The Palm House
The Royal Botanic Gardens, Kew

Text abstracts and illustrations from Minter and from Kohlmaier (see References)
The Palm House under construction c.1847 (daguerreotype)

The Palm House 1848 (engraving)
The Kew palm house was built on a mass of heaped-up soil. "A spacious terrace, with the necessary steps, surrounds the whole, and being somewhat elevated above the ground level, gives the appearance of solidity and breadth of base for the stupendous structure to stand on."

The original hot-water heating plant consisted of two boilers patented by Burbidge, Healy & Co., with about 27,900 feet of heating pipes laid underground. The pipes were laid along the facade beneath 4-foot-square cast-iron gratings. This heating plant ensured an inside temperature of 80°F when the external temperature was 20°F. The boilers were housed in two cellars close to the hothouse. Provided with sufficient storage for fuel, they were connected by a 558-foot tunnel to a coal bunker located adjacent to a road. The coal was supplied and the ashes taken away by a truck pulled along the rails in the tunnel. The concept of a completely transparent building in an open position as a center of attraction would have lost its effect had a masonry structure such as a chimney been erected in its vicinity. Therefore, it was decided to erect the campanile-style chimney at a distance.

My Lord, I have given my best attention to your Lordship's verbal instructions respecting the Palm House, namely, 'to go on this winter as was done last'.

This I regret to say, is not possible, for the evil is progressive. As the plants have died, or been removed to warmer houses, or have lost their foliage, so is the heat and moisture that these intercept now dispersed; as the climbers on the rafters have been successively killed, so has the radiation of cold from the iron and glass increased... The plants have made no growth, and very few and small leaves this summer. The leaves are already turning yellow, and are so sparse that the pots and tubs are everywhere seen; and a person standing outside the north wing can see the museum building through it all along, that is to say, through 15 parallel rows of plants... During the last two winters the thermometer in the Palm House sometimes stood at 42°... I have removed all the most tender plants into the other houses, which we have crowded to excess, and have filled up with about 1,500 greenhouse plants instead, for appearance's sake; till now there is not a single young palm on the shelves, and the term palm-house is a chimera...

Not only was the Palm House unfit for palms, but, lamented Hooker, 'many most interesting tropical plants (as the Mango, Cocoa-nut, Chocolate, Breadfruit etc.) can no longer be cultivated in it.' He recommended closing the house to the public from November to April.

The solution was the introduction of two flue chimneys in the wings of the house, thereby rendering the campanile superfluous. This saved a quarter of the fuel and gave an extra 10°F (roughly 5°C), although the chimneys did interrupt the smooth outline of the building. Further improvements to the heating
system have continued to this day. A circuit of pipework around the gallery was installed at Dr Hooker’s suggestion in 1877 to prevent draught at high level. This was so successful that another was added to the north wing lantern. The pipework in the north wing was renewed and upgraded in 1895 and that of the south wing in 1896, with pipework being carried all the way around at high level. Further renewal of the boilers took place in 1934–5 and extra piping was added. The heavy manual labour of hauling coke through the tunnel from the Shaft Yard to the basement boilers (which had always been assigned to gardeners who had committed some misdemeanour) finally ended when the railway was electrified in 1950. In 1961 the boiler houses were moved to the Shaft Yard, leaving the Palm House basements empty. The boilers were converted to oil and the campanile came back into use as a chimney, with the tunnel serving only as a duct for the heating pipelines. The two chimney stacks in the wings were removed several years later.

The smoke stack, disguised as a campanile (bell tower) is just visible behind the trees (left background). The smaller building in front of the Palm Hose is the Waterlily House, built 1864.
The Palm House 1852 (engraving from the Illustrated London News)
Underground tunnel and railway supplying coke to the Basement boilers in the Palm House

Renovation and re-use of the Victorian tunnel serving the Palm House in progress
Restoration of the Palm House underway in October 1985. The underfloor heating pipes have been removed.
Prince of Wales Conservatory 1987