

THE PUMPING STATION = CAMBRIDGE MUSEUM OF TECHNOLOGY

The Old Pumping Station, Cheddars Lane, Cambridge CB5 8LD

Tour of CMT - Location: Main entrance.

Important facts:

- Sewage went into the river and the King's Ditch before the construction of the Pumping Station in 1894
- Scavengers employed by the local council collected rubbish which was buried in pits or recycled
- Two bouts of cholera (severe vomiting and diarrhea) hit Cambridge, resulting in many deaths and health fears
- Report by William Ranger (public health hero) in 1849 linked Cambridge's health problems to dirty water and living conditions
- The pumping station was built specifically to deal with the health hazard of exposed sewage.



Script: In the Victorian era, waste of every kind was disposed of directly into the river Cam, or into The King's Ditch, which had been part of the town's defences.

William Ranger wrote a report on Cambridge's health in 1849. He said the conditions in Cambridge were 'a disgrace to humanity' which made it impossible for the people 'to be healthy, cleanly or even moral.' The town council employed cleaners called 'scavengers' to collect the rubbish and take it away to be recycled, buried or used as fertilizer on the land. The waste in the river made it smell and even clean water could be contaminated and make people sick.

There were two waves of a disease called 'cholera', an illness that typically strikes when people consume the same bacteria that you would find in toilet water; this is the same reason why you wash your hands after using the toilet. Cholera causes severe vomiting and diarrhea which dehydrates people and kills them. It hit Cambridge along with many other parts of England during the 19th century.

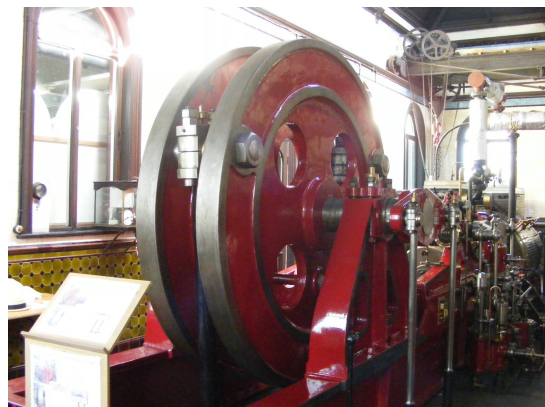
According to Gwen Raverat (Charles Darwin's granddaughter), when Queen Victoria visited Cambridge she asked what the pieces of paper floating in the river were. They were really pieces of toilet paper but Dr Whewell, who was showing her around, told her that they were notices telling people not to bathe in the river.

In 1894, Cambridge reacted to this health disaster by building new sewers which brought the town's sewage to the pumping station. All sewage that was produced by the city passed through this one spot, and was pumped two miles away to Milton, to the sewage farm where it was used as a fertilizer on the land. The project meant that the river could be properly cleaned, and was no longer a health hazard. Pumping stations like this one were built all over the country at this time, and it made living in cities safer, which was important because more and more people were moving to the city from the countryside.

Location: Main Engine Room (in the main entrance doors, the room with the large red engines)

Important facts:

- The engines ran 24 hours a day, 7 days a week, from 1894 until 1968
- These are steam engines, which harness the power of steam to pump water from 13 metres underground
- These steam engines have many similarities to engines you might find in a car, though the car would have significantly more power.
- Victorians often made their sewage pumping stations look very beautiful. Maybe they were trying to cover up the fact they were pumping sewage or maybe they were really proud of their engineering!



Script: This is the main engine room for the pumping station. The two engines you see here were made by a company called Hathorn Davey and are the last of their kind in the world that can still work. They were purchased because they were very reliable and were used in lots of other industries. They were bought for the modern equivalent of £900 thousand. You might notice that the engines are connected to beams on the wheels. This is because each engine pumps

water up from about 13 metres below your feet to move sewage out to Milton. Above ground, they are about two metres tall, so you are standing next to less than 1/6th of the engines' actual height!

The engines first started running in 1895, and pumped sewage 24 hours a day, 7 days a week, until 1968. That means that these engines were pumping in this room non-stop for over 70 years. To make sure they had a chance to be cleaned and fixed, the engines would take turns, spending one week pumping and one week being serviced. Since the engines had to be run constantly, it also meant people worked here 24 hours a day too. If you look out the door where you came in, and look behind the tree, you might see the Engineers' House. The house was built in 1898 for the Engineer in Charge of the Pumping Station, so if anything went wrong at any time, he could be here quickly to deal with any problems.

We know the Engineer ran a very tight ship here. The room you are in now was the cleanest room in the whole site to make sure the engines ran properly – normally, workers had to take off their shoes to come in here! We also know that there were three people who worked here whose entire job was to clean. These engines do have a lot of power, and if something got in their way, it could mean disaster for the engines, or for the river.

These engines use pressurised steam to move pistons back and forth. When you use a kettle to boil water, the water becomes full of energy, maybe making a noise, or shaking the kettle. These engines capture that energy to drive the pumps. At the far end of the room, you can see the piston drum on the engines; they look like giant barrels on their sides. You can find pistons in a car, which might have six, eight, or even twelve pistons moving back and forth to make the car move. On these engines, they only have one piston each. The power of an engine is measured in 'horsepower'. These engines have a horsepower of about 80, meaning if you had a team of 80 horses pulling a rope in one direction, and these engines pulling in the opposite direction, no one would move. To compare, a family car has between 100 and 200 horsepower, a Ferrari has a horsepower of 560, and a monster truck would have a horsepower of 1500. Our engines are very strong, but not nearly as strong as what would be in your car! There is a working model of how the engines move at the far end of the room.

You might also notice that this room has a lot of decorations: there are high ceilings, there is lots of natural light, and the walls are covered in colourful tile work. The Victorians designed this space to be beautiful maybe to distract from why the building was here in the first place or maybe they were very proud of their engineering achievement! This is common to many Victorian sewage works: in London, Cross Ness sewage pumping station has the nickname of 'Cathedral on the Marsh'.

Location: Gas engine room (adjacent to the main engine room, it has two large green engines sunk below the floor level)

Important facts:

- Gas engines were installed in 1909, showing that the site was always changing
- These engines are similar to what is in a car, though the technology has come a long way in a century

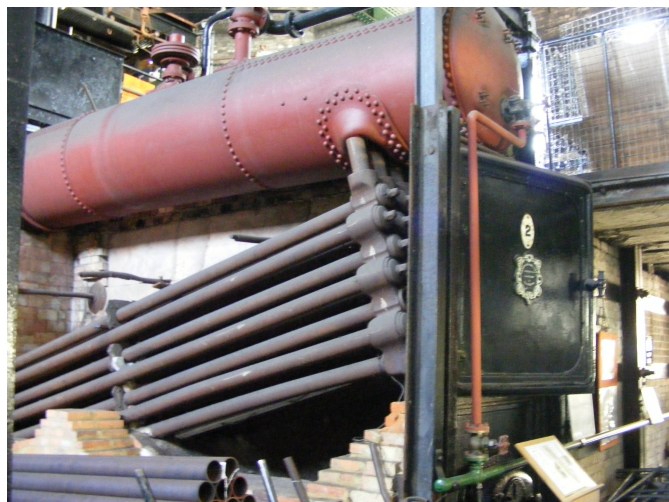
Script: In this room, you can see the two giant gas engines. They were installed in 1909, making them just over a hundred years old. They were put in place to assist the steam engines when the Cam would overflow, because this would cause the sewers to flood. These engines pumped the excess sewage on to storage tanks on site so that the steam engines could handle it later.

When these engines were first installed, they were an amazing piece of technology: they only took about five minutes to start up! You can imagine how fast a car starts up from when you put the keys into the ignition until when the engine is running – now, it is a matter of seconds. At the time, five minutes was something of a miracle because the steam engines took much longer to set in motion.

Location: Boiler room (going back into the main engine room, walk through the corridor behind the engines next to the ladies' loo. A green door connects to the boiler room.)

Important facts:

- Engines on site ran on steam
- Steam was created by burning both coke and rubbish, thus cleaning the streets
- This was a dirty and sometimes dangerous job



Script: This is the boiler room. Boiler 1 and Boiler 2 are close to the door at the far end of the room. Water was boiled in the boilers to make steam. Boiler 1 and Boiler 2 were heated by burning coke which was shovelled into the grates which are hidden behind the doors on the boilers. They also burned the town's rubbish which was dropped from above into furnaces, called 'destructors' on either side of the boilers. Boiler 4, the big black one, near the entrance to the room is the youngest of the boilers, dating to 1923 and it only runs on coke. The museum still uses this boiler to power the engines, so there are volunteers that come in to shovel coke! Where is Boiler 3? It was taken out before the museum took over the site.

The workers who fed the boilers were called 'stokers'. They worked in shifts to keep fires burning 24 hours a day to produce the steam that would power the engines. You can imagine how difficult it would have been to come here every day to shovel rubbish and coal. Despite this, very few people were ever injured here. One person had their feet injured on the engine. Only one person ever died in the building, and it was after a long shift of shovelling he sat down and died. This space was hot, smelly, and very uncomfortable, and everyone here knew it. Because of the lousy conditions and the fact that there were people here 24 hours a day, we also know that the workers became something like a family – the people that came in for the morning shift would sometimes bring bacon and eggs to cook on the boiler so everyone could have a nice breakfast to round off the day.

Location: Ash Tunnel (exit outside through the green door next to Boiler 1. Turn left, and enter the tunnel with the giant green doors.)

Important facts:

- All waste from the site was used for another purpose
- Shovelling ash was just as important as shovelling the fuel

Script: This is the ash tunnel, the other side of the boilers. In here, you can see the ash shelves that would have filled with ash as rubbish burned. As ash built up, it could prevent oxygen from getting into the fires, so the ash had to be cleared out every two hours to keep the fires burning. Ash is very dirty, and is terrible for you if you get it in your lungs – this was not a pleasant job.

Ash was removed from the tunnel by a railway, and loaded up into trucks on wheels. Cambridge had lots of brickworks in this area, where people would dig holes in the ground to get clay to make bricks. The ash was taken away to fill in these holes. The ash was also sometimes used to make roads. You might notice a truck sitting in the ash tunnel – it is a large black cart. Inside it is 'clinker'. Clinker is the name of the ash that was left after the rubbish was burned. The clinker could be crushed by a steam roller and used for gravel.



The pumping station did not burn all of the rubbish that was brought here. Some materials could be reused. Just like today, where you might take a bottle back to a store for a deposit, the same happened a century ago. Workers would take the bottles they had found in the rubbish to a shop at the end of their shift to get some extra money. The shop wouldn't accept broken bottles, so instead, they would bury many of the bottles here rather than throw them in the furnace. If they were put in the furnace they would melt and make a mess. It means we find lots of old bottles if we start digging under our feet here.

Metal was also removed from the rubbish as it could be sold to be reused.

In the ash tunnel, you will also find two wooden logs lying on the ground. These logs are actually water mains that come from London. You can see how they carried water around the city – they are hollowed out, then carved on the ends to fit together. These logs were used in London to transport water up until the 1820s. What is truly remarkable is that the technology for the pumping station dates to the 1840s, meaning that in England, we went from having logs transporting our water to having sewers and steam engines in less than twenty years!

So often, we think of how quickly technology moves – there are always new models of iPods, smartphones, and computers, but this is not a new trend.

Technology has always moved quickly, and always in very dramatic leaps.

Location: Print room exterior (through the ash tunnel, next to the gents' toilets)

Important facts:

- Everything on site was used for something
- The chimney is an important feature of the history and skyline of Cambridge

Script: Here, you can see just how tall the chimney is. There are a few different measurements for the chimney, but they are all about 80 metres. When the pumping station shut down in 1968, Radio 3 put an antenna at the top to help it broadcast, and in 1992, a man named Fred Dibnah was filmed for a television documentary when he repaired the chimney. As a part of his documentary, he built put his ladders up all the way to the top. He carved his initials into the side of the chimney – see if you can find “F.D. 1992”.



You might notice that there is a grill leaning up against the side of the chimney. This is because the local council tried to destroy some confidential documents in the furnace, but because of the extreme heat of the bottom of the chimney, and the extreme cold of the top all the papers were sucked out of the destructors, up the chimney and out over Cambridge. Secret documents were raining all around the city, and there was an emergency calling of street sweepers to get them destroyed without everyone seeing. To prevent this in the future, the chimney got a grill that would catch any papers that not been burned.

Next to the phone booth is the print room. This room was once used as a steam laundry for local hospitals to disinfect bedclothes. The super hot steam would kill bacteria and germs left behind from sick people, and it was very helpful in keeping the hospitals clean. This was just another way that absolutely everything was reused from this site. Now, the room is used to show off the museum's collection of printing presses. Since the time of Henry VIII, Cambridge has had a thriving printing industry – you have probably heard of Cambridge University Press. Cambridge University Library is required to have a copy of every single book ever published in the UK. If you are lucky, you might be able to catch one of the printers today doing some demonstrations.

Location: Top Bay (Up the stairs next to the print room, on to the flat drive way)

Important facts:

- Bombers were a real threat to Cambridge during WWII
- Technology moved very quickly, and even new technology does not remain new for very long
- The site shut down in 1968 in favour of electricity instead of coke power

Script: This is the Top Bay, where horses with carts full of rubbish would drop off their cargo to be burned. Lorries replaced horses in Cambridge in the 1920s.



You might notice that while most of the building is made of brick, this part of the building is made of wood. During the Second World War, Cambridge was a target for enemy bombers with good reason. There were a number of important industries working on the war effort in Cambridge including Pye, Cambridge Instrument Company and Shorts. Cambridge also had railway connections between London and Northern England. The council was worried that glowing fires of the destructors might be seen at night and make the pumping station both an easy target and a landmark that bombers could use to find other important places. To deal with this issue, the town council had the wooden building put up so that the glowing fires could not be seen at night from the air. The plan worked, and the site became dark at night for the first time in 1942.

Also in this area, you will find a grey pump next to the crane. . The pump was part of the machinery from the new electrically powered pumping station which was installed next door on Riverside and started working in 1968. The old Cheddars Lane Pumping station stopped its work as an industrial site, and the workers went to find jobs elsewhere. If you look next door to the museum now, though, you don't see a pumping station: you see houses and flats. That is because the electric pumping station was replaced by one at Milton in the 1980s.