THE vertical lift bridge across the River Tees at Newport, Middlesbrough, opened in February 1934 by the Duke of York, is the first bridge of this type to be erected in this country, and is claimed to be the largest of its kind in the world. It has a span 265 ft. 4 in. between the bearings of the moving portion, and carries a roadway 38 ft. wide between the kerbs, in addition to two footpaths each 9 ft. in width. When the moving portion is raised for ships to pass, the navigable waterway, which is 250 ft. in width, has a clearance of 120 ft. between high water level and the steelwork of the bridge. When the span is down there is a clearance of 21 ft. The bridge took nearly three years to build and the work cost nearly £500,000, including the cost of the land.

The scheme of which the new bridge forms the principal part has been carried out to the order of a Joint Committee of representatives of the Durham County Council and of the Middlesbrough Corporation, and provides communication between Newport and Haverton Hill Road. This road forms a connection between Stockton-on-Tees and Billingham, and has recently become of increasing importance owing to the industrial development in Billingham and the neighbouring districts.

The illustration above shows the new vertical lift bridge at Middlesbrough in position for vehicles to pass over it. The bridge is the first of the vertical lift type to be built in this country, and is claimed to be the largest of its kind in the world. The photographs illustrating this article are published by courtesy of the engineers, Messrs. Mott, Hay and Anderson.

To effect communication with Haverton Hill Road an approach road was constructed across some low-lying ground on the north side of the river. This approach is carried on an embankment of blast furnace slag for a length of more than 3,000 ft. Half way along the embankment it was found necessary to construct another bridge in order to carry the road across the Billingham Beck branch of the London and North Eastern Railway. This bridge is built of steel, with five spans, and it is the first highway bridge in the country the structural work of which has been erected entirely by welding. On account of the peaty nature of the subsoil, and in order to avoid disturbance of the rail tracks, the five spans of the bridge are supported partly on octagonal reinforced-concrete piles 18 in. in diameter, and partly on 4-in. diameter cylinders, all of which were sunk to a depth of 70 ft. The bridge is 216 ft. in total length, and carries a 38 ft. roadway with a 9 ft. footpath on each side. These widths of roadway and footpath are standard also for the lifting bridge and throughout the approaches.

From the embankment, the lifting span is reached over three approach spans of plate-girder construction, while on the south approach there are two spans of similar construction followed by a 154-ft. span carried on double warren trusses. Continuing along the south approach, there is a reinforced-concrete box abutment, a skew span of 68 ft., and finally a 500-ft. length of embankment on a falling gradient, built between two concrete retaining walls.

The lift span, which weighs 2,700 tons, is suspended from two supporting towers, and is arranged so that it can be lifted and lowered vertically between them to allow boats to pass. To enable the span to be lifted in this way without the necessity for extremely powerful engines, it is provided with four steel counterweight boxes, to which it is connected by means of 80 wire ropes that pass over eight pulley sheaves arranged at the top of the towers. These sheaves are steel castings 15 ft. in diameter, and are mounted on roller bearings and protected against the weather by a number of hoods. The counterweight boxes, which hang vertically, are partly filled with burr concrete, a material in which the customary stone aggregate is replaced by steel punchings; and the remaining part of the weight required is made up of cast iron blocks to enable final adjustments in weight to be made.

The two towers that support the lift span are each 156 ft. in height. As the counterweights exactly balance the span, the towers have to carry a combined moving weight, or load, of 5,400 tons, half of which is taken by