

The Existence of the Steam Carriage

THE INVENTION ITSELF

The several survey histories of the automobile usually refer to Cugnot in France, Evans in Maryland, Symington in Scotland, Murdock in Cornwall followed by a dozen names from the 1820s and 1830s who tried and failed to make the steam carriage practicable. Goldsworthy Gurney is always mentioned and even excoriated in some works from the mid-nineteenth century. The truth is that Goldsworthy Gurney produced a workable steam carriage in 1827 and "perfected" it by 1829.

With hindsight it is difficult to see how anyone but Gurney could have invented the steam carriage. He was a medical doctor, a chemist, and a student of the steam engine from his schooldays in Cornwall where he frequented the home of Davies Gilbert (or "Giddy," as he was also known) and became a close friend of Richard Trevithick, already known for his invention of the high pressure steam engine which Giddy pronounced superior to James Watt's condensing steam engine. (Indeed, it was four times as powerful and rapidly replaced all Boulton and Watt engines in Cornwall mines.) The young boy and the famous engineer corresponded throughout Gurney's student years so that Gurney knew of all Trevithick's improvements in the steam engine. In his testimony before a parliamentary committee in 1834, Gurney recalled witnessing Trevithick's first experiment with a steam carriage in 1804.³ The carriage steamed down a declivity but remained stuck in the hollow, its wheels spinning found until the steam was dissipated. Wheels inexplicably seemed unable to move a carriage along the ground surface, although they could do so quite readily on rails, as Trevithick demonstrated convincingly the same year with a steam locomotive at Merthyr Tydvil in Wales and at Euston Square in London in 1813. As a result, engineers firmly believed that there was a lack of sufficient friction for carriages to be self-propelled on level ground.

Gurney came to London as a young doctor in 1820 and, aside from building up a profitable practice, lectured on chemical science at the Surrey Institute. His lecture courses, which he published in 1823 as *A Course of Lectures on Chemical Science*, were so original and intellectually stimulating that they were attended by many prominent scientists and engineers. Here he laid the scientific groundwork for the steam carriage in three discoveries: (1) the chemical components required in steam to generate motive power, (2) the steam jet to raise that power to high levels, and (3) the principle of the separator which made his carriage boiler distinctive and superior to all the boilers devised by his rival steam carriage builders. He stated in these lectures that "elementary power was capable of being applied to propel carriages along common roads with great political advantage," and that "the floating knowledge of the day placed the object within our reach." Only one of his prominent listeners, Dr. William Hyde Wollaston, the chemist, supported him.

Chemical Components

Gurney's experimentation with different gases that could be managed with the equipment of the day led him to discover that ammoniacal gas, like steam, was absorbable in water under reduced temperature and pressure and when heated could be given out again with considerable force. In combination with other absorbable gases, it became manageable within an apparatus which he perfected by May 1825. Thus was laid the basis of his steam engine.

The Steam Jet

Gurney's idea for the steam jet had been brewing in his head since his youth. In those early years he had written to Trevithick about Trevithick's experiment in which he held the chimney of a burning argand lamp below the vapor issuing from the spout of a tea kettle in order to dissolve the vapor in the warm air. Trevithick tried to bring the waste steam from his locomotive into contact with the ascending hot air from the fire in the funnel, but the steam disappeared only when the temperature of the air in the flue was sufficiently high. Trevithick, finding on the whole that the smoke billowed forth as before, turned up the education, pipe, allowing the waste steam to escape and setting an example that others followed. Gurney recog-

nized the need for "the blow pipe" (as he called it in lecture XIII) if enough power were ever to be generated to move a carriage swiftly. His daughter Anna recalled that as a young girl she would watch her father's experiment in the classroom with the oxyhydrogen blowpipe which filled the place with a "wonderful light," and again after he had given up his practice and his lecturing to spend all his time on the steam carriage.

We occupied rooms which were probably intended for Sir William Adams, a celebrated oculist, for whom this building was erected, as an eye infirmary, in Albany Street, Regent's Park. From a window of my room I looked into the yard where my father was constructing his steam carriage. The intense combination caused by the steam blast, and the consequent increase of high pressure steam force acting on the jet, created such a tremendous current or draught of air up the chimney that it was something terrific to see or hear. The workmen would sometimes throw things into the fire as the carriage passed round the yard—large pieces of slate or sheet iron--which would dart up the chimney like a shot, falling occasionally nearer to the men than was safe, and my father would have to check their enthusiasm. The roaring mind, too, sometimes was astounding. Many difficulties had to be overcome, which occupied the years before "1827". The noise had to be got rid of, or it would have frightened the horses, and the heat had to be insulated, or it might have burnt the whole vehicle.⁴