

### Steam engine

- Heron of Alexandria 50 ad
- Jet/steam turbine
- Ancient Chinese also had it as well
- Was not invented to power factories, was a solution to another problem
- Navy - needed special large trees to build the mass
- Wood was running out so hard to get wood for power
- Over night Britain switch to coal
- Steam engine was re-invented to mine coal

### Thomas Savery - did not invent the steam engine

- Did get the patent for it and became wealthy because of it
- Called it Miner's friend
- Copied Edward Marquise of Worcester
- He understood that the engine doesn't work for under 12m
- Never bothered with it
- That thing was a vacuum pump
- Limited to about 12m

### Denis Papin

- Unfortunate person since he was French and so the Royal society didn't treat him well. - British didn't like French so they didn't like him
- 1690 - First piston steam engine -> steam boat
- He invented it based on ancient document which basically powered the industrial revolution type steam engine later on.
- Why was he removed from history?
- Inadequate technology (could not be built at the time) (established internal) Or social issues (external-new)
- Communicated to Robert Boyle - Hooke - Thomas Savery - Isaac Newton
- Nothing was built due to his social connections
- Needed to find patient
- Worked as an assistant to Robert Boyle which took most of the credit of Denis Papin
- Connections to the Royal society and money
- Turns out Robert Hooke was later hired by Boyle and became friends with Papin
- But then later they both died
  - Newton became the head of Royal society
- Proposal for a steam boat needed 15 pounds
- Member of royal society couldn't give him the money because they would go against Isaac Newton and tried to wipe him from history.
- As best friend of Newton's biggest enemy he had it tough
- Thomas Savery sent a nasty letter denouncing Papin saying that he was a fraud and that Thomas was the only inventor or Engine
- Newton rejected Papin

- "you should try the simplest and cheapest experiments first."
- Papin already did so it was an insult
- Papin became homeless and vanished so he dead somewhere

#### Thomas Newcomen

- Claimed that he invented the piston steam engine - stolen from papin
- Hot water was boiled and admitted into the cylinder at the same time colder water injected into the cylinder which created a partial vacuum that created the motion
- A model of Steam engine breaks at Glasgow University

#### James watt

- Was fixing broken equipment at the University
- External Condenser - Made the engine extremely efficient
- Changed to a steam push vacuum pull system

#### Matthew Boulton

- Realised money could be made and got the patent for the james watt steam engine
- Opened the first engine factory
- Lunar society - textbook reading (important)
- Basically Matthew Boulton provided all the money for James watt
- Problem: They could not obtain the precision to make the mass production possible because of the cylinders and pistons

#### Solution: invention from ancient China

- Cannons
- They was friendly firing on allies because barrels keep exploding
- Needed a new method to make cannon not break

#### John Wilkinson - apparently a really shitty dude

- Obsessed with standardization
- Invented the Cannon boring machine -> helped James watt

#### James watt later invented a new engine

- "revolution" -> crank/flywheel got patent afterwards
- Cheated James Pickard from his engine and money

#### Factory System

- Before the factory system:
- Putting-out system
- Aka cottage system
- Contracted work - at worker's home
- Paid on your own hours by your output
- Allowed you to stay with family - life was good

- Then the factories came
- Machines got too large
- Led to the first factories

Factory - new technology of labour organization

- Workers removed from families/homes (minimal wages)
- Destroyed old system which
- Bad wages that people can't buy food
- At the time poverty was seen as a punishment from God as a sin
- When the fathers at factories cant provide
- Brought in Wives and children and people started dying
- Made the few owners hella rich

Silk mill in Derby

- Paradigm of factory - powered by water

Richard Arkwright

- First person to use steam engine in a factory -> super efficient
- Cromford Mill factory

You have to pay a subscription to use the steam engine

- Idea invented by James watt

Marc Brunel

- Automated production/assembly line
- Essentially invented full automated assembly line
- Portsmouth block mills factory became the famous factory back in 1800s
- Comes back to the Navy (desired steam engine)
- To automate building ships in parts

This means factories can move away from the river systems

- Removed the biggest cost of factories - shipping
- No longer dependent on water - moved into cities - workers - modern industrial society
- Enormous value for the factory owners at the time but really terrible for the workers
- No female engineers
- Women were highly restricted towards almost everything that had to do with innovation and engineering till 1957

Mary Fergusson

- First female admitted to the institution of Civil Engineers in Britain

Crystal palace and Great exhibition of 1851

- Hight of industrial revolution

### Queen Victoria 1819 - 1901

- The Royal commission - prince Albert/social programs integration of art and industries competition for design
- This was because people started to realise how poor the working conditions for the people and that was caused by how factories ran
- Use these programs to improve the working conditions for people in the factories
- "people who are well fed provide higher quality works"
- Poor way of going about it
- No one could produce him the building large and cheap enough to house such an exhibition

### Joseph Paxton - Gardener

- Obsession with Green houses
- Great Conservatory
- Complete failure in its purpose to house plants but
- It was a glass "house" that paved the way to what glass skyscrapers look like now
- Submitted Design using a napkin in a pub lol
- 9 months later the crystal palace was constructed
- Regarded as a temple/church for the worshippers of technology (religion)
- Product of industrial revolution - new religion of the new age

### Fruits of the industrial revolution - bring industries and arts together - Great exhibition of 1851

- Presentation section restricted to technological revolutions
- Grand piano invented around this time

- First printer scanner and fax machine
- Invented by Alexander Bain
- Presented during the great exhibition of 1851
- Operated with electrochemistry
- 2 electric pendulums that moved the scanning line by line
- Special ink that can be read by electrical signals
- 1865 first fax line
- Incredible quality for the time
- Used to confirm peoples signature (banks)
- Send samples of new patterns in the textile industry
- Talking telegraph (very spooky/creepy)

Visited by over 6 million people

Directly resulted in changes in applied art

### Singer machine - sowing machine (Domestic revolution)

- First machine to have applied art
- Drawings on machine that made it loop *\*pretty\**

- First time someone built a machine that was designed towards women at the time
- Gave women the independence
- Very revolutionary at the time
- Was dependent on husband on money
- Allowed women to do full time jobs at home and bring income directly to them
- One of the first machines to be associated with women
- Installment plan
- Give the machine to women and allowed them to pay it back installments until you pay off the machine (think about buying cars today)
- Photography
- Start of when women started establishing themselves in industry.