

**REPRODUCTIONS OF PRINTS,
DRAWINGS AND PAINTINGS**
of Interest in the History of Science
and Engineering

6. George Stephenson and the First Public Railway

By E. C. WATSON

THE most famous of all the early locomotive builders was George Stephenson (1781-1848). "Although he cannot be described as the inventor of the locomotive, he certainly did more towards its improvement during the crucial period than any other man and, by concurrent construction of suitable railways, did much to establish its practical utility."¹

Since a number of accounts² of Stephenson's life and work are available, one will not be attempted here. Suffice it to say that, having had his interest in steam traction aroused by the success of Blenkinsop and Hedley at Wylam, in 1814 he built a locomotive for the tramway between the Killingworth Colliery, where he had been appointed enginewright in 1812, and the shipping port nine miles away. This locomotive, which was modelled after that of Blenkinsop, was the first to run by adhesion on iron edge-rails. Between 1814 and 1822, moreover, he made a number of improvements in this engine, and several of the improved types were built and used successfully. In 1823, having succeeded in impressing the advantages of steam traction on Edward Pease, the promoter of a railway from Darlington to Stockton to transport the coal wealth of Durham

1. *Handbook of the Science Museum, Land Transport III. Railway Locomotives and Rolling Stock. Part I—Historical Review* (H. M. Stationery Office, London, 1931), p. 11.

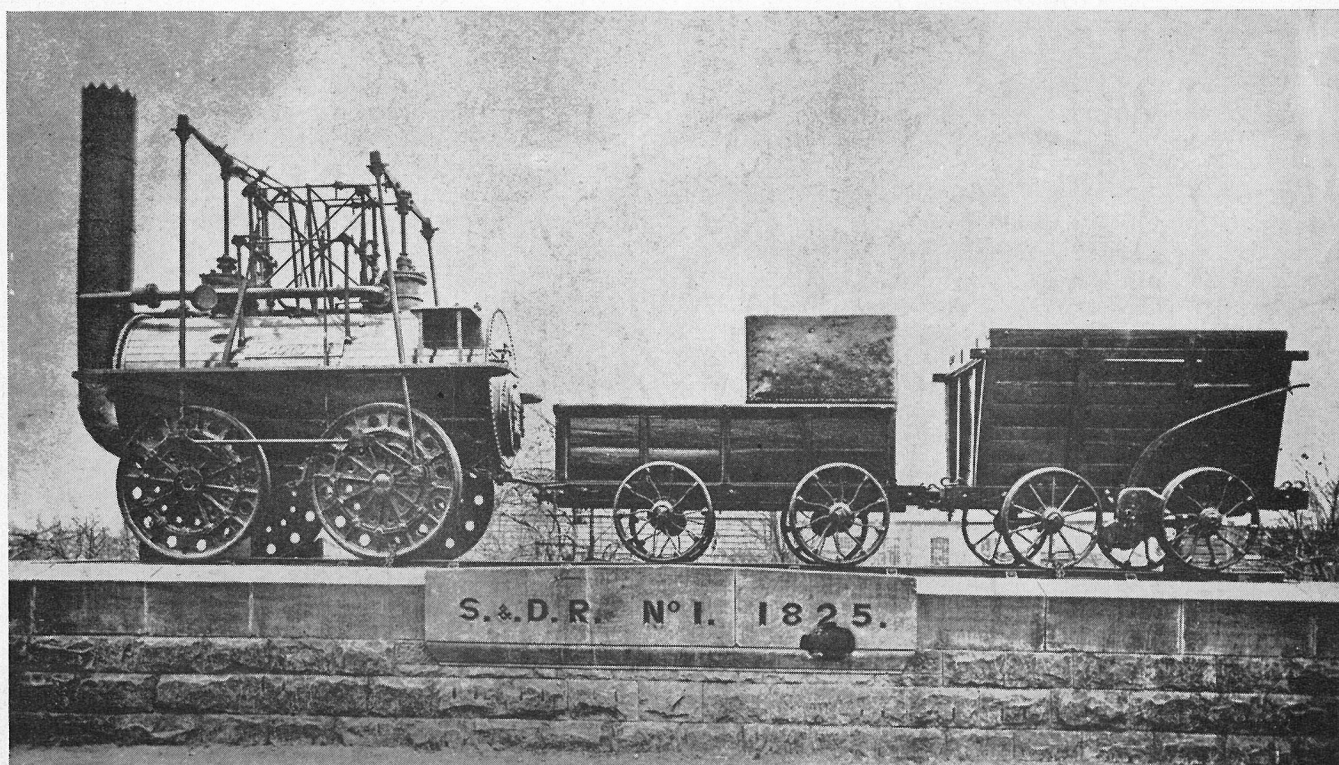
2. Samuel Smiles, *Story of the Life of George Stephenson* (London, 1857; new ed., 1873); Samuel Smiles, *Lives of the Engineers*, Vol. III. *George and Robert Stephenson* (London, 1868; new ed. 1904); C. Mat-schoss, *Great Engineers* (London, 1939), pp. 171-189; R. H. Thurston, *A History of the Growth of the Steam-Engine* (Ithaca, 1939), pp. 183-204; J. S. Jeans, *Jubilee Memorial of the Railway System. A History of the Stockton and Darlington Railway* (London, 1875), pp. 219-230.

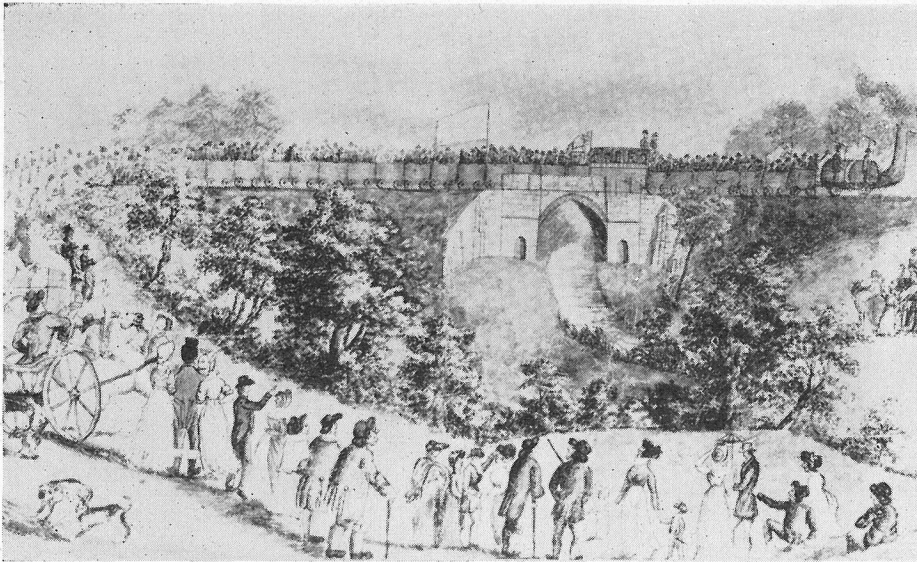


FIG. 1. George Stephenson (1781-1848).

County to North Sea ports, he was appointed engineer of the railway, with permission to carry out his own plans. The success of the Stockton and Darlington

FIG. 2. The first locomotive used on a public railway.





AT LEFT:

FIG. 3. Inauguration of the first public railway, September 27, 1825.

Railway led to his employment in the construction of the Liverpool and Manchester Railway, the first great line and the one which established the railway system as truly successful. In 1823, also anticipating a demand for engines, he and his son Robert, with the backing of Pease, opened in Newcastle the first locomotive works in the world. "This establishment was the chief seat of practical locomotive development for the ensuing twenty years, and a training ground for locomotive engineers."³

The Stockton and Darlington Railroad was the first public steam railway in the world. At the opening, on September 27, 1825, a train of 34 vehicles, making a gross load of about 80 tons, was drawn by one engine driven by Stephenson with a signalman on horseback in advance. The train moved off at the rate of from 10 to 12 miles per hour and attained a speed of 15 miles per hour on favorable parts of the line. The locomotive, appropriately called "Locomotion," was built by the Stephensons at Newcastle. It weighed about seven tons, developed about 10 horsepower, and hauled a load of from 60 to 70 tons at an average speed of five miles per hour.

Fig. 1 reproduces a full-length portrait of Stephenson by John Lucas. It is taken from the well-known engraving by T. S. Atkinson. The section of the Liverpool and Manchester Railroad across Chat Moss, a bog some 12 square miles in extent, is shown in the background.

Fig. 2 shows the "Locomotion" mounted on a pedestal in front of the Darlington North Road Railway Station, where it was placed with suitable ceremonies in June, 1857.

Fig. 3 is reproduced from a drawing by Dobbin in the Science Museum, London. It portrays the opening of the Stockton and Darlington Railway. As Jeans wrote 50 years later, many curious recollections of the opening ceremony were preserved by those who were present. "One can scarcely even now meet with a man or woman of advanced years between Auckland and Darlington, both inclusive, who did not assist in the opening celebration. It was commonly reported at the time, and has since been handed down as a reminiscence of the event, that the whole of the inhabitants turned out to witness the advent of the 'iron horse,' save and except two old ladies whose infirmities or prejudices, or both combined, prevented them from rendering so marked a need of homage to the new era. Great excitement prevailed among the spectators as the engine came in sight. Excitement in many minds took the form of disappointment

when it was found that the locomotive was not built after the fashion of a veritable four-footed quadruped, some of the older folks expecting to see the strange phenomenon of an automatical semblance of a horse stalking along on four legs. But everybody admitted that the performance of old 'Locomotion' was wonderful in its way, and vigorous cheering greeted its approach."⁴

3. *Handbook of the Science Museum*, loc. cit.

4. J. S. Jeans, *Jubilee Memorial of the Railway System* (London, 1875), pp. 71-72.

America's First Gasoline Automobile

(Continued from Page 8)

I took this car to London in June, 1897, and there became acquainted with the Honorable C. S. Rolls, later of the famous Rolls-Royce car. Mr. Rolls frequently rode with me, both as passenger and driver, and in July, 1897, wrote an article for the English magazine *Automotor*, in which he praised the flexibility of the engine and stated that the car was free from most of the objectionable features of other makes.

LATER DEVELOPMENTS

With manufacture started in 1901 at the J. Stevens Arms and Tool Company in Chicopee Falls, Massachusetts, the first Stevens-Duryeas had a two-cylinder engine, shown in *Fig. 9*, and three-speed transmission, located in the body beneath the driver's seat. These cars were profitably sold for three years, but, seeing the growing influence of foreign design, in 1903 I designed a four-cylinder motor, placed forward under a hood with a shaft drive to a bevel gear in the rear axle. For the engine I designed a multiple-disk, dry-plate clutch, and arranged to bolt the engine crankcase, clutch housing, and transmission housing together as a unit. This we called the "unit power plant" and a diagram of it appears in *Fig. 10*. The car was finished in 1904 and shown at the New York show in January, 1905. A year later a company now prominent in the industry exhibited at the New York show an exact copy of the chassis of this Stevens-Duryea car, and later the unit power plant, with multiple-disk, dry-plate clutch, became substantially standard for the industry.

A six-cylinder car, shown in *Fig. 11*, was added to the Stevens-Duryea line in 1906 and after that sixes became the company's principal product. These cars were a source of very satisfactory profits to stockholders,