

James Watt (1736-1819)

Year	Event	Commentary
1736	James is born on January 19th, in Greenock (near Glasgow); father is James Watt, a carpenter and shipwright, and treasurer and magistrate of Greenock; mother is Agnes Muirhead; a delicate child, James is taught until age eleven or so by his mother; he does not shine as student until grammar school, when under competent tutelage he excels at mathematics; he is not precocious, except in drawing; perhaps his most important experiences are in his fathers shop, where the younger James is set up with his own equipment and proves quite capable — the workmen saying that "Jamie has a fortune in his fingers' ends".	<p>There are numerous aspects of James' early life worth noting, including the following:</p> <ol style="list-style-type: none"> 1. First, he is a sickly child, a common trait of creative geniuses (see Ochse, ch. 4) — presumably this makes a life of isolation and intellectual achievement more likely. 2. Second, we see the common pattern of indifference or mediocrity when it comes to formal education; James had most of his education at home, did not even complete grammar school, and learned many of his most important lessons in his father shop, where he made models (e.g., of cranes and barrel organs); nevertheless, his parents are a high-achieving, middle-class couple (see Ochse, ch. 4, and Simonton, ch. 4). 3. Third, James early on shows a natural talent for his areas of later achievement, demonstrating exceptional talent in the areas of logical-mathematical, spatial, and mechanical ability (see Ochse, ch. 8).
1753	His mother dies, when Jamie is 17; James decides to become a mathematical instrument maker, and leaves for Glasgow, where he obtains an apprenticeship, but knows more than the man he works for.	Once again we see the familiar pattern where parental bereavement is associated with creative genius, although in this case involving a mother instead of a father (see Ochse, ch. 4, and Simonton, ch. 4).
1755	James leaves for London, where after some difficulty he is finally apprenticed to an instrument maker; he lasted only one year before his health began to fail him, due to his long hours and fragile constitution; nevertheless, James learned "more in one year than most journeymen in four".	<p>James' professional life was affected directly by two gulfs between professions:</p> <ol style="list-style-type: none"> 1. The first of these was between science (chemistry) and practice (engineering) — much of Watt's success derived from the fact that he was able to bridge this gap, applying scientific principles (many of which were learned from his friend Joseph Black) to engineering problems; 2. The second of these was between instrument making, which a highly refined craft, and iron working, which was very crude — the crudeness of the latter was a major obstacle to Watt implementing his ideas, represented in instrument-like models, for practical use, which required the use of iron.
1757	Returning to Glasgow, he soon earned.	

through his friends, a position as "Mathematical Instrument Maker to the University".

1759 Because the university work was not enough to sustain him, he — in partnership with James Craig — opened a shop in Saltmarket to make all sorts of instruments, including toys.

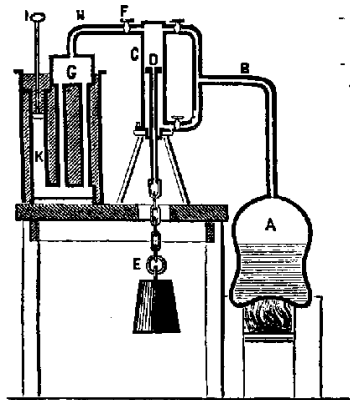
1764 A momentous year in James' life: He marries his cousin Margaret Miller, who, before she dies nine year later, bears him six children; and in one of those serendipitous twists of human affairs, the university acquires a non-working model of a Newcomen engine, and Watt is asked to repair it.

It is often thought that Watt invented the steam engine, this is not true: Thomas Newcomen had built at Staffordshire, England, a working steam engine in 1712 — Watt's genius was to make a steam engine of sufficient power, efficiency, and flexibility that it could drive the industrial revolution.

1765 Watt immediately sees the limitations of the Newcomen engine, and in May of 1765 comes up with his first and greatest invention, the idea of a separate condenser.

Two things are noteworthy about this remarkable event:

1. First, James Watt may have been the first person to apply a scientific principle (Joseph Black's concept of latent heat) to an engineering problem; this fact is remarkable, from a creativity standpoint, for at least two reasons: (a) it shows the importance of shared knowledge and communication to creative genius (see Ochse, ch. 3, and Simonton, ch. 6), and (b) it illustrates a common aspect of scientific creativity, namely that creative insights are often sparked by cross-disciplinary fertilization.
2. Second, Watt's own description of this event clearly illustrates the role of incubation in problem solving and creative insight, in other words, the so-called "bed-bus-bath syndrome" (see Ochse, ch. 9 and Simonton, ch. 2).



1766–74 Watt works as a land surveyor on Britain's new canals; he is only able to work sporadically on his steam engine designs.

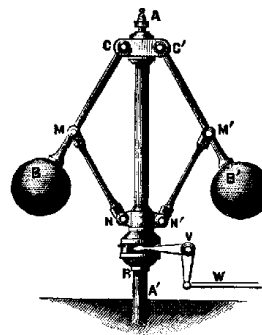
1768 James enters into a partnership with John Roebuck to make a prototype of Watt's improved steam engine.

1769 Watt takes out his famous patent for "A New Invented Method of Lessening the Consumption of Steam and Fuel in Fire Engines".

1772 Roebuck goes bankrupt, freeing Watt from their earlier agreement.

1775 Watt forms a partnership with Matthew

Also about this time begins the monthly



Boulton, a partnership which will last 25 years; they are the ideal pair — Watt, the technically-gifted hypochondriac and genius, and Boulton, the wealthy, insightful, and opportunistic industrialist.

meetings of the **Lunar Society**, an extremely influential, yet informal, group of industrialists and scientists, which included among its dozen or so members not only Watt and Boulton, but Joseph Priestley, Erasmus Darwin, William Small, and Benjamin Franklin as a corresponding member.

- 1776 Watt and Boulton build their first two engines at Boulton's Soho Iron Works in Cornwall; Watt remarries, his second wife, Ann MacGregor, bears him two children.
- 1781 At Boulton's urging, Watt invents a rotary motion device for his steam engine, called a sun-and-planet gear, that adapts their steam engine for use in corn, malt, and cotton mills.
- 1782 Watt's father dies; James, at the height of his inventive powers, patents the double-acting engine, in which the piston pushes as well as pulls.
- 1784 Watt improves the steam engine by inventing a parallel motion device for connecting the piston to the beam.
- 1785 Watt and Boulton are elected members of the Royal Society of London (members of the Lunar Society revitalized the Royal Society, which had become a social rather than a literary club).
- 1788 Watt invents, at Boulton's suggestion, the centrifugal governor for automatic control of the engine's speed.
- 1790 Watt invents a pressure gauge to monitor and regulate the internal steam pressure of the engine; this last modification takes the Watt engine about as far as it can go.
- 1794–95 Watt purchases a country estate at Doldowlod, Radnorshire, and begins to retire from business; Watt and Boulton establish the new firm of Boulton & Watt, which they turn over to their sons, James and Matthew.
- 1806 James is made a doctor of laws of the University of Glasgow (and made a foreign associate of the French Academy of Sciences in 1816).
- 1819 James dies, at Heathfield Hall, near Birmingham.

James Watt



By this time Watt is a wealthy man, based on royalties from his patents.