

## **The Social Context of Innovation: Bureaucrats, Families and Heroes in the Early Industrial Revolution**

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The opening essay focuses on the invention of the steam engine. The first technological conceptualization of the steam engine emerged around 1620, when the Dutch mechanic and alchemist Cornelius **Drebbel** conducted a series of experiments on naval weaponry at the royal dockyard at Woolwich on the Thames. Woolwich gun-wharf was administered by the Royal Ordnance department, the most powerful department of state under James I. James conceived of the office of the Ordnance as a vast bureaucracy, whose royal-appointed Master of the Ordnance supervised not only engineers, private gunfounders, shipwrights, boat-wrights, carpenters, smiths, sailors, and masters of cables, but also paymasters, scribes, stewards, interpreters, chaplains, physicians, surgeons, and trumpeters. In 1697, in the new premises of the Royal Ordnance in Lambeth and Vauxhall, Thomas Savery--Captain and ordnance officer--successfully built the first steam-pressure engine, developing **Drebbel's** original idea. In 1712, Newcomen installed the atmospheric piston engine at the coalmines at Dudley Castle, using atmospheric pressure instead of Savery's steam pressure. Newcomen's invention was perfected by John Watt half a century later, when steam-power replaced water-power in modern factory production.