here, following on the example already set in Continental countries. It is in the highest degree desirable that persons of this class should be enabled to form a clear and definite opinion on the subject in all its bearings, and especially from points of view that may not hitherto have been presented for their consideration.

Then the question is one of very practical interest indeed to the British taxpayer. It seems to be generally assumed by the advocates of canal revival that it is no use depending on private enterprise. England is not yet impoverished, and there is plenty of money still available for investment where a modest return on it can be assured. But capitalists, large or small, are not apparently disposed to risk their own money in the resuscitation of English canals. Their expectation evidently is that the scheme would not pay. In the absence, therefore, of any willingness on the part of shrewd capitalists — ever on the

look-out for profitable investments — to touch the business, it is proposed that either the State or the local authorities should take up the matter, and carry it through at the risk, more or less, either of taxpayers or ratepayers.

The Association of Chambers of Commerce, for instance, adopted, by a large majority, the following resolution at its annual meeting, in London, in February 1905:—

"This Association recommends that the improvement and extension of the canal system of the United Kingdom should be carried out by means of a public trust, and, if necessary, in combination with local or district public trusts, and aided by a Government guarantee, and that the Executive Council be requested to take all reasonable measures to secure early legislation upon the subject."

Then Sir John T. Brunner has strongly supported a nationalisation policy. In a letter to *The Times* he once wrote:

"I submit to you that we might begin with the nationalisation of our canals—some for the most part sadly antiquated—and bring them up to one modern standard gauge, such as the French gauge."

Another party favours municipalisation and the creation of public trusts, a Bill with the latter object in view being promoted in the Session of 1905, though it fell through owing to an informality in procedure.

It would be idle to say that a scheme of canal nationalisation, or even of public trusts with "Government guarantee" (whatever the precise meaning of that term may be) involving millions of public money, could be carried through *without* affecting

the British taxpayer. It is equally idle to say that if only the canal system were taken in hand by the local authorities they would make such a success of it that there would be absolutely no danger of the ratepayers being called upon to make good any deficiency. The experiences that Metropolitan ratepayers, at least, have had as the result of County Council management of the Thames steamboat service would not predispose them to any feeling of confidence in the control of the canal system of the country by local authorities.

At the Manchester meeting of the Association of Chambers of Commerce, in September 1904, Colonel F. N. Tannett Walker (Leeds) said, during the course of a debate on the canal question: "Personally, he was not against big trusts run by local authorities. He knew no more business-like concern in the world than the Mersey Harbour Board, which was a credit to the country as showing what business men, not working for their own selfish profits, but for the good of the community, could do for an undertaking. He would be glad to see the Mersey Boards scattered all over the country." But, even accepting the principle of canal municipalisation, what prospect would there be of Colonel Walker's aspiration being realised? The Mersey Harbour Board is an exceptional body, not necessarily capable of widespread reproduction on the same lines of efficiency. Against what is done in Liverpool may be put, in the case of London, the above-mentioned waste of public money in connection with the control of the Thames steamboat service by the London County Council. If the municipalised canals were to be worked on the same system, or any approach thereto, as these municipalised steam-

boats, it would be a bad look-out for the ratepayers of the country, whatever benefit might be gained by a small section of the traders.

Then one must remember that the canals, say, from the Midlands to one of the ports, run through various rural districts which would have no interest in the through traffic carried, but might be required, nevertheless, to take a share in the cost and responsibility of keeping their sections of the municipalised waterways in an efficient condition, or in helping to provide an adequate water-supply. It does not follow that such districts—even if they were willing to go to the expense or the trouble involved—would be able to provide representatives on the managing body who would in any way compare, in regard to business capacity, with the members of the Mersey Harbour Board, even if they did so in respect to public spirit, and the sinking of their local interests and prejudices to promote the welfare of manufacturers, say, in Birmingham, and shippers in Liverpool, for neither of whom they felt any direct concern.

Under the best possible conditions as regards municipalisation, it is still impossible to assume that a business so full of complications as the transport services of the country, calling for technical or expert knowledge of the most pronounced type, could be efficiently controlled by individuals who would be essentially amateurs at the business—and amateurs they would still be even if assisted by members of Chambers of Commerce who, however competent as merchants and manufacturers, would not necessarily be thoroughly versed in all these traffic problems. The result could not fail to be disastrous.

I come, at this point, in connection with the possible liability of ratepayers, to just one matter of detail that might be disposed of here. It is certainly one that seems to be worth considering. Assume, for the sake of argument, that, in accordance with the plans now being projected, (1) public trusts were formed by the local authorities for the purpose of acquiring and operating the canals; (2) that these trusts secured possession—on some fair system of compensation—of the canals now owned or controlled by railway companies; (3) that they sought to work the canals in more or less direct competition with the railways; (4) that, after spending large sums of money in improvements, they found it impossible to make the canals pay, or to avoid heavy losses thereon; and (5) that these losses had to be made good by the ratepayers. I am merely assuming that all this might happen, not that it necessarily would. But, admitting that it did, would the railway companies, as ratepayers, be called upon to contribute their share towards making good the losses which had been sustained by the local authorities in carrying on a direct competition with them?

Such a policy as this would be unjust, not alone to the railway shareholders, but also to those traders who had continued to use the railway lines, since it is obvious that the heavier the burdens imposed on the railway companies in the shape of local rates (which already form such substantial items in their "working expenses"), the less will the companies concerned be in a position to grant the concessions they might otherwise be willing to make. Besides, apart from monetary considerations, the principle of the thing would be intolerably unfair, and, if only

to avoid an injustice, it would surely be enacted that any possible increase in local rates, due to the failure of particular schemes of canal municipalisation, should fall exclusively on the traders and the general public who were to have been benefited, and in no way on the railway companies against whom the commercially unsuccessful competition had been waged.

This proposition will, I am sure, appeal to that instinct of justice and fair play which every Englishman is (perhaps not always rightly), assumed to possess. But what would happen if it were duly carried out, as it ought to be? Well, in the Chapter on "Taxation of Railways" in my book on "Railways and their Rates," I gave one list showing that in a total of eighty-two parishes a certain British railway company paid an average of 60·25 per cent. of the local rates; while another table showed that in sixteen specified parishes the proportion of local rates paid by the same railway company ranged from 66·9 per cent. to 86·1 per cent. of the total, although in twelve parishes out of the sixteen the company had not even a railway station in the place. But if, in all such parishes as these, the railway companies were very properly excused from having to make good the losses incurred by their municipalised-canal competitors (in addition to such losses as they might have already suffered in meeting the competition), then the full weight of the burden would fall upon that smaller—and, in some cases, that very small—proportion of the general body of ratepayers in the locality concerned.

The above is just a little consideration, *en passant*, which might be borne in mind by others than those who look at the subject only from a trader's or an engineer's point of view. It will help, also, to

strengthen my contention that any ill-advised, or, at least, unsuccessful municipalisation of the canal system of the country might have serious consequences for the general body of the community, who, in the circumstances, would do well to "look before they leap."

But, independently of commercial, engineering, rating and other considerations, there are important matters of principle to be considered. Great Britain is almost the only country in the world where the railway system has been constructed without State or municipal aid—financial or material—of any kind whatever. The canals were built by "private enterprise," and the railways which followed were constructed on the same basis. This was recognised as the national policy, and private investors were allowed to put their money into British railways, throughout successive decades, in the belief and expectation that the same principle would be continued. In other countries the State has (1) provided the funds for constructing or buying up the general railway system; (2) guaranteed payment of interest; or (3) has granted land or made other concessions, as a means of assisting the enterprise. Not only has the State refrained from adopting any such course here, and allowed private investors to bear the full financial risk, but it has imposed on British railways requirements which may certainly have led to their being the best constructed and the most complete of any in the world, but which have, also, combined with the extortions of landowners in the first instance, heavy expenditure on Parliamentary proceedings, etc., to render their construction per mile more costly than those of any other system of railways in the world; while to-day local taxation

is being levied upon them at the rate of £5,000,000 per annum, with an annual increment of £250,000.

This heavy expenditure, and these increasingly heavy demands, can only be met out of the rates and charges imposed on those who use the railways; and one of the greatest grievances advanced against the railways, and leading to the agitation for canal revival, is that these rates and charges are higher in Great Britain than in various other countries, where the railways have cost less to build, where State funds have been freely drawn on, and where the State lines may be required to contribute nothing to local taxation. The remedy proposed, however, is not that anything should be done to reduce the burdens imposed on our own railways, so as to place them at least in the position of being able to make further concessions to traders, but that the State should now itself start in the business, in competition, more or less, with the railway companies, in order to provide the traders — if it can—with something *cheaper* in the way of transport!

Whatever view may be taken of the reasonableness and justice of such a procedure as this, it would, undoubtedly, represent a complete change in national policy, and one that should not be entered upon with undue haste. The logical sequel, for instance, of nationalisation of the canals would be nationalisation of the railways, since it would hardly do for the State to own the one and not the other. Then, of course, the nationalisation of all our ports would have to follow, as the further logical sequel of the State ownership of the means of communication with them, and the consequent suppression of competition. From a Socialist standpoint, the successive steps here mentioned would certainly be approved; but, even

if the financial difficulty could be met, the country is hardly ready for all these things at present.

Is it ready, even in principle, for either the nationalisation or the municipalisation of canals alone? And, if ready in principle, if ready to employ public funds to compete with representatives of the private enterprise it has hitherto encouraged, is it still certain that, when millions of pounds sterling have been spent on the revival of our canals, the actual results will in any way justify the heavy expenditure? Are not the physical conditions of our country such that canal construction here presents exceptional drawbacks, and that canal navigation must always be exceptionally slow? Are not both physical and geographical conditions in Great Britain altogether unlike those of most of the Continental countries of whose waterways so much is heard? Are not our commercial conditions equally dissimilar? Is not the comparative neglect of our canals due less to structural or other defects than to complete changes in the whole basis of trading operations in this country — changes that would prevent any general discarding of the quick transit of small and frequent supplies by train, in favour of the delayed delivery of large quantities at longer intervals by water, however much the canals were improved?

These are merely some of the questions and considerations that arise in connection with this most complicated of problems, and it is with the view of enabling the public to appreciate more fully the real nature of the situation, and to gain a clearer knowledge of the facts on which a right solution must be based, that I venture to lay before them the pages that follow.

## CHAPTER II

### EARLY DAYS

It seems to be customary with writers on the subject of canals and waterways to begin with the Egyptians, to detail the achievements of the Chinese, to record the doings of the Greeks, and then to pass on to the Romans, before even beginning their account of what has been done in Great Britain. Here, however, I propose to leave alone all this ancient history, which, to my mind, has no more to do with existing conditions in our own country than the system of inland navigation adopted by Noah, or the character of the canals which are supposed to exist in the planet of Mars.

For the purposes of the present work it will suffice if I go no further back than what I would call the "pack-horse period" in the development of transport in England. This was the period immediately preceding the introduction of artificial canals, which had their rise in this country about 1760-70. It preceded, also, the advent of John Loudon McAdam, that great reformer of our roads, whose name has been immortalised in the verb "to macadamise." Born in 1756, it was not until the early days of the nineteenth century that McAdam really started on his beneficent mission, and even then the high-roads of England — and especially of Scotland—were, as a rule, deplorably

bad, "being at once loose, rough, and perishable, expensive, tedious and dangerous to travel on, and very costly to repair." Pending those improvements which McAdam brought about, adapting them to the better use of stage-coaches and carriers' waggons, the few roads already existing were practically available—as regards the transport of merchandise—for pack-horses only. Even coal was then carried by pack-horse, the cost working out at about 2s. 6d. per mile for as much as a horse could carry.

It was from these conditions that canals saved the country—long, of course, before the locomotive came into vogue. As it happened, too, it was this very question of coal transport that led to their earliest development. There is quite an element of romance in the story. Francis Egerton, third and last Duke of Bridgewater (born 1736), had an unfortunate love affair in London when he reached the age of twenty-three, and, apparently in disgust with the world, he retired to his Lancashire property, where he found solace to his wounded feelings by devoting himself to the development of the Worsley coal mines. As a boy he had been so feeble-minded that the doubt arose whether he would be capable of managing his own affairs. As a young man disappointed in love, he applied himself to business in a manner so eminently practical that he deservedly became famous as a pioneer of improved transport. He saw that if only the cost of carriage could be reduced, a most valuable market for coal from his Worsley mines could be opened up in Manchester.

It is true that, in this particular instance, the pack-horse had been supplemented by the Mersey and Irwell Navigation, established as the result of Parliamentary powers obtained in 1733. This navigation

was conducted almost entirely by natural waterways, but it had many drawbacks and inconveniences, while the freight for general merchandise between Liverpool and Manchester by this route came to 12s. per ton. The Duke's new scheme was one for the construction of an artificial waterway which could be carried over the Irwell at Barton by means of an aqueduct. This idea he got from the aqueduct on the Languedoc Canal, in the south of France.

But the Duke required a practical man to help him, and such a man he found in James Brindley. Born in 1716, Brindley was the son of a small farmer in Derbyshire — a dissolute sort of fellow, who neglected his children, did little or no work, and devoted his chief energies to the then popular sport of bull-baiting. In the circumstances James Brindley's school-teaching was wholly neglected. He could no more have passed an examination in the Sixth Standard than he could have flown over the Irwell with some of his ducal patron's coals. "He remained to the last illiterate, hardly able to write, and quite unable to spell. He did most of his work in his head, without written calculations or drawings, and when he had a puzzling bit of work he would go to bed, and think it out." From the point of view of present day Board School inspectors, and of the worthy magistrates who, with varied moral reflections, remorselessly enforce the principles of compulsory education, such an individual ought to have come to a bad end. But he didn't. He became, instead, "the father of inland navigation."

James Brindley had served his apprenticeship to a millwright, or engineer; he had started a little business as a repairer of old machinery and a maker of new; and he had in various ways given proof of

his possession of mechanical skill. The Duke — evidently a reader of men—saw in him the possibility of better things, took him over, and appointed him his right-hand man in constructing the proposed canal. After much active opposition from the proprietors of the Mersey and Irwell Navigation, and also from various landowners and others, the Duke got his first Act, to which the Royal assent was given in 1762, and the work was begun. It presented many difficulties, for the canal had to be carried over streams and bogs, and through tunnels costly to make, and the time came when the Duke's financial resources were almost exhausted. Brindley's wages were not extravagant. They amounted, in fact, to £1 a week — substantially less than the minimum wage that would be paid to-day to a municipal road-sweeper. But the costs of construction were heavy, and the landowners had unduly big ideas of the value of the land compulsorily acquired from them, so that the Duke's steward sometimes had to ride about among the tenantry and borrow a few pounds from one and another in order to pay the week's wages. When the Worsley section had been completed, and had become remunerative, the Duke pledged it to Messrs Child, the London bankers, for £25,000, and with the money thus raised he pushed on with the remainder of the canal, seeing it finally extended to Liverpool in 1772. Altogether he expended on his own canals no less than £220,000; but he lived to derive from them a revenue of £80,000 a year.

The Duke of Bridgewater's schemes gave a great impetus to canal construction in Great Britain, though it was only natural that a good deal of opposition should be raised, as well. About the year 1765

numerous pamphlets were published to show the danger and impolicy of canals. Turnpike trustees were afraid the canals would divert traffic from the roads. Owners of pack-horses fancied that ruin stared them in the face. Thereupon the turnpike trustees and the pack-horse owners sought the further support of the agricultural interests, representing that, when the demand for pack-horses fell off, there would be less need for hay and oats, and the welfare of British agriculture would be prejudiced. So the farmers joined in, and the three parties combined in an effort to arouse the country. Canals, it was said, would involve a great waste of land; they would destroy the breed of draught horses; they would produce noxious or humid vapours; they would encourage pilfering; they would injure old mines and works by allowing of new ones being opened; and they would destroy the coasting trade, and, consequently, "the nursery for seamen."

By arguments such as these the opposition actually checked for some years the carrying out of several important undertakings, including the Trent and Mersey Navigation. But, when once the movement had fairly started, it made rapid progress. James Brindley's energy, down to the time of his death in 1772, was especially indomitable. Having ensured the success of the Bridgewater Canal, he turned his attention to a scheme for linking up the four ports of Liverpool, Hull, Bristol, and London by a system of main waterways, connected by branch canals with leading industrial centres off the chief lines of route. Other projects followed, as it was seen that the earlier ventures were yielding substantial profits, and in 1790 a canal mania began. In 1792 no fewer than eighteen new canals were promoted. In

1793 and 1794 the number of canal and navigation Acts passed was forty-five, increasing to eighty-one the total number which had been obtained since 1790. So great was the public anxiety to invest in canals that new ones were projected on all hands, and, though many of them were of a useful type, others were purely speculative, were doomed to failure from the start, and occasioned serious losses to thousands of investors. In certain instances existing canals were granted the right to levy tolls upon new-comers, as compensation for prospective loss of traffic—even when the new canals were to be 4 or 5 miles away—fresh schemes being actually undertaken on this basis.

The canals that paid at all paid well, and the good they conferred on the country in the days of their prosperity is undeniable. Failing, at that time, more efficient means of transport, they played a most important rôle in developing the trade, industries, and commerce of our country at a period especially favourable to national advancement. For half a century, in fact, the canals had everything their own way. They had a monopoly of the transport business—except as regards road traffic—and in various instances they helped their proprietors to make huge profits. But great changes were impending, and these were brought about, at last, with the advent of the locomotive.

The general situation at this period is well shown by the following extracts from an article on "Canals and Rail-roads," published in the *Quarterly Review* of March 1825:—

"It is true that we, who, in this age, are accustomed to roll along our hard and even roads at the rate of 8 or 9 miles an hour, can hardly imagine the

inconveniences which beset our great-grandfathers when they had to undertake a journey—forcing their way through deep miry lanes; fording swollen rivers; obliged to halt for days together when 'the waters were out'; and then crawling along at a pace of 2 or 3 miles an hour, in constant fear of being set down fast in some deep quagmire, of being overturned, breaking down, or swept away by a sudden inundation.

"Such was the travelling condition of our ancestors, until the several turnpike Acts effected a gradual and most favourable change, not only in the state of the roads, but the whole appearance of the country; by increasing the facility of communication, and the transport of many weighty and bulky articles which, before that period, no effort could move from one part of the country to another. The pack-horse was now yoked to the waggon, and stage coaches and post-chaises usurped the place of saddle-horses. Imperfectly as most of these turnpike roads were constructed, and greatly as their repairs were neglected, they were still a prodigious improvement; yet, for the conveyance of heavy merchandise the progress of waggons was slow and their capacity limited. This defect was at length remedied by the opening of canals, an improvement which became, with regard to turnpike roads and waggons, what these had been to deep lanes and pack-horses.[1] But we

[1] That canals also played their part in the transport of passengers a hundred years ago is shown by the following items of news, which I take from *The Times* of 1806:—

FRIDAY, *December* 19, 1806.

"The first division of the troops that are to proceed by the Paddington Canal for Liverpool, and thence by transports for Dublin, will leave Paddington to-day, and will be followed by others to-morrow and Sunday. By this mode of conveyance the men will be only seven days in reaching Liverpool, and with comparatively little fatigue, as it would take them above fourteen days to march that distance. Relays of fresh horses for the

may apply to projectors the observation of Sheridan, 'Give these fellows a good thing and they never know when to have done with it,' for so vehement became the rage for canal-making that, in a few years, the whole surface of the country was intersected by these inland navigations, and frequently in parts of the island where there was little or no traffic to be conveyed. The consequence was, that a large proportion of them scarcely paid an interest of one per cent., and many nothing at all; while others, judiciously conducted over populous, commercial, and manufacturing districts, have not only amply remunerated the parties concerned, but have contributed in no small degree to the wealth and prosperity of the nation.

"Yet these expensive establishments for facilitating the conveyance of the commercial, manufacturing and agricultural products of the country to their several destinations, excellent and useful as all must acknowledge them to be, are now likely, in their turn, to give way to the old invention of RAIL-ROADS. Nothing now is heard of but rail-roads; the daily papers teem with notices of new lines of them in every direction, and pamphlets and paragraphs are thrown before the public eye, recommending nothing short of making them general throughout the kingdom. Yet, till within these few months past, this old invention, in use a full century before canals, has

canal boats have been ordered to be in readiness at all the stages."

MONDAY, *December* 22, 1806.

"Saturday the 8th Regiment embarked at the Paddington Canal for Liverpool, in a number of barges, each containing 60 men. This regiment consists of 950 men. The 7th Regiment embarked at the same time in eighteen barges: they are all to proceed to Liverpool. The Dukes of York and Sussex witnessed the embarkation. The remainder of the brigade was to follow yesterday, and Friday next another and very considerable embarkation will follow."

been suffered, with few exceptions, to act the part only of an auxiliary to canals, in the conveyance of goods to and from the wharfs, and of iron, coals, limestone, and other products of the mines to the nearest place of shipment. . . .

"The powers of the steam-engine, and a growing conviction that our present modes of conveyance, excellent as they are, both require and admit of great improvements, are, no doubt, among the chief reasons that have set the current of speculation in this particular direction."

Dealing with the question of "vested rights," the article warns "the projectors of the intended rail-roads . . . of the necessity of being prepared to meet the most strenuous opposition from the canal proprietors," and proceeds:—

"But, we are free to confess, it does not appear to us that the canal proprietors have the least ground for complaining of a grievance. They embarked their property in what they conceived to be a good speculation, which in some cases was realised far beyond their most sanguine hopes; in others, failed beyond their most desponding calculations. If those that have succeeded should be able to maintain a competition with rail-ways by lowering their charges; what they thus lose will be a fair and unimpeachable gain to the public, and a moderate and just profit will still remain to them; while the others would do well to transfer their interests from a bad concern into one whose superiority must be thus established. Indeed, we understand that this has already been proposed to a very considerable extent, and that the level beds of certain unproductive canals have been offered for the reception of rail-ways.

"There is, however, another ground upon which, in many instances, we have no doubt, the opposition of the canal proprietors may be properly met—we mean, and we state it distinctly, the unquestionable fact, that

our trade and manufactures have suffered considerably by the disproportionate rates of charge upon canal conveyance. The immense tonnage of coal, iron, and earthenware, Mr Cumming tells us,[1] 'have enabled one of the canals, passing through these districts (near Birmingham), to pay an annual dividend to the proprietary of £140 upon an original share of £140, and as such has enhanced the value of each share from £140 to £3,200; and another canal in the same district, to pay an annual dividend of £160 upon the original share of £200, and the shares themselves have reached the value of £4,600 each.'

"Nor are these solitary instances. Mr Sandars informs us[2] that, of the only two canals which unite Liverpool with Manchester, the thirty-nine original proprietors of one of them, the Old Quay,[3] have been paid for every other year, for nearly half a century, the *total amount of their investment*; and that a share in this canal, which cost only £70, has recently been sold for £1,250; and that, with regard to the other, the late Duke of Bridgewater's, there is good reason to believe that the net income has, for the last twenty years, averaged nearly £100,000 per annum!"

In regard, however, to the supersession of canals in general by railways, the writer of the article says:—

"We are not the advocates for visionary projects that interfere with useful establishments; we scout

[1] Illustrations of the Origin and Progress of Rail and Tram Roads, and Steam Carriages, or Locomotive Engines. By T. G. Cumming, Surveyor, Denbigh, 1824.

[2] A Letter on the subject of the projected Rail-road between Liverpool and Manchester, pointing out the necessity for its adoption, and the manifest advantages it offers to the public; with an exposure of the exorbitant and unjust charges of the Water-Carriers. By Joseph Sandars, Esq., Liverpool, 1825.

[3] Mersey and Irwell Navigation.

the idea of a *general* rail-road as altogether impracticable. . . .

"As to those persons who speculate on making rail-ways general throughout the kingdom, and superseding all the canals, all the waggons, mail and stage-coaches, post-chaises, and, in short, every other mode of conveyance by land and water, we deem them and their visionary schemes unworthy of notice."

## CHAPTER III

### RAILWAYS TO THE RESCUE

It is not a little curious to find that, whereas the proposed resuscitation of canals is now being actively supported in various quarters as a means of effecting increased competition with the railways, the railway system itself originally had a most cordial welcome from the traders of this country as a means of relieving them from what had become the intolerable monopoly of the canals and waterways!

It will have been seen that in the article published in the *Quarterly Review* of March 1825, from which I gave extracts in the last Chapter, reference was made to a "Letter on the Subject of the Projected Rail-road between Liverpool and Manchester," by Mr Joseph Sandars, and published that same year. I have looked up the original "Letter," and found in it some instructive reading. Mr Sandars showed that although, under the Act of Parliament obtained by the Duke of Bridgewater, the tolls to be charged on his canal between Liverpool and Manchester were not to exceed 2s. 6d. per ton, his trustees had, by various exactions, increased them to 5s. 2d. per ton on all goods carried along the canal. They had also got possession of all the available land and warehouses along the canal banks at Manchester, thus monopolising the accommodation, or nearly so,

and forcing the traders to keep to the trustees, and not patronise independent carriers. It was, Mr Sandars declared, "the most oppressive and unjust monopoly known to the trade of this country —a monopoly which there is every reason to believe compels the public to pay, in one shape or another, £100,000 more per annum than they ought to pay." The Bridgewater trustees and the proprietors of the Mersey and Irwell Navigation were, he continued, "deaf to all remonstrances, to all entreaties"; they were "actuated solely by a spirit of monopoly and extension," and "the only remedy the public has left is to go to Parliament and ask for a new line of conveyance." But this new line, he said, would have to be a railway. It could not take the form of another canal, as the two existing routes had absorbed all the available water-supply.

In discussing the advantages of a railway over a canal, Mr Sandars continued:—

"It is computed that goods could be carried for considerably less than is now charged, and for one-half of what has been charged, and that they would be conveyed in one-sixth of the time. Canals in summer are often short of water, and in winter are obstructed by frost; a Railway would not have to encounter these impediments."

Mr Sandars further wrote:—

"The distance between Liverpool and Manchester, by the three lines of Water conveyance, is upwards of 50 miles — by a Rail-road it would only be 33. Goods conveyed by the Duke and Old Quay [Mersey and Irwell Navigation] are exposed to storms, the delays from adverse winds, and the risk of damage, during a passage of 18 miles

in the tide-way of the Mersey. For days together it frequently happens that when the wind blows very strong, either south or north, their vessels cannot move against it. It is very true that when the winds and tides are favourable they can occasionally effect a passage in fourteen hours; but the average is certainly thirty. However, notwithstanding all the accommodation they can offer, the delays are such that the spinners and dealers are frequently obliged to cart cotton on the public high-road, a distance of 36 miles, for which they pay four times the price which would be charged by a Rail-road, and they are three times as long in getting it to hand. The same observation applies to manufactured goods which are sent by land-carriage daily, and for which the rate paid is five times that which they would be subject to by the Rail-road. This enormous sacrifice is made for two reasons—sometimes because conveyance by water cannot be promptly obtained, but more frequently because speed and certainty as to delivery are of the first importance. Packages of goods sent from Manchester, for immediate shipment at Liverpool, often pay two or three pounds per ton; and yet there are those who assert that the difference of a few hours in speed can be no object. The merchants know better."

In the same year that Mr Sandars issued his "Letter," the merchants of the port of Liverpool addressed a memorial to the Mayor and Common Council of the borough, praying them to support the scheme for the building of a railway, and stating:—

"The merchants of this port have for a long time past experienced very great difficulties and obstructions in the prosecution of their business, in consequence of the high charges on the freight of goods

between this town and Manchester, and of the frequent impossibility of obtaining vessels for days together."

It is clear from all this that, however great the benefit which canal transport had conferred, as compared with prior conditions, the canal companies had abused their monopoly in order to secure what were often enormous profits; that the canals themselves, apart from the excessive tolls and charges imposed, failed entirely to meet the requirements of traders; and that the most effective means of obtaining relief was looked for in the provision of railways.

The value to which canal shares had risen at this time is well shown by the following figures, which I take from the *Gentleman's Magazine* for December, 1824:—

| Canal. | Shares. | Price. |
|---|---|---|
| | £ s. d. | £ |
| Trent and Mersey | 75 0 0 | 2,200 |
| Loughborough | 197 0 0 | 4,600 |
| Coventry | 44 0 0 (and bonus) | 1,300 |
| Oxford (short shares) | 32 0 0 „ „ | 850 |
| Grand Junction | 10 0 0 „ „ | 290 |
| Old Union | 4 0 0 | 103 |
| Neath | 15 0 0 | 400 |
| Swansea | 11 0 0 | 250 |
| Monmouthshire | 10 0 0 | 245 |
| Brecknock and Abergavenny | 8 0 0 | 175 |
| Staffordshire & Worcestershire | 40 0 0 | 960 |
| Birmingham | 12 10 0 | 350 |
| Worcester and Birmingham | 1 10 0 | 56 |
| Shropshire | 8 0 0 | 175 |
| Ellesmere | 3 10 0 | 102 |
| Rochdale | 4 0 0 | 140 |
| Barnsley | 12 0 0 | 330 |
| Lancaster | 1 0 0 | 45 |
| Kennet and Avon | 1 0 0 | 29 |

These substantial values, and the large dividends that led to them, were due in part, no doubt, to the general improvement in trade which the canals had helped most materially to effect; but they had been greatly swollen by the merciless way in which the traders of those days were exploited by the representatives of the canal interest. As bearing on this point, I might interrupt the course of my narrative to say that in the House of Commons on May 17, 1836, Mr Morrison, member for Ipswich, made a speech in which, as reported by Hansard, he expressed himself "clearly of opinion" that "Parliament should, when it established companies for the formation of canals, railroads, or such like undertakings, invariably reserve to itself the power to make such periodical revisions of the rates and charges as it may, under the then circumstances, deem expedient"; and he proposed a resolution to this effect. He was moved to adopt this course in view of past experiences in connection with the canals, and a desire that there should be no repetition of them in regard to the railways then being very generally promoted. In the course of his speech he said:—

"The history of existing canals, waterways, etc., affords abundant evidence of the evils to which I have been averting. An original share in the Loughborough Canal, for example, which cost £142, 17s. is now selling at about £1,250, and yields a dividend of £90 or £100 a year. The fourth part of a Trent and Mersey Canal share, or £50 of the company's stock, is now fetching £600, and yields a dividend of about £30 a year. And there are various other canals in nearly the same situation."

At the close of the debate which followed,

Mr Morrison withdrew his resolution, owing to the announcement that the matter to which he had called attention would be dealt with in a Bill then being framed. It is none the less interesting thus to find that Parliamentary revisions of railway rates were, in the first instance, directly inspired by the extortions practised on the traders by canal companies in the interest of dividends far in excess of any that the railway companies have themselves attempted to pay.

Reverting to the story of the Liverpool and Manchester Railway—the projection of which, as Mr Sandars' "Letter" shows, represented a revolt against "the exorbitant and unjust charges of the water-carriers"—the Bill promoted in its favour was opposed so vigorously by the canal and other interests that £70,000 was spent in the Parliamentary proceedings in getting it through. But it was carried in 1826, and the new line, opened in 1830, was so great a success that it soon began to inspire many similar projects in other directions, while with its opening the building of fresh canals for ordinary inland navigation (as distinct from ship canals) practically ceased.

There is not the slightest doubt that, but for the extreme dissatisfaction of the trading interests in regard alike to the heavy charges and to the shortcomings of the canal system, the Liverpool and Manchester Railway—that precursor of the "railway mania"—would not have been actually constructed until at least several years later. But there were other directions, also, in which the revolt against the then existing conditions was to bring about important developments. In the pack-horse period the collieries of Nottinghamshire and Leicestershire

respectively supplied local needs only, the cost of transport by road making it practically impossible to send coal out of the county in which it was raised. With the advent of canals the coal could be taken longer distances, and the canals themselves gained so much from the business that at one time shares in the Loughborough Canal, on which £142 had been paid, rose, as already shown, to £4,600, and were looked upon as being as safe as Consols. But the collapse of a canal from the Leicestershire coal-fields to the town of Leicester placed the coalowners of that county at a disadvantage, and this they overcame, in 1832, by opening the Leicester and Swinnington line of railway. Thereupon the disadvantage was thrown upon the Nottinghamshire coalowners, who could no longer compete with Leicestershire. In fact, the immediate outlook before them was that they would be excluded from their chief markets, that their collieries might have to be closed, and that the mining population would be thrown out of employment.

In their dilemma they appealed to the canal companies, and asked for such a reduction in rates as would enable them to meet the new situation; but the canal companies — wedded to their big dividends — would make only such concessions as were thought by the other side to be totally inadequate. Following on this the Nottinghamshire coalowners met in the parlour of a village inn at Eastwood, in the autumn of 1832, and formally declared that "there remained no other plan for their adoption than to attempt to lay a railway from their collieries to the town of Leicester." The proposal was confirmed by a subsequent meeting, which resolved that "a railway from Pinxton to Leicester is essential to the

interests of the coal-trade of this district." Communications were opened with George Stephenson, the services of his son Robert were secured, the "Midland Counties Railway" was duly constructed, and the final outcome of the action thus taken—as the direct result of the attitude of the canal companies—is to be seen in the splendid system known to-day as the Midland Railway.

Once more, I might refer to Mr Charles H. Grinling's "History of the Great Northern Railway," in which, speaking of early conditions, he says :—

"During the winter of 1843-44 a strong desire arose among the landowners and farmers of the eastern counties to secure some of the benefits which other districts were enjoying from the new method of locomotion. One great want of this part of England was that of cheaper fuel, for though there were collieries open at this time in Leicestershire, Nottinghamshire, and Derbyshire, the nearest pits with which the eastern counties had practicable transport communication were those of South Yorkshire and Durham, and this was of so circuitous a character that even in places situated on navigable rivers, unserved by a canal, the price of coal often rose as high as 40s. or even 50s. a ton. In remoter places, to which it had to be carted 10, 20, or even 30 miles along bad cross-roads, coal even for house-firing was a positive luxury, quite unattainable by the poorer classes. Moreover, in the most severe weather, when the canals were frozen, the whole system of supply became paralysed, and even the wealthy had not seldom to retreat shivering to bed for lack of fuel."

In this particular instance it was George Hudson, the "Railway King," who was approached, and the

first lines were laid of what is now the Great Northern Railway.

So it happened that, when the new form of transport came into vogue, in succession to the canals, it was essentially a case of "Railways to the Rescue."

# CHAPTER IV

## RAILWAY-CONTROLLED CANALS

BOTH canals and railways were, in their early days, made according to local conditions, and were intended to serve local purposes. In the case of the former the design and dimensions of the canal boat used were influenced by the depth and nature of the estuary or river along which it might require to proceed, and the size of the lock (affecting, again, the size of the boat) might vary according to whether the lock was constructed on a low level, where there was ample water, or on a high level, where economy in the use of water had to be practised. Uniformity under these varying conditions would certainly have been difficult to secure, and, in effect, it was not attempted. The original designers of the canals, in days when the trade of the country was far less than it is now and the general trading conditions very different, probably knew better what they were about than their critics of to-day give them credit for. They realised more completely than most of those critics do what were the limitations of canal construction in a country of hills and dales, and especially in rugged and mountainous districts. They cut their coat, as it were, according to their cloth, and sought to meet the actual needs of the day rather than anticipate the requirements of futurity. From their

WHAT CANAL WIDENING WOULD MEAN.

(Cowley Tunnel and Embankments, on Shropshire Union Route between Wolverhampton and the Mersey.)

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point of view this was the simplest solution of the problem.

But, though the canals thus made suited local conditions, they became unavailable for through traffic, except in boats sufficiently small to pass the smallest lock or the narrowest and shallowest canal *en route*. Then the lack of uniformity in construction was accompanied by a lack of unity in management. Each and every through route was divided among, as a rule, from four to eight or ten different navigations, and a boat-owner making the journey had to deal separately with each.

The railway companies soon began to rid themselves of their own local limitations. A "Railway Clearing House" was set up in 1847, in the interests of through traffic; groups of small undertakings amalgamated into "great" companies; facilities of a kind unknown before were made available, while the whole system of railway operation was simplified for traders and travellers. The canal companies, however, made no attempt to follow the example thus set. They were certainly in a more difficult position than the railways. They might have amalgamated, and they might have established a Canal Clearing House. These would have been comparatively easy things to do. But any satisfactory linking up of the various canal systems throughout the country would have meant virtual reconstruction, and this may well have been thought a serious proposition in regard, especially, to canals built at a considerable elevation above the sea level, where the water supply was limited, and where, for that reason, some of the smallest locks were to be found. To say the least of it, such a work meant a very large outlay, and at that time practically all

the capital available for investment in transport was being absorbed by new railways. These, again, had secured the public confidence which the canals were losing. As Mr Sandars said in his "Letter":—

"Canals have done well for the country, just as high roads and pack-horses had done before canals were established; but the country has now presented to it cheaper and more expeditious means of conveyance, and the attempt to prevent its adoption is utterly hopeless."

All that the canal companies did, in the first instance, was to attempt the very thing which Mr Sandars considered "utterly hopeless." They adopted a policy of blind and narrow-minded hostility. They seemed to think that, if they only fought them vigorously enough, they could drive the railways off the field; and fight them they did, at every possible point. In those days many of the canal companies were still wealthy concerns, and what their opposition might mean has been already shown in the case of the Liverpool and Manchester Railway. The newcomers had thus to concentrate their efforts and meet the opposition as best they could.

For a time the canal companies clung obstinately to their high tolls and charges, in the hope that they would still be able to pay their big dividends. But, when the superiority of the railways over the waterways became more and more manifest, and when the canal companies saw greater and still greater quantities of traffic being diverted from them by their opponents, in fair competition, they realised the situation at last, and brought down their tolls with a rush. The reductions made were so substantial

that they would have been thought incredible a few years previously.

In the result, benefits were gained by all classes of traders, for those who still patronised the canals were charged much more reasonable tolls than they had ever paid before. But even the adoption of this belated policy by the canal companies did not help them very much. The diversion of the stream of traffic to the railways had become too pronounced to be checked by even the most substantial of reductions in canal charges. With the increasing industrial and commercial development of the country it was seen that the new means of transport offered advantages of even greater weight than cost of transport, namely, speed and certainty of delivery. For the average trader it was essentially a case of time meaning money. The canal companies might now reduce their tolls so much that, instead of being substantially in excess of the railway rates, as they were at first, they would fall considerably below; but they still could not offer those other all-important advantages.

As the canal companies found that the struggle was, indeed, "utterly hopeless," some of them adopted new lines of policy. Either they proposed to build railways themselves, or they tried to dispose of their canal property to the newcomers. In some instances the route of a canal, no longer of much value, was really wanted for the route of a proposed railway, and an arrangement was easily made. In others, where the railway promoters did not wish to buy, opposition to their schemes was offered by the canal companies with the idea of forcing them either so to do, or, alternatively, to make such terms with them as would be to the advantage of the canal shareholders.

The tendency in this direction is shown by the extract already given from the *Quarterly Review*; and I may repeat here the passage in which the writer suggested that some of the canal companies "would do well to transfer their interests from a bad concern into one whose superiority must be thus established," and added: "Indeed, we understand that this has already been proposed to a very considerable extent, and that the level beds of certain unproductive canals have been offered for the reception of rail-ways." This was as early as 1825. Later on the tendency became still more pronounced as pressure was put on the railway companies, or as promoters, in days when plenty of money was available for railway schemes, thought the easiest way to overcome actual or prospective opposition was to buy it off by making the best terms they could. So far, in fact, was the principle recognised that in 1845 Parliament expressly sanctioned the control of canals by railway companies, whether by amalgamation, lease, purchase, or guarantee, and a considerable amount of canal mileage thus came into the possession, or under the control, of railway companies, especially in the years 1845, 1846, and 1847. This sanction was practically repealed by the Railway and Traffic Acts of 1873 and 1888. By that time about one-third of the existing canals had been either voluntarily acquired by, or forced upon, the railway companies. It is obvious, however, that the responsibility for what was done rests with Parliament itself, and that in many cases, probably, the railway companies, instead of being arch-conspirators, anxious to spend their money in killing off moribund competitors, who were generally considered to be on the point of dying a natural death, were, at times,

victims of the situation, being practically driven into purchases or guarantees which, had they been perfectly free agents, they might not have cared to touch.

The general position was, perhaps, very fairly indicated by the late Sir James Allport, at one time General Manager of the Midland Railway Company, in the evidence he gave before the Select Committee on Canals in 1883.

"I doubt (he said) if Parliament ever, at that time of day, came to any deliberate decision as to the advisability or otherwise of railways possessing canals; but I presume that they did not do so without the fullest evidence before them, and no doubt canal companies were very anxious to get rid of their property to railways, and they opposed their Bills, and, in the desire to obtain their Bills, railway companies purchased their canals. That, I think, would be found to be the fact, if it were possible to trace them out in every case. I do not believe that the London and North-Western would have bought the Birmingham Canal but for this circumstance. I have no doubt that the Birmingham Canal, when the Stour Valley line was projected, felt that their property was jeopardised, and that it was then that the arrangement was made by which the London and North-Western Railway Company guaranteed them 4 per cent."

The bargains thus effected, either voluntarily or otherwise (and mostly otherwise), were not necessarily to the advantage of the railway companies, who might often have done better for themselves if they had fought out the fight at the time with their antagonists, and left the canal companies to their fate, instead of taking over waterways which have been more or less of a loss to them ever since.

Considering the condition into which many of the canals had already drifted, or were then drifting, there is very little room for doubt what their fate would have been if the railway companies had left them severely alone. Indeed, there are various canals whose continued operation to-day, in spite of the losses on their wholly unremunerative traffic, is due exclusively to the fact that they are owned or controlled by railway companies. Independent proprietors, looking to them for dividends, and not under any statutory obligations (as the railway companies are) to keep them going, would long ago have abandoned such canals entirely, and allowed them to be numbered among the derelicts.

As bearing on the facts here narrated, I might mention that, in the course of a discussion at the Institution of Civil Engineers, in November 1905, on a paper read by Mr John Arthur Saner, "Waterways in Great Britain" (reported in the official "Proceedings" of the Institution), Mr James Inglis, General Manager of the Great Western Railway Company, said that "his company owned about 216 miles of canal, not a mile of which had been acquired voluntarily. Many of those canals had been forced on the railway as the price of securing Acts, and some had been obtained by negotiations with the canal companies. The others had been acquired in incidental ways, arising from the fact that the traffic had absolutely disappeared." Mr Inglis further told the story of the Kennet and Avon Canal, which his company maintain at a loss of about £4,000 per annum. The canal, it seems, was constructed in 1794 at a cost of £1,000,000, and at one time paid 5 per cent. The traffic fell off steadily with the extension of the railway system, and in 1846

the canal company, seeing their position was hopeless, applied to Parliament for powers to construct a railway parallel with the canal. Sanction was refused, though the company were authorised to act as common carriers. In 1851 the canal owners approached the Great Western Railway Company, and told them of their intention to seek again for powers to build an opposition railway. The upshot of the matter was that the railway company took over the canal, and agreed to pay the canal company £7,773 a year. This they have done, with a loss to themselves ever since. The rates charged on the canal were successively reduced by the Board of Trade (on appeal being made to that body) to 1¼d., then to 1d., and finally ½d. per ton-mile; but there had never been a sign, Mr Inglis added, that the reduction had any effect in attracting additional traffic.[1]

To ascertain for myself some further details as to the past and present of the Kennet and Avon Navigation, I paid a visit of inspection to the canal in the neighbourhood of Bath, where it enters the River Avon, and also at Devizes, where I saw the remarkable series of locks by means of which the canal reaches the town of Devizes, at an elevation of 425 feet above sea level. In conversation, too, with various authorities, including Mr H. J. Saunders, the Canals Engineer of the Great Western Railway

[1] Another of the speakers, Mr Gordon C. Thomas, engineer to the Grand Junction Canal Company, said that "notwithstanding the generous expenditure on maintenance, and the large sums recently spent upon improvements, the through traffic on the Grand Junction was only one-half of what it was fifty years ago, and now the through traffic was in many cases unable to pay as high a rate as the local traffic."

Company, I obtained some interesting facts which throw light on the reasons for the falling off of the traffic along the canal.

Dealing with this last mentioned point first, I learned that much of the former prosperity of the Kennet and Avon Navigation was due to a substantial business then done in the transport of coal from a considerable colliery district in Somersetshire, comprising the Radstock, Camerton, Dunkerton, and Timsbury collieries. This coal was first put on the Somerset Coal Canal, which connected with the Kennet and Avon at Dundas—a point between Bath and Bradford-on-Avon—and, on reaching this junction, it was taken either to towns directly served by the Kennet and Avon (including Bath, Bristol, Bradford, Trowbridge, Devizes, Kintbury, Hungerford, Newbury and Reading) or, leaving the Kennet and Avon at Semmington, it passed over the Wilts and Berks Canal to various places as far as Abingdon. In proportion, however, as the railways developed their superiority as an agent for the effective distribution of coal, the traffic by canal declined more and more, until at last it became non-existent. Of the three canals affected, the Somerset Coal Canal, owned by an independent company, was abandoned, by authority of Parliament, two years ago ; the Wilts and Berks, also owned by an independent company, is practically derelict, and the one that to-day survives and is in good working order is the Kennet and Avon, owned by a railway company.

Another branch of local traffic that has left the Kennet and Avon Canal for the railway is represented by the familiar freestone, of which large quantities are despatched from the Bath district. The stone goes away in blocks averaging 5 tons

in weight, and ranging up to 10 tons, and at first sight it would appear to be a commodity specially adapted for transport by water. But once more the greater facilities afforded by the railway have led to an almost complete neglect of the canal. Even where the quarries are immediately alongside the waterway (though this is not always the case) horses must be employed to get the blocks down to the canal boat; whereas the blocks can be put straight on to the railway trucks on the sidings which go right into the quarry, no horses being then required. In calculating, therefore, the difference between the canal rate and the railway rate, the purchase and maintenance of horses at the points of embarkation must be added to the former. Then the stone could travel only a certain distance by water, and further cost might have to be incurred in cartage, if not in transferring it from boat to railway truck, after all, for transport to final destination; whereas, once put on a railway truck at the quarry, it could be taken thence, without further trouble, to any town in Great Britain where it was wanted. In this way, again, the Kennet and Avon (except in the case of consignments to Bristol) has practically lost a once important source of revenue.

A certain amount of foreign timber still goes by water from Avonmouth or Bristol to the neighbourhood of Pewsey, and some English-grown timber is taken from Devizes and other points on the canal to Bristol, Reading, and intermediate places; grain is carried from Reading to mills within convenient reach of the canal, and there is also a small traffic in mineral oils and general merchandise, including groceries for shopkeepers in towns along the canal route; but, whereas, in former days a grocer would

order 30 tons of sugar from Bristol to be delivered to him by boat at one time, he now orders by post, telegraph, or telephone, very much smaller quantities as he wants them, and these smaller quantities are consigned mainly by train, so that there is less for the canal to carry, even where the sugar still goes by water at all.

Speaking generally, the actual traffic on the Kennet and Avon at the western end would not exceed more than about three or four boats a day, and on the higher levels at the eastern end it would not average one a day. Yet, after walking for some miles along the canal banks at two of its most important points, it was obvious to me that the decline in the traffic could not be attributable to any shortcomings in the canal itself. Not only does the Kennet and Avon deserve to rank as one of the best maintained of any canal in the country, but it still affords all reasonable facilities for such traffic as is available, or seems likely to be offered. Instead of being neglected by the Great Western Railway Company, it is kept in a state of efficiency that could not well be improved upon short of a complete reconstruction, at a very great cost, in the hope of getting an altogether problematical increase of patronage in respect to classes of traffic different from what was contemplated when the canal was originally built.

Within the last year or two the railway company have spent £3,000 or £4,000 on the pumping machinery. The main water supply is derived from a reservoir, about 9 acres in extent, at Crofton, this reservoir being fed partly by two rivulets (which dry up in the summer) and partly by its own springs; and extensive pumping machinery is provided for raising to the summit level the water

LOCKS ON THE KENNET AND AVON CANAL AT DEVIZES.

(A difference in level of 239 feet in 2½ miles is overcome by 29 locks  Of these, 17 immediately follow one another in direct line, "pounds" being provided to ensure sufficiency of reserve water to work boats through.)

*Photo by Chivers, Devizes.*]

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that passes from the reservoir into the canal at a lower level, the height the water is thus raised being 40 feet. There is also a pumping station at Claverton, near Bath, which raises water from the river Avon. Thanks to these provisions, on no occasion has there been more than a partial stoppage of the canal owing to a lack of water, though in seasons of drought it is necessary to reduce the loading of the boats.

The final ascent to the Devizes level is accomplished by means of twenty-nine locks in a distance of $2\frac{1}{2}$ miles. Of these twenty-nine there are seventeen which immediately follow one another in a direct line, and here it has been necessary to supplement the locks with "pounds" to ensure a sufficiency of reserve water to work the boats through. No one who walks alongside these locks can fail to be impressed alike by the boldness of the original constructors of the canal and by the thoroughness with which they did their work. The walls of the locks are from 3 to 6 feet in thickness, and they seem to have been built to last for all eternity. The same remark applies to the constructed works in general on this canal. For a boat to pass through the twenty-nine locks takes on an average about three hours. The $39\frac{1}{2}$ miles from Bristol to Devizes require at least two full days.

Considerable expenditure is also incurred on the canal in dredging work; though here special difficulties are experienced, inasmuch as the geological formation of the bed of the canal between Bath and Bradford-on-Avon renders steam dredging inadvisable, so that the more expensive and less expeditious system of "dragging" has to be relied on instead.

Altogether it costs the Great Western Railway Company about £1 to earn each 10s. they receive from the canal; and whether or not, considering present day conditions of trade and transport, and the changes that have taken place therein, they would get their money back if they spent still more on the canal, is, to say the least of it, extremely problematical. One fact absolutely certain is that the canal is already capable of carrying a much greater amount of traffic than is actually forthcoming, and that the absence of such traffic is not due to any neglect of the waterway by its present owners. Indeed, I had the positive assurance of Mr Saunders that, in his capacity as Canals Engineer to the Great Western, he had never yet been refused by his Company any expenditure he had recommended as necessary for the efficient maintenance of the canals under his charge. "I believe," he added, "that any money required to be spent for this purpose would be readily granted. I already have power to do anything I consider advisable to keep the canals in proper order; and I say without hesitation that all the canals belonging to the Great Western Railway Company are well maintained, and in no way starved. The decline in the traffic is due to obvious causes which would still remain, no matter what improvements one might seek to carry out."

The story told above may be supplemented by the following extract from the report of the Great Western Railway Company for the half-year ending December 1905, showing expenses and receipts in connection with the various canals controlled by that company:—

GREAT WESTERN RAILWAY CANALS,

FOR HALF-YEAR ENDING 31st DECEMBER 1905.

| Canal. | To Canal Expenses. | By Canal Traffic. |
|---|---|---|
| Bridgwater and Taunton | £1,991 2 8 | £664 8 9 |
| Grand Western | 197 7 1 | 119 10 10 |
| Kennet and Avon | 5,604 0 9 | 2,034 18 8 |
| Monmouthshire | 1,557 3 3 | 886 16 8 |
| Stourbridge Extension | 450 19 4 | 765 7 1 |
| Stratford-upon-Avon | 1,349 11 3 | 724 1 4 |
| Swansea | 1,643 15 7 | 1,386 14 9 |
| | £12,793 19 11 | £6,581 18 1 |

The capital expenditure on these different canals, to the same date, was as follows:—

| | |
|---|---|
| Brecon | £61,217 19 0 |
| Bridgwater and Taunton | 73,989 12 4 |
| Grand Western | 30,629 8 7 |
| Kennet and Avon | 209,509 19 3 |
| Stourbridge Extension | 49,436 15 0 |
| Stratford-on-Avon | 172,538 9 7 |
| Swansea | 148,711 17 6 |
| TOTAL, | £746,034 1 3 |

These figures give point to the further remark made by Mr Inglis at the meeting of the Institution of Civil Engineers when he said, "It was not to be imagined that the railway companies would willingly have all their canal property lying idle; they would be only too glad if they could see how to use the canals so as to obtain a profit, or even to reduce the loss."

On the same occasion, Mr A. Ross, who also took part in the debate, said he had had charge of a number of railway-owned canals at different times, and he was of opinion there was no foundation

for the allegation that railway-owned canals were not properly maintained. His first experience of this kind was with the Sankey Brook and St Helens Canal, one of wide gauge, carrying a first-class traffic, connecting the two great chemical manufacturing towns of St Helens and Widnes, and opening into the Mersey. Early in the seventies the canal became practically a wreck, owing to the mortar on the walls having been destroyed by the chemicals in the water which the manufactories had drained into the canal. In addition, there was an overflow into the Sankey Brook, and in times of flood the water flowed over the meadows, and thousands of acres were rendered barren. Mr Ross continued (I quote from the official report):—

"The London and North-Western Railway Company, who owned the canal, went to great expense in litigation, and obtained an injunction against the manufacturers, and in the result they had to purchase all the meadows outright, as the quickest way of settling the question of compensation. The company rebuilt all the walls and some of the locks. If that canal had not been supported by a powerful corporation like the London and North-Western Railway, it must inevitably have been in ruins now. The next canal he had to do with, the Manchester and Bury Canal, belonging to the Lancashire and Yorkshire Railway Company, was almost as unfortunate. The coal workings underneath the canal absolutely wrecked it, compelling the railway company to spend many thousands of pounds in law suits and on restoring the works, and he believed that no independent canal could have survived the expense. Other canals he had had to do with were the Peak Forest, the Macclesfield and the Chesterfield canals, and the Sheffield and South Yorkshire Navigation, which belonged to the old Manchester Sheffield and Lincoln-

shire Railway. Those canals were maintained in good order, although the traffic was certainly not large."

On the strength of these personal experiences Mr Ross thought that "if a company came forward which was willing to give reasonable compensation, the railway companies would not be difficult to deal with."

The "Shropshire Union" is a railway-controlled canal with an especially instructive history.

This system has a total mileage of just over 200 miles. It extends from Wolverhampton to Ellesmere Port on the river Mersey, passing through Market Drayton, Nantwich and Chester, with branches to Shrewsbury, Newtown (Montgomeryshire), Llangollen, and Middlewich (Cheshire). Some sections of the canal were made as far back as 1770, and others as recently as 1840. At one time it was owned by a number of different companies, but by a process of gradual amalgamation, most of these were absorbed by the Ellesmere and Chester Canal Company. In 1846 this company obtained Acts of Parliament which authorised them to change their name to that of "The Shropshire Union Railways and Canal Company," and gave them power to construct three lines of railway: (1) from the Chester and Crewe Branch of the Grand Junction Railway at Calveley to Wolverhampton; (2) from Shrewsbury to Stafford, with a branch to Stone; and (3) from Newtown (Montgomeryshire) to Crewe. Not only do we get here a striking instance of the tendency shown by canal companies to start railways on their own account, but in each one of the three Acts authorising the lines mentioned I

find it provided that "it shall be lawful for the Chester and Holyhead Railway Company and the Manchester and Birmingham Railway Company, or either of them, to subscribe towards the undertaking, and hold shares in the Shropshire Union Railways and Canal Company."

Experience soon showed that the Shropshire Union had undertaken more than it could accomplish. In 1847 the company obtained a fresh Act of Parliament, this time to authorise a lease of the undertakings of the Shropshire Union Railways and Canal Company to the London and North-Western Railway Company. The Act set forth that the capital of the Shropshire Union Company was £482,924, represented by shares on which all the calls had been paid, and that the indebtedness on mortgages, bonds and other securities amounted to £814,207. Under these adverse conditions, "it has been agreed," the Act goes on to say, "between the Shropshire Union Railways and Canal Company and the London and North-Western Railway Company, with a view to the economical and convenient working" of the three railways authorised, "that a lease in perpetuity of the undertaking of the Shropshire Union Railways and Canal Company should be granted to the London and North-Western Railway Company, and accepted by them, at a rent which shall be equal to . . half the rate per cent. per annum of the dividend which shall from time to time be payable on the capital stock of the London and North-Western Railway Company."

We have in this another example of the way in which a railway company has saved a canal system from extinction, while under the control of the London and North-Western the Shropshire Union Canal is still undoubtedly one of the best maintained of any

WAREHOUSES AND HYDRAULIC CRANES AT ELLESMERE PORT.

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in the country. There may be sections of it, especially in out-lying parts, where the traffic is comparatively small, but a considerable business is still done in the conveyance of sea-borne grain from the Mersey to the Chester district, or in that of tinplates, iron, and manufactured articles from the Black Country to the Mersey for shipment. For traffic such as this the canal already offers every reasonable facility. The Shropshire Union is also a large carrier of goods to and from the Potteries district, in conjunction with the Trent and Mersey. So little has the canal been "strangled," or even neglected, by the London and North-Western Railway Company that, in addition to maintaining its general efficiency, the expenditure incurred by that company of late years for the development of Ellesmere Port—the point where the Shropshire Union Canal enters the Manchester Ship Canal—amounts to several hundred thousand pounds, this money having been spent mainly in the interest of the traffic along the Shropshire Union Canal. Deep-water quay walls of considerable length have been built; warehouses for general merchandise, with an excellent system of hydraulic cranes, have been provided; a large grain depôt, fully equipped with grain elevators and other appliances, has been constructed at a cost of £80,000 to facilitate, more especially, the considerable grain transport by canal that is done between the River Mersey and the Chester district; and at the present time the dock area is being enlarged, chiefly for the purpose of accommodating deeper barges, drawing about 7 feet of water.

Another fact I might mention in regard to the Shropshire Union Canal is in connection with mechanical haulage. Elaborate theories, worked out

on paper, as to the difference in cost between rail transport and water transport, may be completely upset where the water transport is to be conducted, not on a river or on a canal crossing a perfectly level plain, but along a canal which is raised, by means of locks, several hundred feet on one side of a ridge, or of some elevated table-land, and must be brought down in the same way on the other side. So, again, the value of what might otherwise be a useful system of mechanical haulage may be completely marred owing to the existence of innumerable locks.

This conclusion is the outcome of a series of practical experiments conducted on the Shropshire Union Canal at a time when the theorists were still working out their calculations on paper. The experiments in question were directed to ascertaining whether economy could be effected by making up strings of narrow canal boats, and having them drawn by a tug worked by steam or other motive power, instead of employing man and horse for each boat. The plan answered admirably until the locks were reached. There the steam-tug was, temporarily, no longer of any service. It was necessary to keep a horse at every lock, or flight of locks, to get the boats through, so that, apart from the tedious delays (the boats that passed first having to wait for the last-comers before the procession could start again), the increased expense at the locks nullified any saving gained from the mechanical haulage.

As a further illustration—drawn this time from Scotland—of the relations of railway companies to canals, I take the case of the Forth and Clyde Navigation, controlled by the Caledonian Railway Company.

This navigation really consists of two sections—the Forth and Clyde Navigation, and the Monkland Navigation. The former, authorised in 1768, and opened in 1790, commences at Grangemouth on the Firth of Forth, crosses the country by Falkirk and Kirkintilloch, and terminates at Bowling on the Clyde. It has thirty-nine locks, and at one point has been constructed through 3 miles of hard rock. The original depth of 8 feet was increased to 10 feet in 1814. In addition to the canal proper, the navigation included the harbours of Grangemouth and Bowling, and also the Grangemouth Branch Railway, and the Drumpeller Branch Railway, near Coatbridge. The Monkland Canal, also opened in 1790, was built from Glasgow *viâ* Coatbridge to Woodhall in Lanarkshire, mainly for the transport of coal from the Lanarkshire coal-fields to Glasgow and elsewhere. Here the depth was 6 feet. The undertakings of the Forth and Clyde and the Monkland Navigations were amalgamated in 1846.

Prior to 1865, the Caledonian Railway did not extend further north than Greenhill, about 5 miles south of Falkirk, where it joined the Scottish Central Railway. This undertaking was absorbed by the Caledonian in 1865, and the Caledonian system was thus extended as far north as Perth and Dundee. The further absorption of the Scottish North-Eastern Railway Company, in 1866, led to the extension of the Caledonian system to Aberdeen.

At this time the Caledonian Railway Company owned no port or harbour in Scotland, except the small and rather shallow tidal harbour of South Alloa. Having got possession of the railway lines in Central Scotland, they thought it necessary to obtain control of some port on the east coast, in the

interests of traffic to or from the Continent, and especially to facilitate the shipment to the Continent of coal from the Lanarkshire coal-fields, chiefly served by them. The port of Grangemouth being adapted to their requirements, they entered into negotiations with the proprietors of the Forth and Clyde Navigation, who were also proprietors of the harbour of Grangemouth, and acquired the whole undertaking in 1867, guaranteeing to the original company a dividend of 6¼ per cent.

Since their acquisition of the canal, the Caledonian Railway Company have spent large sums annually in maintaining it in a state of efficiency, and its general condition to-day is better than when it was taken over. Much of the traffic handled is brought into or sent out from Grangemouth, and here the Caledonian Railway Company have more than doubled the accommodation, with the result that the imports and exports have enormously increased. All the same, there has been a steady decrease in the actual canal traffic, due to various causes, such as (*a*) the exhaustion of several of the coal-fields in the Monkland district; (*b*) the extension of railways; and (*c*) changes in the sources from which certain classes of traffic formerly carried on the canal are derived.

In regard to the coal-fields, the closing of pits adjoining the canal has been followed by the opening of others at such a distance from the canal that it was cheaper to consign by rail.

In the matter of railway extensions, when the Caledonian took over the canal in 1867, there were practically no railways in the district through which it runs, and the coal and other traffic had, perforce, to go by water. But, year by year, a complete net-

work of railways was spread through the district by independent railway companies, notwithstanding the efforts made by the Caledonian to protect the interests of the canal—efforts that led, in some instances, to Parliament refusing assent to the proposed lines. Those that were constructed (over a dozen lines and branches altogether), were almost all absorbed by the North British Railway Company, who are strong competitors with the Caledonian Railway Company, and have naturally done all they could to get traffic for the lines in question. This, of course, has been at the expense of the canal and to the detriment of the Caledonian Railway Company, who, in view of their having guaranteed a dividend to the original proprietors, would prefer that the traffic in question should remain on the canal instead of being diverted to an opposition line of railway. Other traffic which formerly went by canal, and is now carried on the Caledonian Railway, is of a character that would certainly go by canal no longer, and for this the Caledonian and the North British Companies compete.

The third factor in the decline of the canal relates to the general consideration that, during the last thirty or forty years, important works have no longer been necessarily built alongside canal banks, but have been constructed wherever convenient, and connected with the railways by branch lines or private sidings, expense of cartage to or from the canal dock or basin thus being saved. On the Forth and Clyde Canal a good deal of coal is still carried, but mainly to adjoining works. Coal is also shipped in vessels on the canal for transport to the West Highlands and Islands, where the railways cannot compete; but even here there is an

increasing tendency for the coal to be bought in Glasgow (to which port it is carried by rail), so that the shippers can have a wider range of markets when purchasing. Further changes affecting the Forth and Clyde Canal are illustrated by the fact that whereas, at one time, large quantities of grain were brought into Grangemouth from Russian and other Continental ports, transhipped into lighters, and sent to Glasgow by canal, the grain now received at Glasgow comes mainly from America by direct steamer.

That the Caledonian Railway Company have done their duty towards the Forth and Clyde Canal is beyond all reasonable doubt. It is true that they are not themselves carriers on the canal. They are only toll-takers. Their business has been to maintain the canal in efficient condition, and allow any trader who wishes to make use of it so to do, on paying the tolls. This they have done, and, if the traders have not availed themselves of their opportunities, it must naturally have been for adequate reasons, and especially because of changes in the course of the country's business which it is impossible for a railway company to control, even where, as in this particular case, they are directly interested in seeing the receipts from tolls attain to as high a figure as practicable.

I reserve for another chapter a study of the Birmingham Canal system, which, again, is "railway controlled"; but I may say here that I think the facts already given show it is most unfair to suggest, as is constantly being done in the Press and elsewhere, that the railway companies bought up canals—"of malice aforethought," as it were—


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1. River Ouse Navigation (Yorkshire).
2. River Wharfe Navigation.
3. Aire and Calder Navigation.
4. Market Weighton Navigation.
5. Driffield Navigation.
6. Beverley Beck Navigation.
7. Leven Navigation.
8. Leeds and Liverpool Canal.
9. Manchester Ship Canal.
10. Bridgewater portion of Manchester Ship Canal.
11. Rochdale Canal.
12. Calder and Hebble Navigation.
13. Weaver Navigation.
14. Idle Navigation.
15. Trent Navigation Co.
16. Aucholme Navigation.
17. Caistor Canal.
18. Louth Canal (Lincolnshire).
19. Derby Canal.
20. Nutbrook Canal.
21. Erewash Canal.
22. Loughborough Navigation.
23. Leicester Navigation.
24. Leicestershire Union Canal.
25. Witham Navigation.
26. Witham Navigaton.
27. Glen Navigation.
28. Welland Navigation.
29. Nen Navigation.
30. Wisbech Canal.
31. Nar Navigation.
32. Ouse and Tributaries (Bedfordshire).
33. North Walsham Canal.
34. Bure Navigation.
35. Blyth Navigation.
36. Ipswich and Stowmarket Navigation.
37. Stour Navigation.
38. Colne Navigation.
39. Chelmer and Blackwater Navigation.
40. Roding Navigation.
41. Stort Navigation.
42. Lea Navigation.
43. Grand Junction Canal.
44. Grand Union Canal.
45. Oxford Canal.
46. Coventry Canal.
47. Warwick and Napton Canal.
48. Warwick and Birmingham Canal.
49. Birmingham and Warwick Junction Canal.
50. Worcester and Birmingham Canal.
51. Stafford and Worcester Canal.
52. Severn (Lower) Navigation.
53. Gloucester and Berkeley Ship Canal.
54. Lower Avon Navigation.
55. Stroudwater Canal.
56. Wye Navigation.
57. Axe Navigation.
58. Parrett Navigation.
59. Tone Navigation.
60. Wilts and Berks Canal.
61. Thames Navigation.
62. London and Hampshire Canal.
63. Wey Navigation.
64. Medway Navigation.
65. Canterbury Navigation.
66. Ouse Navigation (Sussex).
67. Adur Navigation.
68. Arun and Wey Canal.
69. Portsmouth and Arunder Canal.
70. Itchen Navigation.

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for the express purpose of killing such competition as they represented—a form of competition in which, as we have seen, public confidence had already practically disappeared. One of the witnesses at the canal enquiry in 1883 even went so far as to assert:

"The railway companies have been enabled, in some cases by means of very questionable legality, to obtain command of 1,717 miles of canal, so adroitly selected as to strangle the whole of the inland water traffic, which has thus been forced upon the railways, to the great interruption of their legitimate and lucrative trade."

The assertions here made are constantly being reproduced in one form or another by newspaper writers, public speakers, and others, who have gone to no trouble to investigate the facts for themselves, who have never read, or, if they have read, have disregarded, the important evidence of Sir James Allport, at the same enquiry, in reference to the London coal trade (I shall revert to this subject later on), and who probably have either not seen a map of British canals and waterways at all, or else have failed to notice the routes that still remain independent, and are in no way controlled by railway companies.

I give, facing p. 54, a sketch which shows the nature and extent of these particular waterways, and the reader will see from it that they include entirely free and independent communication (*a*) between Birmingham and the Thames; (*b*) from the coal-fields of the Midlands and the North to London; and (*c*) between the west and east coasts, *viâ* Liverpool, Leeds, and Goole. To say, therefore, in these circumstances, that "the whole of the

inland water traffic" has been strangled by the railway companies because the canals or sections of which they "obtained command" were "so adroitly selected," is simply to say what is not true.

The point here raised is not one that merely concerns the integrity of the railway companies—though in common justice to them it is only right that the truth should be made known. It really affects the whole question at issue, because, so long as public opinion is concentrated more or less on this strangulation fiction, due attention will not be given to the real causes for the decay of the canals, and undue importance will be attached to the suggestions freely made that if only the one-third of the canal mileage owned or controlled by the railway companies could be got out of their hands, the revival schemes would have a fair chance of success.

Certain it is, therefore, as the map I give shows beyond all possible doubt, that the causes for the failure of the British canal system must be sought for elsewhere than in the fact of a partial railway-ownership or control. Some of these alternative causes I propose to discuss in the Chapters that follow my story of the Birmingham Canal, for which (inasmuch as Birmingham and district, by reason of their commercial importance and geographical position, have first claim to consideration in any scheme of canal resuscitation) I would beg the special attention of the reader.


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# CHAPTER V

## THE BIRMINGHAM CANAL AND ITS STORY

WHAT is known as the "Birmingham Canal" is really a perfect network of waterways in and around Birmingham and South Staffordshire, representing a total length of about 160 miles, exclusive of some hundreds of private sidings in connection with different works in the district.

The system was originally constructed by four different canal companies under Acts of Parliament passed between 1768 and 1818. These companies subsequently amalgamated and formed the Birmingham Canal Navigation, known later on as the Birmingham Canal Company. From March 1816 to March 1818 the company paid £36 per annum per share on 1,000 shares, and in the following year the amount paid on the same number of shares rose to £40 per annum. In 1823 £24 per annum per share was paid on 2,000 shares, in 1838 £9 to £16 on 8,000, in 1844 £8 on 8,800, and from May 1845 to December 1846 £4 per annum per share on 17,600 shares.

The year 1845 was a time of great activity in railway promotion, and the Birmingham Canal Company, who already had a canal between that town and Wolverhampton, proposed to supplement it by a railway through the Stour Valley, using for

the purpose a certain amount of spare land which they already owned. A similar proposal, however, in respect to a line of railway to take practically the same route between Birmingham and Wolverhampton, was brought forward by an independent company, who seem to have had the support of the London and Birmingham Railway Company; and in the result it was arranged among the different parties concerned (1) that the Birmingham Canal Company should not proceed with their scheme, but that they and the London and Birmingham Railway Company should each subscribe a fourth part of the capital for the construction of the line projected by the independent Birmingham, Wolverhampton, and Stour Valley Railway Company; and (2) that the London and Birmingham Railway Company should, subject to certain terms and conditions, guarantee the future dividend of the Canal Company, whenever the net income was insufficient to produce a dividend of £4 per share on the capital, the Canal Company thus being insured against loss resulting from competition.

The building of the Stour Valley Line between Birmingham and Wolverhampton, with a branch to Dudley, was sanctioned by an Act of 1846, which further authorised the Birmingham Canal Company and the London and Birmingham Railway Company to contribute each one quarter of the necessary capital. The canal company raised their quarter, amounting to £190,087, by means of mortgages. In return for their guarantee of the canal company's dividend, the London and Birmingham Railway Company obtained certain rights and privileges in regard to the working of the canal. These were authorised by the London

and Birmingham Railway and Birmingham Canal Arrangement Act, 1846, which empowered the two companies each to appoint five persons as a committee of management of the Birmingham Canal Company. Those members of the committee chosen by the London and Birmingham Railway Company were to have the same powers, etc., as the members elected by the canal company ; but the canal company were restricted from expending, without the consent of the railway company, "any sum which shall exceed the sum of five hundred pounds in the formation of any new canal, or extension, or branch canal or otherwise, for the purpose of any single work to be hereafter undertaken by the same company"; nor, without consent of the railway company, could the canal company make any alterations in the tolls, rates, or dues charged. In the event of differences of opinion arising between the two sections of the committee of management, the final decision was to be given by the railway representatives in such year or years as the railway company was called upon to make good a deficiency in the dividends, and by the canal representatives when no such demand had been made upon the railway company. In other words the canal company retained the deciding vote so long as they could pay their way, and in any case they could spend up to £500 on any single work without asking the consent of the railway company.

In course of time the Stour Valley Line, as well as the London and Birmingham Company, became part of the system of the London and North-Western Railway Company, which thus took over the responsibilities and obligations, in regard to the waterways, already assumed ; while the mortgages issued by the Birmingham Canal Company, when they undertook

to raise one-fourth of the capital for the Stour Valley Railway, were exchanged for £126,725 of ordinary stock in the London and North-Western Railway.

The Birmingham Canal Company was able down to 1873 (except only in one year, 1868, when it required £835 from the London and North-Western Company) to pay its dividend of £4 per annum on each share, without calling on the railway company to make good a deficiency. In 1874, however, there was a substantial shortage of revenue, and since that time the London and North-Western Railway Company, under the agreement already mentioned, have had to pay considerable sums to the canal company, as the following table shows:—

| Year | | Year | |
|---|---|---|---|
| 1874 | £10,528 18 0 | 1890 | £22,069 9 8 |
| 1875 | nil. | 1891 | 17,626 2 3 |
| 1876 | 4,796 10 9 | 1892 | 29,508 4 2 |
| 1877 | 361 7 9 | 1893 | 31,618 19 4 |
| 1878 | 11,370 5 7 | 1894 | 27,935 8 9 |
| 1879 | 20,225 0 5 | 1895 | 39,065 15 2 |
| 1880 | 13,534 19 6 | 1896 | 22,994 0 10 |
| 1881 | 15,028 9 3 | 1897 | 10,186 19 7 |
| 1882 | 6,826 7 1 | 1898 | 10,286 13 3 |
| 1883 | 8,879 4 7 | 1899 | 18,470 18 1 |
| 1884 | 14,196 7 9 | 1900 | 34,075 19 6 |
| 1885 | 25,460 19 10 | 1901 | 62,644 2 8 |
| 1886 | 35,169 9 6 | 1902 | 27,645 2 3 |
| 1887 | 31,491 14 1 | 1903 | 34,047 4 6 |
| 1888 | 15,350 10 11 | 1904 | 37,832 5 8 |
| 1889 | 5,341 19 3 | 1905 | 39,860 13 0 |

The sum total of these figures is £685,265, 2s. 11d.

It will have been seen, from the facts already narrated, that for a period of over twenty years from the date of the agreement the canal company con-

tinued to earn their own dividend without requiring any assistance from the railway company. Meantime, however, various local, in addition to general, causes had been in operation tending to affect the prosperity of the canals. The decline of the pig-iron industry in the Black Country had set in, while though the conversion of manufactured iron into plates, implements, etc., largely took its place, the raw materials came more and more from districts not served by the canals, and the finished goods were carried mainly by the railways then rapidly spreading through the district, affording facilities in the way of sidings to a considerable number of manufacturers whose works were not on the canal route. Then the local iron ore deposits were either worked out or ceased to be remunerative, in view of the competition of other districts, again facilitated by the railways; and the extension of the Bessemer process of steel-making also affected the Staffordshire iron industry.

These changes were quite sufficient in themselves to account for the increasing unprofitableness of the canals, without any need for suggestions of hostility towards them on the part of the railways. In point of fact, the extension of the railways and the provision of "railway basins" brought the canals a certain amount of traffic they might not otherwise have got. It was, indeed, due less to an actual decrease in the tonnage than to a decrease in the distance carried that the amount received in tolls fell off, that the traffic ceased to be remunerative, and that the deficiencies arose which, under their statutory obligations, the London and North-Western Railway Company had to meet. The more that the traffic actually left the canals, the greater was the deficiency which, as

shown by the figures I have given, the railway company had to make good.[1]

The condition of the canals in 1874, when the responsibilities assumed by the London and North-Western Railway Company began to fall more heavily upon them, left a good deal to be desired, and the railway company found themselves faced with the necessity of finding money for improvements which eventually represented a very heavy expenditure, apart altogether from the making up of a guaranteed dividend. They proceeded, all the same, to acquit themselves of these responsibilities, and it is no exaggeration to say that, during the thirty years which have since elapsed, they have spent enormous sums in improving the canals, and in maintaining them in what—adverse critics notwithstanding—is their present high state of efficiency, considering the peculiarities of their position.

One of the greatest difficulties in the situation was in regard to water supply. At Birmingham, portions of the canal are 453 feet above ordnance datum; Wolverhampton, Wednesfield, Tipton, Dudley, and Oldbury are higher still, for their elevation is 473 feet, while Walsall, Darlaston, and Wednesbury are at a height of 408 feet. On high-lands like these

[1] In the evidence he gave before the Royal Commission on Canals and Waterways on 21st March 1906, Sir Herbert Jekyll, Assistant Secretary to the Board of Trade, said (as reported in *The Times* of 22nd March):—"One remarkable feature was noticeable—that, although the tonnage carried rather increased than diminished between 1838 and 1848, the receipts fell off enormously, pointing to the conclusion that the railway competition had brought about a large reduction in canal companies charges. It was also noteworthy that on many canals the decrease in receipts had continued out of all proportion to the decrease, if any, in the tonnage carried."

there are naturally no powerful streams, and such is the lack of local water supplies that, as every one knows, the city of Birmingham has recently had to go as far as Wales in order to obtain sufficient water to meet the needs of its citizens.

In these circumstances special efforts had to be made to obtain water for the canals in the district, and to ensure a due regard for economy in its use. The canals have, in fact, had to depend to a certain extent on water pumped from the bottom of coal pits in the Black Country, and stored in reservoirs on the top levels; the water, also, temporarily lost each time a canal boat passed through one of the many locks in the district being pumped back to the top to be used over again.

To this end pumping machinery had already been provided by the old canal companies, but the London and North-Western Railway Company, on taking over the virtual direction of the canals for which they were financially responsible, substituted new and improved plant, and added various new pumping stations. Thanks to the changes thus effected—at, I need hardly say, very considerable cost—the average amount of water now pumped from lower to higher levels, during an average year, is 25,000,000 gallons per day, equal to 1,000 locks of water. On occasions the actual quantity dealt with is 50,000,000 gallons per day, while the total capacity of the present pumping machinery is equal to about 102,000,000 gallons, or 4,080 locks, per day. There is absolutely no doubt that, but for the special provisions made for an additional water supply, the Birmingham Canal would have had to cease operations altogether in the summer of 1905—probably for two months—because of the shortage of water. The reservoirs

on the top level were practically empty, and it was solely owing to the company acquiring new sources of supply, involving a very substantial expenditure indeed, that the canal system was kept going at all. A canal company with no large financial resources would inevitably have broken down under the strain.

Then the London and North-Western Company are actively engaged in substituting new pumping machinery — representing "all the latest improvements"—for old, the special aim, here, being the securing of a reduction of more than 50 per cent. over the former cost of pumping. An expenditure of from £15,000 to £16,000 was, for example, incurred by them so recently as 1905 at the Ocker Hill pumping station. In this way the railway company are seeking both to maintain the efficiency of the canal and to reduce the heavy annual demands made upon them in respect to the general cost of operation and shareholders' dividend.

For reasons which will be indicated later on, it is impossible to improve the Black Country canals on any large scale; but, in addition to what I have already related, the London and North-Western Railway Company are constantly spending money on small improvements, such as dredging, widening waterway under-bridges, taking off corners, and putting in side walls in place of slopes, so as to give more space for the boats. In the latter respect many miles have been so treated, to the distinct betterment of the canal.

All this heavy outlay by the railway company, carried on for a series of years, is now beginning to tell, to the advantage alike of the traders and of the canal as a property, and if any scheme of State or municipal purchase were decided on by the country

the various substantial items mentioned would naturally have to be taken into account in making terms.

Another feature of the Birmingham Canal system is that it passes to a considerable extent through the mining districts of the Black Country. This means, in the first place, that wherever important works have been constructed, as in the case of tunnels, (and the system passes through a number of tunnels, three of these being 3,172 yards, 3,027 yards, and 3,785 yards respectively in length) the mineral rights underneath have to be bought up in order to avoid subsidences. In one instance the railway company paid no less than £28,500 for the mining rights underneath a short length (754 yards) of a canal tunnel. In other words, this £28,500 was practically buried in the ground, not in order to work the minerals, but with a view to maintain a secure foundation for the canal. Altogether the expenditure of the company in this one direction, and for this one special purpose alone, in the Black Country district, must amount by this time to some hundreds of thousands of pounds.

Actual subsidences represent a great source of trouble. There are some parts of the Birmingham Canal where the waterway was originally constructed on a level with the adjoining ground, but, as more and more coal has been taken from the mines underneath, and especially as more and more of the ribs of coal originally left to support the roof have been removed, the land has subsided from time to time, rendering necessary the raising of the canal. So far has this gone that to-day the canal, at certain of these points, instead of being on a level with the adjoining ground, is on an embankment 30 feet above. Drops

of from 10 to 20 feet are of frequent occurrence, even with narrow canals, and the cost involved in repairs and restoration is enormous, as the reader may well suppose, considering that the total length of the Birmingham Canal subject to subsidences from mining is about 90 miles.

I come next to the point as to the comparative narrowness of the Birmingham Canal system and the small capacity of the locks—conditions, as we are rightly told, which tell against the possibility of through, or even local, traffic in a larger type of boat. Such conditions as these are generally presented as one of the main reasons why the control should be transferred to the State, to municipalities, or to public trusts, who, it is assumed, would soon get rid of them.

The reader must have fully realised by this time that the original size of the waterways and locks on the Birmingham Canal was determined by the question of water supply. But any extensive scheme of widening would involve much beyond the securing of more water.

During the decades the Birmingham Canal has been in existence important works of all kinds have been built alongside its banks, not only in and around Birmingham itself, but all through the Black Country. There are parts of the canal where almost continuous lines of such works on each side of the canal, flush up to the banks or towing path, are to be seen for miles together. Any general widening, therefore, even of the main waterways, would involve such a buying up, reconstruction of, or interference with extremely valuable properties that the expenditure involved — in the interests of a problematical saving in canal tolls—would be alike prodigious and prohibitive.

There is the less reason for incurring such expenditure when we consider the special purposes which the canals of the district already serve, and, I may even say, efficiently serve. The total traffic passing over the Birmingham Canal system amounts to about 8,000,000 tons per annum,[1] and of this a considerable proportion is collected for eventual transport by rail. Every few miles along the canal in the Black Country there is a "railway-basin" put in either by the London and North-Western Railway Company, who have had the privilege of finding the money to keep the canal going since 1874, or by the Great Western or the Midland Railway Companies. Here, again, very considerable expenditure has been incurred by the railway companies in the provision alike of wharves, cranes, sheds, etc., and of branch railways connecting with the main lines of the company concerned. From these railway-basins narrow boats are sent out to works all over the district to collect iron, hardware, tinplates, bricks, tiles, manufactured articles, and general merchandise, and bring them in for loading into the railway trucks alongside. So complete is the network of canals, with their hundreds of small "special" branches, that for many of the local works their only means of communication with the railway

[1] In Mr Saner's paper the Birmingham Canal navigations are classed among the "Independently-Owned Canals," and Mr Saner says:—"There are 1,138 miles owned by railway companies, which convey only 6,009,820 tons per annum, and produce a net profit of only £40 per mile of navigation. This," he adds, "appears to afford clear proof that the railways do not attempt to make the most of the canals under their control." But when the Birmingham Canal, with its 8,000,000 tons of traffic a year, is transferred (as it ought to be) from the independently-owned to the railway-controlled canals, entirely different figures are shown.

is by water, and the consignments are simply conveyed to the railway by canal boat, instead of, as elsewhere, by collecting van or road lorry.

The number of these railway-basins—the cost of which is distinctly substantial—is constantly being increased, for the traffic through them grows almost from day to day.

The Great Western Railway Company, for example, have already several large transhipping basins on the canals of the Black Country. They have one at Wolverhampton, and another at Tipton, only 5 miles away ; yet they have now decided to construct still another, about half-way between the two. The matter is thus referred to in the *Great Western Railway Magazine* for March, 1906 :—

"The Directors have approved a scheme for an extensive depôt adjoining the Birmingham Canal at Bilston, the site being advantageously central in the town. It will comprise a canal basin and transfer shed, sidings for over one hundred and twenty waggons, and a loop for made-up trains. A large share of the traffic of the district, mainly raw material and manufactured articles of the iron trade, will doubtless be secured as a result of this important step—the railway and canal mutually serving each other as feeders."

The reader will see from this how the tendency, even on canals that survive, is for the length of haul to become shorter and shorter, so that the receipts of the canal company from tolls may decline even where there is no actual decrease in the weight of the traffic handled.

In the event of State or municipal purchase being resorted to, the expenditure on all these costly basins and the works connected therewith would have to be

taken into consideration, equally with the pumping machinery and general improvements, and, also, the purchase of mining rights, already spoken of; but I fail to see what more either Government or County Council control could, in the circumstances, do for the Birmingham system than is being done already. Far more for the purposes of maintenance has been spent on the canal by the London and North-Western Railway Company than had been so spent by the canal company itself; and, although a considerable amount of traffic arising in the district does find its way down to the Mersey, the purpose served by the canal is, and must necessarily be, mainly a local one.

That Birmingham should become a sort of half-way stage on a continuous line of widened canals across country from the Thames to the Mersey is one of the most impracticable of dreams. Even if there were not the question of the prodigious cost that widenings of the Birmingham Canal would involve, there would remain the equally fatal drawback of the elevation of Birmingham and Wolverhampton above sea level. In constructing a broad cross-country canal, linking up the two rivers in question, it would be absolutely necessary to avoid alike Birmingham and the whole of the Black Country. That city and district, therefore, would gain no direct advantage from such a through route. They would have to be content to send down their commodities in the existing small boats to a lower level, and there, in order to reach the Mersey, connect with either the Shropshire Union Canal or the Trent and Mersey. One of these two waterways would certainly have to be selected for a widened through route to the Mersey.

Assume that the former were decided upon, and that, to meet the present-day agitation, the State, or some Trust backed by State or local funds, bought up the Shropshire Union, and resolved upon a substantial widening of this particular waterway, so as to admit of a larger type of boat and the various other improvements now projected. In this case the *crux* of the situation (apart from Birmingham and Black Country conditions), would be the city of Chester.

For a distance of 1½ miles the Shropshire Union Canal passes through the very heart of Chester. Right alongside the canal one sees successively very large flour mills or lead works, big warehouses, a school, streets which border it for some distance, masses of houses, and, also, the old city walls. At one point the existing canal makes a bend that is equal almost to a right angle. Here there would have to be a substantial clearance if boats much larger than those now in use were to get round so ugly a corner in safety. This bend, too, is just where the canal goes underneath the main lines of the London and North-Western and the Great Western Railways, the gradients of which would certainly have to be altered if it were desired to employ larger boats.

The widening of the Shropshire Union Canal at Chester would, in effect, necessitate a wholesale destruction of, or interference with, valuable property (even if the city walls were spared), and an expenditure of hundreds of thousands of pounds. Such a thing is clearly not to be thought of. The city of Chester would have to be avoided by the through route from the Midlands to the Mersey, just as the canals of Birmingham and the Black Country would have to

WHAT CANAL WIDENING WOULD MEAN.
(The Shropshire Union Canal at the Northgate, Chester, looking East.)

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be avoided in a through route from the Thames. If the Shropshire Union were still kept to, a new branch canal would have to be constructed from Waverton to connect again with the Shropshire Union at a point half-way between Chester and Ellesmere Port, leaving Chester in a neglected bend on the south.

On this point as to the possibility of enlarging the Shropshire Union Canal, I should like to quote the following from some remarks made by Mr G. R. Jebb, engineer to the Shropshire Union Railways and Canal Company, in the discussion on Mr Saner's paper at the Institution of Civil Engineers:—

"As to the suggestion that the railway companies did not consider it possible to make successful commercial use of their canals in conjunction with their lines, and that the London and North-Western Railway Company might have improved the main line of the Shropshire Union Canal between Ellesmere Port and Wolverhampton, and thus have relieved their already overburdened line, as a matter of fact about twenty years ago he went carefully into the question of enlarging that particular length of canal, which formed the main line between the Midlands and the sea. He drew up estimates and plans for wide canals, of different cross sections, one of which was almost identical with the cross section proposed by Mr Saner. After very careful consideration with a disposition to improve the canal if possible, it was found that the cost of the necessary works would be too heavy. Bridges of wide span and larger headway —entailing approaches which could not be constructed without destroying valuable property on either side— new locks and hydraulic lifts would be required, and a transhipping depôt would have been necessary where each of the narrow canals joined. The

company were satisfied, and he himself was satisfied, that no reasonable return for that expenditure could be expected, and therefore the work was not proceeded with. . . . He was satisfied that whoever found the money for canal improvements would get no fair return for it."

The adoption of the alternative route, *viâ* the Trent and Mersey, would involve (1) locking-up to and down a considerable summit, and (2) a continuous series of widenings (except along the Weaver Canal), the cost of which, especially in the towns of Stoke, Etruria, Middlewich, and Northwich, would attain to proportions altogether prohibitive.

The conclusion at which I arrive in regard to the Birmingham Canal system is that it cannot be directly included in any scheme of cross-country waterways from river to river; that by reason alike of elevation, water supply, and the existence of a vast amount of valuable property immediately alongside, any general widening of the present system of canals in the district is altogether impracticable; that, within the scope of their unavoidable limitations, those particular canals already afford every reasonable facility to the real requirements of the local traders; that, instead of their having been "strangled" by the railways, they have been kept alive and in operation solely and entirely because of the heavy expenditure upon them by the London and North-Western Railway Company, following on conditions which must inevitably have led to collapse (with serious disadvantages to the traders dependent on them for transport) if the control had remained with an independent but impoverished canal company; and that very little, if anything, more—with due

regard both for what is practical, and for the avoidance of any waste of public money—could be done than is already being done, even if State or municipal authorities made the costly experiment of trying what they could do for them with their own 'prentice hands.

## CHAPTER VI

### THE TRANSITION IN TRADE

Of the various causes which have operated to bring about the comparative decay of the British canal system (for, as already shown, there are sections that still retain a certain amount of vitality), the most important are to be found in the great changes that have taken place in the general conditions of trade, manufacture and commerce.

The tendency in almost every branch of business to-day is for the trader to have small, or comparatively small, stocks of any particular commodity, which he can replenish speedily at frequent intervals as occasion requires. The advantages are obvious. A smaller amount of capital is locked up in any one article; a larger variety of goods can be dealt in; less accommodation is required for storage; and men with limited means can enter on businesses which otherwise could be undertaken only by individuals or companies possessed of considerable resources. If a draper or a grocer at Plymouth finds one afternoon that he has run short of a particular article, he need only telegraph to the wholesale house with which he deals in London, and a fresh supply will be delivered to him the following morning. A trader in London who wanted something from Dublin, and telegraphed for it one day, would expect as a matter

of course to have it the next. What, again, would a London shopkeeper be likely to say if, wanting to replenish his limited stock with some Birmingham goods, he was informed by the manufacturer :—"We are in receipt of your esteemed order, and are sending the goods on by canal. You may hope to get them in about a week"?

With a little wider margin in the matter of delivery, the same principle applies to those trading in, or requiring, raw materials—coal, steel, ironstone, bricks, and so on. Merchants, manufacturers, and builders are no more anxious than the average shopkeeper to keep on hand stocks unnecessarily large, and to have so much money lying idle. They calculate the length of time that will be required to get in more supplies when likely to be wanted, and they work their business accordingly.

From this point of view the railway is far superior to the canal in two respects, at least.

First, there is the question of speed. The value of this factor was well recognised so far back as 1825, when, as I have told on page 25, Mr Sandars related how speed and certainty of delivery were regarded as "of the first importance," and constituted one of the leading reasons for the desired introduction of railways. But speed and certainty of delivery become absolutely essential when the margin in regard to supplies on hand is habitually kept to a working minimum. The saving in freight effected as between, on the one hand, waiting at least several days, if not a full week, for goods by canal boat, and, on the other, receiving them the following day by train, may be more than swallowed up by the loss of profit or the loss of business in consequence of the delay. If the railway transport be a little

more costly than the canal transport, the difference should be fully counterbalanced by the possibility of a more rapid turnover, as well as the other advantages of which I have spoken.

In cases, again, where it is not a matter of quickly replenishing stocks but of effecting prompt delivery even of bulky goods, time may be all-important. This fact is well illustrated in a contribution, from Birmingham, published in the "Engineering Supplement" of *The Times* of February 14, 1906, in which it was said:—

"Makers of wheels, tires, axles, springs, and similar parts are busy. Of late the South African colonies have been larger buyers, while India and the Far Eastern markets, including China and Japan, South America, and some other shipping markets are providing very good and valuable indents. In all cases, it is especially remarked, very early execution of contracts and urgent delivery is impressed by buyers. The leading firms have learned a good deal of late from German, American, Belgian, and other foreign competitors in the matter of rapid output. By the improvement of plant, the laying down of new and costly machine tools, and by other advances in methods of production, delivery is now made of contracts of heavy tonnage within periods which not so long ago would have been deemed by these same producers quite impossible. In no branch of the engineering trades is this expedition more apparent than in the constructional engineering department, such as bridges, roofs, etc., also in steam boiler work."

Now where, in cases such as these, "urgent delivery is impressed by buyers," and the utmost energy is probably being enforced on the workers, is it likely that even the heavy goods so made

would be sent down to the port by the tediously slow process of canal boat, taking, perhaps, as many days as even a goods train would take hours? Alternatively, would the manufacturers run the risk of delaying urgent work by having the raw materials delivered by canal boat in order to effect a small saving on cost of transport?

Certainty of delivery might again be seriously affected in the case of canal transport by delays arising either from scarcity of water during dry seasons, or from frost in winter. The entire stoppage of a canal system, from one or other of these causes, for weeks together, especially on high levels, is no unusual occurrence, and the inconvenience which would then result to traders who depended on the canals is self-evident. In Holland, where most of the goods traffic goes by the canals that spread as a perfect network throughout the whole country, and link up each town with every other town, the advent of a severe frost means that the whole body of traffic is suddenly thrown on the railways, which then have more to get through than they can manage. Here the problem arises: If waterways take traffic from the railways during the greater part of the year, should the railways still be expected to keep on hand sufficient rolling stock, etc., not only for their normal conditions, but to meet all the demands made upon them during such periods as their competitors cannot operate?

There is an idea in some quarters that stoppage from frost need not be feared in this country because, under an improved system of waterways, measures would be taken to keep the ice on the canals constantly broken up. But even with this arrangement there comes a time, during a prolonged frost,

when the quantity of broken ice in the canal is so great that navigation is stopped unless the ice itself is removed from the water. Frost must, therefore, still be reckoned with as a serious factor among the possibilities of delay in canal transport.

Secondly, there is the question of quantities. For the average trader the railway truck is a much more convenient unit than the canal boat. It takes just such amount as he may want to send or receive. For some commodities the minimum load for which the lowest railway rate is quoted is as little as 2 tons; but many a railway truck has been run through to destination with a solitary consignment of not more than half-a-ton. On the other hand, a vast proportion of the consignments by rail are essentially of the "small" type. From the goods depôt at Curzon Street, Birmingham, a total of 1,615 tons dealt with, over a certain period, represented 6,110 consignments and 51,114 packages, the average weight per consignment being 5 cwts. 1 qr. 4 lbs., and the average weight per package, 2 qrs. 14 lbs. At the Liverpool goods depôts of the London and North-Western Railway, a total weight of 3,895 tons handled consisted of 5,049 consignments and 79,513 packages, the average weight per consignment being 15 cwts. 1 qr. 20 lbs., and the average weight per package 3 qrs. 26 lbs. From the depôt at Broad Street, London, 906 tons represented 6,201 consignments and 23,067 packages, with an average weight per consignment of 2 cwts. 3 qrs. 19 lbs., and per package, 3 qrs. 4 lbs.; and so on with other important centres of traffic.

There is little room for doubt that a substantial proportion of these consignments and packages consisted partly of goods required by traders either

to replenish their stocks, or, as in the case of tailors and dressmakers, to enable them to execute particular orders; and partly of commodities purchased from traders, and on their way to the customers. In regard to the latter class of goods, it is a matter of common knowledge that there has been an increasing tendency of late years to eliminate the middleman, and establish direct trading between producer and consumer. Just as the small shopkeeper will purchase from the manufacturer, and avoid the wholesale dealer, so, also, there are individual householders and others who eliminate even the shopkeeper, and deal direct with advertising manufacturers willing to supply to them the same quantities as could be obtained from a retail trader.

For trades and businesses conducted on these lines, the railway — taking and delivering promptly consignments great or small, penetrating to every part of the country, and supplemented by its own commodious warehouses, in which goods can be stored as desired by the trader pending delivery or shipment — is a far more convenient mode of transport than the canal boat; and to the railway the perfect revolution that has been brought about in the general trade of this country is mainly due. Business has been simplified, subdivided, and brought within the reach of "small" men to an extent that, but for the railway, would have been impossible; and it is difficult to imagine that traders in general will forego all these advantages now, and revert once more to the canal boat, merely for the sake of a saving in freight which, in the long run, might be no saving at all.

Here it may be replied by my critics that there

is no idea of reviving canals in the interests of the general trader, and that all that is sought is to provide a cheaper form of transport for those heavier or bulkier minerals or commodities which, it is said, can be carried better and more economically by water than by rail.

Now this argument implies the admission that canal resuscitation, on a national basis, or at the risk more or less of the community, is to be effected, not for the general trader, but for certain special classes of traders. As a matter of fact, however, such canal traffic as exists to-day is by no means limited to heavy or bulky articles. In their earlier days canal companies simply provided a water-road, as it were, along which goods could be taken by other persons on payment of certain tolls. To enable them to meet better the competition of the railways, Parliament granted to the canal companies, in 1846, the right to become common carriers as well, and, though only a very small proportion of them took advantage of this concession, those that did are indebted in part to the transport of general merchandise for such degree of prosperity as they have retained. The separate firms of canal carriers ("by-traders") have adopted a like policy, and, notwithstanding the changes in trade of which I have spoken, a good deal of general merchandise does go by canal to or from places that happen to be situated in the immediate vicinity of the water-ways. It is extremely probable that if some of the canals which have survived had depended entirely on the transport of heavy or bulky commodities, their financial condition to-day would have been even worse than it really is.

But let us look somewhat more closely into this

theory that canals are better adapted than railways for the transport of minerals or heavy merchandise, calling for the payment of a low freight. At the first glance such a commodity as coal would claim special attention from this point of view; yet here one soon learns that not only have the railways secured the great bulk of this traffic in fair and open competition with the canals, but there is no probability of the latter taking it away from them again to any appreciable extent.

Some interesting facts in this connection were mentioned by the late Sir James Allport in the evidence he gave before the Select Committee on Canals in 1883. Not a yard, he said, of the series of waterways between London and Derbyshire, Nottinghamshire, part of Staffordshire, Warwickshire and Leicestershire — counties which included some of the best coal districts in England for supplying the metropolis — was owned by railway companies, yet the amount of coal carried by canal to London had steadily declined, while that by rail had enormously increased. To prove this assertion, he took the year 1852 as one when there was practically no competition on the part of the railways with the canals for the transport of coal, and he compared therewith the year 1882, giving for each the total amount of coal received by canal and railway respectively, as follows:—

| | 1852 | 1882 |
|---|---|---|
| Received by canal | 33,000 tons | 7,900 tons |
| ,, ,, railway | 317,000 ,, | 6,546,000 ,, |

The figures quoted by Sir James Allport were taken from the official returns in respect to the dues formerly levied by the City of London and the

late Metropolitan Board of Works on all coal coming within the Metropolitan Police Area, representing a total of 700 square miles; though at an earlier period the district in which the dues were enforced was that included in a 20-mile radius. The dues were abolished in 1889, and since then the statistics in question have no longer been compiled. But the returns for 1889 show that the imports of coal, by railway and by canal respectively, into the Metropolitan Police Area for that year were as follows:—

BY RAILWAY

| | Tons. | Cwts. |
|---|---|---|
| Midland | 2,647,554 | 0 |
| London and North-Western | 1,735,067 | 13 |
| Great Northern | 1,360,205 | 0 |
| Great Eastern | 1,077,504 | 13 |
| Great Western | 940,829 | 0 |
| London and South-Western | 81,311 | 2 |
| South-Eastern | 27,776 | 18 |
| Total by Railway | 7,870,248 | 6 |

BY CANAL

| | | |
|---|---|---|
| Grand Junction | 12,601 | 15 |
| Difference | 7,857,646 | 11 |

If, therefore, the independent canal companies, having a waterway from the colliery district of the Midlands and the North through to London (without, as already stated, any section thereof being controlled by railway companies), had improved their canals, and doubled, trebled, or even quadrupled the quantity of coal they carried in 1889, their total would still have been insignificant as compared with the quantity conveyed by rail.

The reasons for this transition in the London coal

"FROM PIT TO PORT."

(Prospect Pit, Wigan Coal and Iron Company. Raised to the surface, the coal is emptied on to a mechanical shaker, which grades it into various sizes—lumps, cobbles, nuts, and slack. These sizes then each pass along a picking belt—so that impurities can be removed—and fall into the railway trucks placed at the end ready to receive them. The coal can thus be taken direct from the mouth of the pit to any port or town in Great Britain.)

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trade (and the same general principle applies elsewhere) can be readily stated. They are to be found in the facilities conferred by the railway companies, and the great changes that, as the direct result thereof, have taken place in the coal trade itself. Not only are most of the collieries in communication with the railways, but the coal waggons are generally so arranged alongside the mouth of each pit that the coal, as raised, can be tipped into them direct from the screens. Coal trains, thus made up, are next brought to certain sidings in the neighbourhood of London, where the waggons await the orders of the coal merchants to whom they have been consigned. At Willesden, for example, there is special accommodation for 2,000 coal waggons, and the sidings are generally full. Liberal provision of a like character has also been made in London by the Midland, the Great Northern, and other railway companies in touch with the colliery districts. An intimation as to the arrival of the consignments is sent by the railway company to the coal merchant, who, in London, is allowed three "free" days at these coal sidings in which to give instructions where the coal is to be sent. After three days he is charged the very modest sum of 6d. per day per truck. Assuming that the coal merchant gives directions, either within the three days or later, for a dozen trucks, containing particular qualities of coal, to be sent to different parts of London, north, south, east and west, those dozen trucks will have to be picked out from the one or two thousand on the sidings, shunted, and coupled on to trains going through to the stated destination. This represents in itself a considerable amount of work, and special staffs have to be kept on duty for the purpose.

Then, at no fewer than one hundred and thirty-five railway stations in London and the suburbs thereof, the railway companies have provided coal depôts on such vacant land as may be available close to the local sidings, and here a certain amount of space is allotted to the use of coal merchants. For this accommodation no charge whatever is made in London, though a small rent has to be paid in the provinces. The London coal merchant gets so many feet, or yards, allotted to him on the railway property; he puts up a board with his name, or that of his firm; he stores on the said space the coal for which he has no immediate sale; and he sends his men there to fetch from day to day just such quantities as he wants in order to execute the orders received. With free accommodation such as this at half a dozen, or even a score, of suburban railway stations, all that the coal merchant of to-day requires in addition is a diminutive little office immediately adjoining each railway station, where orders can be received, and whence instructions can be sent. Not only, also, do the railway companies provide him with a local coal depôt which serves his every purpose, but, after allowing him three "free" days on the great coal sidings, to which the waggons first come, they give him, on the local sidings, another seven "free" days in which to arrange his business. He thus gets ten clear days altogether, before any charge is made for demurrage, and, if then he is still awaiting orders, he has only to have the coal removed from the trucks on to the depôt, or "wharf" as it is technically called, so escaping any payment beyond the ordinary railway rate, in which all these privileges and advantages are included.

If canal transport were substituted for rail transport,

the coal would first have to be taken from the mouth of the pit to the canal, and, inasmuch as comparatively few collieries (except in certain districts) have canals immediately adjoining, the coal would have to go by rail to the canal, unless the expense were incurred of cutting a branch of the canal to the colliery—a much more costly business, especially where locks are necessary, than laying a railway siding. At the canal the coal would be tipped from the railway truck into the canal boat,[1] which would take it to the canal terminus, or to some wharf or basin on the canal banks. There the coal would be thrown up from the boat into the wharf (in itself a more laborious and more expensive operation than that of shovelling it down, or into sacks on the same level, from a railway waggon), and from the wharf it would have to be carted, perhaps several miles, to final destination.

Under this arrangement the coal would receive much more handling—and each handling means so much additional slack and depreciation in value; a week would have to be allowed for a journey now possible in a day; the coal dealers would have to provide their own depôts and pay more for cartage, and they would have to order particular kinds of coal by the boat load instead of by the waggon load.

This last necessity would alone suffice to render the scheme abortive. Some years ago when there was so much discussion as to the use of a larger size of railway waggon, efforts were made to induce the coal interests to adopt this policy. But the 8-ton truck was so convenient a unit, and suited so well the essentially

[1] The fact that coal tipped into a canal boat would have a longer drop than coal falling from the colliery screen into railway waggons is important because of the greater damage done to the coal, and the consequent decrease in value.

retail nature of the coal trade to-day, that as a rule the coal merchants would have nothing to do with trucks even of 15 or 20 tons. Much less, therefore, would they be inclined to favour barge loads of 200 or 250 tons.

Exceptions might be made in the case of gas works, or of factories already situated alongside the banks of canals which have direct communication with collieries. In the Black Country considerable quantities of coal thus go by canal from the collieries to the many local ironworks, etc., which, as I have shown, are still actively served by the Birmingham Canal system. But these exceptions can hardly be offered as an adequate reason for the nationalisation of British canals. The general conditions, and especially the nature of the coal trade transition, will be better realised from some figures mentioned by the chairman of the London and North-Western Railway Company, Lord Stalbridge, at the half-yearly meeting in February 1903. Notwithstanding the heavy coal traffic—in the aggregate—the average consignment of coal, he showed, on the London and North-Western Railway is only 17½ tons, and over 80 per cent. of the total quantity carried represents consignments of less than 20 tons, the actual weights ranging from lots of 2 tons 14 cwts. to close upon 1,000 tons for shipment.

"But," the reader may say, "if coal is taken in 1,000-ton lots to a port for shipment, surely canal transport could be resorted to here!" This course is adopted on the Aire and Calder Navigation, which is very favourably situated, and goes over almost perfectly level ground. The average conditions of coal shipment in the United Kingdom are, however, much better met by the special facilities which rail transport offers.

Of the way in which coal is loaded into railway trucks direct from the colliery screens I have already spoken; but, in respect to steam coal, it should be added that anthracite is sold in about twelve different sizes, and that one colliery will make three or four of these sizes, each dropped into separate trucks under the aforesaid screens. The output of an anthracite colliery would be from 200 to 300 tons a day, in the three or four sizes, as stated, this total being equal to from 20 to 30 truck-loads. An order received by a coal factor for 2,000 or 3,000 tons of a particular size would, therefore, have to be made up with coal from a number of different collieries.

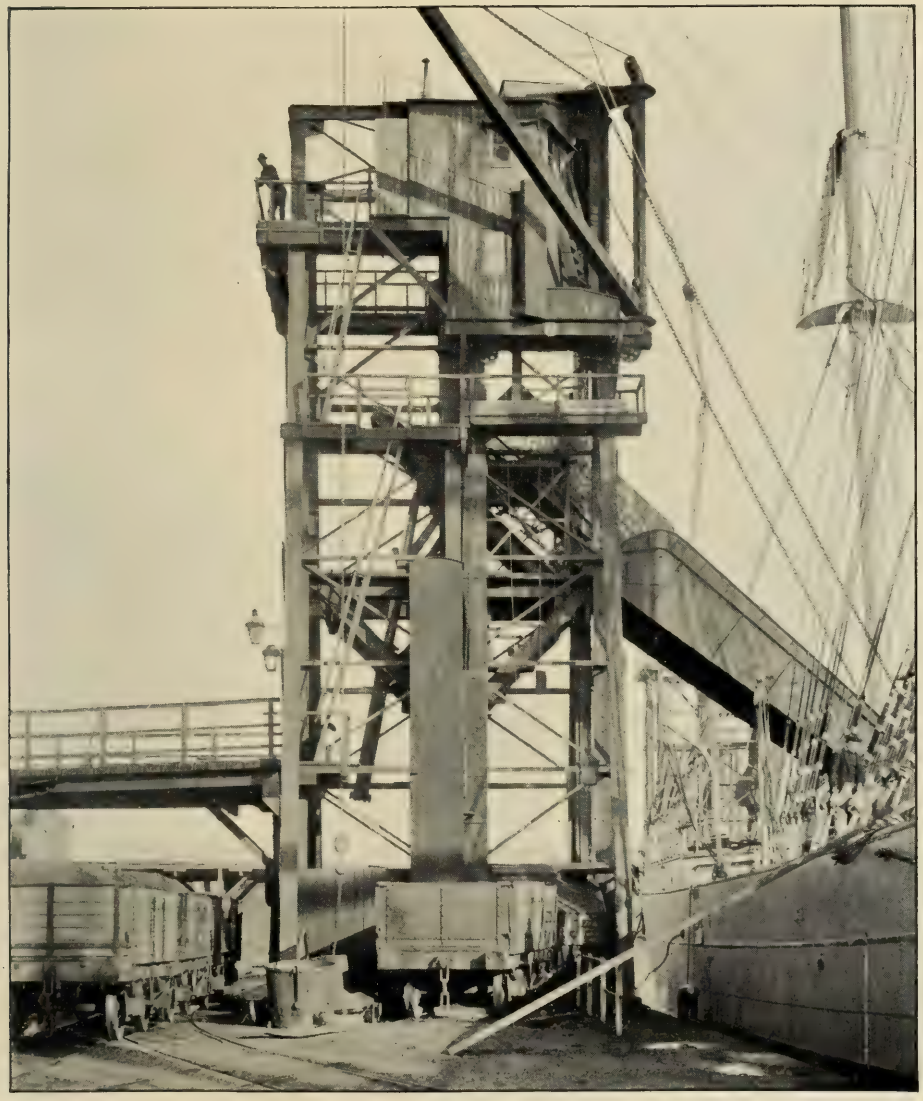
The coal, however, is not actually sold at the collieries. It is sent down to the port, and there it stands about for weeks, and sometimes for months, awaiting sale or the arrival of vessels. It must necessarily be on the spot, so that orders can be executed with the utmost expedition, and delays to shipping avoided. Consequently it is necessary that ample accommodation should be provided at the port for what may be described as the coal-in-waiting. At Newport, for example, where about 4,000,000 tons of coal are shipped in the course of the year (independently of "bunkers,") there are 50 miles of coal sidings, capable of accommodating from 40,000 to 50,000 tons of coal sent there for shipment. A record number of loaded coal trucks actually on these sidings at any one time is 3,716. The daily average is 2,800.

Now assume that the coal for shipment from Newport had been brought there by canal boat. To begin with, it would have been first loaded, by means of the colliery screens, into railway trucks, taken in these to the canal, and then tipped into the boats. This would mean further breakage, and,

in the case of steam coal especially, a depreciation in value. But suppose that the coal had duly arrived at the port in the canal boats, where would it be stored for those weeks and months to await sale or vessels? Space for miles of sidings on land can easily be found; but the water area in a canal or dock in which barges can wait is limited, and, in the case of Newport at least, it would hardly be equal to the equivalent of 3,000 truck-loads of coal.

There comes next the important matter of detail as to the way in which coal brought to a port is to be shipped. Nothing could be simpler and more expeditious than the practice generally adopted in the case of rail-borne coal. When a given quantity of coal is to be despatched, the vessel is brought alongside a hydraulic coal-tip, such as that shown in the illustration facing this page, and the loaded coal trucks are placed in succession underneath the tip. Raised one by one to the level of the shoot, the trucks are there inclined to such an angle that the entire contents fall on to the shoot, and thence into the hold of the ship. Brought to the horizontal again, the empty truck passes on to a viaduct, down which it goes, by gravitation, back to the sidings, the place it has vacated on the tip being at once taken by another loaded truck.

Substitute coal barges for coal trucks, and how will the loading then be accomplished? Under any possible circumstances it would take longer to put a series of canal barges alongside a vessel in the dock than to place a series of coal trucks under the tip on shore. Nor could the canal barge itself be raised to the level of a shoot, and have its contents tipped bodily into the collier. What was done in



THE SHIPPING OF COAL: HYDRAULIC TIP ON G.W.R., SWANSEA.

(The loaded truck is hoisted to level of shoot, and is there inclined to necessary angle to "tip" the coal, which falls from shoot into hold of vessel. Empty truck passes by gravitation along viaduct, on left, to sidings.)

[*To face page* 88.

the South Wales district by one colliery some years ago was to load up a barge with iron tubs, or boxes, filled with coal, and placed in pairs from end to end. In dock one of these would be lifted out of the barge by a crane, and lowered into the hold, where the bottom would be knocked out, the emptied tub being then replaced in the barge by the crane, and the next one to it raised in turn. But, apart from the other considerations already presented, this system of shipment was found more costly than the direct tipping of railway trucks, and was consequently abandoned.

Although, therefore, in theory coal would appear to be an ideal commodity for transport by canal, in actual practice it is found that rail transport is both more convenient and more economical, and certainly much better adapted to the exigences of present day trade in general, in the case alike of domestic coal and of coal for shipment. Whether or not the country would be warranted in going to a heavy expense for canal resuscitation for the special benefit of a limited number of traders having works or factories alongside canal banks is a wholly different question.

I take next the case of raw cotton as another bulky commodity carried in substantial quantities. At one time it was the custom in the Lancashire spinning trade for considerable supplies to be bought in Liverpool, taken to destination by canal, and stored in the mills for use as required. A certain proportion is still handled in this way; but the Lancashire spinners who now store their cotton are extremely few in number, and represent the exception rather than the rule. It is found much more convenient to receive from Liverpool from day to day by rail the exact number of bales required to meet immediate

wants. The order can be sent, if necessary, by post, telegraph, or telephone, and the cotton may be expected at the mill next day, or as desired. If barge-loads of cotton were received at one time, capital would at least have to be sunk in providing warehousing accommodation, and the spinner thinks he can make better use of his money.

The day-by-day arrangement is thus both a convenience and a saving to the trader; though it has one disadvantage from a railway standpoint, for cotton consignments by rail are, as a rule, so small that there is difficulty in making up a "paying load" for particular destinations. As the further result of the agitation a few years ago for the use of a larger type of railway waggons, experiments have been made at Liverpool with large trucks for the conveyance especially of raw cotton. But, owing to the day-by-day policy of the spinners, it is no easy matter to make up a 20-ton truck of cotton for many of the places to which consignments are sent, and the shortage in the load represents so much dead weight. Consignments ordered forward by rail must, however, be despatched wholly, or at any rate in part, on day of receipt. Any keeping of them back, with the idea of thus making up a better load for the railway truck, would involve the risk of a complaint, if not of a claim, against the railway company, on the ground that the mill had had to stop work owing to delay in the arrival of the cotton.

If the spinners would only adopt a two- or three-days-together policy, it would be a great advantage to the railways; but even this might involve the provision of storage accommodation at the mills, and they accordingly prefer the existing arrangement.

What hope could there be, therefore, except under very special circumstances, that they would be willing to change their procedure, and receive their raw cotton in bulk by canal boat?

Passing on to other heavy commodities carried in large quantities, such as bricks, stone, drain-pipes, manure, or road-making materials, it is found, in practice, that unless both the place whence these things are despatched and the place where they are actually wanted are close to a waterway, it is generally more convenient and more economical to send by rail. The railway truck is not only (once more) a better unit in regard to quantity, but, as in the case of domestic coal, it can go to any railway station, and can often be brought miles nearer to the actual destination than if the articles or materials in question are forwarded by water; while the addition to the canal toll of the cost of cartage at either end, or both, may swell the total to the full amount of the railway rate, or leave so small a margin that conveyance by rail, in view of the other advantages offered, is naturally preferred. Here we have further reasons why commodities that seem to be specially adapted for transport by canal so often go by rail instead.

There are manufacturers, again, who, if executing a large shipping order, would rather consign the goods, as they are ready, to a railway warehouse at the port, there to await shipment, than occupy valuable space with them on their own premises. Assuming that it might be possible and of advantage to forward to destination by canal boat, they would still prefer to send off 25 or 30 tons at a time, in a narrow boat (and 25 to 30 tons would represent a big lot in most industries), rather than keep

everything back (with the incidental result of blocking up the factory) until, in order to save a little on the freight, they could fill up a barge of 200 or 300 tons.

So the moral of this part of my story is that, even if the canals of the country were thoroughly revived, and made available for large craft, there could not be any really great resort to them unless there were, also, brought about a change in the whole basis of our general trading conditions.

## CHAPTER VII

### CONTINENTAL CONDITIONS

THE larger proportion of the arguments advanced in the Press or in public in favour of a restoration of our own canal system is derived from the statements which are unceasingly being made as to what our neighbours on the Continent of Europe are doing.

Almost every writer or speaker on the subject brings forward the same stock of facts and figures as to the large sums of money that are being expended on waterways in Continental countries; the contention advanced being, in effect, that because such and such things are done on the Continent of Europe, therefore they ought to be done here. In the "Engineering Supplement" of *The Times*, for instance—to give only one example out of many—there appeared early in 1906 two articles on "Belgian Canals and Waterways" by an engineering contributor who wrote, among other things, that, in view of "the well-directed efforts now being made with the object of effecting the regeneration of the British canal system, the study of Belgian canals and other navigable waterways possesses distinct interest"; and declared, in concluding his account thereof, that "if the necessary powers, money, and concentrated effort were available, there is little doubt that equally satisfactory results could be obtained in

Great Britain." Is this really the case? Could we possibly hope to do all that can be done either in Belgium or in Continental countries generally, even if we had the said powers and money, and showed the same concentrated effort? For my part I do not think we could, and these are my reasons for thinking so :—

Taking geographical considerations first, a glance at the map of Europe will show that, apart from their national requirements, enterprises, and facilities, Germany, Belgium, and Holland are the gateways to vast expanses producing, or receiving, very large quantities of merchandise and raw materials, much of which is eminently suitable for water transport on long journeys that have absolutely no parallel in this country. In the case of Belgium, a good idea of the general position may be gained from some remarks made by the British Consul-General at Antwerp, Sir E. Cecil Hertslet, in a report ("Miscellaneous Series," 604) on "Canals and other Navigable Waterways of Belgium," issued by the Foreign Office in 1904. Referring to the position of Antwerp he wrote :—

"In order to form a clear idea of the great utility of the canal system of Belgium, it is from its heart, from the great port of Antwerp, as a centre, that the survey must be taken. . . . Antwerp holds a leading position among the great ports of the world, and this is due, not only to her splendid geographical situation at the centre of the ocean highways of commerce, but, also, and perhaps more particularly, to her practically unique position as a distributing centre for a large portion of North-Eastern Europe."

Thus the canals and waterways of Belgium do not serve merely local, domestic, or national purposes,

but represent the first or final links in a network of water communications by means of which merchandise can be taken to, or brought from, in bulk, "a large portion of North-Eastern Europe." Much of this traffic, again, can just as well pass through one Continental country, on its way to or from the coast, as through another. In fact, some of the most productive of German industrial centres are much nearer to Antwerp or Rotterdam than they are to Hamburg or Bremen. Hence the extremely keen rivalry between Continental countries having ports on the North Sea for the capture of these great volumes of trans-Continental traffic, and hence, also, their low transport rates, and, to a certain extent, their large expenditure on waterways.

Comparing these with British conditions, we must bear in mind the fact that we dwell in a group of islands, and not in a country which forms part of a Continent. We have, therefore, no such transit traffic available for "through" barges as that which is handled on the Continent. Traffic originating in Liverpool, and destined say, for Austria, would not be put in a canal boat which would first go to Goole, or Hull, then cross the North Sea in the same boat to Holland or Belgium, and so on to its destination. Nor would traffic in bulk from the United States for the Continent—or even for any of our East Coast ports—be taken by boat across England. It would go round by sea. Traffic, again, originating in Birmingham, might be taken to a port by boat. But it would there require transhipment into an ocean-going vessel, just as the commodities received from abroad would have to be transferred to a canal boat—unless Birmingham could be converted into a sea-port.

If Belgium and Holland, especially, had had no chance of getting more than local, as distinct from through or transit traffic—if, in other words, they had been islands like our own, with the same geographical limitations as ourselves, and with no trans-Continental traffic to handle, is there the slightest probability that they would have spent anything like the same amount of money on the development of their waterways as they have actually done? In the particular circumstances of their position they have acted wisely; but it does not necessarily follow that we, in wholly different circumstances, have acted foolishly in not following their example.

It might further be noted, in this connection, that while in the case of Belgium all the waterways in, or leading into, the country converge to the one great port of Antwerp, in England we have great ports, competing more or less the one with the other, all round our coasts, and the conferring of special advantages on one by the State would probably be followed by like demands on the part of all the others. As for communication between our different ports, this is maintained so effectively by coasting vessels (the competition of which already powerfully influences railway rates) that heavy expenditure on canal improvement could hardly be justified on this account. However effectively the Thames might be joined to the Mersey, or the Humber to the Severn, by canal, the vast bulk of port-to-port traffic would probably still go by sea.

Then there are great differences between the physical conditions of Great Britain and those parts of the Continent of Europe where the improvement of waterways has undergone the greatest expansion. Portions of Holland—as everybody knows—are

below the level of the sea, and the remainder are not much above it. A large part of Belgium is flat; so is most of Northern Germany. In fact there is practically a level plain right away from the shores of the North Sea to the steppes of Russia. Canal construction in these conditions is a comparatively simple and a comparatively inexpensive matter; though where such conditions do not exist to the same extent—as in the south of Germany, for example—the building of canals becomes a very different problem. This fact is well recognised by Herr Franz Ulrich in his book on "Staffeltarife und Wasserstrassen," where he argues that the building of canals is practicable only in districts favoured by Nature, and that hilly and backward country is thus unavoidably handicapped.

Much, again, of the work done on the Continent has been a matter either of linking up great rivers or of canalising these for navigation purposes. We have in England no such rivers as the Rhine, the Weser, the Elbe, and the Oder, but the very essence of the German scheme of waterways is to connect these and other rivers by canals, a through route by water being thus provided from the North Sea to the borders of Russia. Further south there is already a small canal, the Ludwigs Canal, connecting the Rhine and the Danube, and this canal—as distinct from those in the northern plains—certainly does rise to an elevation of 600 feet from the River Main to its summit level. A scheme has now been projected for establishing a better connection between the Rhine and the Danube by a ship canal following the route either of the Main or of the Neckar. In describing these two powerful streams Professor Meiklejohn says, in his "New Geography":—

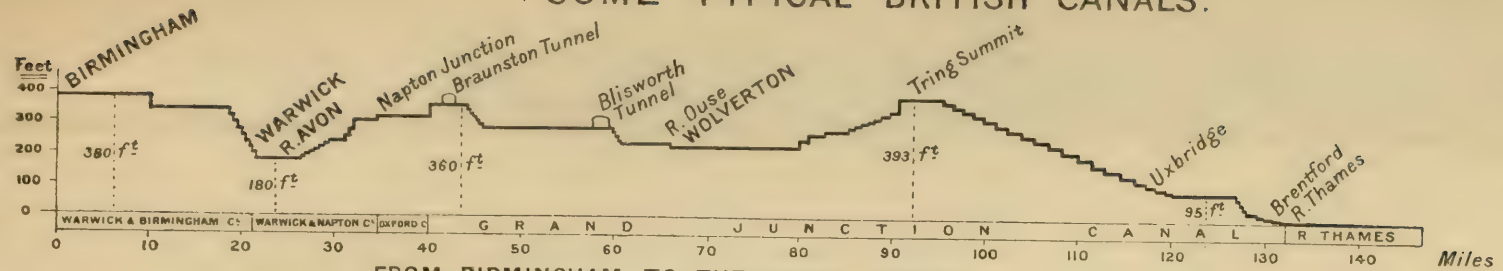
"The two greatest rivers of Europe—greatest from almost every point of view—are the Danube and the Rhine. The Danube is the largest river in Europe in respect of its volume of water; it is the only large European river that flows due east; and it is therefore the great highway to the East for South Germany, for Austria, for Hungary, and for the younger nations in its valley. It flows through more lands, races, and languages than any other European river. The Rhine is the great water-highway for Western Europe; and it carries the traffic and the travellers of many countries and peoples. Both streams give life to the whole Continent; they join many countries and the most varied interests; while the streams of France exist only for France itself. The Danube runs parallel with the mighty ranges of the Alps; the Rhine saws its way through the secondary highlands which lie between the Alps and the Netherlands."

The construction of this proposed link would give direct water communication between the North Sea and the Black Sea, a distance, as the crow flies, and not counting river windings, of about 1,300 miles. Such an achievement as this would put entirely in the shade even the present possible voyage, by canal and river, of 300 miles from Antwerp to Strasburg.

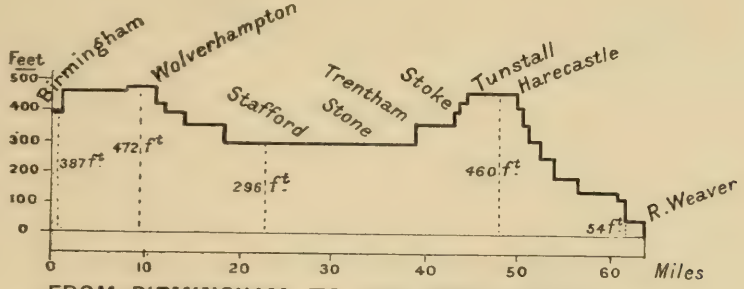
What are our conditions in Great Britain, as against all these?

In place of the "great lowland plain" in which most of the Continental canal work we hear so much about has been done, we possess an undulating country whose physical conditions are well indicated by the canal sections given opposite this page. Such differences of level as those that are there shown must be overcome by locks, lifts, or inclined planes, together with occasional tunnels or viaducts. In the result the construction of canals is necessarily much

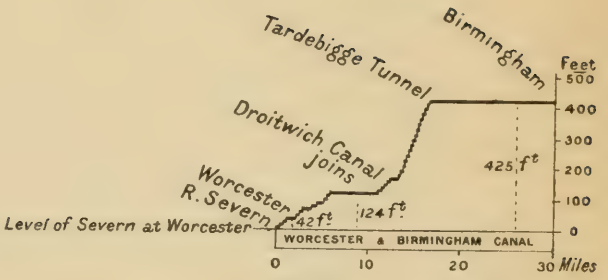
# SOME TYPICAL BRITISH CANALS.




FROM BIRMINGHAM TO THE RIVER THAMES
(155 locks in 147 miles.)




FROM BIRMINGHAM TO THE RIVER WEAVER




BETWEEN THE SEVERN AND BIRMINGHAM

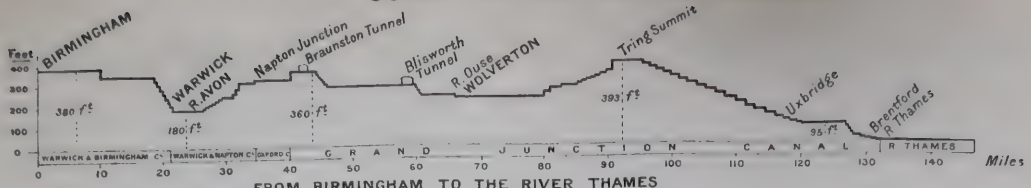
*The difference in level of about 250 feet in 3 miles at Tardebigge is overcome by a flight of 30 locks*

Feet

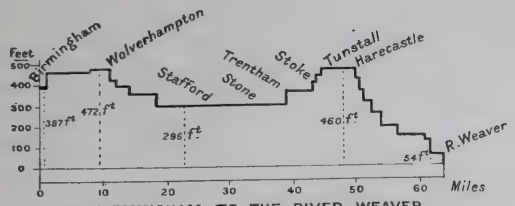
Summit level

[*To face page* 98.

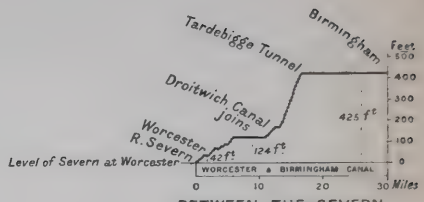
# SOME TYPICAL BRITISH CANALS.




FROM BIRMINGHAM TO THE RIVER THAMES
(155 locks in 147 miles)

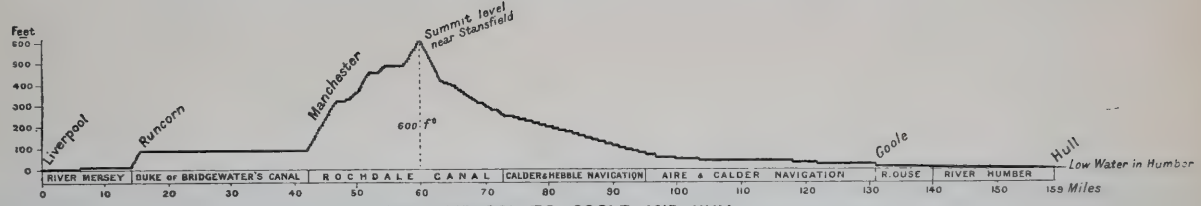



FROM BIRMINGHAM TO THE RIVER WEAVER



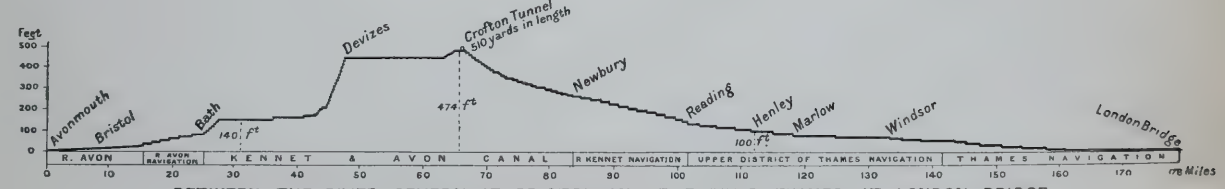

BETWEEN THE SEVERN AND BIRMINGHAM

*The difference in level of about 250 feet in 3 miles at Tardebigge is overcome by a flight of 30 locks*




FROM LIVERPOOL TO GOOLE AND HULL

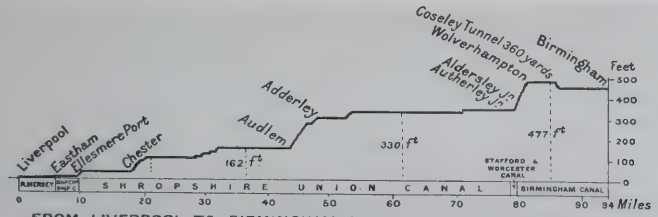
*The elevation of 600 ft on the Rochdale Canal is surmounted by 92 locks in 32 miles*




BETWEEN THE RIVER SEVERN AT BRISTOL AND THE RIVER THAMES AT LONDON BRIDGE

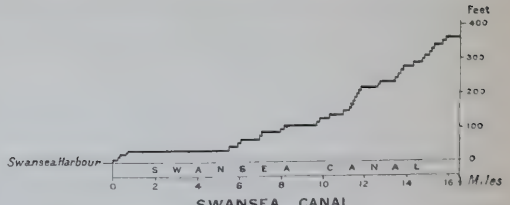
*The fall of 239 ft in 2½ miles at Devizes is overcome by a flight of 29 locks*

*A boat takes 3 hours passing through these locks*



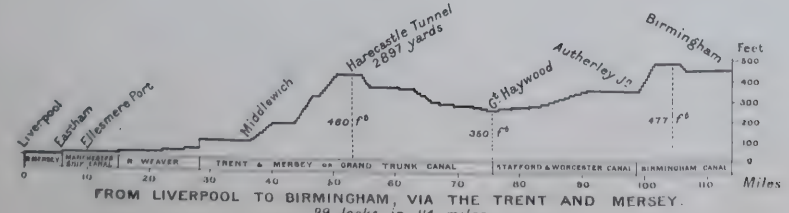

FROM LIVERPOOL TO BIRMINGHAM, VIA THE SHROPSHIRE UNION

*69 locks in 94 miles*




SWANSEA CANAL

*36 locks in 16½ miles*




FROM LIVERPOOL TO BIRMINGHAM, VIA THE TRENT AND MERSEY.

*99 locks in 114 miles*

more costly in Great Britain than on the aforesaid "great lowland plain" of Continental Europe, and dimensions readily obtainable there become practically impossible here on account alike of the prohibitive cost of construction and the difficulties that would arise in respect to water supply. A canal connecting the Rhine, the Weser, and the Elbe, in Germany, is hardly likely to run short of water, and the same may be said of the canals in Holland, and of those in the lowlands of Belgium. This is a very different matter from having to pump water from low levels to high levels, to fill reservoirs for canal purposes, as must be done on the Birmingham and other canals, or from taking a fortnight to accomplish the journey from Hull to Nottingham as once happened owing to insufficiency of water.

There is, also, that very important consideration, from a transport standpoint, of the "length of haul." Assuming, for the sake of argument (1) that the commercial conditions were the same in Great Britain as they are on the Continent; (2) that our country, also, consisted of a "great lowland plain"; and (3) that we, as well, had great natural waterways, like the Rhine, yielding an abundant water supply;—assuming all this, it would still be impossible, in the circumscribed dimensions of our isles, to get a "length of haul" in any way approaching the barge-journeys that are regularly made between, say, North Sea ports and various centres in Germany.

The geographical differences in general between Great Britain and Continental countries were thus summed up by Mr W. H. Wheeler in the discussion on Mr Saner's paper at the Institution of Civil Engineers:—

"There really did not seem to be any justification for Government interference with the canals. England was in an entirely different situation from Continental countries. She was a sea-girt nation, with no less than eight first-class ports on a coast-line of 1,820 miles. Communication between these by coasting steamers was, therefore, easy, and could be accomplished in much less time and at less cost than by canal. There was no large manufacturing town in England that was more than about 80 miles in a direct line from a first-class seaport; and taking the country south of the Firth of Forth, there were only 42½ square miles to each mile of coast. France, on the other hand, had only two first-class ports, one in the north and the other in the extreme south, over a coast-line of 1,360 miles. Its capital was 100 miles from the nearest seaport, and the towns in the centre of the country were 250 to 300 miles from either Havre or Marseilles. For every mile of coast-line there were 162 square miles of country. Belgium had one large seaport and only 50 miles of coast-line, with 227 square miles of country to every square mile. Germany had only two first-class ports, both situated on its northern coast; Frankfort and Berlin were distant from those ports about 250 miles, and for every mile of coast-line there were 231 square miles of country. The necessity of an extended system of inland waterways for the distribution of produce and materials was, therefore, far more important in those countries than it was in England."

Passing from commercial and geographical to political conditions, we find that in Germany the State owns or controls alike railways and waterways. Prussia bought up most of the former, partly with the idea of safeguarding the protective policy of the country (endangered by the low rates charged on imports by independent railway companies), and partly in order that the Government could secure,

in the profits on railway operation, a source of income independent of Parliamentary votes. So well has the latter aim been achieved that a contribution to the Exchequer of from £10,000,000 to £15,000,000 a year has been obtained, and, rather than allow this source of income to be checked by heavy expenditure, the Prussian Government have refrained from carrying out such widenings and improvements of their State system of railways as a British or an American railway company would certainly have adopted in like circumstances, and have left the traders to find relief in the waterways instead. The increased traffic the waterways of Germany are actually getting is mainly traffic which has either been diverted from the railways, or would have been handled by the railways in other countries in the natural course of their expansion. Whatever may be the case with the waterways, the railways of Prussia, especially, are comparatively unprogressive, and, instead of developing through traffic at competitive rates, they are reverting more and more to the original position of railways as feeders to the waterways. They get a short haul from place of origin to the waterway, and another short haul, perhaps, from waterway again to final destination; but the greater part of the journey is done by water.

These conditions represent one very material factor in the substantial expansion of water-borne traffic in Germany—and most of that traffic, be it remembered, has been on great rivers rather than on artificial canals. The latter are certainly being increased in number, especially, as I have said, where they connect the rivers; and the Government are the more inclined that the waterways should be developed because then there will be less need for

spending money on the railways, and for any interference with the "revenue-producing machine" which those railways represent.

In France the railways owned and operated by the State are only a comparatively small section of the whole; but successive Governments have advanced immense sums for railway construction, and the State guarantees the dividends of the companies; while in France as in Germany railway rates are controlled absolutely by the State. In neither country is there free competition between rail and water transport. If there were, the railways would probably secure a much greater proportion of the traffic than they do. Still another consideration to be borne in mind is that although each country has spent great sums of money—at the cost of the general taxpayer—on the provision of canals or the improvement of waterways, no tolls are, with few exceptions, imposed on the traders. The canal charges include nothing but actual cost of carriage, whereas British railway rates may cover various other services, in addition, and have to be fixed on a scale that will allow of a great variety of charges and obligations being met. Not only, both in Germany and France, may the waterway be constructed and improved by the State, but the State also meets the annual expenditure on dredging, lighting, superintendence and the maintenance of inland harbours. Here we have further reasons for the growth of the water-borne traffic on the Continent.

Where the State, as railway owner or railway subsidiser, spends money also on canals, it competes only, to a certain extent, with itself; but this would be a very different position from State-owned or

State-supported canals in this country competing with privately-owned railways.[1]

If then, as I maintain is the case, there is absolutely no basis for fair comparison between Continental and British conditions—whether commercial, geographical, or political—we are left to conclude that the question of reviving British canals must be judged and decided strictly from a British standpoint, and subject to the limitations of British policy, circumstances, and possibilities.

[1] Fuller information respecting traffic conditions in Continental countries will be found in my book on "Railways and Their Rates."

# CHAPTER VIII

## WATERWAYS IN THE UNITED STATES

In some respects conditions in the United States compare with those of Continental Europe, for they suggest alike powerful streams, artificial canals constructed on (as a rule) flat or comparatively flat surfaces, and the possibilities of traffic in large quantities for transport over long distances before they can reach a seaport. In other respects the comparison is less with Continental than with British conditions, inasmuch as, for the last half century at least, the American railways have been free to compete with the waterways, and fair play has been given to the exercise of economic forces, with the result that, in the United States as in the United Kingdom, the railways have fully established their position as the factors in inland transport best suited to the varied requirements of trade and commerce of to-day, while the rivers and canals (I do not here deal with the Great Lakes, which represent an entirely different proposition) have played a rôle of steadily diminishing importance.

The earliest canal built in the United States was

that known as the Erie Canal. It was first projected in 1768, with the idea of establishing a through route by water between Lake Erie and the River Hudson at Albany, whence the boats or barges employed would be able to reach the port of New York. The Act for its construction was not passed, however, by the Provincial Legislature of the State of New York until 1817. The canal itself was opened for traffic in 1825. It had a total length from Cleveland to Albany of 364 miles, included therein being some notable engineering work in the way of aqueducts, etc.

At the date in question there were four North Atlantic seaports, namely, Boston, New York, Philadelphia, and Baltimore, all of about equal importance. Boston, however, had appeared likely to take the lead, by reason both of her comparatively dense population and of her substantial development of manufactures. Philadelphia was also then somewhat in advance of New York in trade and population. The effect of the Erie Canal, however, was to concentrate all the advantages, for the time being, on New York. Thanks to the canal, New York secured the domestic trade of a widespread territory in the middle west, while her rivals could not possess themselves of like facilities, because of the impracticability of constructing canals to cross the ranges of mountains separating them from the valley of the Mississippi and the basin of the Great Lakes—ranges broken only by the Hudson and the Mohawk valleys, of which the constructors of the Erie Canal had already taken advantage. So New York, with its splendid harbour, made great progress alike in trade, wealth, and population, completely out-

distancing her rivals, and becoming, as a State, "the Empire State," and, as a city, "the financial and commercial centre of the Western Hemisphere."

While, again, the Erie Canal was "one of the most efficient factors" in bringing about these results, it was also developing the north-west by giving an outlet to the commerce of the Great Lakes, and during the second quarter of the nineteenth century it represented what has been well described as "the most potent influence of American progress and civilisation." Not only did the traffic it carried increase from 1,250,000 tons, in 1837, to 3,000,000 tons in 1847, but it further inspired the building of canals in other sections of the United States. In course of time the artificial waterways of that country represented a total length of 5,000 miles.

With the advent of the railways there came revolutionary changes which were by no means generally appreciated at first. The cost of the various canals had been defrayed mostly by the different States, and, though financial considerations had thus been more readily met, the policy pursued had committed the States concerned to the support of the canals against possible competition. When, therefore, "private enterprise" introduced railways, in which the doom of the canals was foreseen, there was a wild outburst of indignant protest. The money of the taxpayers, it was said, had been sunk in building the canals, and, if the welfare of these should be prejudiced by the railways, every taxpayer in the State would suffer. When it was seen that the railways had come to stay, the demand arose that, while passengers might travel by rail,

the canals should have the exclusive right to convey merchandise.

The question was even discussed by the Legislature of the State of New York, in 1857, whether the railways should not be prevented from carrying goods at all, or, alternatively, whether heavy taxes should not be imposed on goods traffic carried by rail in order to check the considerable tendency then being shown for merchandise to go by rail instead of by canal, irrespective of any difference in rates. The railway companies were further accused of conspiring to "break down those great public works upon which the State has spent forty years of labour," and so active was the campaign against them — while it lasted — that one New York paper wrote:—"The whole community is aroused as it never was before."

Some of the laws which had been actually passed to protect the State-constructed canals against the railways were, however, repealed in 1851, and the agitation itself was not continued beyond 1857, from which year the railways had free scope and opportunity to show what they could do. The contest was vigorous and prolonged, but the railways steadily won.

In the first instance the Erie Canal had a depth of 4 feet, and could be navigated only by 30-ton boats. In 1862 it was deepened to 7 feet, in order that boats of 240 tons, with a capacity of 8,000 tons of wheat, could pass, the cost of construction being thus increased from $7,000,000 to $50,000,000. Then, in 1882, all tolls were abolished, and the canal has since been maintained out of the State treasury. But how the traffic on the New York canals as a whole (including the Erie, the Oswego, the

Champlain, etc.) has declined, in competition with the railroads, is well shown by the following table :—[1]

| Year. | Total Traffic on New York Canals and Railroads. | Percentage on Canals only. |
|---|---|---|
| | Tons. | Per cent. |
| 1860 | 7,155,803 | 65 |
| 1870 | 17,488,469 | 35 |
| 1880 | 29,943,633 | 21 |
| 1890 | 56,327,661 | 9·3 |
| 1900 | 84,942,988 | 4·1 |
| 1903 | 93,248,299 | 3·9 |

The falling off in the canal traffic has been greatest in just those heavy or bulky commodities that are generally assumed to be specially adapted for conveyance by water. Of the flour and grain, for instance, received at New York, less than 10 per cent. in 1899, and less than 8 per cent. in 1900, came by the Erie Canal.

The experiences of the New York canals have been fully shared by other canals in other States. Of the sum total of 5,000 miles of canals constructed, 2,000 had been abandoned by 1890 on the ground that the traffic was insufficient to cover working expenses. Since then most of the remainder have shared the same fate, one of the last of the survivors, the Delaware and Hudson, being converted into a railway a year or two ago. In fact the only canals

[1] The figures for the years 1860 to 1890 are taken from the "Report of the Committee on Canals of New York State," 1900, General Francis V. Greene, chairman; and those for 1900 and 1903 from the "Annual Report of Superintendent of Public Works, New York State," 1903.

in the United States to-day, besides those in the State of New York, whose business is sufficiently regular to warrant the inclusion of their traffic in the monthly reports of the Government are the Chesapeake and Delaware (connecting Chesapeake and Delaware Bays, and having an annual traffic of about 700,000 tons, largely lumber); and the Chesapeake and Ohio (from Cumberland to Georgetown, owned by the State of Maryland, and transporting coal almost exclusively, the amount depending on the state of congestion of traffic on the railroads).

It is New York that has been most affected by this decline in American canals. When the railways began to compete severely with the Erie Canal, New York's previous supremacy over rival ports in the Eastern States was seriously threatened. Philadelphia and Baltimore, and various smaller ports also, started to make tremendous advance. Then the Gulf ports—notably New Orleans and Galveston—were able to capture a good deal of ocean traffic that might otherwise have passed through New York. Not only do the railway lines to those ports have the advantage of easy grades, so that exceptionally heavy train-loads can be handled with ease, and not only is there no fear of snow or ice blocks in winter, but the improvements effected in the ports themselves—as I had the opportunity of seeing and judging, in the winter of 1902-3, during a visit to the United States—have made these southern ports still more formidable competitors of New York. While, therefore, the trade of the United States has undergone great expansion of late years, that proportion of it which passes through the port of New York has seriously declined. "In less than ten

years," says a pamphlet on "The Canal System of New York State," issued by the Canal Improvement State Committee, City of New York, "Pennsylvania or some other State may be the Empire State, which title New York has held since the time of the Erie Canal."

So a movement has been actively promoted in New York State for the resuscitation of the Erie and other canals there, with a view to assuring the continuance of New York's commercial supremacy, and giving her a better chance—if possible—of competing with rivals now flourishing at her expense. At first a ship canal between New York and Lake Erie was proposed; but this idea has been rejected as impracticable. Finally, the Legislature of the State of New York decided on spending $101,000,000 on enlarging the Erie and other canals in the State, so as to give them a depth of 12 feet, and allow of the passage of 1,000-ton barges, arrangements being also made for propulsion by electric or steam traction.

In addition to this particular scheme, "there are," says Mr F. H. Dixon, Professor of Economics, Dartmouth College, in an address on "Competition between Water and Railway Transportation Lines in the United States," read by him before the St Louis Railway Club, and reported in the *Engineering News* (New York) of March 22, 1906, "many other proposals for canals in different sections of the country, extending all the way from projects that have some economic justification to the crazy and impracticable schemes of visionaries." But the general position in regard to canal resuscitation in the United States does not seem to be very hopeful, judging from a statement made by Mr Carnegie—once an advocate

A CARGO BOAT ON THE MISSISSIPPI.

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of the proposed Pittsburg-Lake Erie Canal—before the Pittsburg Chamber of Commerce in 1898.

"Such has been the progress of railway development," he said, "that if we had a canal to-day from Lake Erie through the Ohio Valley to Beaver, free of toll, we could not afford to put boats on it. It is cheaper to-day to transfer the ore to 50-ton cars, and bring it to our works at Pittsburg over our railway, than it would be to bring it by canal."

Turning from artificial to natural waterways in the United States, I find the story of the Mississippi no less instructive.

This magnificent stream has, in itself, a length of 2,485 miles. But the Missouri is really only an upper prolongation of the same river under another name, and the total length of the two, from mouth to source, is 4,190 miles, of which the greater distance is navigable. The Mississippi and its various tributaries drain, altogether, an area of 1,240,000 square miles, or nearly one-third of the territory of the United States. If any great river in the world had a chance at all of holding its own against the railroads as a highway of traffic it should, surely, be the Mississippi, to which British theorists ought to be able to point as a powerful argument in support of their general proposition concerning the advantages of water over rail-transport. But the actual facts all point in the other direction.

The earliest conditions of navigation on the Mississippi are well shown in the following extract from an article published in the *Quarterly Review* of March 1830, under the heading, "Railroads and Locomotive Steam-carriages":—

"As an example of the difficulties of internal

navigation, it may be mentioned that on the great river Mississippi, which flows at the rate of 5 or 6 miles an hour, it was the practice of a certain class of boatmen, who brought down the produce of the interior to New Orleans, to break up their boats, sell the timber, and afterwards return home slowly by land; and a voyage up the river from New Orleans to Pittsburg, a distance of about 2,000 miles, could hardly be accomplished, with the most laborious efforts, within a period of four months. But the uncertain and limited influence, both of the wind and the tide, is now superseded by a new agent, which in power far surpassing the raging torrent, is yet perfectly manageable, and acts with equal efficacy in any direction. . . . Steamboats of every description, and on the most approved models, ply on all the great rivers of the United States; the voyage from New Orleans to Pittsburg, which formerly occupied four months, is accomplished with ease in fifteen or twenty days, and at the rate of not less than 5 miles an hour."

Since this article in the *Quarterly Review* was published, enormous sums of money have been spent on the Mississippi—partly with a view to the prevention of floods, but partly, also, to improve the river for the purposes of navigation. Placed in charge of a Mississippi Commission and of the Chief of Engineers in the United States Army, the river has been systematically surveyed; special studies and reports have been drawn up on every possible aspect of its normal or abnormal conditions and circumstances; the largest river dredges in the world have been employed to ensure an adequate depth of the river bed; engineering works in general on the most complete scale have been carried out—in fact, nothing that science, skill, or money could accomplish has been left undone.

The difficulties were certainly considerable. There has always been a tendency for the river bed to get choked up by the sediment the stream failed to carry on; the banks are weak; while the variation in water level is sometimes as much as 10 feet in a single month. None the less, the Mississippi played for a time as important a rôle in the west and the south as the Erie Canal played in the north. Steamboats on the western rivers increased in number from 20, in 1818, to 1,200, in 1848, and there was a like development in flat boat tonnage. With the expansion of the river traffic came a growth of large cities and towns alongside. Louisville increased in population from 4,000, in 1820, to 43,000, in 1850, and St Louis from 4,900 to 77,000 in the same period.

With the arrival of the railroads began the decline of the river, though some years were to elapse before the decline was seriously felt. It was the absolute perfection of the railway system that eventually made its competition irresistible. The lines paralleled the river; they had, as I have said, easy grades; they responded to that consideration in regard to speedy delivery of consignments which is as pronounced in the United States as it is in Great Britain; they were as free from stoppages due to variations in water level as they were from stoppages on account of ice or snow; and they could be provided with branch lines as "feeders," going far inland, so that the trader did not have either to build his factory on the river bank or to pay cost of cartage between factory and river. The railway companies, again, were able to provide much more efficient terminal facilities, especially in the erection of large wharves, piers, and depôts which allow of the railway waggons coming right alongside the steamers. At Galveston I saw cargo being

discharged from the ocean-going steamers by being placed on trucks which were raised from the vessel by endless moving-platforms to the level of the goods station, where stood, along parallel series of lines, the railway waggons which would take them direct to Chicago, San Francisco, or elsewhere. With facilities such as these no inland waterway can possibly compete. The railways, again, were able, in competition with the river, to reduce their charges to "what the traffic would bear," depending on a higher proportion of profit elsewhere. The steamboats could adopt no such policy as this, and the traders found that, by the time they had paid, not only the charges for actual river transport, but insurance and extra cartage, as well, they had paid as much as transport by rail would have cost, while getting a much slower and more inconvenient service.

The final outcome of all these conditions is indicated by some remarks made by Mr Stuyvesant Fish, President of the Illinois Central Railroad Company (the chief railway competitors of the Mississippi steamboats), in the address he delivered as President of the Seventh Session of the International Railway Congress at Washington, in May 1905 :—

"It is within my knowledge that twenty years ago there were annually carried by steamboats from Memphis to New Orleans over 100,000 bales of cotton, and that in almost every year since the railroads between Memphis and New Orleans passed under one management, not a single bale has been carried down the Mississippi River from Memphis by boat, and in no one year have 500 bales been thus carried; the reason being that, including the charges for marine and fire insurance, the rates by water are higher than by rail."

SUCCESSFUL RIVALS OF MISSISSIPPI CARGO BOATS.

(1) Illinois Central Freight Train ; 43 cars ; 2,100 tons.
(2) ,, ,, Banana Express, New Orleans to Chicago ; 34 cars ; 433 tons of bananas.

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To this statement Mr Fish added some figures which may be tabulated as follows:—

TONNAGE OF FREIGHT RECEIVED AT OR DESPATCHED FROM NEW ORLEANS.

| | 1890 | 1900 |
|---|---|---|
| By the Mississippi River (all sources) | 2,306,290 | 450,498 |
| By rail . . . . . | 3,557,742 | 6,852,064 |

Decline of river traffic in ten years . 1,855,792 tons
Increase of rail ,, ,, ,, . 3,294,322 ,,

These figures bear striking testimony to the results that may be brought about in a country where railways are allowed a fair chance of competing with even the greatest of natural waterways—a chance, as I have said, denied them in Germany and France. Looking, too, at these figures, I understand better the significance of what I saw at Memphis, where a solitary Mississippi steamboat—one of the survivals of those huge floating warehouses now mostly rusting out their existence at New Orleans—was having her cargo discharged on the river banks by a few negroes, while the powerful locomotives of the Illinois Central were rushing along on the adjoining railway with the biggest train-loads it was possible for them to haul.

On the general position in the United States I might quote the following from a communication with which I have been favoured by Mr Luis Jackson, an Englishman by birth, who, after an early training on British railways, went to the United States, created there the rôle of "industrial

commissioner" in connection with American railways, and now fills that position on the Erie Railroad :—

"When I was in the West the question of water transportation down the Mississippi was frequently remarked upon. The Mississippi is navigable from St Paul to New Orleans. In the early days the towns along the Mississippi, especially those from St Paul to St Louis, depended upon, and had their growth through, the river traffic. It was a common remark among our railroad people that 'we could lick the river.' The traffic down the Mississippi, especially from St Paul to St Louis (I can only speak of the territory with which I am well acquainted) perceptibly declined in competition with the railroads, and the river towns have been revived by, and now depend more for their growth on, the railroads than on the river. . . Figures do not prove anything. If the Erie Canal and the Mississippi River traffic had increased, doubled, trebled, or quadrupled in the past years, instead of actually dwindling by tonnage figures, it would prove nothing as against the tremendous tonnage hauled by the trunk line railroads. The Erie Railroad Company, New York to Chicago, last year carried 32,000,000 tons of revenue freights. It would take a pretty good canal to handle that amount of traffic; and the Erie is only one of many lines between New York and Chicago.

"A canal, paralleling great railroads, to some extent injures them on through traffic. The tendency of all railroads is in the line of progress. As the tonnage increases the equipment becomes larger, and the general tendency of railroad rates is downwards; in other words, the public in the end gets from the railroad all that can be expected from a canal, and much more. The railroad can expand right and left, and reach industries by side tracks; with canals every manufacturer must locate on the banks of the canal. Canals for internal commerce, in my mind, are out of date; they belong to the 'slow.' Nor do I believe

that the traffic management of canals by the State has the same conception of traffic measures which is adopted by the modern managers of railroads.

"Canals affect rates on heavy commodities, and play a part mostly injurious, to my mind, to the proper development of railroads, especially on the Continent of Europe. They may do local business, but the railroad is the real handmaid of commerce."

By way of concluding this brief sketch of American conditions, I cannot do better than adopt the final sentences in Professor Dixon's paper at the St Louis Railway Club to which I have already referred:—

"Two considerations should, above all others, be kept in mind in determination of the feasibility of any project: first, the very positive limitations to the efficiency of rivers and canals as transportation agencies because of their lack of flexibility and the natural disabilities under which they suffer; and secondly, that water transportation is not necessarily cheap simply because the Government constructs and maintains the channels. Nothing could be more delusive than the assertion so frequently made, which is found in the opening pages of the report of the New York Committee on Canals of 1899, that water transportation is inherently cheaper than rail transportation. Such an assertion is true only of ocean transportation, and possibly also of large bodies of water like the lakes, although this last is doubtful.

"By all means let us have our waterways developed when such development is economically justifiable. What is justifiable must be a matter of judgment, and possibly to some extent of experimentation, but the burden of proof rests on its advocates. Such projects should be carried out by the localities interested and the burden should be borne by those who are to derive the benefit. Only in large undertakings of national concern should the General Government be called upon for aid.

"But I protest most vigorously against the deluge of schemes poured in upon Congress at every session by reckless advocates who, disregarding altogether the cost of their crazy measures in the increased burden of general taxation, argue for the inherent cheapness of water transportation, and urge the construction at public expense of works whose traffic will never cover the cost of maintenance."

# CHAPTER IX

## ENGLISH CONDITIONS

I HAVE already spoken in Chapter VII. of some of the chief differences between Continental and English conditions, but I revert to the latter because it is essential that, before approving of any scheme of canal restoration here, the British public should thoroughly understand the nature of the task that would thus be undertaken.

The sections of actual canal routes, given opposite page 98, will convey some idea of the difficulties which faced the original builders of our artificial waterways. The wonder is that, since water has not yet been induced to flow up-hill, canals were ever constructed over such surfaces at all. Most probably the majority of them would not have been attempted if railways had come into vogue half a century earlier than they did. Looking at these diagrams, one can imagine how the locomotive—which does not disdain hill-climbing, and can easily be provided with cuttings, bridges, viaducts, and tunnels — could follow the canal; but one can hardly imagine that in England, at least, the canal would have followed the railway.

The whole proposition in regard to canal revival would be changed if only the surfaces in Great Britain were the same as they are, say, between

Hamburg and Berlin, where in 230 miles of waterway there are only three locks. In this country there is an average of one lock for every 1¼ mile of navigation. The sum total of the locks on British canals is 2,377, each representing, on an average, a capitalised cost of £1,360. Instead of a "great central plain," as on the Continent of Europe, we have a "great central ridge," extending the greater length of England. In the 16 miles between Worcester and Tardebigge on the Worcester and Birmingham Canal, there are fifty-eight locks to be passed through by a canal boat going from the Severn to Birmingham. At Tardebigge there is a difference in level of about 250 feet in 3 miles or so. This is overcome by a "flight" of thirty locks, which a 25-ton boat may hope to get through in four hours. Between Huddersfield and Ashton, on the Huddersfield Narrow Canal, there are seventy-four locks in 20 miles; between Manchester and Sowerby Bridge, on the Rochdale Canal, there are ninety-two locks in 32 miles, to enable the boats to pass over an elevation 600 feet above sea level; and at Bingley, on the Leeds and Liverpool Canal, five "staircase" locks give a total lift of 59 feet 2 inches.

Between London and Liverpool there are three canal routes, each passing through either ten or eleven separate navigations, and covering distances of from 244 to 267 miles. By one of these routes a boat has to pass through such series of locks as ninety in 100 miles on the Grand Junction Canal, between Paddington and Braunston; forty-three in 17 miles on the Birmingham Canal, between Birmingham and Aldersley; and forty-six in 66 miles on the Shropshire Union Canal, between Autherley and Ellesmere Port. Proceeding by an

alternative route, the boat would pass through fifty-nine locks in 67 miles on the Trent and Mersey; while a third route would give two hundred and eighty-two locks in a total of 267 miles. The number of separate navigations is ten by Routes I. and II., and eleven by Route III.

Between London and Hull there are two routes, one 282 miles with one hundred and sixty-four locks, and the other 305 miles with one hundred and forty-eight locks. On the journey from London to the Severn, a boat would pass through one hundred and thirty locks in 177 miles in going to the Avonmouth Docks (this total including one hundred and six locks in 86 miles between Reading and Hanham, on the Kennet and Avon Canal); and either one hundred and two locks in 191 miles, or two hundred and thirty in 219 miles, if the destination were Sharpness Docks. Between Liverpool and Hull there are one hundred and four locks in 187 miles by one route; one hundred and forty-nine in 159 miles by a second route; and one hundred and fifty-two in 149 miles by a third. In the case of a canal boat despatched from Birmingham, the position would be—to London, one hundred and fifty-five locks in 147 miles; to Liverpool (1) ninety-nine locks in 114 miles, (2) sixty-nine locks in 94 miles; to Hull, sixty-six locks in 164 miles; to the Severn, Sharpness Docks (1) sixty-one locks in 75 miles, (2) forty-nine locks in 89 miles.

Early in 1906 a correspondent of *The Standard* made an experimental canal journey from the Thames, at Brentford, to Birmingham, to test the qualities of a certain "suction-producer gas motor barge." The barge itself stood the test so well that the correspondent was able to declare:—"In the new power

may be found a solution of the problem of canal traction." He arrived at this conclusion notwithstanding the fact that the motor barge was stopped at one of the locks by a drowned cat being caught between the barge and the incoming "butty" boat. The journey from London to Birmingham occupied, "roughly," six and a half days—a journey, that is, which London and North-Western express trains accomplish regularly in two hours. The 22½ miles of the Warwick and Birmingham Canal, which has thirty-four locks, alone took ten hours and a half. From Birmingham the correspondent made other journeys in the same barge, covering, altogether, 370 miles. In that distance he passed through three hundred and twenty-seven locks, various summits "several hundred feet" in height being crossed by this means.

At Anderton, on the Trent and Mersey Canal, there is a vertical hydraulic lift which raises or lowers two narrow boats 50 feet to enable them to pass between the canal and the River Mersey, the operation being done by means of troughs 75 feet by 14½ feet. Inclined planes have also been made use of to avoid a multiplicity of locks. It is assumed that in the event of any general scheme of resuscitation being undertaken, the present flights of locks would, in many instances, be done away with, hydraulic lifts being substituted for them. Where this could be done it would certainly effect a saving in time, though the provision of a lift between series of locks would not save water, as this would still be required for the lock below. Hydraulic lifts, however, could not be used in mining districts, such as the Black Country, on account of possible subsidences. Where that drawback did not occur there would still be the

question of expense. The cost of construction of the Anderton lift was £50,000, and the cost of maintenance is £500 a year. Would the traffic on a particular route be always equal to the outlay? In regard to inclined planes, it was proposed some eight or ten years ago to construct one on the Birmingham Canal in order to do away with a series of locks at a certain point and save one hour on the through journey. Plans were prepared, and a Bill was deposited in Parliament; but just at that time a Board of Trade enquiry into canal tolls and charges led to such reductions being enforced that there no longer appeared to be any security for a return on the proposed expenditure, and the Bill was withdrawn.

In many instances the difference in level has been overcome by the construction of tunnels. There are in England and Wales no fewer than forty-five canal tunnels each upwards of 100 yards in length, and of these twelve are over 2,000 yards in length, namely, Standidge Tunnel, on the Huddersfield Narrow Canal, 5,456 yards; Sapperton, Thames and Severn, 3,808; Lappal, Birmingham Canal navigations, 3,785; Dudley, Birmingham Canal, 3,672; Norwood, Chesterfield Canal, 3,102; Butterley, Cromford, 3,063; Blisworth, Grand Junction, 3,056; Netherton, Birmingham Canal, 3,027; Harecastle (new), Trent and Mersey, 2,926; Harecastle (old), Trent and Mersey, 2,897; West Hill, Worcester and Birmingham, 2,750; and Braunston, Grand Junction, 2,042.

The earliest of these tunnels were made so narrow (in the interests of economy) that no space was left for a towing path alongside, and the boats were passed through by the boatmen either pushing a pole or shaft against the roof or sides, and then walking

from forward to aft of the boat, or else by the "legging" process in which they lay flat on their backs in the boat, and pushed with their feet against the sides of the tunnel. At one time even women engaged in work of this kind. Later tunnels were provided with towing paths, while in some of them steam tugs have been substituted for shafting and legging.

Resort has also been had to aqueducts, and these represent some of the best work that British canal engineers have done. The first in England was the one built at Barton by James Brindley to carry the Bridgewater Canal over the Irwell. It was superseded by a swing aqueduct in 1893, to meet the requirements of the Manchester Ship Canal. But the finest examples are those presented by the aqueducts of Chirk and Pontcysyllte on the Ellesmere Canal in North Wales, now forming part of the Shropshire Union Canal. Each was the work of Telford, and the two have been aptly described as "among the boldest efforts of human invention of modern times." The Chirk aqueduct (710 feet long) carries the canal over the River Ceriog. It was completed in 1801 and cost £20,898. The Pontcysyllte aqueduct, of which a photograph is given as a frontispiece, carries the canal in a cast-iron trough a distance of 1,007 feet across the valley of the River Dee. It was opened for traffic in 1803, and involved an outlay of £47,000. Another canal aqueduct worthy of mention is that which was constructed by Rennie in 1796, at a cost of £48,000, to carry the Lancaster Canal over the River Lune.

These facts must surely convince everyone who is in any way open to conviction of the enormous difference between canal construction as carried on

in bygone days in Great Britain—involving as it did all these costly, elaborate, and even formidable engineering works—and the building of canals, or the canalisation of rivers, on the flat surfaces of Holland, Belgium, and Northern Germany. Reviewing—even thus inadequately—the work that had been already done, one ceases to wonder that, when the railways began to establish themselves in this country, the canal companies of that day regarded with despair the idea of practically doing the greater part of their work over again, in order to carry on an apparently hopeless struggle with a powerful competitor who had evidently come not only to stay but to win. It is not surprising, after all, that many of them thought it better to exploit the enemy by inducing or forcing him to buy them out!

The average reader who may not hitherto have studied the question so completely as I am here seeking to do, will also begin by this time to understand what the resuscitation of the British canal system might involve in the way of expense. The initial purchase—presumably on fair and equitable terms — would in itself cost much more than is supposed even by the average expert.

"Assuming," says one authority, Mr Thwaite, "that 3,500 miles of the canal system were purchasable at two-thirds of their original cost of construction, say £2,350 per mile of length, then the capital required would be £8,225,000."

This looks very simple. But is the original cost of construction of canals passing through tunnels, over viaducts, and up and down elevations of from 400 to 600 feet, calculated here on the same basis as canals on the flat-lands? Is allowance made for

costly pumping apparatus—such as that provided for the Birmingham Canal—for the docks and warehouses recently constructed at Ellesmere Port, and for other capital expenditure for improvements, or are these omitted from the calculation of so much "per mile of length"? Items of this kind might swell even "cost of construction" to larger proportions than those assumed by Mr Thwaite. That gentleman, also, evidently leaves out of account the very substantial sums paid by the present owners or controllers of canals for the mining rights underneath the waterways in districts such as Staffordshire or Lancashire.

This last-mentioned point is one of considerable importance, though very few people seem to know that it enters into the canal question at all. When canals were originally constructed it was assumed that the companies were entitled to the land they had bought from the surface to the centre of the earth. But the law decided they could claim little more than a right of way, and that the original landowners might still work the minerals underneath. This was done, with the result that there were serious subsidences of the canals, involving both much loss of water and heavy expenditure in repairs. The stability of railways was also affected, but the position of the canals was much worse on account of the water.

To maintain the efficiency of the canals (and of railways in addition) those responsible for them—whether independent companies or railway companies—have had to spend enormous sums of money in the said mining districts on buying up the right to work the minerals underneath. In some instances the landowner has given notice of his intention to work the minerals himself, and, although he may in reality

have had no such intention, the canal company or the railway company have been compelled to come to terms with him, to prevent the possibility of the damage that might otherwise be done to the waterway. The very heavy expenditure thus incurred would hardly count as "cost of construction," and it would represent money sunk with no prospect of return. Yet, if the State takes over the canals, it will be absolutely bound to reckon with these mineral rights as well—if it wants to keep the canals intact after improving them—and, in so doing, it must allow for a considerably larger sum for initial outlay than is generally assumed.

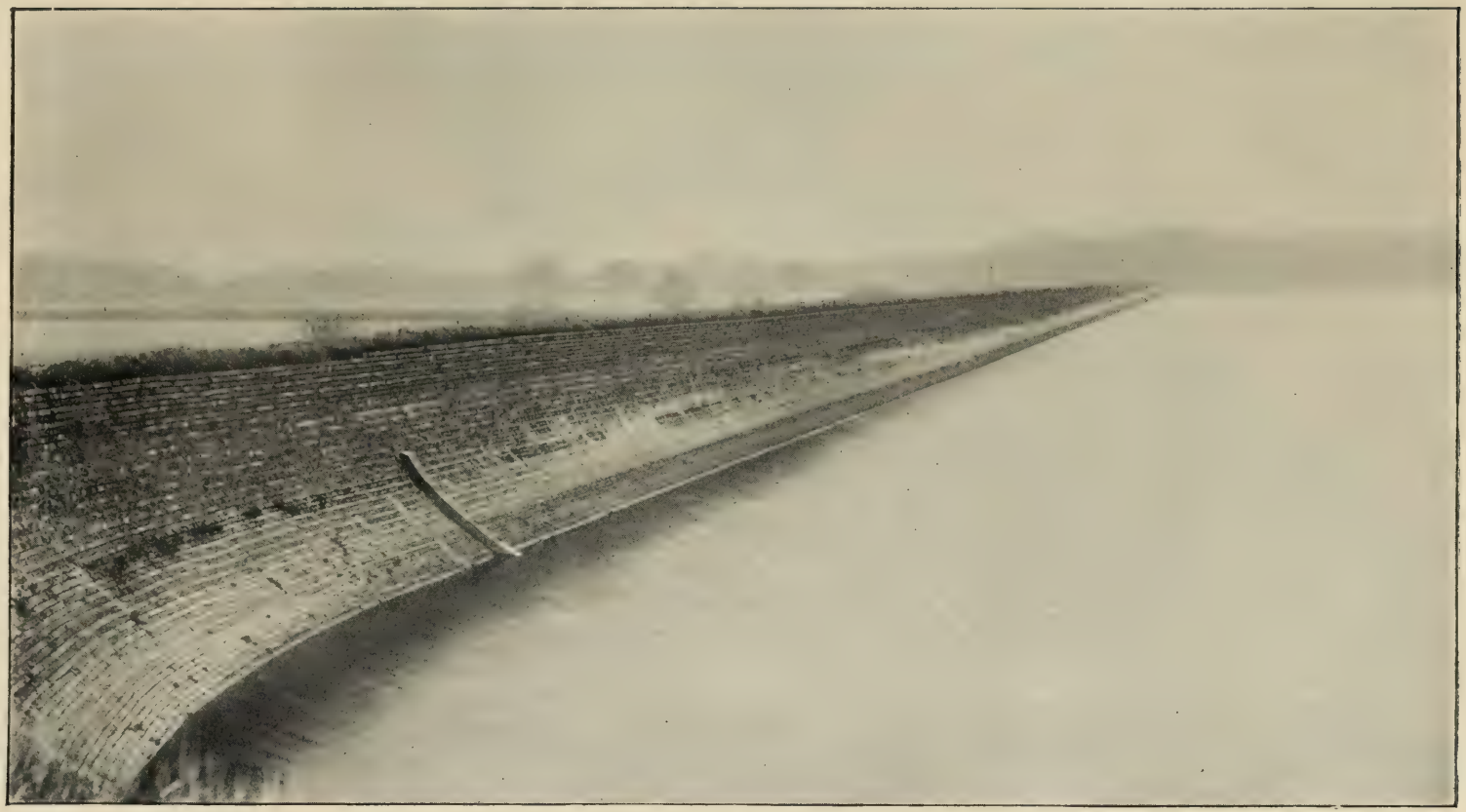
But the actual purchase of canals *and* mineral rights would be only the beginning of the trouble. There would come next the question of increasing the capacity of the canals by widening, and what this might involve I have already shown. Then there are the innumerable locks by which the great differences in level are overcome. A large proportion of these would have to be reconstructed (unless lifts or inclined planes were provided instead) to admit either the larger type of boat of which one hears so much, or, alternatively, two or four of the existing narrow boats. Assuming this to be done, then, when a single narrow boat came up to each lock in the course of the journey it was making, either it would have to wait until one or three others arrived, or, alternatively, the water in a large capacity lock would be used for the passage of one small boat. The adoption of the former course would involve delay; and either would necessitate the provision of a much larger water supply, together with, for the highest levels, still more costly pumping machinery.

The water problem would, indeed, speedily become

one of the most serious in the whole situation—and that, too, not alone in regard to the extremely scanty supplies in the high levels. The whole question has been complicated, since canals were first built, by the growing needs of the community, towns large and small having tapped sources of water supply which otherwise might have been available for the canals.

Even as these lines are being written, I see from *The Times* of March 17, 1906, that, because the London, Brighton and South Coast Railway Company are sinking a well on land of their own adjoining the railway near the Carshalton springs of the River Wandle, with a view to getting water for use in their Victoria Station in London, all the public authorities in that part of Surrey, together with the mill-owners and others interested in the River Wandle, are petitioning Parliament in support of a Bill to restrain them, although it is admitted that "the railway company do not appear to be exceeding their legal rights." This does not look as if there were too much water to spare for canal purposes in Great Britain; and yet so level-headed a journal as *The Economist*, in its issue of March 3, 1906, gravely tells us, in an article on "The New Canal Commission," that "the experience of Canada is worth studying." What possible comparison can there be, in regard to canals, between a land of lakes and great rivers and a country where a railway company may not even sink a well on their own property without causing all the local authorities in the neighbourhood to take alarm, and petition Parliament to stop them![1]

[1] "The St Lawrence River and the Great Lakes whose waters flow through it into the Atlantic form a continuous waterway



WATER SUPPLY FOR CANALS.
(Belvide Reservoir, Staffordshire, Shropshire Union Canal.)

[*To face page* 128.

On this question of water supply, I may add, Mr John Glass, manager of the Regents Canal, said at the meeting of the Institution of Civil Engineers in November 1905:—

"In his opinion Mr Saner had treated the water question, upon which the whole matter depended, in too airy a manner. Considering, for instance, the route to Birmingham, it would be seen that to reach Birmingham the waterway was carried over one summit of 400 feet, and another of 380 feet, descended 200 feet, and eventually arrived at Birmingham, which was about 350 feet above sea level. The proposed standard lock, with a small allowance for the usual leakage in filling, would consume about 50,000 cubic feet of water, and the two large crafts which Mr Saner proposed to accommodate

extending from the Fond du Lac, at the head of Lake Superior, to the Straits of Belle Isle, a distance of 2,384 miles. . . . Emptying into the St Lawrence . . . are the Ottawa and Richlieu Rivers, the former bringing it into communication with the immense timber forests of Ontario, and the latter connecting it with Lake Champion in the United States. These rivers were the thoroughfares in peace and the base lines in war for the Indian tribes long before the white man appeared in the Western Hemisphere. . . . The early colonists found them the convenient and almost the only channels of intercourse among themselves and with the home country. . . . The St Lawrence was navigable for sea-going vessels as far as Montreal, but between Montreal and the foot of Lake Ontario there was a succession of rapids separated by navigable reaches. . . . The head of navigation on the Ottawa River is the city of Ottawa. . . . Between this city and the mouth of the river there are several impassable rapids. The Richlieu was also so much obstructed at various points as to be unavailable for navigation. . . . The canal system of Canada . . . has been established to overcome these obstructions by artificial channels at various points to render freely navigable the national routes of transportation."—"*Highways of Commerce*," *issued by the Bureau of Statistics, Department of State, Washington.*

in the lock[1] would carry together, he calculated, about 500 tons. Supposing it were possible to regulate the supply and demand so as to spread that traffic economically over the year, and to permit of twenty-five pairs of boats passing from Birmingham to the Thames, or in the opposite direction, on 300 days in the year, the empty boats going into the same locks as the laden boats, it would be necessary to provide 1,250,000 cubic feet of water daily, at altitudes of 300 to 400 feet; and in addition it would be necessary to have water-storage for at least 120 days in the year, which would amount to about 150,000,000 cubic feet. When it was remembered that the districts in which the summit-levels referred to were situated were ill-supplied with water, he thought it was quite impossible that anything like that quantity of water could be obtained for the purpose. Canal-managers found that the insufficiency of water in all districts supplied by canals increased every year, and the difficulty of acquiring proper water-storage became enhanced."

Not only the ordinary waterway and the locks, but the tunnels and viaducts, also, might require widening. Then the adoption of some system of mechanical haulage is spoken of as indispensable. But a resort to tugs, however propelled, is in no way encouraged by the experiments made on the Shropshire Union, as told on p. 50. An overhead electrical installation, with power houses and electric lighting, so that navigation could go on at night, would be an especially costly undertaking. But the increased

[1] The use of a larger type of canal boat is generally regarded as an essential part of the resuscitation scheme. But of the narrow boats now in active service in the canals of the United Kingdom there are from 10,000 to 11,000. What is to be done with these? If they are scrap-heaped, and fresh boats substituted, we increase still further the sum total of the outlay the scheme will involve.

speed which it is hoped to gain from mechanical haulage on the level would also necessitate a general strengthening of the canal banks to avoid damage by the wash, and even then the possible speed would be limited by the breadth of the waterway. On this particular point I cannot do better than quote the following from an article on "Canals and Waterways" published in *The Field* of March 10, 1906:—

"Among the arguments in favour of revival has been that of anticipated rapid steam traffic on such re-opened waterways. Any one who understands the elementary principles of building and propulsion of boats will realise that volume of water of itself fixes limits for speed of vessels in it. Any vessel of certain given proportions has its limit of speed (no matter what horse-power may be employed to move it) according to the relative limit (if any) of the volume of water in which it floats. Our canals are built to allow easy passage of the normal canal barge at an average of 3 to $3\frac{1}{2}$ miles an hour. A barge velocity of even 5 miles, still more of 6 or 7, would tend to wash banks, and so to wreck (to public danger) embankments where canals are carried higher than surrounding land. A canal does not lie in a valley from end to end like a river. It would require greater horse-power to tow one loaded barge 6 miles an hour on normal canal water than to tow a string of three or even four such craft hawsered 50 or more feet apart at the pace of $3\frac{1}{2}$ miles. The reason would be that the channel is not large enough to allow the wave of displacement forward to find its way aft past the advancing vessel, so as to maintain an approximate level of water astern to that ahead, unless either the channel is more than doubled or else the speed limited to something less than 4 miles. It therefore comes to this, that increased speed on our canals, to any tangible extent, does not seem to be attainable,

even if all barges shall be screw steamers, unless the entire channel can be reconstructed to far greater depth and also width."

What the actual cost of reconstruction would be —as distinct from cost of purchase—I will not myself undertake to estimate; and merely general statements, based on the most favourable sections of the canals, may be altogether misleading. Thus, a writer in the *Daily Chronicle* of March 21, 1906, who has contributed to that journal a series of articles on the canal question, "from an expert point of view," says:—

"If the Aire and Calder navigation, which is much improved in recent years, be taken as a model, it has been calculated that £1,000,000 per 100 miles would fit the trunk system for traffic such as is dealt with on the Yorkshire navigation."

How can the Aire and Calder possibly be taken as a model—from the point of view of calculating cost of improvements or reconstruction? Let the reader turn once more to the diagrams given opposite p. 98. He will see that the Aire and Calder is constructed on land that is almost flat, whereas the Rochdale section on the same trunk route between the Mersey and the Humber reaches an elevation of 600 feet. How can any just comparison be made between these two waterways? If the cost of "improving" a canal of the "model" type of the Aire and Calder be put at the rate of £1,000,000 per 100 miles, what would it come to in the case of the Rochdale Canal, the Tardebigge section of the Worcester and Birmingham Canal, or the series of independent canals between Birmingham

and London? That is a practical question which I will leave—to the experts!

Supposing, however, that the canals have been purchased, taken possession of, and duly improved (whatever the precise cost) by State, municipalities, or public trust, as the case may be. There will then be the almost exact equivalent of a house without furniture, or a factory without machinery. Before even the restored canals could be adapted to the requirements of trade and commerce there would have to be a very considerable expenditure, also, on warehouses, docks, appliances, and other indispensable adjuncts to mere haulage.

After all the money that has been spent on the Manchester Ship Canal it is still found necessary to lay out a great deal more on warehouses which are absolutely essential to the full and complete development of the enterprise. The same principle would apply to any scheme of revived inland navigation. The goods depôts constructed by railway companies in all large towns and industrial centres have alone sufficed to bring about a complete revolution in trade and commerce since the days when canals were prosperous. There are many thousands of traders to-day who not only order comparatively small quantities of supplies at a time from the manufacturer, but leave even these quantities to be stored locally by the railway company, having delivered to them from day to day, or week by week, just as much as they can do with. A certain "free" period is allowed for warehousing, and, if they remove the goods during that period, they pay nothing to the railway company beyond the railway rate. After the free period a small "rent" is charged—a rent which,

while representing no adequate return to the railway company for the heavy capital outlay in providing the depôts, is much less than it would cost the trader if he had to build store-rooms for himself, or pay for accommodation elsewhere. Other traders, as mentioned in the chapter on "The Transition in Trade," send goods to the railway warehouses as soon as they are ready, to wait there until an order is completed, and the whole consignment can be despatched; while others again, agents and commission men, carry on a considerable business from a small office, leaving all the handling of the commodities in which they deal to be done by the railway companies. In fact, the situation might be summed up by saying that, under the trading conditions of to-day, railway companies are not only common carriers, but general warehousemen in addition.

If inland canals are to take over any part of the transport at present conducted by the railways, they will have to provide the traders with like facilities. So, in addition to buying up and reconstructing the canals; in addition to widenings, and alterations of the gradients of roads and railways passed under; and in addition to the maintenance of towing paths, locks, bridges, tunnels, aqueducts, culverts, weirs, sluices, cranes, wharves, docks, and quay walls, reservoirs, pumping machinery, and so on, there would still be all the subsidiary considerations in regard to warehousing, etc., which would arise when it became a question with the trader whether or not he should avail himself of the improved water transport thus placed at his disposal.

For the purposes of reasonable argument I will

assume that no really sensible person, knowing anything at all of actual facts and conditions, would attempt to revive the entire canal system of the country.[1] I have shown on p. 19, that even in the year 1825 it was recognised that some of the canals had been built by speculators simply as a means of abstracting money from the pockets of foolish investors, victims of the "canal mania," and that no useful purpose could be served by them even at a time when there were no competing railways. Yet to-day sentimental individuals who, in wandering about the country, come across some of these absolutely useless, though still, perhaps, picturesque survivals, write off to the newspapers to lament over "our neglected waterways," to cast the customary reflections on the railway companies, and to join their voice to the demand for immediate nationalisation or municipalisation, according to

[1] At the Society of Arts' Conference on Canals, in 1888, Mr L. F. Vernon-Harcourt said :—"The statistics show that great caution must be exercised in the selection of canal routes for improvement, if they are to prove a commercial success, and that the scope for such schemes is strictly limited. Any attempt at a general revival and improvement of the canal system throughout England cannot prove financially successful, as local canals, through thinly populated agricultural districts, could not compete with railways. These routes alone should be selected for enlargement of waterway which lead direct from the sea to large and increasing towns like the proposed canal from the Bristol Channel to Birmingham, or which, like the Aire and Calder Navigation and the Leeds and Liverpool Canal, are suitably set for the conveyance of coal and general bulky goods to populous districts. One or two through routes to London from manufacturing centres, or from coal-mining districts, might have a prospect of success, provided the existing canals along the route could be acquired at a small cost, and the necessary improvement works were not heavy."

their individual leanings, and regardless of all considerations of cost or practicability.

Derelicts of the type here referred to are not worth considering at all. It is a pity they were not drained and filled in long ago, and given, as it were, a decent burial, if only out of consideration for the feelings of sentimentalists. Much more deserving of study are those particular systems which either still carry a certain amount of traffic, or are situated on routes along which traffic might be reasonably expected to flow. But, taking even canals of this type, the reader must see from the considerations I have already presented that resuscitation would be a very costly business indeed. Estimates of which I have read in print range from £20,000,000 to £50,000,000; but even these omit various important items (mining rights, etc.), which would certainly have to be added, while the probability is that, however high the original estimate in regard to work of this kind, a good deal more would have to be expended before it was finished.

The remarks I have here made are based on the supposition that all that is aimed at is such an improvement as would allow of the use of a larger type of canal boat than that now in vogue. But, obviously, the expenditure would be still heavier if there were any idea of adapting the canals to the use of barges similiar in size to those employed on the waterways of Germany, or craft which, starting from an inland manufacturing town in the Midlands, could go on a coasting trip, or make a journey across to the Continent. Here the capital expenditure would be so great that the cost would be absolutely prohibitive.

Whatever the precise number of millions the resuscitation scheme might cost, the inevitable question would present itself—How is the money to be raised?

The answer thereto would be very simple if the entire expense were borne by the country—that is to say, thrown upon the taxpayers or ratepayers. The problem would then be solved at once. The great drawback to this solution is that most of the said taxpayers or ratepayers would probably object. Besides, there is the matter of detail I mentioned in the first Chapter: if the State or the municipalities buy up the canals on fair terms, including the canals owned or controlled by the railways, and, in operating them in competition with the railways, make heavy losses which must eventually fall on the taxpayers or ratepayers, then it would be only fair that the railway companies should be excused from such direct increase in taxation as might result from the said losses. In that case the burden would fall still more heavily on the general body of the tax or ratepayers, independently of the railway companies.

It would fall, too, with especial severity on those traders who were themselves unable to make use of the canals, but might have to pay increased local rates in order that possible competitors located within convenient reach of the improved waterways could have cheaper transport. It might also happen that when the former class of traders, bound to keep to the railways, applied to the railway companies for some concession to themselves, the reply given would be—"What you suggest is fair and reasonable, and under ordinary circumstances we should be prepared to meet your wishes; but the falling off in our receipts, owing to the competition of State-aided

canals, makes it impossible for us to grant any further reductions." An additional disadvantage would thus have to be met by the trader who kept to the railway, while his rival, using the canals, would practically enjoy the benefit of a State subsidy.

The alternative to letting the country bear the burden would be to leave the resuscitated canal system to pay for itself. But is there any reasonable probability that it could? The essence of the present day movement is that the traders who would be enabled to use the canals under the improved conditions should have cheaper transport; but if the twenty, fifty, or any other number of millions sterling spent on the purchase and improvement of the canals, and on the provision of indispensable accessories thereto, are to be covered out of the tolls and charges imposed on those using the canals, there is every probability that (if the canals are to pay for themselves) the tolls and charges would have to be raised to such a figure that any existing difference between them and the present railway rates would disappear altogether. That difference is already very often slight enough, and it may be even less than appears to be the case, because the railway rate might include various services, apart from mere haulage—collection, delivery, warehousing, use of coal depôt, etc.—which are not covered by the canal tolls and charges, and the cost of which would have to be added thereto. A very small addition, therefore, to the canal tolls, in order to meet interest on heavy capital expenditure on purchase and reconstruction, would bring waterways and railways so far on a level in regard to rates that the railways, with the superior advantages they offer in many ways, would, inevitably, still get the preference.

The revival movement, however, is based on the supposition that no increase in the canal tolls now charged would be necessary.[1] Canal transport, it is said, is already much higher in this country than it is on the Continent—and that may well be so, considering (1) that canals such as ours, with their numerous locks, etc., cost more to construct, operate and maintain than canals on the flat lands of Continental Europe; (2) that British canals are still supposed to maintain themselves; and (3) that canal traffic as well as railway traffic is assessed in the most merciless way for the purposes of local taxation. In the circumstances it is assumed that the canal traffic in England could not pay higher tolls and charges than those already imposed, and that the interest on the aforesaid millions, spent on purchase and improvements, would all be met out of the expanded traffic which the restored canals would attract.

Again I may ask—Is there any reasonable probability of this? Bearing in mind the complete transition in trade of which I have already spoken—a transition which, on the one hand, has enormously increased the number of individual traders, and, on the other, has brought about a steady and continuous decrease in the weight of individual consignments—is there the slightest probability that the conditions of trade are going to be changed, and that merchants, manufacturers, and other traders will forego the express delivery of convenient quantities by rail, in order to effect a problematical saving (and especially problematical where extra cartage has to be done) on the tedious delivery of wholesale quantities by canal?

[1] There are even those who argue that the resuscitated canals should be toll free.

Nothing short of a very large increase indeed in the water-borne traffic would enable the canals to meet the heavy expenditure foreshadowed, and, even if such increase were secured, the greater part of it would not be new traffic, but simply traffic diverted from the railways. More probably, however, the very large increase would not be secured, and no great diversion from the railways would take place. The paramount and ever-increasing importance attached by the vast majority of British traders to quick delivery (an importance so great that on some lines there are express goods trains capable of running from 40 to 60 miles an hour) will keep them to the greater efficiency of the railway as a carrier of goods; while, if a serious diversion of traffic were really threatened, the British railways would not be handicapped as those of France and Germany are in any resort to rates and charges which would allow of a fair competition with the waterways.

In practice, therefore, the theory that the canals would become self-supporting, as soon as the aforesaid millions had been spent, must inevitably break down, with the result that the burden of the whole enterprise would then necessarily fall upon the community; and why the trader who consigns his goods by rail, or the professional man who has no goods to consign at all, should be taxed to allow of cheaper transport being conferred on the minority of persons or firms likely to use the canals even when resuscitated, is more than I can imagine, or than they, probably, will be able to realise.

The whole position was very well described in some remarks made by Mr Harold Cox, M.P., in the course of a discussion at the Society of Arts in February

1906, on a paper read by Mr R. B. Buckley, on "The Navigable Waterways of India."

"There was," he said, "a sort of feeling current at the present time in favour of spending large amounts of the taxpayer's money in order to provide waterways which the public did not want, or at any rate which the public did not want sufficiently to pay for them, which after all was the test. He noticed that everybody who advocated the construction of canals always wanted them constructed with the taxpayer's money, and always wanted them to be worked without a toll. Why should not the same principle be applied to railways also? A railway was even more useful to the public than a canal; therefore, construct it with the taxpayer's money, and allow everybody to use it free. It was always possible to get plenty of money subscribed with which to build a railway, but nobody would subscribe a penny towards the building of canals. An appeal was always made to the government. People had pointed to France and Germany, which spent large sums of money on their canals. In France that was done because the French Parliamentary system was such that it was to the interest of the electorate and the elected to spend the public money on local improvements or non-improvements. . . . He had been asked, Why make any roads? The difference between roads and canals was that on a canal a toll could be levied on the people who used it, but on a road that was absolutely impossible. Tolls on roads were found so inconvenient that they had to be given up. There was no practical inconvenience in collecting tolls on canals; and, therefore, the principle that was applied to everything else should apply to canals—namely, that those who wanted them should pay for them."

# CHAPTER X

## CONCLUSIONS AND RECOMMENDATIONS

TAKING into consideration all the facts and arguments here presented, I may summarise as follows the conclusions at which I have arrived :—

(1) That, alike from a geographical, physical, and economic point of view, there is no basis for fair comparison between British and Continental conditions; consequently our own position must be judged on its own merits or demerits.

(2) That, owing to the great changes in British trade, manufacture, and commerce, giving rise to widespread and still increasing demands for speedy delivery of comparatively small consignments for a great number of traders of every possible type, canal transport in Great Britain is no longer suited to the general circumstances of the day.

(3) That although a comparatively small number of traders, located in the immediate neighbourhood of the canals, might benefit from a canal-resuscitation scheme, the carrying out of such scheme at the risk, if not at the cost, of the taxpayers, would virtually amount to subsidising one section of the community to the pecuniary disadvantage of other sections.

(4) That the nationalisation or the municipalisation of British canals would introduce a new principle inconsistent with the "private enterprise" hitherto

recognised in the case of railways, in which such large sums have been sunk by investors, but with which State-aided canals would compete.

(5) That, in view both of the physical conditions of our land (necessitating an extensive resort to locks, etc., to overcome great differences in level) and of the fact that many of the most important of the canals are now hemmed in by works, houses, or buildings, any general scheme of purchase and improvement, in regard even to main routes (apart from hopeless derelicts), would be extremely costly, and, in most instances, entirely outside the scope of practicability.

(6) That such a scheme, involving an expenditure of many millions, could not fail to affect our national finances.

(7) That there is no ground for expecting so large an outlay could be recouped by increased receipts from the canals, and that the cost would thus inevitably fall upon the community.

(8) That the allegation as to the chief canals of the country, or sections thereof, having been "captured" and "strangled" by the railway companies, in the interests of their own traffic, is entirely unsupported by evidence, the facts being, rather, that in most cases the canals were more or less forced upon the railway companies, who have spent money liberally on such of them as offered reasonable prospect of traffic, and, in that way, have kept alive and in active working condition canals that would inevitably have been added to the number of derelicts had they remained in the hands of canal companies possessed of inadequate capital for the purposes of their efficient maintenance.

(9) That certain of these canals (as, for example,

the Birmingham and the Shropshire Union Canals) are still offering to traders all reasonable facilities within the limitations of their surroundings and physical possibilities; and that if such canals were required to bear the expense of extremely costly widenings, of lock reconstruction, of increased water supply, and of general improvements, the tolls and charges would have to be raised to such a point that the use of the canals would become prohibitive even to those local traders who now fully appreciate the convenience they still afford.

(10) That, in effect, whatever may be done in the case of navigable rivers, any scheme which aimed at a general resuscitation of canals in this country, at the risk, if not at the expense, of the community, is altogether impracticable; and that, inasmuch as the only desire of the traders, in this connection, is to secure cheaper transport, it is desirable to see whether the same results could not be more effectively, more generally, and more economically obtained in other directions.

Following up this last conclusion, I beg to recommend :—

(*a*) The desirability of increasing the usefulness of the railway system, which can go anywhere, serve everybody, and carry and deliver consignments, great and small, with that promptness and despatch which are all-important to the welfare of the vast majority of industries and enterprises, as conducted under the trading conditions of to-day. This usefulness, some of the traders allege, is marred by rates and charges which they consider unduly heavy, especially in the case of certain commodities calling for exceptionally low freight, and canal transport is now asked for by them, as against rail transport,

just as the traders of 1825 wanted the railways as a relief from the waterways. The rates and charges, say the railway companies, are not unreasonable in themselves, considering all the circumstances of the case and the nature of the various services represented, while the actual amount thereof is due, to a certain extent, not so much to any seeking on the part of the companies to pay dividends of abnormal proportions, akin to those of the canal companies of old (the average railway dividend to-day, on over one thousand millions of actual capital, being only about 3½ per cent.), but to a combination of causes which have increased unduly capital outlay and working expenses, only to be met out of the rates, fares, and charges that are imposed on traders and travellers. Among these causes may be mentioned the heavy price the companies have had to pay for their land; the cost of Parliamentary proceedings; various requirements imposed by Parliament or by Government departments; and the heavy burden of the contribution that railway companies make to local rates. (See p. 10.) These various conditions must necessarily influence the rates and charges to be paid by traders. Some of them—such as cost of land—belong to the past; others—like the payments for local taxation—still continue, and tend to increase rather than decrease. In any case, the power of the railway companies to concede to the traders cheaper transport is obviously handicapped. But if, to obtain such cheaper transport, the country is prepared to risk (at least) from £20,000,000 to £50,000,000 on a scheme of canal reconstruction which, as I have shown, is of doubtful utility and practicability, would it not be much more sensible, and much more economical, if the weight of the

obligations now cast upon railways were reduced, thus enabling the companies to make concessions in the interests of traders in general, and especially in the interests of those consigning goods to ports for shipment abroad, for whose benefit the canal revival is more particularly sought?

(*b*) My second recommendation is addressed to the general trader. His policy of ordering frequent small consignments to meet immediate requirements, and of having, in very many instances, practically no warehouse or store-rooms except the railway goods depôts, is one that suits him admirably. It enables him either to spend less capital or else to distribute his capital over a larger area. He is also spared expense in regard to the provision of warehouse accommodation of his own. But to the railway companies the general adoption of this policy has meant greater difficulty in the making up of "paying loads." To suit the exigencies of present-day trade, they have reduced their *minima* to as low, for some commodities, as 2-ton lots, and it is assumed by many of the traders that all they need do is to work up to such *minima*. But a 2-ton lot for even an 8-ton waggon is hardly a paying load. Still less is a 10-cwt. consignment a paying load for a similarly sized waggon. Where, however, no other consignments for the same point are available, the waggon goes through all the same. In Continental countries consignments would be kept back, if necessary, for a certain number of days, in order that the "paying load" might be made up. But in Great Britain the average trader relies absolutely on prompt delivery, however small the consignment, or whatever the amount of "working expenses" incurred by the railway in handling it. If, however, the trader

would show a little more consideration for the railway companies — whom he expects to display so much consideration for him — he might often arrange to send or to receive his consignments in such quantities (at less frequent intervals, perhaps) as would offer better loading for the railway waggons, with a consequent decrease of working expenses, and a corresponding increase in the ability of the railway company to make better terms with him in other directions. Much has been done of late years by the railway companies to effect various economies in operation, and excellent results have been secured, especially through the organisation of transhipping centres for goods traffic, and through reductions in train mileage; but still more could be done, in the way of keeping down working expenses and improving the position of the companies in regard to concessions to traders, if the traders themselves would co-operate more with the railways to avoid the disadvantages of unremunerative "light-loading."

(*c*) My third and last recommendation is to the agriculturists. I have seen repeated assertions to the effect that improved canals would be of great advantage to the British farmer; and in this connection it may interest the reader if I reproduce the following extract from the pamphlet, issued in 1824, by Mr T. G. Cumming, under the title of "Illustrations of the Origin and Progress of Rail and Tram Roads and Steam Carriages," as already mentioned on p. 21 :—

"To the farming interests the advantages of a rail-way will soon become strikingly manifest; for, even where the facilities of a canal can be embraced, it presents but a slow yet expensive mode of

conveyance ; a whole day will be consumed in accomplishing a distance of 20 miles, whilst by the rail-way conveyance, goods will be carried the same distance in three or four hours, and perhaps to no class of the community is this increased speed of more consideration and value than to the farmer, who has occasion to bring his fruit, garden stuff, and poultry to market, and still more so to such as are in the habit of supplying those great and populous towns with milk and butter, whilst with all these additional advantages afforded by a rail-way, the expense of conveyance will be found considerably cheaper than by canal.

"Notwithstanding the vast importance to the farmer of having the produce of his farm conveyed in a cheap and expeditious manner to market, it is almost equally essential to him to have a cheap conveyance for manure from a large town to a distant farm ; and here the advantages to be derived from a rail-way are abundantly apparent, for by a single loco-motive engine, 50 tons of manure may be conveyed, at a comparatively trifling expense, to any farm within the line of the road. In the article of lime, also, which is one of the first importance to the farmer, there can be no question but the facilities afforded by a rail-way will be the means of diminishing the expense in a very material degree."

If railways were desirable in 1824 in the interests of agriculture, they must be still more so in 1906, and the reversion now to the canal transport of former days would be a curious commentary on the views entertained at the earlier date. As regards perishables, consigned for sale on markets, growers obviously now want the quickest transport they can secure, and special fruit and vegetable trains are run daily in the summer season for their accommodation.

The trader in the North who ordered some strawberries from Kent, and got word that they were being sent on by canal, would probably use language not fit for even a fruit and vegetable market to hear. As for non-perishable commodities, consigned to or by agriculturists, the railway is a much better distributer than the canal, and, unless a particular farm were alongside a canal, the extra cost of cartage therefrom might more than outweigh any saving in freight. If greater facilities than the ordinary railway are needed by agriculturists, they will be met far better by light railways, or by railway road-motors of the kind adopted first by the North-Eastern Railway Company at Brandsby, than by any possible extension of canals. These road-motors, operated between lines of railway and recognised depôts at centres some distance therefrom, are calculated to confer on agriculturists a degree of practical advantage, in the matter of cheaper transport, limited only by the present unfortunate inability of many country roads to bear so heavy a traffic, and the equally unfortunate inability of the local residents to bear the expense of adapting the roads thereto. If, instead of spending a large sum of money on reconstructing canals, the Government devoted some of it to grants to County Councils for the reconstruction of rural highways, they would do far more good for agriculture, at least. As for cheaper rail transport for agricultural commodities in general, I have said so much elsewhere as to how these results can be obtained by means of combination that I need not enlarge on that branch of the subject now, further than to commend it to the attention of the British farmer, to whom combination in its various phases will afford a much more

substantial advantage than any possible resort to inland navigation.

These are the alternatives I offer to proposals which I feel bound to regard as more or less quixotic, and I leave the reader to decide whether, in view of the actualities of the situation, as set forth in the present volume, they are not much more practical than the schemes of canal reconstruction for which public favour is now being sought.

# APPENDIX

## THE DECLINE IN FREIGHT TRAFFIC ON THE MISSISSIPPI

WHILST this book is passing through the Press, I have received from Mr Stuyvesant Fish, President of the Illinois Central Railroad Company—whom I asked to favour me with some additional details respecting the decline in freight traffic on the Mississippi River—the following interesting notes, drawn up by Mr T. J. Hudson, General Traffic Manager of the Illinois Central:—

The traffic on the Mississippi River was established and built up under totally different conditions from those now obtaining, and when the only other means of travel and transportation was on horseback and by waggon, methods not suitable in view of the great distances and the general impassibility of the country. In those days the principal source of supply was St Louis—and points reached through St Louis—for grain, grain products, etc., excepting that vehicles, machinery, and iron were brought down the Ohio River from Pittsburg and Cincinnati by boat to Cairo, and trans-shipped there, or to Memphis, and trans-shipped or re-distributed from that place. The distributing points on the Lower Mississippi River were Memphis, Vicksburg, Natchez, Bayou Sara, Baton Rouge and New Orleans. Goods were shipped to these points and re-shipped from there

over small railroads to short distances, and also hauled by waggon and re-shipped on boats plying in local trade on the Mississippi River and tributary streams. For example, there were Boat Lines making small landing points above and below Memphis, and above and below Vicksburg ; also Boat Lines plying the Yazoo and Tallahatchie Rivers on the east, and the White, Arkansas and Red Rivers on the west, etc.

All the goods shipped by steamboat were hauled by waggon or dray to the steamboat landing, and, when discharged by the boats at destination, were again hauled by waggon from the landing to the stores and warehouses, even in those cases in which re-shipment was made from points like Memphis, Vicksburg, etc. When re-shipped by river, the goods were again hauled to the steamboat landing, and, when reaching the local landing or point of final consumption, after being discharged on the bank, were again hauled by waggon or dray, perhaps for considerable distances into the interior.

While the cost of water transportation is primarily low, the frequent handling and re-handling made this mode of transportation more or less expensive, and in some instances quite costly. River transportation again is slow, taking longer time in transit. The frequent handlings, further, were damaging and destructive to the packages in the case of many kinds of goods. Transportation on the rivers was also at times interrupted or delayed from one cause or another, such as high water or low water, and the service was, in consequence, more or less irregular, thus requiring dealers to carry large stocks on which the insurance and interest was a considerable item of expense.

With the development of the railroads through the country, not only was competition brought into play to the distributing points along the river, such as Memphis, Vicksburg, etc., from St Louis, Cincinnati, and Pittsburg, but also from other initial sources of supply which were not located on rivers, but were

enabled by reason of the establishment of rail transportation to consign direct; whereas under the old conditions it was necessary for them to consign to some river point and trans-ship. What was still more important and effective in accomplishing the results since brought about was the material benefit conferred by the railroads on most of the communities situated back from the river. These communities had previously been obliged to send their consignments perhaps many miles by road to some point on the river, whence the commodities were carried to some other point, there to be taken by waggon or dray to the place of consumption—another journey of many miles, perhaps, by road. Progress was slow, and in some instances almost impossible, while only small boats could be hauled.

Then the construction of railroads led to the development of important distributing points in the interior, such as Jackson, (Tennessee), and Jackson, (Mississippi), not to mention many others. Goods loaded into railroad cars on tracks alongside the mills, factories and warehouses could be unloaded at destination into warehouses and stores which also had their tracks alongside. By this means drayage was eliminated, and the packages could be delivered in clean condition. Neither of these conditions was possible where steamboat transportation was employed. Interior points are now enabled to buy direct, either in large or small quantities, from initial sources of supply, and without the delay and expense incident to shipment to river-distributing points, and transshipment by rail or steamboat or hauling by waggon. Rail transportation is also more frequent, regular, rapid and reliable; not to mention again the convenience which is referred to above.

The transportation by river of package-freight, such as flour, meal, meat, canned goods, dry goods, and other commodities, has been almost entirely superseded by rail transportation, except in regard to short-haul local landings, where the river is more

convenient, and the railroad may not be available. There is some south-bound shipment of wire, nails, and other iron goods from the Pittsburg district to distributing points like Memphis and New Orleans, but in these cases the consignments are exclusively in barge-load lots. The only other commodity to which these conditions apply is coal. This is taken direct from the mines in the Pittsburg district, and dropped into barges on the Monongahela River; and these are floated down the river, during periods of high water, in fleets of from fifty to several hundred barges at a time.

There is no movement of grain in barges from St Louis to New Orleans, as was the case a great many years ago. The grain for export *viâ* New Orleans is now largely moved direct in cars from the country elevators to the elevators at New Orleans, from which latter the grain is loaded direct into ships. There is, also, some movement north-bound in barges of lumber and logs from mills and forests not accessible to railroads, but very little movement of these or other commodities from points that are served by railroad rails. Lumber to be shipped on the river must be moved in barge-load quantities, and taken to places like St Louis, where it has to be hauled from the barge to lumber yards, and then loaded on railroad cars, if it is going to the interior, where a considerable proportion of the quantity handled will be wanted. Mills reached by railroad tracks can, and do, load in car-load quantities, and ship to the final point of use, without the delay incident to river transportation, and the expense involved by transfer or re-shipment.

It is not to be inferred from the foregoing that all the distributing points along the river have dried up since the development of rail transportation. In fact, the contrary is the case, because the railroads have opened up larger territories to these distributing points, and in regard to many kinds of goods these river points have become, in a way, initial sources

of supply as well as of manufacture. Memphis, for example, has grain brought to its elevators direct from the farms, the same as St Louis, and can and does ship on short notice to the many towns and communities in the territory surrounding. There are, also, flour and meal mills, iron foundries, waggon and furniture factories, etc., at Memphis, and at other places. Many of the points, however, which were once simply landings for interior towns and communities have now become comparatively insignificant.

To sum up in a few words, I should say that the railroads have overcome the steamboat competition on the Mississippi River, not only by affording fair and reasonable rates, but also because rail transportation is more frequent, rapid, reliable, and convenient, and is, on the whole, much cheaper.

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