Border. A prudent policy of constructional extension also was followed, so that to-day the ramifications of the undertaking represent a network of some 2,000 miles.

Taken on the whole, the system does not possess many important works which under present conditions would rank as startling pieces of engineering, although in the early days many achievements created intense interest, and were regarded as marvels of human activity. The Kilsby Tunnel represents, perhaps, the most interesting illustration of tunnel-boring, owing to the abnormal difficulties which were encountered, while the tubular bridge across the Menai Straits, although subsequently eclipsed in point of length and importance by other similar structures, never has lost its fascinating interest, inasmuch as it was the first work of its class.

The Menai Bridge.

This bridge, 1,510 feet in length, comprises two immense rectangular tubes—one for each set of metals—through which the trains pass. It was designed by Robert Stephenson, and was commenced in 1845. There are four spans, two each of 460 feet and two each of 230 feet, supported on masonry piers, giving a clearance of 103 feet 9 inches between the under side of the tubes and the water at high spring tides. At the ends the tubes are 23 feet in depth by 30 feet deep at the centre. The most interesting feature was in connection with their construction and setting in position in the days when facilities were slender and equipment of an indifferent character. A special plant of an elaborate, ingenious and expensive nature was set up for the work. While the erection of the piers was in progress, the construction of the box-tube spans was carried out on the banks of the Straits. When completed, the tubes were transferred to pontoons, and were floated to the site when the water was at high tide. By means of capstans and ropes the pontoons were warped into position between the piers until the ends of the tubes were brought dead into position in grooves in the masonry, where they were made fast. As the tide fell, the pontoons dropped clear of their loads, leaving the tubes resting on their seats.

How the Tubes were Raised.

The tubes were then raised by the aid of a huge overhead hydraulic press, which by means of chains lifted them 6 feet at a time, the masonry being completed beneath as rapidly as possible after each lift. As the links of the chain could be withdrawn as required, having been made specially for this purpose, after each lift the chain was shortened, and the plunger of the hydraulic press permitted to descend. The shortened chain was then re-attached to the metallic work, and the ram of the plunger forced out again, lifting the mass a further 6 feet, to permit the masonry to be continued upwards a similar height. This cycle of operations was continued until the tubes were brought to the required level, the chains and plunger being called upon to handle, in this way, a maximum weight of 1,144 tons. The total weight of iron worked into the tubes is about 10,375 tons, and the walls present a superficies of 1,219,680 square feet for painting. As the tubes are continuous from end to end, they stretch about 6 inches in summer, under the influences of higher temperature.

The bridge was completed within the short space of five years, the first train passing through in 1850. Robert Stephenson adopted a similar bridge to span the River St. Lawrence at Montreal, for the Grand Trunk Railway of Canada. This, however, was a far larger undertaking. Two bridges of this type were built by him in Egypt, but in this latter instance the trains did not run through the bridge, but along the top deck of the rectangular tube.

Although the original stretches of the London and North Western Railway are very flat, and conducive to the fast and economical movement of traffic, the extensions of the system into Wales and north