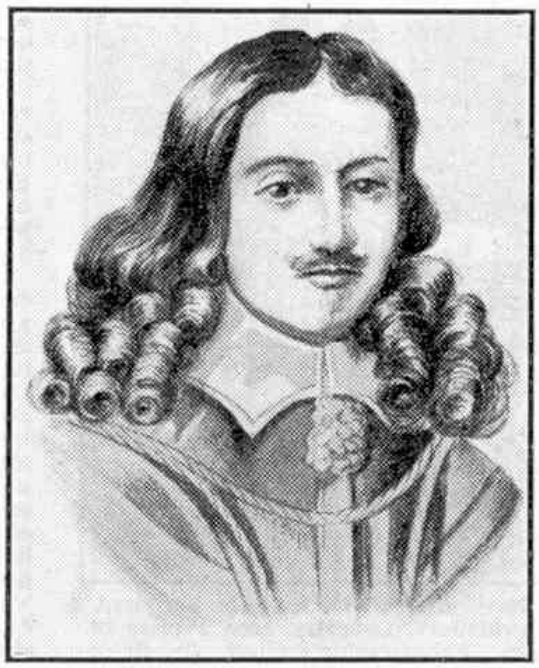
**Famous Inventors**

# The Marquis of Worcester

## A Pioneer of the Steam Engine

IT is widely believed that the inventor of the steam engine was James Watt. Watt's name is the greatest in the story of the development of the steam engine, but other inventors contributed to this story, and there were steam engines at work many years before Watt was born. The application of steam indeed really dates back more than 20 centuries, but the credit for first putting it to work belongs to Edward Somerset, Marquis of Worcester, who actually raised water by steam power at Vauxhall, London.



Edward Somerset, Marquis of Worcester, 1601-1667.

Edward Somerset was born in 1601. He spent his early life at Raglan Castle, Monmouthshire, in almost princely surroundings, for the Earls of Worcester owned immense estates in South Wales and London, and the castle was one of the greatest in the country. His time was spent chiefly in scientific pursuits with the help of Caspar Kaltoff, a mechanic who remained in his service practically throughout his life. He devised many amusing toys, drawing instruments and mechanical devices, and it was then that he made his earliest efforts to produce what he called his water-commanding engine. Unfortunately no account of this exists, and the only traces that remain are grooves and cells in the wall of the citadel of Raglan Castle. These are shown in our illustration, and with the knowledge of the later engine that he erected at Vauxhall they enable us to understand the scale and the general arrangement of this pioneer effort. The largest cell is built above the arched interior of the entrance to the drawbridge of the castle, and is a little more than 6 ft. high in the centre. Rising from it are two grooves, each about 1 ft. in width and 1 ft. in depth, and on the right is a second groove, at the lower end of which are smaller grooves and another cell. It is probable that the grooves contained pipes through which water from the moat was forced upward to be discharged into a cistern on the roof of the castle.

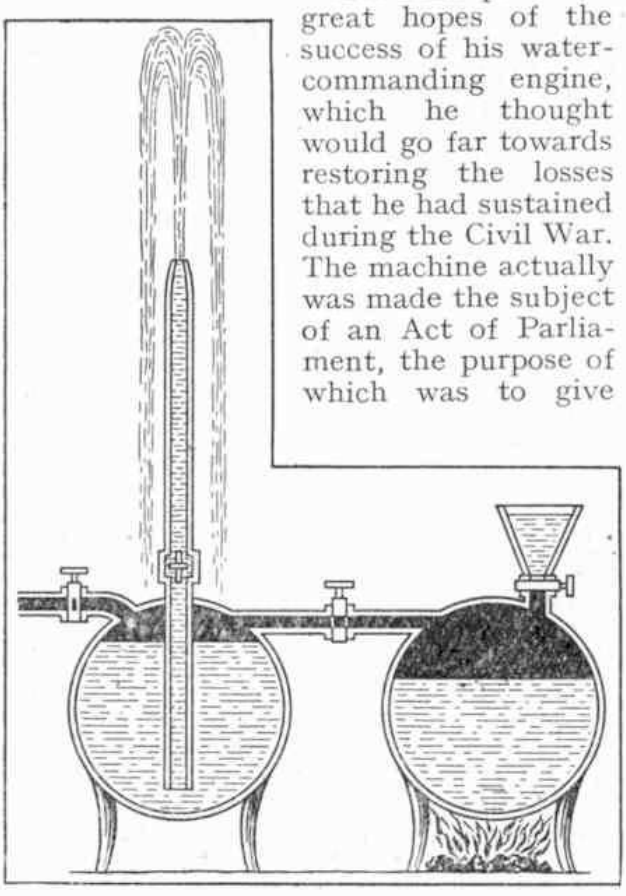
While the inventor was engaged in these pursuits the Civil War broke out. He and his father were convinced royalists, and gave not only their services, but also immense sums of money to support Charles I in his struggles with Parliament. They were constantly appealed to by the King for money, of which he was always in the greatest need, and in addition they raised troops that were maintained at their own expense. Towards the close of his life the inventor calculated that he had spent and lent for his King and country £918,000, an enormous sum for that period, equivalent to several millions of our present currency. The inventor himself was created Earl of Glamorgan and was sent to Ireland to raise troops, but on the final defeat of the King he fled to France, where he lived in comparative poverty until 1652. Then he returned to London, only to be imprisoned for three years in the Tower. When he was released he was probably kept under strict observation, his only solace being the mechanical contrivances and inventions by which he had always been attracted. His estates had been confiscated, large portions passing into the hands of Cromwell.

It was at this time that the inventor went to live at Vauxhall, and began to interest himself again in the development of his water-commanding engine. While he was there Charles II returned, but this did not bring him great relief, for although Raglan Castle and his estates were restored to him they had been so despoiled that he gained little from them and he never recovered the vast sums expended on the

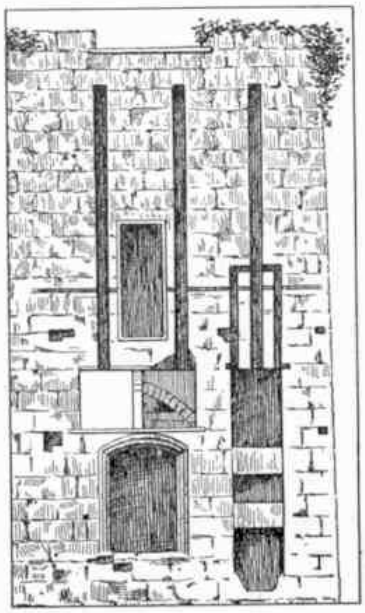
King's behalf. He continued his efforts to put into practical operation his schemes for raising water, still with the help of Caspar Kaltoff, and there is no doubt that he was successful. A French visitor who went expressly to Vauxhall to see this wonder describes it as a machine that in a single minute would raise four large buckets of water to a height of 40 ft. through a pipe 8 in. across.

The exact details of the Marquis's water-commanding engine are somewhat obscure, for no drawings are available. From the descriptions the machine appears to have worked in the manner indicated by the lower illustration on this page. Steam from the boiler on the right entered the vessel on the left and forced water from it up through the vertical tube rising from it. When the vessel was empty the tap through which the steam entered was closed and water was again allowed to flow in, after which the whole operation was repeated. The Vauxhall engine appears to have had two water cylinders, one being filled with fresh water as that in the other was being forced out by the steam. Only one man was required to control the engine, his task being to turn the taps as required.

The Marquis had great hopes of the success of his water-commanding engine, which he thought would go far towards restoring the losses that he had sustained during the Civil War. The machine actually was made the subject of an Act of Parliament, the purpose of which was to give him the benefit and profit of the invention for 99 years. He claimed that it could be used for draining purposes, and for pumping water out of mines, but very few appear to have believed the scheme to be of any real value and the inventor's great hopes were disappointed. He died in 1667, only four years after the Act was passed. His widow continued to give the scheme attention, but nothing is known of the fate of the Vauxhall engine. There is no doubt that it helped to inspire later inventors, notably Morland, who was master mechanic to Charles II, and still more Thomas Savery, a military engineer who about 30 years later devised and brought into use a steam pumping engine that worked on practically the same principle as the Marquis's water-commanding engine.



The steam fountain. Worcester's water-commanding engine is thought to have worked in a similar manner to this device.



Cells and grooves in the wall of Raglan Castle.

The Marquis was full of schemes, and inventions, many of which he described in a remarkable book *"A Century of the Names and Scantlings of Inventions."* This contained brief descriptions of 100 remarkable inventions that he claimed to have already practised. His water-commanding machine is numbered 68 in this collection, in which is included an engine that can be carried in the pocket and yet when fastened on the inside of the greatest ship will sink it at any appointed time. Not content with this he speaks of a way to dive from a distance of a mile to fasten this remarkable engine to a ship, and also includes an invention for preventing attempts to destroy ships by this method! No details are given of these and many other astonishing "inventions," such as a brazen head capable of answering in French, Latin, Welsh, Irish or English, questions whispered into its ear.

The Marquis called his book "the most stupendous work in the whole world," and it certainly would have deserved this description if all the inventions had been really practical, and not the fanciful schemes many of them actually were.