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# STEAM'S THIRD MAN--

Something about William Murdock, whose efforts not only helped James Watt, but are still making life easier for us today

By BOB BOYCE

The steam engine owes its useful existence in our modern world, not to one man, James Watt, as we are accustomed to think, but to three co-workers whose resourceful combination took the invention of Thomas Newcomen, improved it, applied it, and sold the idea to the public. James Watt stands first in developing the idea, Matthew Boulton second as promoter and supporter, and William Murdock third in improving and applying it.

The year 1939 marks the one-hundredth anniversary of the death of William Murdock, this third man of the steam engine and inventor of gas illumination. His span of useful life, starting at the age of twenty-three with his employment at Boulton and Watt's and ending sixty-two years later with his death in 1839, was not marked alone by his assistance with the steam engine, without which Watt would have been lost, but also by his discovery of gas illumination, as well as many other inventions.

Murdock was a goodlooking, modest fellow, with an open, intelligent countenance, and it seems that his temperance in the matter of strong drink was rather remarkable for a Scotchman of the times. His homely, modest manner was probably what got him his job with Boulton and Watt. He was so rattled when he applied that he couldn't hold his hat still. Boulton's attention was attracted, and seeing that it was strange material asked what it was made of. "Timmer sir," said Murdock modestly. "Do you mean to say it's made of wood?" "Deed it is, sir." "And pray how was it made?" "I made it mysel', sir, in a bit laithy of my own contrivin'". This was different, and Boulton became interested in this quaint fellow from the sticks who could turn a hat on a laithe, as he had work for a mechanic with that much skill, so Murdock was hired a 15 shillings, or \$3.60 a week. Watt once told Sir Walter Scott that he had little confidence in Scotchmen as mechanics, but Murdock proved to be the exception, for he soon became Boulton and Watt's most trusted co-worker and advisor.

Two years later he was placed in charge of the engines at Cornwall which were used to pump the water out of the mines. Here he became popular with mine owners and friendly with workmen and engineers, and proved a tireless worker, for he gave himself no rest until he had corrected the defects of the engines. They were continually breaking down and he was often described as 'flying from mine to mine'.

Watt's engine soon began to be used for manufacturing, and since this required rotary motion, he designed an engine using the crank. However, someone else took out a patent on the crank and Watt was forced to abandon it. Murdock saved the day, however, when he devised his sun-and-planet gear, which the conservative Watt used even after the patent on the crank had expired.

Murdock had heard of Watt's original speculations on a steam locomotive, and while in Redruth he designed a successful model of his own, so that Watt told him if he succeeded within a year in making an engine capable of pulling a carriage and two people at four miles an hour he would start a locomotive business with Murdock as partner. However, Murdock met a very interesting painter's daughter and in his rush to get married forgot all about his locomotive, otherwise Stephenson might never have had the credit for the first locomotive.

Murdock's greatest achievement was probably his invention of gas illumination, and we realize how important it was when we stop to think that it was the sole means of illumination for our city streets and homes from the time Murdock introduced it until Edison invented his arc light about eighty years later.

Having heard that many of the constituents of coal were driven off as vapors, Murdock tried catching the vapors from a kettle of coal and burning them. After numerous experiments he had his house fitted up with pipes, the gas being formed in a kettle of coal in the basement from which it was conveyed to the rooms and burned. He also confined gas in portable iron retorts which could be carried from room to room and burned. He used one of these portable lamps on his trips to the mines after dark.

Murdock introduced his gas illumination to the public in 1802 when he illuminated the works at Soho with gas. The idea soon became very popular, although it received much ridicule, for Sir Humphrey Davy asked the promoters if they intended to use the dome of St. Peter's for a gas-ometer and Sir Walter Scott made jokes about sending light through the streets in pipes.

Since Murdock failed to take out a patent, all he received for his invention was the honor of having invented it. Several companies applied for the patent and finally a London company succeeded in obtaining it and proceeded to install gas illumination in the House of Commons. The architect insisted that the pipes be placed several inches from the walls, for it was

thought that the gas they carried was on fire, and the members of the House, at first touching the pipes cautiously with gloved hands, were very much surprised to find them cool. Crowds of curious people used to follow the lamplighters on their rounds, and the lamplighters became so disgusted they called a strike, so that the sponsor of the gas company was forced to make the rounds for a while.

Another of Murdock's important, although probably less spectacular, inventions was the hectograph, which was used universally for copying letters until the invention of the typewriter many years later. During his first years of work with Boulton and Watt, Watt set Murdock to copying his letters, which bored Murdock to the extent that he mixed jellies until he found one from which transfers could be made. The peculiarity of the hectograph was the reversing of the writing so that it had to be read in a mirror, and all old copies of drawings made before the blue-print's appearance several years ago are marked "reverse".

In 1800 Watt withdrew from the firm of Boulton and Watt, and in 1809 Boulton died, after which time the sons of the two men continued the business with Murdock as their advisor. After retiring, Watt carried on

a very intimate correspondence with Murdock in which he sought advice on many of the inventions upon which he worked before his death. During this period, Murdock is credited with many more inventions, one of which was the substitution of fish-skins for isinglass. That one was responsible for his eviction from his apartment. He was accustomed to hanging the skins on the walls of his fine apartment to dry, but one day his landlady caught him at it and she threw him out.

In 1807 with the aid of the young partners of Boulton and Watt, Murdock supplied Fulton with engines for his steamboat, the "Clermont". He also supplied Fulton and Livingstone with engines for the "Car of Neptune", and the "Paragon", and improved marine engines so that their use soon became universal.

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