

Gas

Gas Lighting

Resources for teachers





Using the resource

National Grid owns, manages and operates the national gas transmission network in Great Britain, making gas available when and where it's needed all over the country. This resource is part of our series for schools, highlighting and celebrating how gas has lit our homes and streets and kept us warm for over 200 years.

This resource primarily supports History at Key Stages 1 and 2 and the development of children's enquiry, creative and critical thinking skills. It includes:

- Information for teachers
- Fascinating Did you know..? facts
- A series of historical images to help children explore the theme, with additional information and questions to help them look closer.

It can be combined with other resources in the series to explore wider topics such as:

- Energy
- Homes
- Victorians
- Jobs and work
- The industrial revolution
- Technology

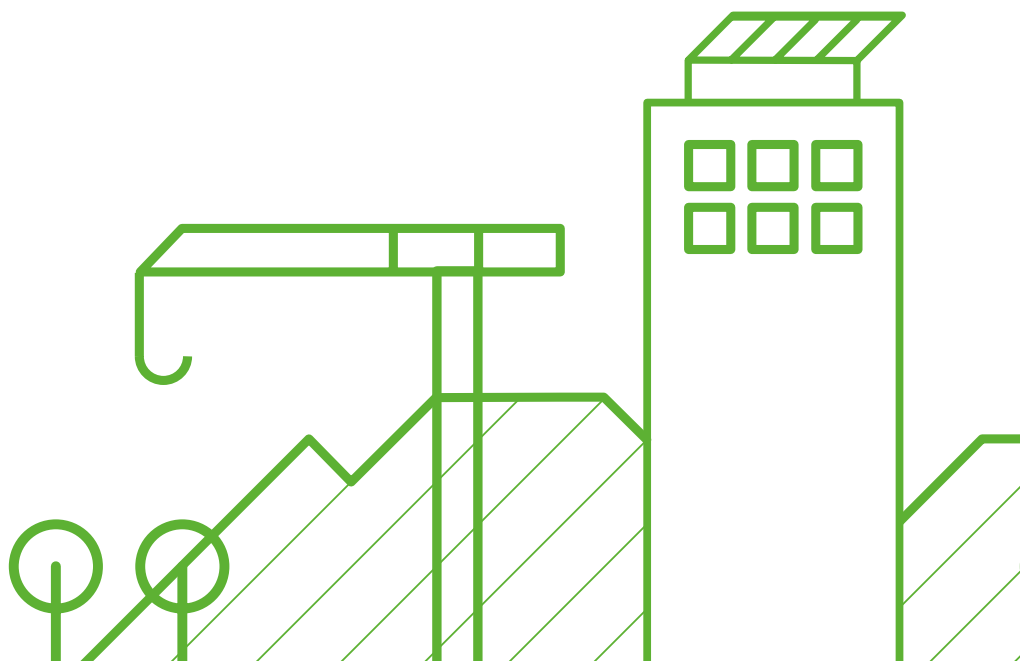
And used to support cross-curricular work in English, Technology, Science and Art & Design.

Project the images onto a whiteboard to look at them really closely, print them out, cut them up or add them to presentations, Word documents and other digital applications.

Our **Classroom activities** resource provides hints, tips and ideas for looking more closely and using the images for curriculum-linked learning.

Resources in the series

- [Gas lighting](#)
- [Heating and cooking with gas](#)
- [Gas gadgets](#)
- [Gas – how was it made?](#)
- [The changing role of women](#)
- [Transport and vehicles](#)
- [Classroom activities](#)
- [Your local gas heritage](#)





A brief history of gas lighting

– information for teachers

Before the 1800s, most homes, workplaces and streets were lit by candles, oil lamps or rushlights (rush plants dried and dipped in grease or fat).

But these gave off a very dim light and could be smoky. In 1792, the Scottish engineer and inventor William Murdoch made an extraordinary discovery which would transform not only lighting, but heating, cooking and all sorts of other activity and industry. Experimenting in his back garden in Cornwall, he found a way to produce gas, by heating coal in a closed container and collecting and cleaning the fumes produced. He then piped the gas into his house. He made holes in the pipes and lit the gas there. This produced a light much brighter and safer than from candles or oil lamps.

Public lighting

Some of the first public gas lighting in Britain appeared in London's **Pall Mall**, in 1807. By 1850 it had been adopted by towns and cities across Britain. The lamps were relatively efficient and cheap to run, and were seen to help increase public safety and reduce crime. At first, the lamps were lit by a **lamplighter**. The lamplighter would set off at dusk and light the lamps using a wick on the end of a long pole, returning at dawn to extinguish the lamp using a small hook. Lamp lighting was an important job and a respected profession – often passed down from father to son, although the job was also done by women.

In the 1930s, the clockwork **Controller** was invented, which lighted the lamps automatically. Although the lamplighter was no longer needed to actually light the gas, the mechanism still had to be wound regularly, the glass in the lamp cleaned and parts repaired and replaced.

Gas was used to light streetlamps until the 1950s when it was replaced in most areas by electricity.

Lighting homes

At first, the cost of gas was high and only the wealthiest could afford to use it to light their homes. But by the 1830s, greater competition and more efficient means of production had reduced the price by as much as three-quarters and gas lighting became increasingly popular in middle class houses across the UK – particularly in urban areas. This really took-off after gas fittings were introduced in the new Houses of Parliament in 1859, with fashionable town houses being built with gas lights in each of the main rooms. But it wasn't until the late 1800s that most working people could afford to light their homes with gas.



1930s

The clockwork Controller was invented, which lighted the lamps automatically.

Lighting industries

Gas lighting proved immediately popular with the factory and mill owners of the 1800s – especially those in the textile industry, as it was safer, cheaper and brighter than the alternatives. While this was a revolution for the owners, it was not such a welcome innovation for everyone. Efficient lighting meant production could now start before sunrise and continue after sunset, contributing to year-round shifts as long as 14 hours for the men, women and children workers.

Another popular use of gas lighting was in theatres. Where previously, audiences had peered through the candle or oil-lit gloom, stages were now fully lit by limelight - gas was used to heat quicklime (calcium oxide) which would incandesce, producing a very bright light. Hence the term 'step into the limelight'. Staff no longer had to tend to candles during performances, actors wore less make-up and had no need to exaggerate their performances, and the audience focused more readily on the show than on shouting, socialising or fighting with each other.

Design Developments

For nearly a century the light from burning gas came from a simple upright flame. Most of the light was directed towards the ceiling – often away from where it was needed most. People experimented with lots of different types of flame including multiple jets, and fan-shaped flames. As demand for better, brighter lighting grew, the burners inside street lamps increased in size and number until the lamps became gigantic – as tall as a grown adult, especially in busy locations.

But an important invention by the Austrian chemist Carl Auer von Welsbach in 1880 led to a revolution in gas lighting - the development of the incandescent gas **mantle**. A mantle consisted of a fine gauze impregnated with rare earth metals. When heated to a high temperature this produced a much, much brighter light than a naked flame. A mantle was also introduced in the early 1900s that could direct light downwards. The mantle became widely used in the 20th century, once its design had been perfected and was less fragile.

These developments came at an ideal time to help gas resist the competition from the newly emerging electricity industry. Millions of street lights meant that the cost of a change to the infrastructure to electricity would always be enormous and the invention of the mantle so improved the performance that gas street lamps held sway for a very long time, whilst electric interior lighting became increasingly popular from the 1930s.



Did you know?

- ◆ There are still 1500 gas lamps operating in London. Five 'lamp attendants' are employed to maintain them, riding between them on motorbikes and using ladders hidden in strategic places to 'climb' the lamp posts.
- ◆ Despite his pioneering work, William Murdoch did not patent his extraordinary invention and made no money from it.
- ◆ Gas lights could be as bright as 12 candles. In 1860, a standard was introduced meaning all gas produced must be of a high enough quality to produce a light equivalent to 12 candles.
- ◆ Gas lights could be formed into different shapes or words to celebrate events such as royal celebrations.

1

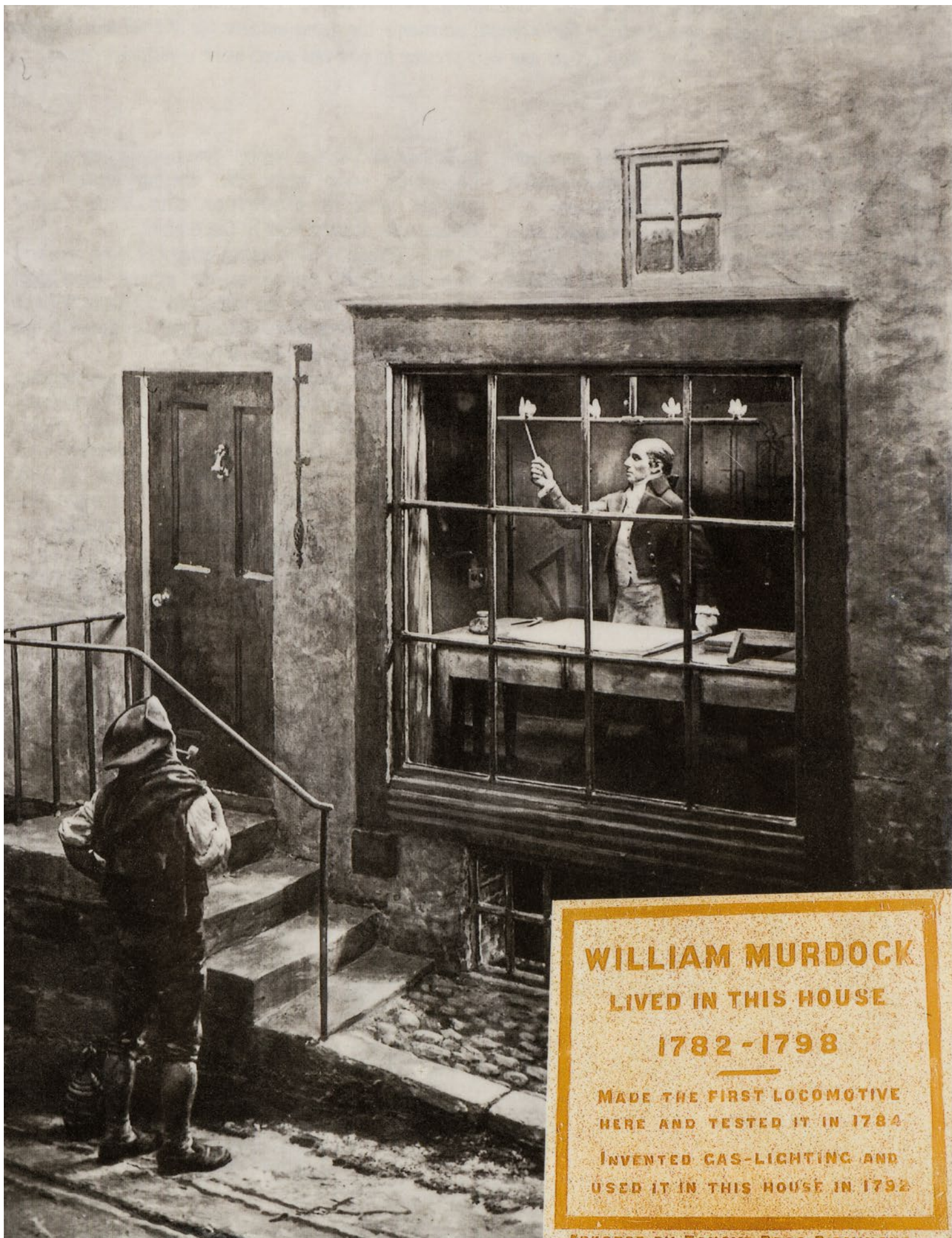
William Murdoch demonstrating gas lighting at his home in Redruth, Cornwall

In 1792, the Scottish engineer and inventor William Murdoch made an extraordinary discovery. Experimenting in his back garden in Redruth, Cornwall, he found a way to produce gas, by heating coal in a closed container and collecting and cleaning the fumes. He piped the gas into his house, made holes in the pipes and lit the gas there. This produced a light much brighter and safer than from candles or oil lamps. His house became the first to be lit by piped gas, manufactured from coal.

Look closer

- ◆ Can you see William Murdoch inside the house? What is he doing?
- ◆ What clues in the picture tell you that this is from the past?
- ◆ What do you think the person looking through the window might be thinking?

1792



National Gas Museum, from a diorama, British Gas Corporation (London); British Gas Council | Photo: Luke Unsworth

2

A peep at the gas lights in Pall Mall by Thomas Rowlandson

Some of the first public gas lighting in Britain appeared in London in 1807, when 13 lamps were installed along Pall Mall to celebrate the birthday of George III. They continued burning until midnight, causing much excitement and wonder.

Look closer

- ◆ Look at the expressions on the faces of the people in this print. How do you think they are feeling about the new gas lamps?
- ◆ Do they all feel the same?
- ◆ What might they be saying?

1807



A PEEP AT THE GAS LIGHTS IN PALL-MALL.

Woodward del.

3

Gas powered street light

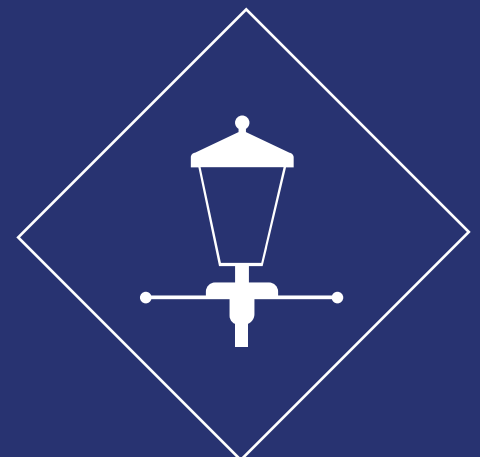
Gas lamps first appeared in London in 1807 and soon spread to towns and cities across the UK. They were initially lit by **lamplighters** and then later by an automatic ignition switch, controlled by a **clockwork timer**.

The design of the lamp post would usually include a horizontal bar somewhere near the top for the lamplighter and, later, the **engineer** to rest their ladder against.

Many Victorian gas lights are still used, but most are now powered by electricity, although a number of gas street lamps still remain, including 1500 working gas lamps in central London. This one was installed outside what is now the National Gas Museum in Leicester, in around 1870. It is still powered by gas.

Look closer

- ◆ Can you see how the gas is piped into the lamp?
- ◆ What do you think this lamp is made from?
- ◆ Why is this a good material for a streetlamp?





4

Model of a Victorian Lamplighter

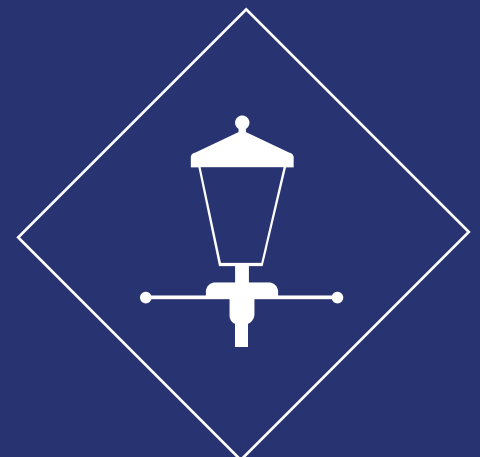
The first gas street lamps were lit by a lamplighter, until the introduction of **clockwork timers** in the 1930s. The lamplighter would set off at dusk and light the lamps using a wick on the end of a long pole, returning at dawn to extinguish the lamp using a small hook.

Lamplighting was an important job and a respected profession – often passed down from father to son, although the job was also done by women.

This model was awarded to the South Western region of British Gas, in 1988, to celebrate their one millionth customer.

Look closer

- ◆ What is the lamplighter wearing to keep him warm on the cold winter nights? Would you have wanted to do this job? Why? Why not?
- ◆ Can you see the horizontal 'T' bar underneath the lamp? What do you think this is used for?
- ◆ What equipment do you think lamplighters carried with them?





5

Three-arm pendant (c.1880) lamp and ‘Westminster’ lamp (c.1930)

The three-arm pendant was designed to be lifted up and down depending on where it was needed. It could be pulled down over a table at night time, to bring the modest amount of light produced by the flame nearer to where it was needed. That would often make it too low in the daytime so it was then lifted up. The bowl-shaped shades made of glass allowed any fumes to escape and protected the flame from draughts.

The Westminster lamp (later called the ‘Station Lamp’) was most often seen in commercial buildings such as railway station waiting rooms. This lamp would have also included a globe-shaped glass shade, surrounding the mantles.

In 1903, the gas **mantle** – the incandescent gauze which made the lamp burn brighter - was adapted to burn downwards. This had a marked effect on the design of lamps and shades and made gas lighting even more useful and desirable.

Look closer

- ◆ What do you think these lampshades are made from? Why is this a suitable material for a gas lamp?
- ◆ What are the main differences between the two lamps?
- ◆ Where do you think they might have been used?





6

Gas mantles

An important invention by the Austrian chemist Carl Auer von Welsbach in 1880 led to a revolution in gas lighting - the development of the incandescent gas mantle. A mantle consisted of a fine gauze impregnated with rare earth metals.

When heated to a high temperature the gauze became incandescent, producing a much, much brighter light than a naked flame. A design was also introduced in the early 1900s that could direct light downwards, this was known as an inverted mantle.

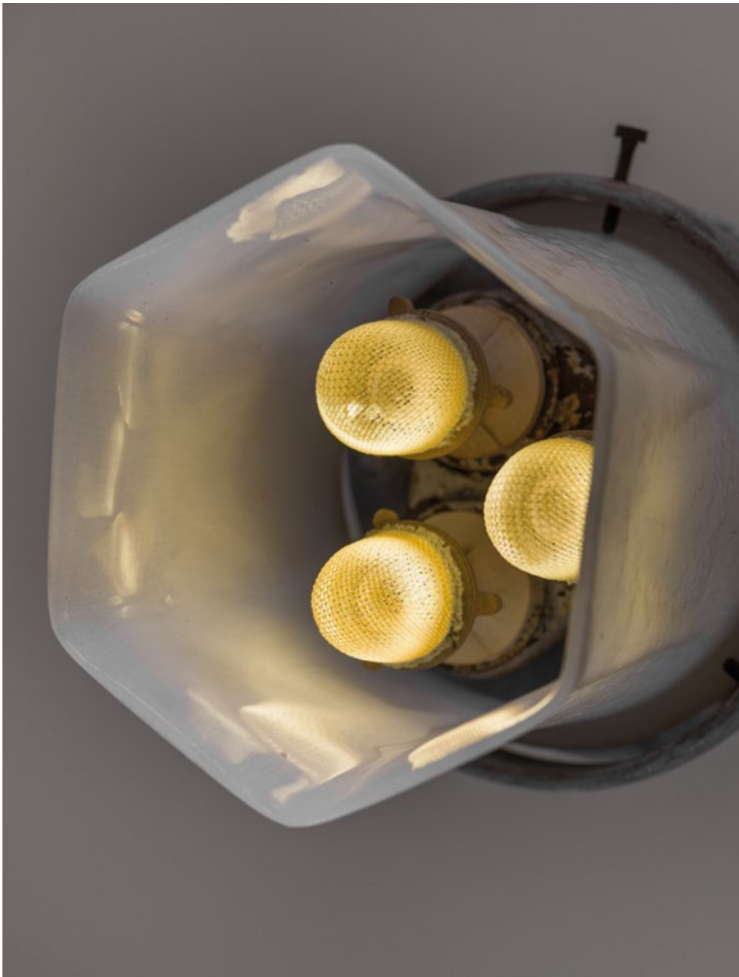
Gas mantles were very fragile once they had been heated. The early ones could disintegrate from the slightest knock and holes would make the light appear to flicker. Some people found they could be strengthened by soaking them in vinegar before use. The mantle became widely used in the 20th century, once its design had been perfected and was less fragile. These developments came at an ideal time to help gas resist the competition from the newly emerging electricity industry.

Gas mantles are still used today – mainly in camping lamps.

Look closer

- ◆ Can you see how the gas flame heats the mantle?
- ◆ What are some of the brand names given to the mantles in the boxes?
- ◆ Can you think of another good one?







Reading light advert

(1887)

Look closer

- ◆ This light was as bright as...how many candles?
- ◆ Do you think this would have been enough light to read by?
- ◆ What words did the makers use to describe the light and make it attractive to buyers?
- ◆ Who might have bought a lamp like this – would they be rich or poor, at home or work?
- ◆ Can you see when this lamp was being advertised? How long ago was this?



SUGG'S
"ALADDIN"
READING
LAMP

PATENT
 (SELF GOVERNING)

3 FT OF GAS
PER HOUR.
EQUAL TO 16 CANDLES.

SUPERIOR TO THE
ELECTRIC LIGHT.

FOR THE OFFICE,
STUDIO,
LIBRARY,
WORKROOM.

PRICE -
25/-

COMPLETE AS SHOWN



1/4 FULL SIZE.

WHITE

LIGHT

GRAND HOTEL BDOES
CHARING
W.C.
 1887

8

Chinese-style lamp shade

(c.1920)

In the 1920s, gas lights were being replaced by those powered by electricity. To try and encourage people to keep using gas, makers of gas fittings made increasingly attractive products for the home. Items decorated with Chinese patterns or made in the Chinese style (Chinoiserie) which had been extremely popular in the 1600s and 1700s among the elite of society, became desirable once again in the 1920s and 30s, like this beautiful glass lamp, and the [Governor General Cooker](#).

Look closer

- ◆ What can you see painted onto the lampshade?
- ◆ Why do you think it is described as being 'Chinese-style'?
- ◆ Can you see how this light is turned on and off?





9

Horstmann Clockwork controller

(c.1930)

Clockwork controllers were introduced in the 1930s, to light street lamps automatically. They consisted of a clockwork mechanism which rotated at the set time to lift a lever which turned the gas on and off. The gas was lit by a pilot light (a small flame which burns continually).

This controller was made by Horstmann, who were originally Swiss clockmakers. They went on to invent many different versions including one with a solar dial that adjusted the switching time daily to allow for the change in the length of the day, and another with a battery-operated ignition system (similar to that on a gas cooker).

Look closer

- ◆ Why do you think there is a timer?
- ◆ Can you see the three gas burners at the top? Why do you think there are three?
- ◆ How big do you think the street lamp would have to be for this to fit inside it? What shape would it be?

Watch a modern-day London gas lamp attendant winding one of these in this [film](#).





10

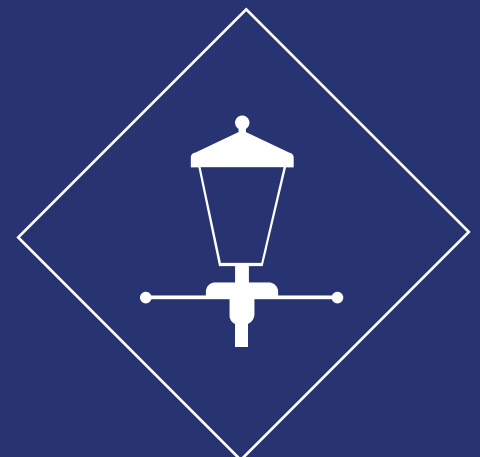
Lamp attendant, Liverpool

(1968)

Although public gas lights were no longer lit by **lamplighters** after the invention of the controller in the 1930s, engineers were still needed to service and repair them (along with household appliances like cookers and water heaters). They would travel from one job to another by bicycle or a tricycle like this one, with a space to carry tools at the front. They would also carry their ladder! A lamp attendant's equipment was very personal and they often gave their bikes names.

Look closer

- ◆ How do you think the engineer carried his ladder?
- ◆ Would you have liked to do this job? Why? Why not?
- ◆ What do you think the lamp attendant might be doing?







Films

There are still working gas lamps in some towns and cities, and lamp attendants who look after them. These videos show modern day lamp attendants working in London – watch them winding the clockwork timers and repairing the lamps, and find out where they hide their ladders!

◆ [Lighting London – British Gas](#)

◆ [How gas was made](#)

