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Mr. Watt's Slight Innovation

Lead: There was not much of an Industrial Revolution until a slight improvement by the Scottish inventor, James Watt.

Tag: *A Moment in Time* with Dan Roberts.

Content: Industrial progress is marked by long series of bottlenecks overcome by small but clever innovations. For centuries the main product of England was wool. First in raw form, cut from English sheep and shipped to the factories of the Netherlands, and later fabricated in English shops into simple woolen

clothing. By 1700 the added popularity of cotton clothing created an opportunity. Already the machinery had been invented which could take raw cotton and wool and make cheap clothing for the mass market, but to operate those machines required energy. Primitive factories used water wheels turned by swiftly moving streams and rivers but there were just so many usable water sources around. Perhaps it was thought this first great modern energy crisis could be resolved by steam power.

The idea of using the energy of steam had been around since at least the Roman era, but modern steam engines such as those invented by Thomas Savery in 1698 and especially

Thomas Newcomen in 1712 were very inefficient. They were mostly used to pump water out of ever-increasingly deep coal mines. Steam from a boiler was injected onto a piston which then was forced upward, the steam was allowed to cool, this created a vacuum and ordinary air pressure pushed the piston down, but they were very, very slow and would have never worked in a textile factory.

In 1763, James Watt, a precision instrument maker from the University of Glasgow, was hired to repair a Newcomen steam engine. He realized that energy was being wasted while the piston cooled off, so he made a slight improvement. He added a separate condenser which bled off the steam

and allowed the piston to remain hot. This relatively small modification quadrupled the efficiency of the steam engine which, using the plentiful supply of bituminous coal in the mines of Northeastern England, became the energy source which drove the Industrial Revolution.

At the University of Richmond, this is Dan Roberts.

Resources

Dickinson, H.W. and H.P. Vowles, *James Watt and the Industrial Revolution*. London, UK: Longmans, Green & Co., 1943.

Watkins, George. *The Steam Engine in Industry*. Ashbourne, UK: Moorland Publishers, 1978-1979.