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The Tyne

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The Geographical Journal.

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THE TYNE.*

By A. J. SARGENT.

It sometimes happens that a phrase or word in colloquial use, and of undoubted significance, contains more real geographical suggestion than the obscurer forms of place-names which delight the etymologist. Such a word is Tyneside. The geographer, speaking of the Tyne, may have in mind the actual water or bed of the river, the river valley from source to mouth, or even the whole area of the river-basin. To the Tynesider, his river is the navigable stretch from Newburn to the sea, with the river-side, a narrow strip with a breadth measured by yards, and hardly ever out of sight of the water. If he extends his view to places outside this narrow zone, it is only because they are intimately connected with or depend for their very existence on the river. Above Newburn, the river valley is in a different category; countrified and sleepy, a fit goal for holiday trips. We may make a further division into Tyne above and below Bridges, a distinction again familiar to the local mind; and we shall have a very fair basis for geographical analysis. For some purposes, we must also add, as an essential part of the Tyne valley, the Wash, the old pre-glacial valley of the Wear; though the former river is now represented only by a tiny stream.

From Newburn to the Bridges there is a strong contrast between the two banks of the river. On the north is a steep and fairly uniform slope, rising to over 300 feet, and leaving only a very narrow ledge of level ground close to the water. On the south is a wide "haugh" of boulder clay and alluvium, through which the Derwent and the little Team meander to join the main river. At the Bridges the heights close in on

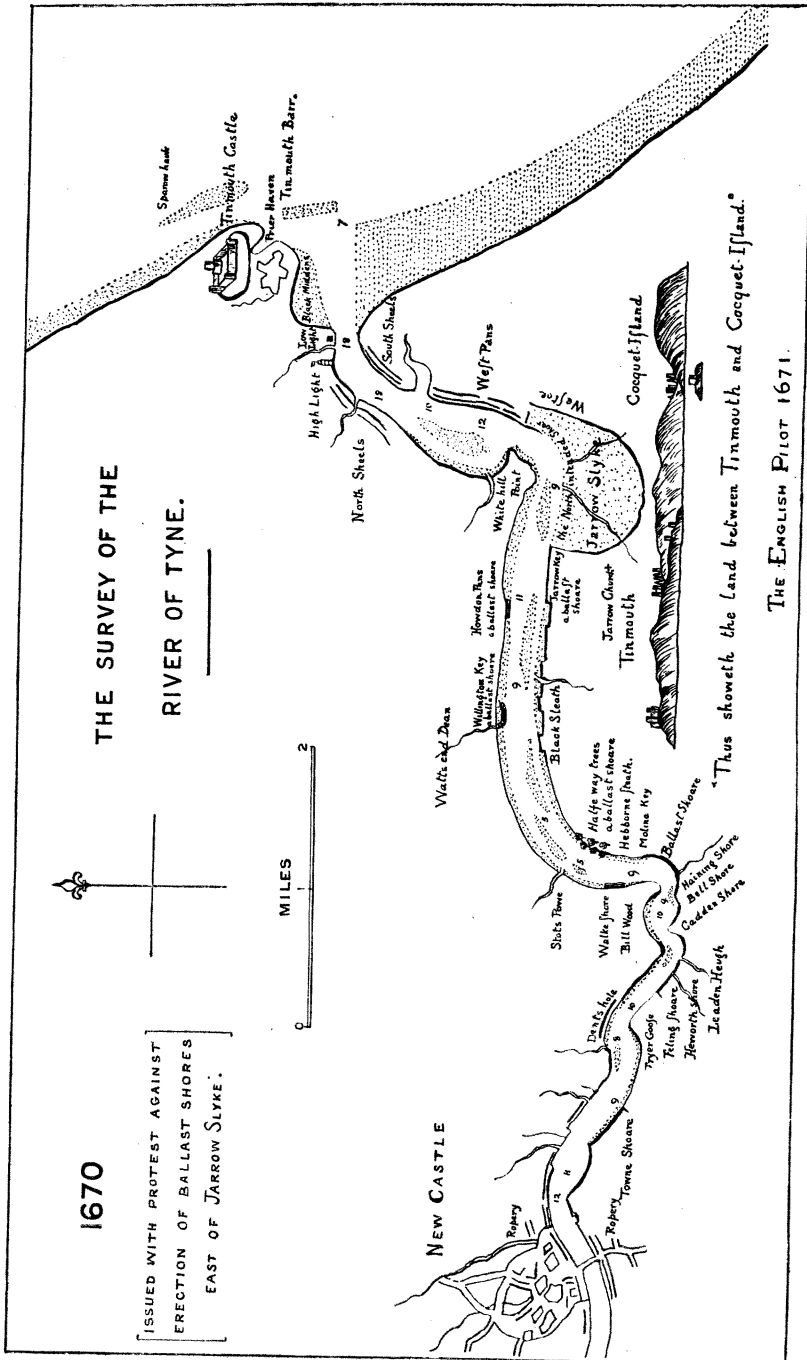
* Royal Geographical Society, February 26, 1912. Map, p. 588.

the river, and here we have the twin towns of Newcastle and Gateshead, with the high level viaducts joining the hills and the swing bridge joining the narrow strips along the water's edge.

Below Bridges the high ground gives back a little, and the slope becomes more gentle, especially on the southern side, until we reach the great bend at St. Anthonys, where the river is again flowing through a gorge. Further down, on the north side, the map shows a considerable area of comparatively moderate height and slope, in the basins of the Wallsend and other becks; while on the south side the land opens out into the great clay flats behind Jarrow Slake, which produce to the eye the impression of a silted bed of an old estuary. The slopes, as a whole, below the bend, are relatively gentle, but the 50-foot contour line is never very far away from the north bank; and though 50 feet may not seem much to the geographer surveying the whole area, it means a great deal to the local inhabitant and user of the river. Towards the river mouth this line is as near the water as at St. Anthonys, and on the north side especially we find a steep bank at Tynemouth, with the heights in the background again closing in to form a kind of gorge.

Such are the essential facts of the topography; but the Tyne of the present is but the creation of yesterday, and even some of the high and steep slopes have an artificial origin. The ballast hills, some of which are still marked on the map, were not placed there by nature, and their growth has provided a fruitful source of controversy in the history of the river. Moreover, geographical relationships are strictly relative to human development; they are rarely the same for the present and a moderately distant past; so that a short excursion into history is a necessary preliminary to the discussion of the conditions of Tyneside to-day.

The Tyne has an environment both local and distant; the importance of this environment at the present is mainly or entirely economic; in the early days of our history it was mainly strategic. In both cases the river is a centre of movement, and we may perhaps find the key to its position in Newcastle. It is natural to classify Newcastle as a Bridge town; but in what sense? In the same sense as London—that is, as the lowest point at which the river could be conveniently bridged or forded? No; so far as charts and maps can tell us, there would have been little difficulty in bridging the Tyne much lower down. The mere fact that the Romans seem to have built their wall to Segedunum, on the site of Wallsend, instead of stopping at the obviously defensible position on the gorge of the Ouseburn, and yet did not continue it to the heights of Tynemouth, seems to suggest that the channel was fordable down to Wallsend in Roman times, while lower down it could be defended by a fleet. The early charts of the river bear out this idea. At a later time fords are said to have existed even below Wallsend; but it is impossible to argue from this to the conditions in Roman times, since the changes in the bed of the river,



so far as history records them, have been in the direction of silting up and shallowing.

We may perhaps regard Newcastle as the effective head of high-water navigation at the period, and this view receives some support from the known condition of the river above Bridges as late as the middle of the nineteenth century. But it is reasonable to assume that the defensibility of the hills at either end of the bridge, and the fact that here we have a position as near as possible both to the sea and to the main line of their communications northwards, may have been the chief considerations influencing the Roman strategists.

The consideration of Newcastle in relation to lines of movement involves a reference to the Roman roads rather than to the physical structure of the country. It is natural to look on Newcastle as the key to the Tyne gap; a glance at the Roman system may provide a corrective to this idea. The main line of Roman communication northward crossed the river at Corbridge, some distance to the west of Newcastle, and we can trace it southwards by Ebchester, Lanchester and Durham to Binchester, in the neighbourhood of Bishop Auckland. It is clear that any position north of Binchester could be outflanked by way of the valleys of the Wear and Browney, trending north-west. Newcastle lies on a branch road, on the right flank of the main position, its most important function being to cover the river and the route leading to the port of Jarrow or Shields. The Tyne gap itself was probably forested and marshy; communications east and west were not through the gap, but along the heights to the north, in the shelter of the great wall.

In the Middle Ages the strategic importance of the Gap increases, but mainly in the reach above Corbridge. The Scottish raiders had a choice of three routes: by Berwick, by Carlisle, or over Carter Bar and by way of the Rede valley to the North Tyne. The last seems to have been less used on the whole than the other two. Here again the gap from Corbridge to Newcastle does not seem to have been greatly favoured. Thus the Scots under David, in 1346, came by way of Haltwhistle to Hexam, and then struck south-east down the valley of the Browney, until checked at Nevilles Cross, outside Durham. Probably the country round Newcastle was not worth raiding, while the agricultural area round Bishop Auckland, in the south of the Palatinate, was a tempting prize. Again, the raiders who were overtaken at Otterburn seem to have retired from Newcastle, not by way of the Tyne valley, but by the ridge road north-west, as they burnt Ponteland on the way. Newcastle throughout seems to have reference to movement north and south rather than east and west. As throwing light on this point, General Wade, in 1745, found the valley tracks or roads impossible for heavy transport to Carlisle, and so could not cut off the Pretender on his march southward. As a result we have a special Act of Parliament for the construction, at the public expense, of the so-called military road, which runs along the heights, following closely the course of the older Roman road.

Right through mediæval history, and down to the present, the chief significance of Newcastle in its long-distance relations was its position on the great north route from London to Scotland, at the point where that route first came within close touch of the sea. That distinction it still retains, though the rail has superseded the road. In its local significance, in relation to its immediate hinterland, Newcastle can no longer be treated in isolation but becomes part of a larger whole, Tyneside.

The relationship of Tyneside, past and present, to its immediate hinterland may be considered as purely economic. Even for the Romans the river had considerable economic value, as an inlet for supplies for their great garrisons, and perhaps as an outlet for lead, even then worked in the upper part of the valley. In the Middle Ages the character of the hinterland became clearly defined. It was essentially determined by a geological fact—the presence, on both sides of the river, of the coal-measures and of the iron ores and clays which they contained. But the significance of this

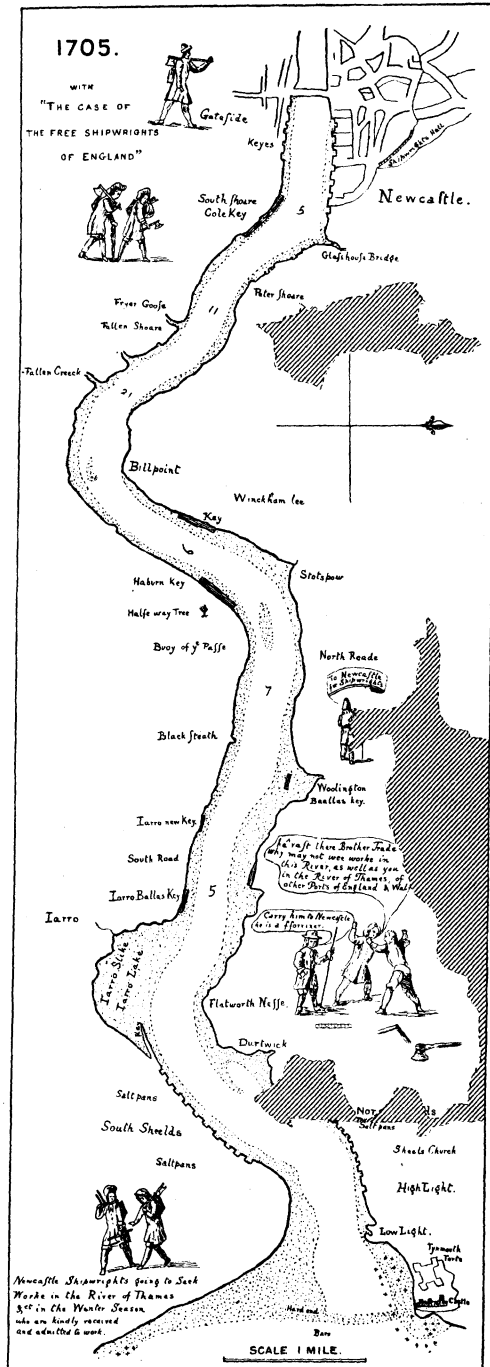
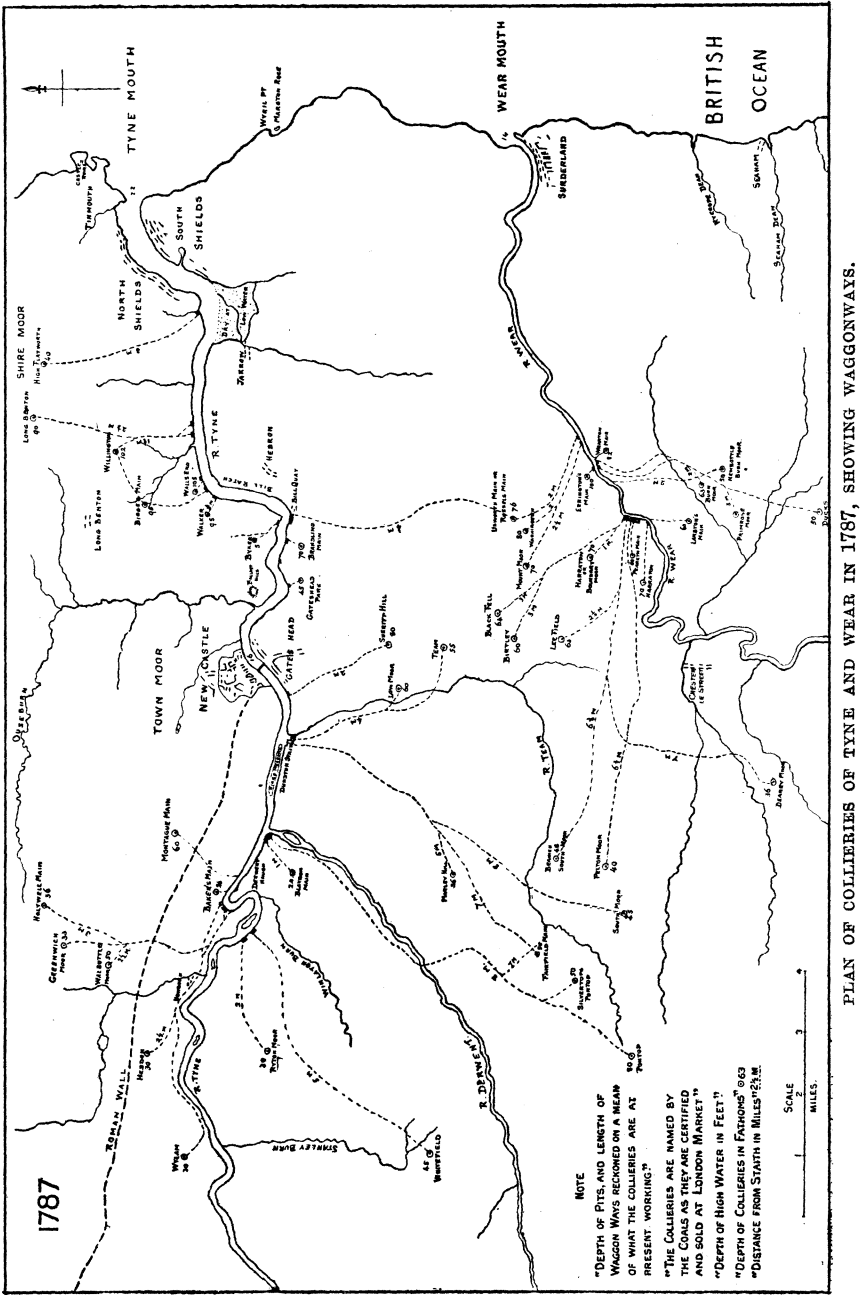


CHART OF THE TYNE, 1705.

geological fact is clear only in the light of geographical conditions. Coal which is inaccessible for commercial purposes is of very small concern to the geographer. Before the coming of the railway, much of our coal was quite useless; some was only available for local industries. When we associate the transport of coal with the packhorse, it is evident that coal can only be handled on a large scale where the mines are close to water navigable for the type of vessel which can carry it to its destination. It was the special advantage of the Tyne that coal could be mined within sight of the waterway, and even on its very banks, and a considerable tonnage could be handled even on the pack-horse system; hence the early development of the coal trade to London.

The packhorse was followed by the two-wheeled cart; this by the four-wheeled waggon, which allowed a somewhat greater range of movement. Here again appears the advantage of the Tyne. The mines lie at a higher level than the river, so that the load is carried for the most part downhill. The next step was to build a rough waggonway, with balks of timber as lines for the wheels; in some cases guide-rails of wood were added, the wheels running outside them. In view of our ancestors' ideas as to what constituted a good road-surface, this was a long step in advance. Then some genius thought of an outside flange of iron, to prevent sideslip; and, finally, the flange is transferred to the waggon-wheel, the iron rail replaces the balk of timber, and we have the railway-waggon and the railway, though without the locomotive. All these changes took place in our area in association with horse-haulage. Next we have the stationary engine hauling by endless cable, and in this connection the structure of the surrounding country leads to the growth of special methods. The force of gravity itself, working through the full waggons, is utilized to haul the empties up the slope to the pithead. This is still the usual and most effective method of working coal for shipment on the Tyne: locomotive haulage on the level stretches, cable control on the steeper slopes, the whole depending on the local relief of the land.

Towards the end of the eighteenth century there was a very full development of the system of waggonways on both sides of the river. We find them coming out at Blaydon and Dunston on the south bank, and at Newburn and Wallsend on the north; but it is worth noting that the largest group of all concentrates on the Upper Wear, following the shortest possible route to the water. The longest of these waggonways was about 8 miles. A comparison with present conditions shows some marked changes. The Upper Tyne still remains a great shipping centre, but the waggonways of the Upper Wear are now directed either to the mouth of that river or to that of the Tyne. The changing conditions of the rivers in relation to the means of transport are largely responsible for this; in other words, the geographical conditions of the hinterland are only relative, and have been modified by human action. The geography of



the coal is only to be understood in the light of the structure of the rivers and their banks.

The modern Tyne has cut a channel in the clay which fills up the deep and wide rock-bed of a pre-glacial river. Looked at from the point of view of the district as a whole, the valley of the river is shallow; but the banks, within a short distance of the water, slope sharply in many places. It is the first 100 feet of rise from the surface of the water which concerns us most. To the sharp slope has been mainly due the development here of the typical method of coal shipment, that is direct from the drop or staith to the ship. In some places, where the 50-75 foot contour-lines lie near the water, the waggons are still lowered by cable on to the staith, which is merely a platform built out on piles high above the water. Where the high land gives back a little, or a valley can be utilized, the approach to the staith is down a slighter gradient, so that a whole train-load of waggons can be allowed to run down by its own weight, controlled only by brakes; the empties are then run to a still lower level, and hauled up the "bank" by locomotives. This method is to be seen in full working at Tyne Dock and Whitehill Point, where it is favoured by the structure of the land. At Tyne Dock the 50-foot level is extended by great embankments over the intervening stretch of lower ground; at Whitehill Point the sides of the valley of a small beck provide natural embankments. The river itself, too, is a factor in controlling the method of shipment. In the docks it is only necessary to make allowance for the varying height of vessels; in the river the problem is complicated by the rise and fall of the tide. Where the approach to the water is along the level, either the staith must be served by an artificial incline, or it is replaced by an elaborate hoist working from the quayside.

Thus from the mine to the ship we find a series of special methods of handling coal based in the main on the peculiarities of the topography; geographical influence is strong even in the strictly technical details of business organization.

Whatever the special advantages of the Tyne may be at present, it lacked these in the old days, in so far as it was not navigable for sea-going ships. Much of the coal was first loaded into barges or keels, and then raised into the ships; and the keelmen are an important fraternity in the early history of the river. The full utilization of the waterway dates only from the last fifty or sixty years. The state of the channel was a burning question of local politics in the eighteenth and early nineteenth centuries. The improvement of the river failed to keep pace with that of the ships which used it. The early charts show us a winding channel, full of shifting banks, with a bar of 7 feet at its mouth, and a low-water depth of as little as 6 feet in some reaches between Jarrow and Newcastle. The bar has vanished, and it is hard to imagine that within the memory of Tynesiders still living a man has walked at low tide across the entrance. Now we have a deep-water canal, with a channel of some 30 feet to the



THE TYNE, LOOKING WEST FROM BILL QUAY.



THE TYNE, LOOKING EAST FROM BILL QUAY.

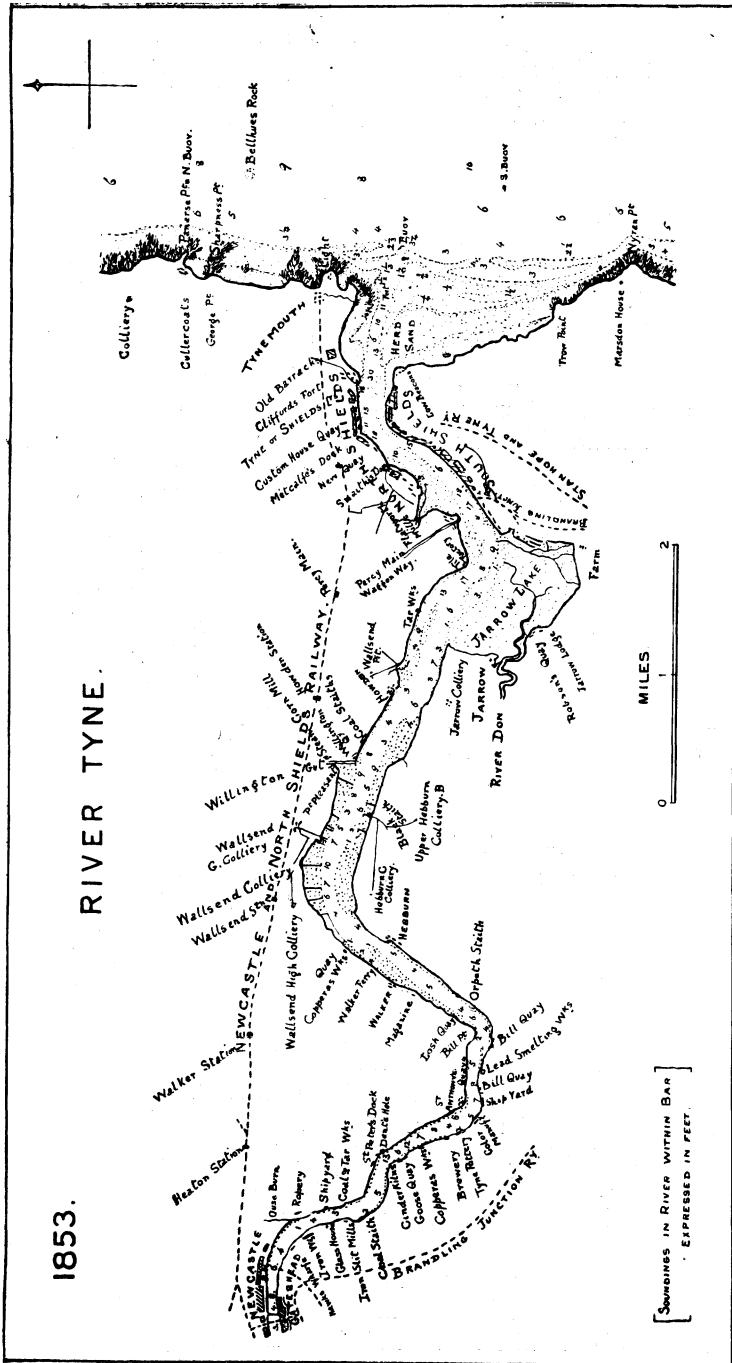


CHART OF THE TYNE, 1853.

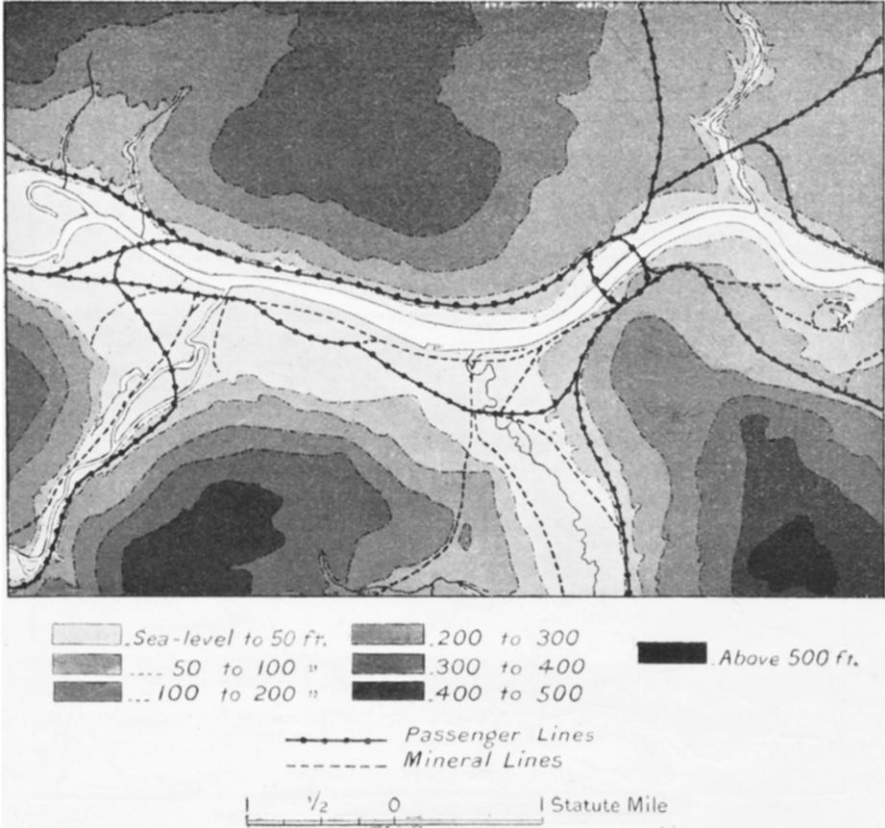
Bridges and of over 20 feet at low water for a long distance above ; while the process of deepening still continues. The river has been trained and dredged, and the clay scooped out into a uniform groove. Rock was only encountered at a few points, as at St. Anthony's and Bill Quay, where the rock is exposed. Whitehill Point, now merely a name, was a spur of rock projecting into the channel where now is deep water. The engineers of the Wear, with its narrow limestone bed, have had a more difficult task.

On the whole, the Tyne has kept pace with the growth of modern shipping. It has also reaped an advantage from the peculiar structure of its mouth. The fact that it has no broad estuary, but runs between the steep banks of Tynemouth and Shields, has been turned to account. The entrance looks rather mean and small for a great commercial highway ; but the walls, running out to the 5-fathom line, control the shifting sands, so that a vessel enters straight from the deep sea into what is practically a dock. We may realize the value of this direct entry by comparison with the approach to the Tees, the Humber, or the Thames.

But the narrowness of this outlet and its steep sides have another aspect ; the level space favourable for economic development is somewhat restricted. The river-front at Tynemouth and Shields is narrow, and difficult of access from the land side ; there is little room for expansion except vertically. So the activity of the port is concentrated a little higher up. On the south side Tyne Dock is reclaimed from the levels of Jarrow Slake ; on the north Albert Edward Dock makes use of the valley of a small beck ; while Northumberland Dock is merely an enclosed bend of the river itself. West of the dock areas we have Jarrow, Hebburn and Wallsend spreading over the lower slopes and valleys, and behind them we come suddenly on green fields. At spots within sight of Newcastle these fields come right down to the river-bank, with here and there a shipbuilding yard or factory wedged into a corner between the river and the hill. The population adjusts itself to these conditions. The works must be on the river for the advantage of cheap and easy transport for their heavy products and materials ; but the workers are not so tied, and we see row after row of their houses mounting gradually towards the hill top. This arrangement strikes the south-country eye as curious and unusual. Where more space is needed than the narrow banks afford, the modern engineer is cutting down the slopes wholesale to the water level, in spite of the cost of the process. At Newcastle itself we may look down from the high-level bridge on a line of busy quays ; but the goods which are being landed there must all be hauled up by cart or underground railway to the level on which we stand. Above Bridges, on the north bank, we find the same arrangement ; the works on the narrow river-ledge, the homes of the workers on the steep slope behind. But the wide marshy flats on the opposite bank are for the most part still untenanted. It is not all lowland which is favourable to human occupation.

The broad result of the structure of the Tyneside area is a curious

want of continuity in the population. The mining population, which is the basis of the river economically, is distributed in scattered blocks in the hill country. The industrial population is highly concentrated in the various towns on the banks, leaving districts in between with a very small density. The people work, and to a large extent live, in a narrow

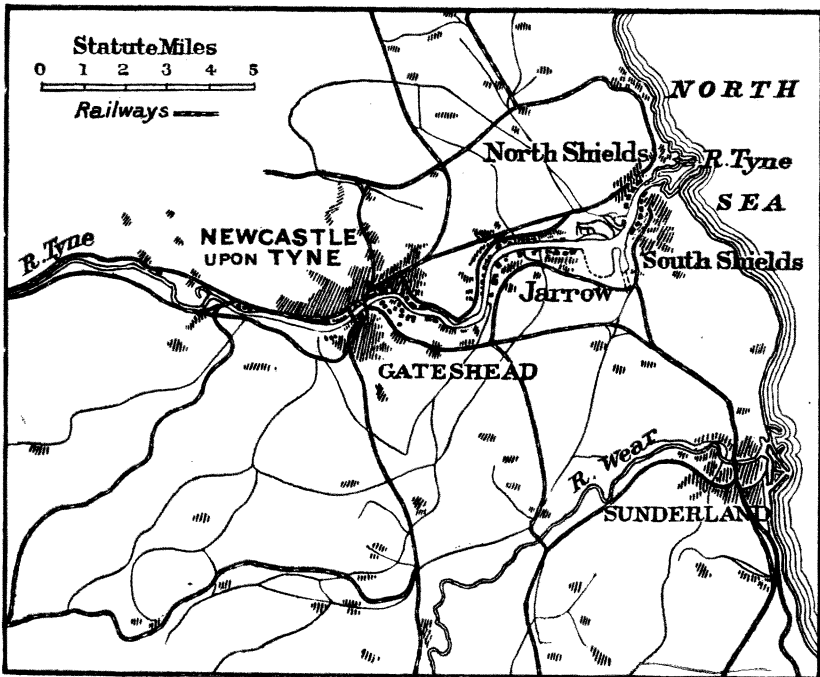


RIVER TYNE AT NEWCASTLE.

belt, with the river on one side and the railway on the other; this is the effective Tyneside.

A threefold railway system is necessary for the existence of this area. First there is the group of mineral lines engaged in the movement of coal; these may be independent or may act as feeders to the larger collecting railway. These waggonways, with their trucks running up and down by no visible agency, are to be met with everywhere. Then we have the riverside lines, running at a level of from 50 to 100 feet, and in places actually on terraces cut along the steep bank. Between these lines and the river is gathered most of the economic activity which they

promote. Where they unite, at the bridge above Wylam, the real Tyne may be said to end. Behind and above the riverside lines come the main passenger lines, of which the most important run north and south. Here the structure of the country is utilized to avoid the disadvantage of the great drop of the banks between Newcastle and Gateshead. The railways avoid the lowlands and valleys, and keep along the flanks of the highground, and so cross the gorge of the Tyne by lofty viaducts. When we leave Durham we have the heights of Newcastle in view, so we avoid the valley bottoms of the Wear and Team. The Roman road does the same thing at a still higher level; but at Gateshead it must plunge down



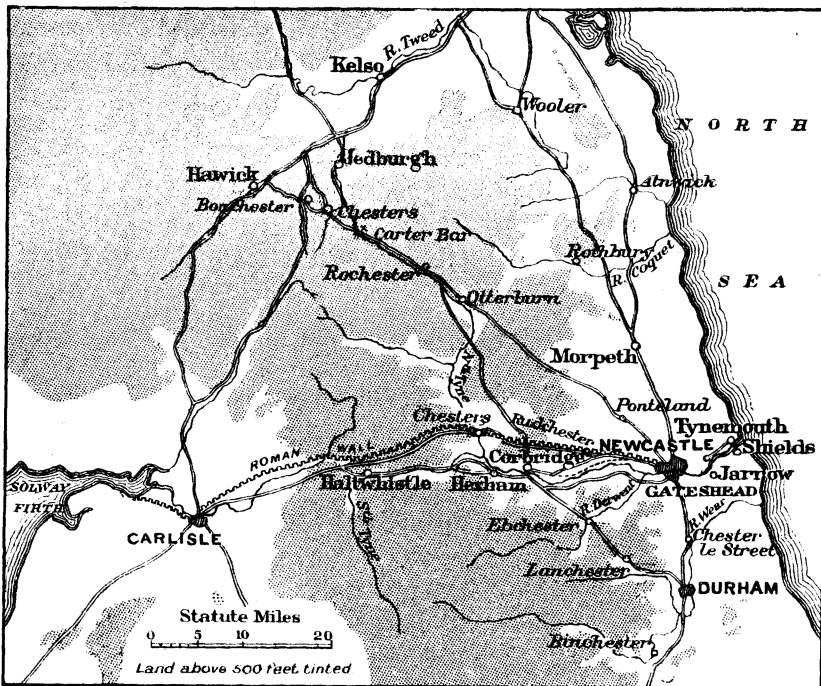
DISTRIBUTION OF POPULATION AND INDUSTRIES.

to the river level to reach the old bridge. The influence of physical features on railway routes is thus modified considerably by the special conditions found at the crossing point of the river.

The railway which carries the traffic to Carlisle and the iron districts of Cumberland at last gives its full value to the Tyne gap. So that some eighteen centuries have been needed for the evolution of this particular geographical influence, though it was suggested in the proposal for a canal early in the nineteenth century.

Coal may be the ultimate basis of the activity of the Tyne, but only a small proportion of Tynesiders are engaged in the actual handling of coal. To the carriage of coal by sea in early times was largely due the

rise of the shipbuilding industry on the Wear and Tyne. Then came the age of iron and steam, and the Tyne produced the first steam collier for the coasting trade to London. From this beginning has grown the great shipbuilding industry of to-day, with all the minor related industries which crowd the banks of the river. Coal, labour, and highly organized transport by sea and land, are here in abundance, but the raw material is lacking and must be imported from further south or from abroad. So the utilization of its natural resources to the full has necessarily involved the Tyne in wider relationships. Ores from the Tees, from Spain, the Mediterranean, Scandinavia and Chile are landed on its banks, and leave



STRATEGIC ROAD MAP.

them again as ships or machinery. With one notable exception, for which the conditions of coal-transport are partly responsible, the work is carried on within sight of the river.

Even the original getting of the coal has led to a vast trade in heavy material, since the whole of the pit props must come from abroad, largely from Scandinavia and the Baltic. So we have a natural balance in the movement of heavy materials, based on geographical conditions; coal and iron goods moving outwards, timber and ores inwards. Here is one important factor in the traffic of shipping between the Tyne and the neighbouring Continent. The local hinterland of the Tyne thus only receives its full geographical meaning as part of a much larger area,

connected, not divided, by the sea. The area of these external relations is extending. South America, among other countries, needs coal, and has bulky foodstuffs to export; and there has been a remarkable growth in imports of foodstuffs into the Tyne of recent years. Much comes from the Continent, but more and more is coming from distant regions. This alters the value of the geographical conditions of the river, since it must be judged in relation to the needs of the larger vessels engaged in the long trades. A modern commercial seaport is made, not born, and must rise superior to mere physical conditions if it is to hold its place in the contest for supremacy. So we come back to coal as determining the nature of the work of the Tynesider, his needs and his purchasing power, and influencing largely the actual direction of his foreign intercourse. But the connection with coal may tend to become rather less direct in the future than in the past.

Many industries on the Tyne have found electricity more adapted to their purposes than steam. The growing use of Power, thus transmitted, will produce a modification in local geographical conditions, in so far as it involves a smaller local distributive movement of coal; but it will not affect the great bulk of the export or inland trade. There may also be some slight improvement in the climatic conditions in the neighbourhood of the river as a result of the reduction of the smoke. A far more important modification in the geographical relations of coal will be brought about in another way. A large quantity of coal is consumed, as near its source as possible, in coke-works and blast-furnaces, and in raising steam at the mines themselves. In all these processes there is a surplus of heat which is wasted into the air, and waste can no longer be ignored in view of the tendency of the cost of our coal to rise, through causes physical or economic. The waste represents a surplus, so that there may perhaps be no market for it locally; but, converted into electrical energy, it can be transmitted to any part of the area which lacks Power. The natural area of concentration for electric, no less than for steam Power would seem to be the banks of the Tyne. The problem is one for engineers, and is already being handled with success. But the change from steam to electricity will not seriously alter the geographical relationships of Tyneside, since it is merely the equivalent of more coal, or coal more economically employed. The main result is likely to be an increase in the density of the population of Tyneside, a filling up of the gaps in the populated area, and the progressive overcoming of minor physical difficulties. The process will still be controlled by topographical conditions, but the relation between the people and the land will become more and more difficult to trace with each modification of local conditions by deliberate human action.

Major DARWIN (before the paper): I am sorry to say that Lord Curzon is again indisposed.

Our lecturer to-night, Mr. Sargent, is Lecturer in Foreign Trade at the School

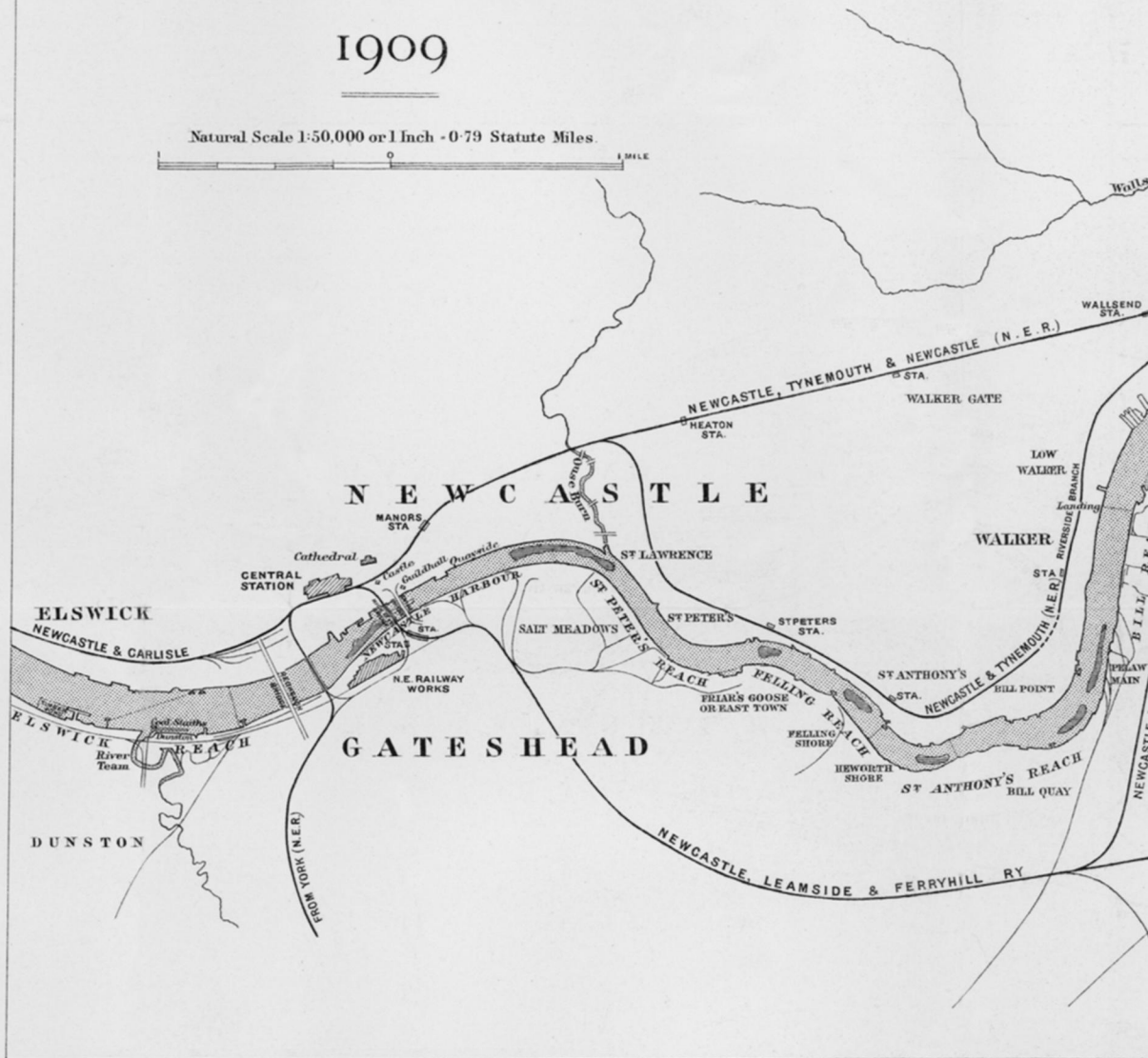
RIVER TYNE

FROM

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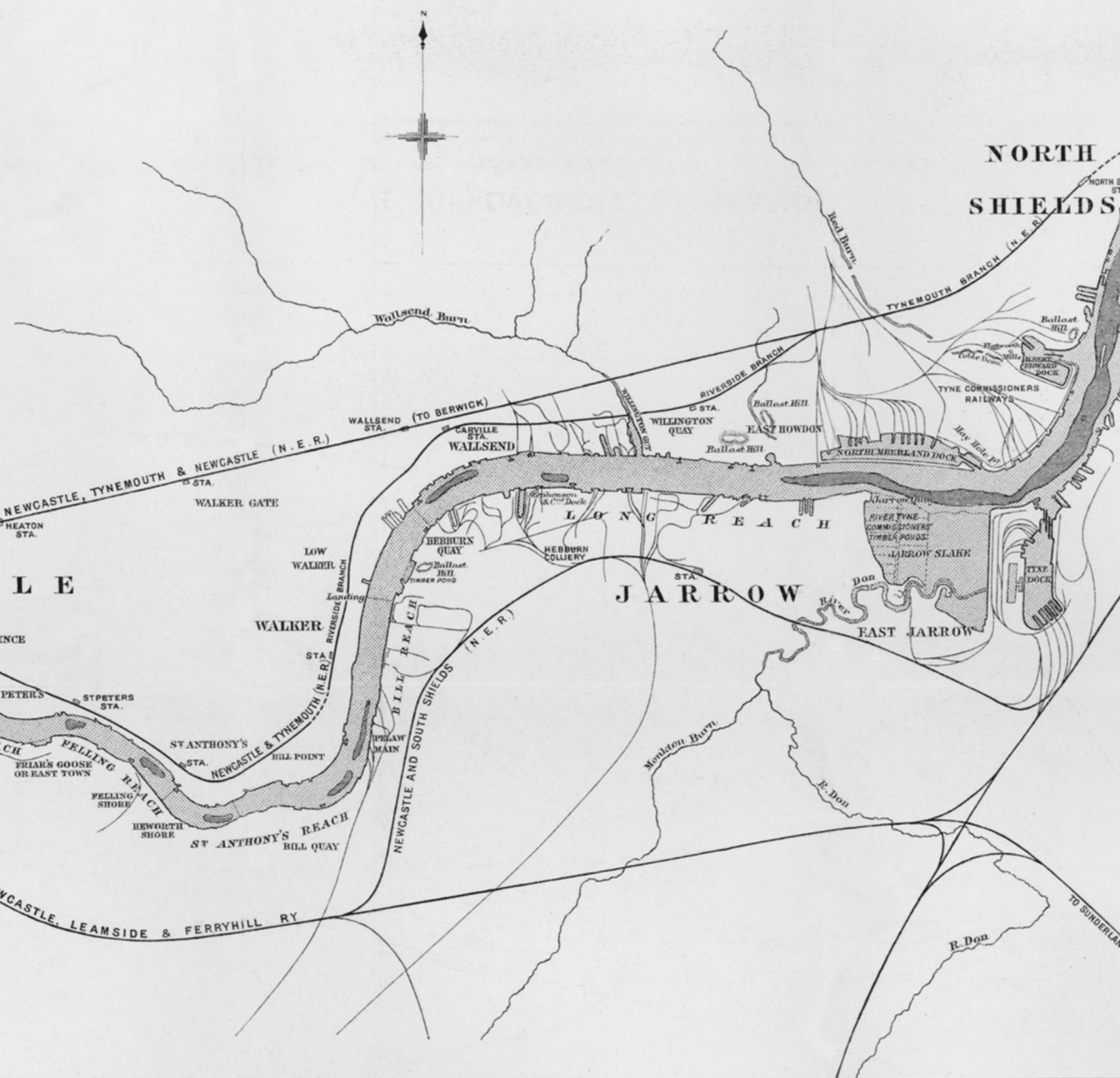
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TYNE

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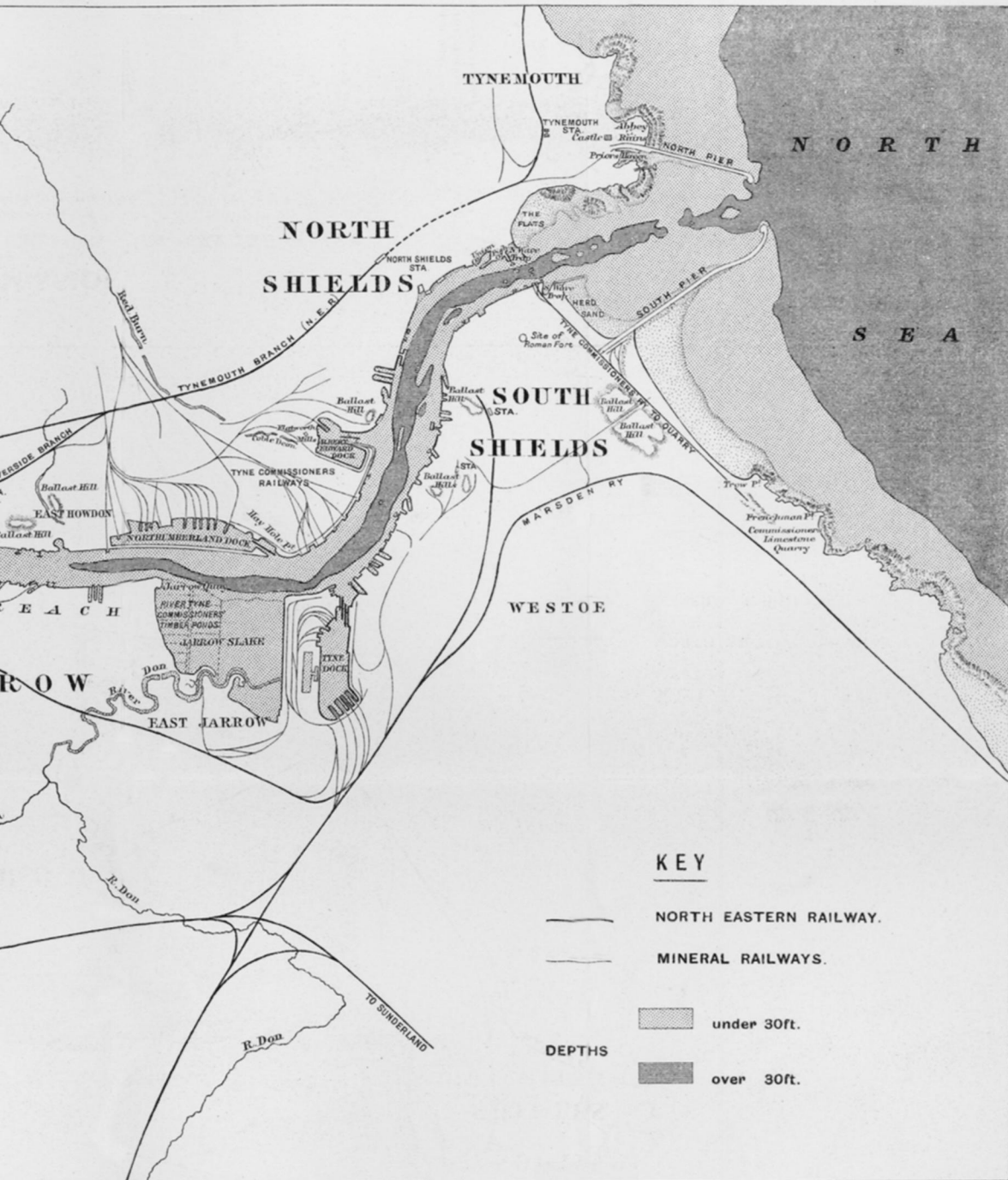
Showing the Depths
1860 and 1904, from



TYNE IMPROVEMENT COMMISSION.

LONGITUDINAL SECTION ON THE CENTRE LINE OF RIVER FROM THE SEA TO WYLAM

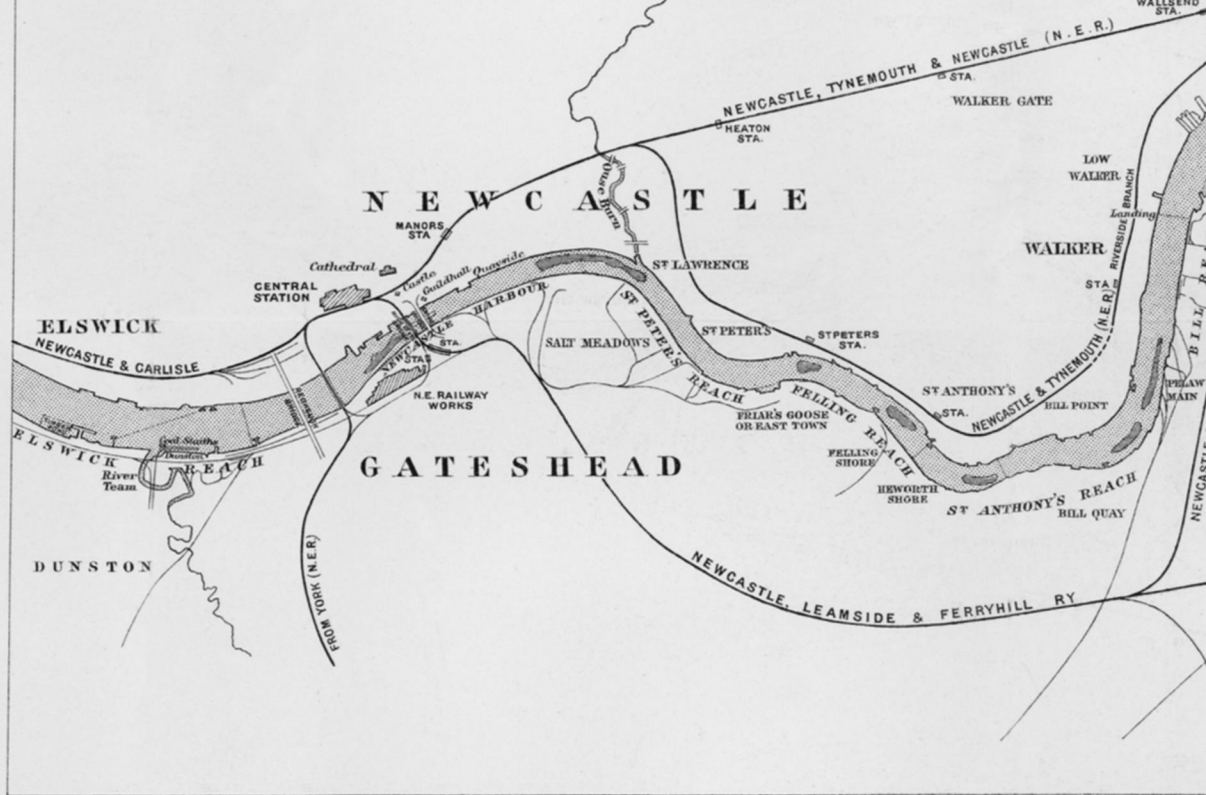
Showing the Depths of the Channel and the lines of High and Low Water Ordinary Spring Tides, in 1860 and 1904, from Surveys made under the direction of Mr. J. F. Ure and Mr. James Walker.



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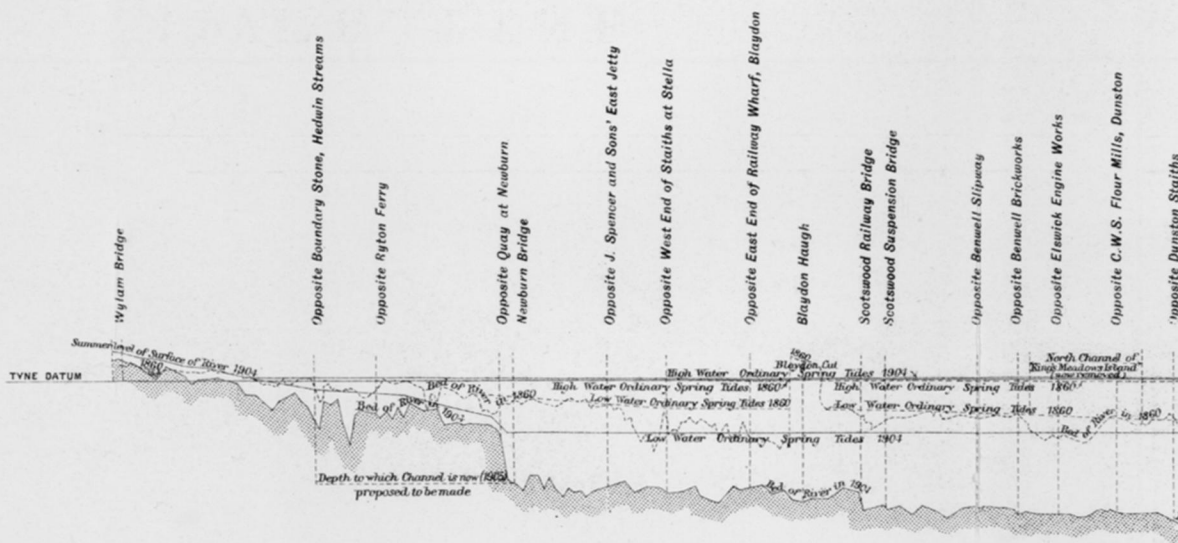
Ordinary Spring Tides, in
and Mr. James Walker.



TYNE

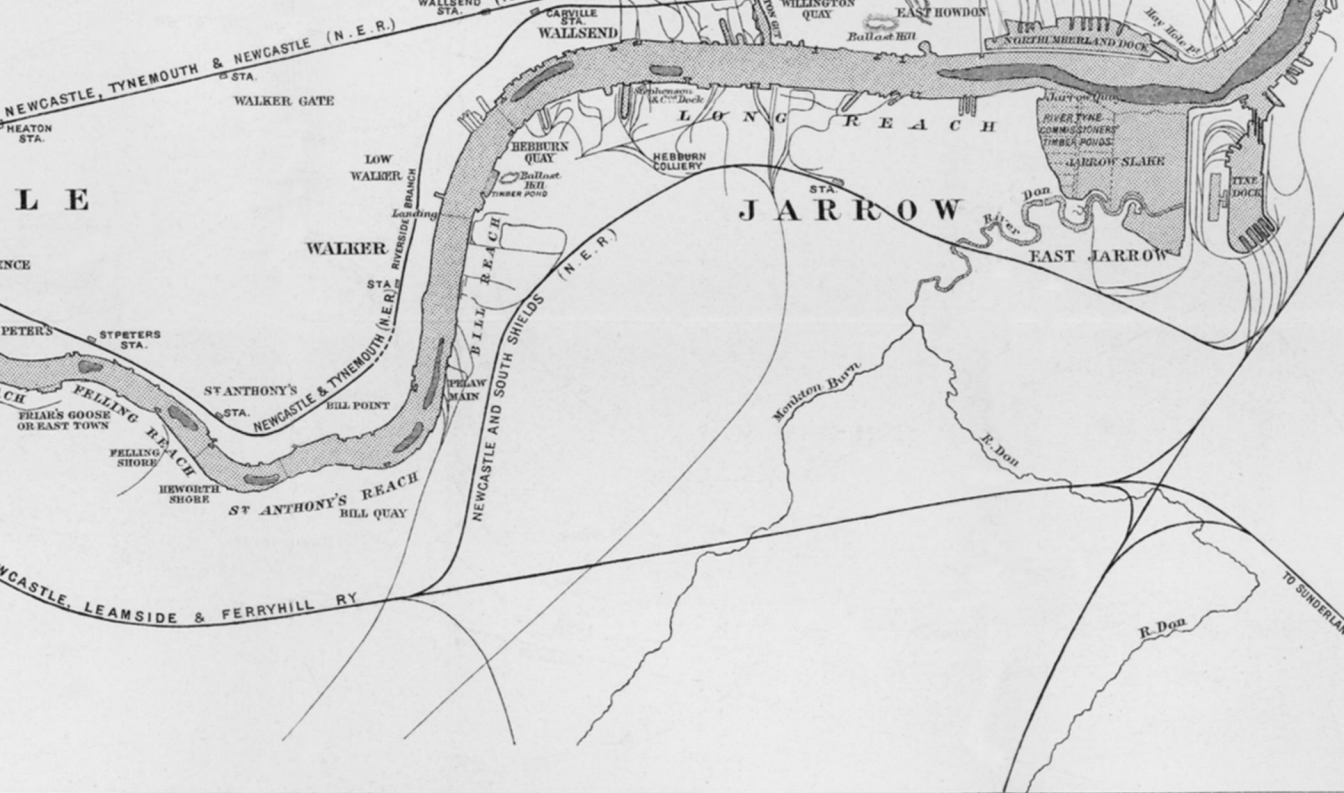
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Showing the Depths
1860 and 1904, from



NOTE.—The Tyne Datum is level with the Notch cut in the Masonry at the South West Corner of the Low Lighthouse, North Shields, and marked D thereon, being High Water Mark at that place on the 31st May, 1813.

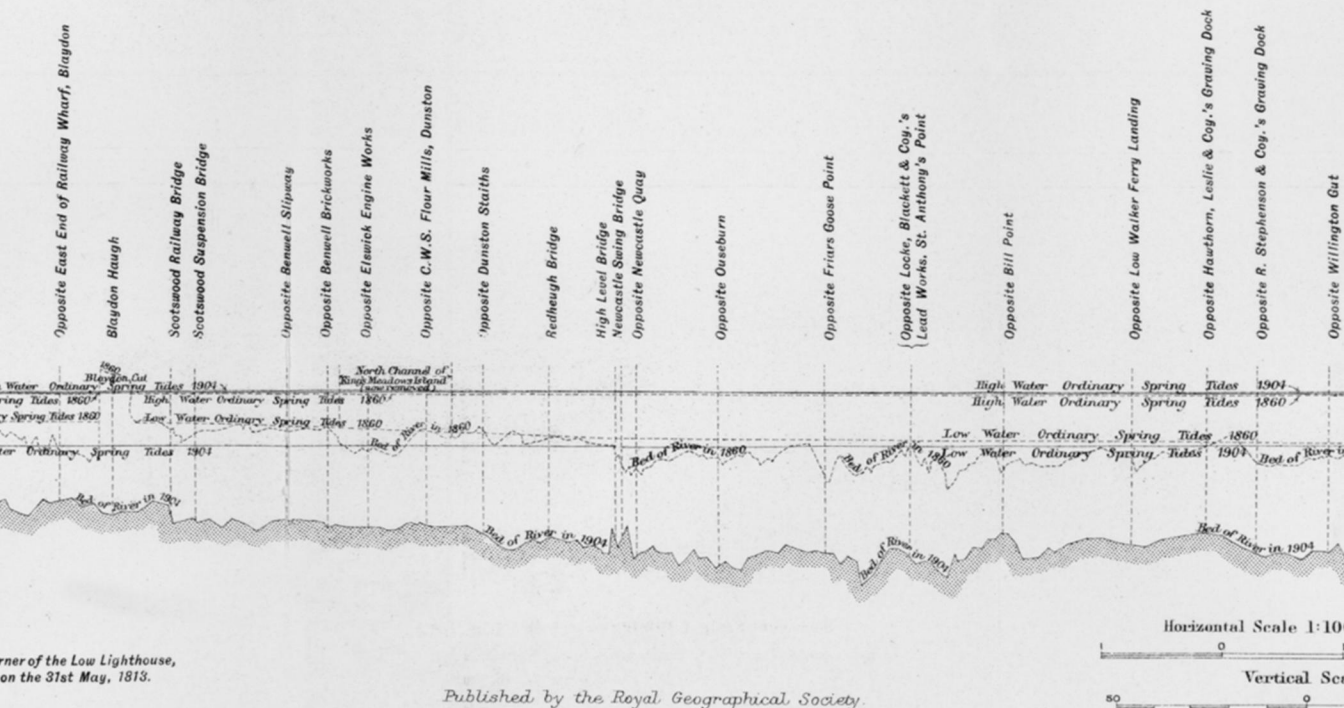
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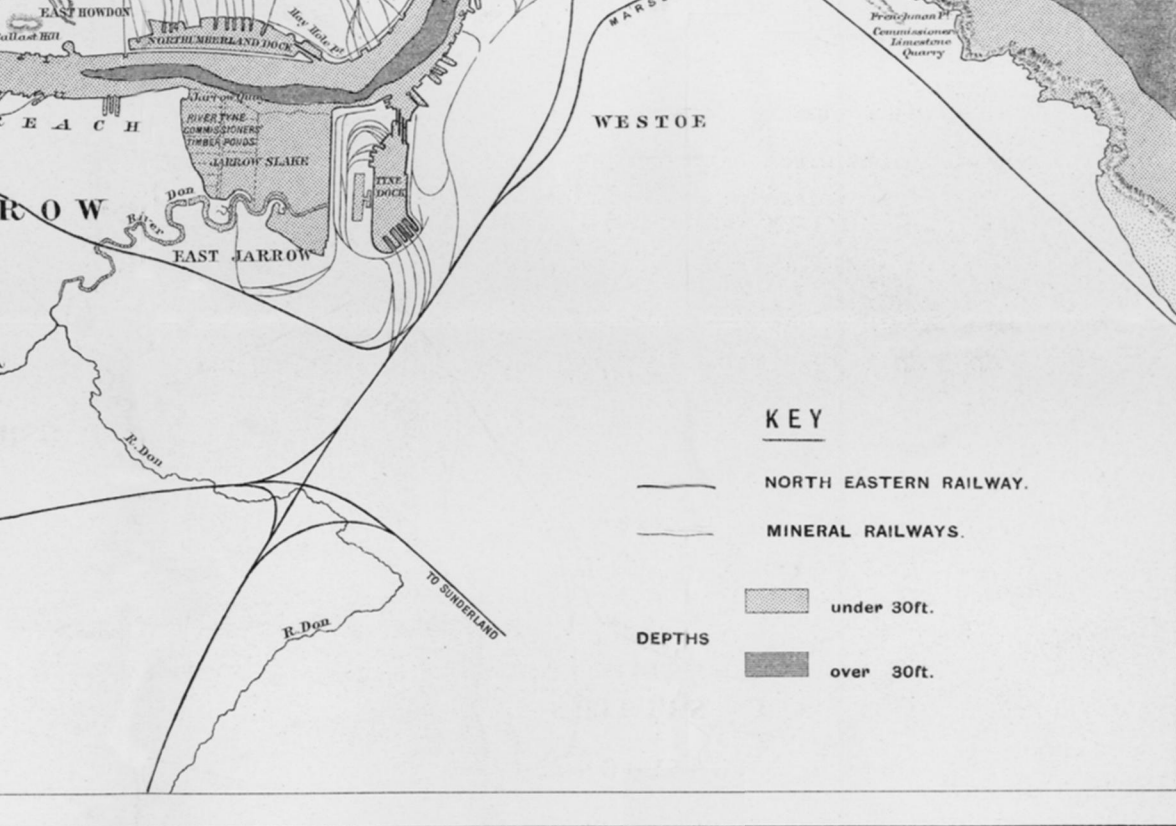


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