

of the pioneers of science. One of these benefits, and perhaps that which to an external beholder marks the greatest difference between the first and the second half of the century, is the greatly increased intercourse which now exists as compared with the earlier years of our century. This intercourse has reacted on the domain of thought, and produced that exchange of ideas which promotes more rapid progress. It hardly belongs to the history of thought to analyse<sup>1</sup> the different steps by which the great change has been brought about. Still, a very superficial glance will suffice to show how the work of bringing about an international exchange of ideas has been very characteristically divided among the three nations in which we are specially interested. It was not in the interest of thought, of science, or of literature, but rather in that of commerce and of industry, that the modern facilities of intercourse and exchange were invented and introduced.<sup>2</sup> We shall therefore expect to

2.  
Science be-  
come inter-  
national.

<sup>1</sup> The principal dates of the introduction of steam-engines and telegraphs for facilitating communication are as follows:—

1802. The tug Charlotte Dundas, built by Symington, was tried on the Forth and Clyde Canal.

1812. Henry Bell built the Comet with side paddle-wheels. It ran on the Clyde as a passenger steamer.

1829. George Stephenson's Rocket was tried on the Stockton and Darlington Railroad, which had been begun in 1821. In the year 1829 the Liverpool and Manchester Railway was inaugurated.

1838. The first steamboats, Sirius and Great Western, crossed the Atlantic.

1833. A comprehensive system of railways was planned by the French and Belgian Governments.

1835. The first German railway was opened between Nürenberg and Fürth. The first electric telegraphs for public use were almost simultaneously constructed in England, Germany, and the United States—the first successful line being probably that constructed by Wheatstone and Cooke between 1836 and 1840. The first Atlantic cable was begun in 1857, and after repeated failures, which were in the main corrected by the scientific investigations of William Thomson (Lord Kelvin), telegraphic communication with America was permanently established in 1866.

<sup>2</sup> This remark applies fully to the railway system, but scarcely to the development of the electric telegraph, which was first actually used for scientific purposes by Gauss and