

Hot water the old-fashioned way

Most hot water is now heated with electricity or natural gas. But in the past it was commonly heated with solid fuels or with town gas made at local gasworks.

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Solid fuels, such as wood and coal, have been used to heat hot water for centuries. In New Zealand, early European settlers would heat water in a kettle or pot over an open fire or on the kitchen range, lift it to the sink, laundry tub or bath and add cold water to adjust the temperature.

The copper, once found in every home laundry, was a larger, more permanent version of this process. The large copper container

held about 14 gallons (60 litres) of water, and was permanently mounted on a concrete or brick stand in the laundry. The water was heated by lighting a fire under the copper, and the clothes were 'boiled' with soap. They were agitated using a broom handle or some other suitable length of wood.

In 1923 a copper with a cast-iron frame cost £4 5s – equivalent to \$350 in 2006. That compares with around \$600 for a modern 5.5 kg automatic washing machine.

Multi-purpose ranges

Water was also heated using multi-purpose wood or coal-burning ranges which had an added water tank. This was filled by hand or connected to the household water tank so that as hot water was drawn off it was replaced by cold water. This 'push-through' system was controlled by the cold tap, so that the hot water outlet acted as a safety vent, dribbling hot water into the sink as the cold water expanded, or steam if the temperature rose too high.

Chip heaters were a further development in water heating. They were solid fuel burners with no oven or hotplates. Instead of a flue above the firebox, a water jacket took heat from the hot gases.

However, all these systems had a major failing. The close contact between the fire and the cold surface of the water container caused inefficient combustion – in other words, it created air pollution. This meant the chimneys had to be regularly cleared of unburnt soot, an unpleasant chore. In modern 'wetbacks' the water heating coil is placed well away from the combustion zone to prevent this happening.

Using gas to heat water

Town gas, produced from coal, was available first in Auckland in 1862 but by the 1870s there were also gasworks in Wellington, Christchurch and Dunedin. By the end of World War 2 New Zealand had 46 gasworks with a total of 200,000 consumers. Natural gas was discovered at Kapuni in 1959, and has been reticulated through the North Island since 1971. Reticulation was never extended



A 1930s laundry copper with piped hot water. Note the firebox cover below and the flue cleaning slot.

to the South Island, and, with the closure of coal-fired gasworks, mains gas is now available in only a few places in the South Island, in the form of Tempered LPG (TLP) or LPG vapour.

In Britain town gas was used to heat water in the 1850s, with multi-purpose ranges available from the 1860s. Where running water was available, the high-energy flame created by town gas could be used directly in the 'geyser' to continuously heat water. Located above the kitchen sink or bath, the geyser is the direct ancestor of today's mains-pressure, continuous-flow gas water heaters. Adequate ventilation and a good extract flue were essential, as town gas is poisonous and foul smelling and its combustion products are

more toxic than those from natural gas.

By the 1930s home cook books were carrying advertisements for gas storage water heaters, showing an insulated tank capable of supplying 'hot water in abundance any hour day or night for every purpose'.

Low pressure hot-water systems

The 1917 manual for the *Southern Cross Domestic Science Course* stated that 'no modern house is complete without a hot water service connection with the kitchen range'. The fundamentals still form the basis of today's low pressure system – albeit fuelled by electricity rather than the kitchen range, and the 'boiler' and 'hot water cylinder' being the same tank. The key features were:

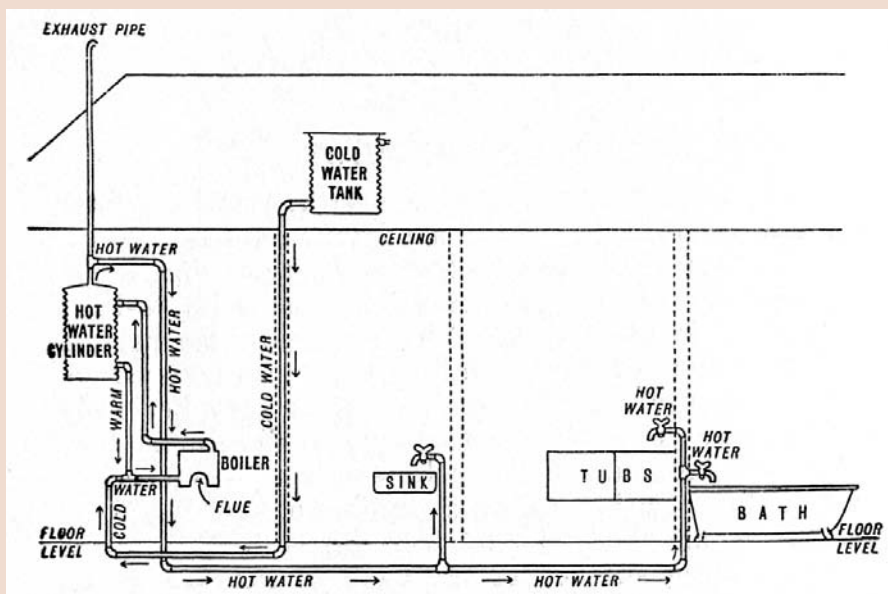
- a cold water tank placed at a high level, either on or near the roof
- an iron boiler or iron pipes to provide a large heating surface at the back of the fire grate
- a cylinder for storing hot water
- the necessary pipe connections.

By the 1925 second edition, experience had found that the kitchen range alone was an inadequate heat source: 'A distinct improvement in the above service can be made by having an additional boiler behind the dining room or sitting-room fire. Then the household is rarely if ever without a plentiful supply of hot water.'

The future of hot water heating

Today, hot water uses about one-third of household energy and a significant proportion of household water. With both energy and water becoming more expensive, innovation is needed to ensure adequate supplies are available for everyone.

Ongoing evolution of domestic hot water systems is essential for the future. There have been improvements in gas water heating technology, notably the condensing boiler which although widely used in Europe is rare in New Zealand. There seems to be little development of solid fuel water heating systems, but they could provide real benefits by maximising flexibility and minimising investment in central energy supply systems. ◀



Household hot water system, 1923, from 'The Southern Cross Domestic Science Course'.