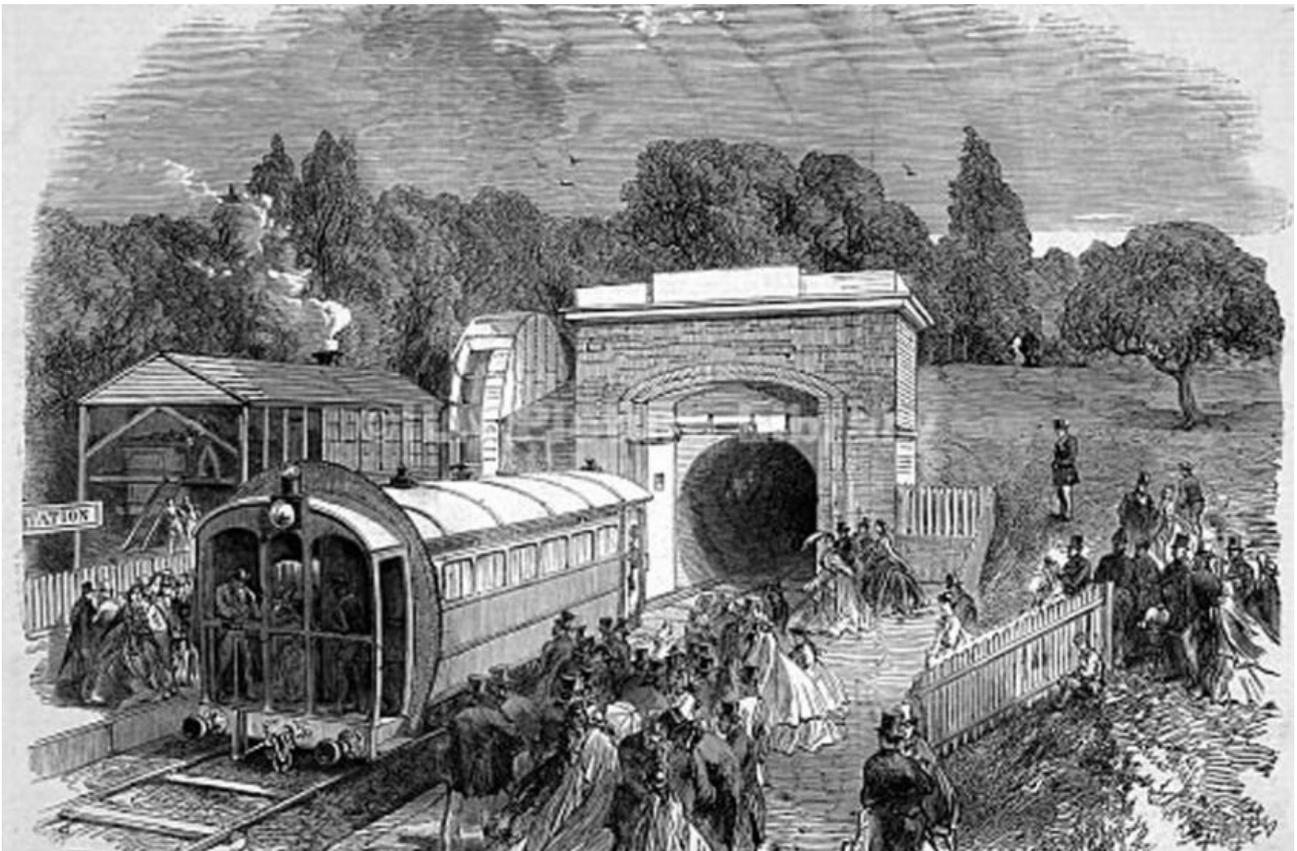


The Pneumatic Railway

Introduction

The Pneumatic Railway was started in early 1864 opened to the public in late August and closed in October. A ride cost 6d and for that you would experience the thrill of travelling through a tunnel in a single carriage with thirty or so others in comfort and no visible means of propulsion. Why it was at the Crystal Palace and what happened afterwards is the story of one man. Thomas Webster Rammell had a passion: the pneumatic railway was his brainchild and with it he was determined to solve the problem of London's crowded streets.

The Structure



None of this remains today. In fact it is not at all clear where this was. However we know that the railway included an incline of 1 in 15 and one station was at Sydenham Gate and the other at Penge Gate. This may be where the campsite is now. Having entered the tunnel the track would have run parallel to Crystal Palace Park Road giving the 1 in 15 gradient before swinging round to the right to approach the Penge Gate Station.

The carriage has no engine. The propulsive power comes from the stationary steam engine in the wooden shed with a plume of smoke or steam. To the right of that is a large cylindrical feature which is some 22 feet in diameter and is the outer casing of a centrifugal fan. Such fans are still in use today though not necessarily on this scale. Most vacuum cleaners and hairdryers use this design. Air is sucked in through a hole at the centre of the casing and expelled through an outlet on the perimeter. Thus one fan can produce raised

air pressure or reduced depending how it is connected. The steam engine drove the fan at a speed of 300 rpm and was capable of creating quite a draught in the tunnel.

The carriage had glass sliding doors at each end and comfortable seating for some thirty to thirty five passengers. It was low on the ground and featured a bristle 'collar' which made a reasonable seal against the tunnel wall. The tunnel was brick-lined and ran for 600 yards.

The tunnel entrance at the top had gates that would seal the tunnel. What was the theory and did it work?

Let's answer the second part of the question first: yes it worked! It worked exceedingly well and seemingly there was no lack of people prepared to pay 6d for the novelty of a ride on it. So how did it work?

First there is the basic principle that we have all experienced when riding a bike on a windy day: it's a lot easier with the wind behind us than with a head wind. Rammell had a powerful fan capable of moving lots of air in the tunnel. The tunnel is as vital a part of his pneumatic system as was the carriage. So nothing will happen until the carriage is in the tunnel.

At the station you can see a gentle slope into the tunnel. This is vital. Outside the tunnel the carriage relies on gravity to move it. To hold the carriage on the incline at the station the carriage has brakes.

The passengers are all aboard, the glass doors at both ends are shut and sealed. The brakeman releases the brake and the carriage moves off and enters the tunnel. The doors clang shut.

In the engine shed the valve operator pulls a big lever and diverts the flow of air from the fan into the tunnel. The air pressure behind the carriage rises, the bristles sealing the carriage to the wall tremble, and the carriage starts to accelerate. First up a short incline then it levels off. Now we're on the slope down and we're going faster and faster. Hold on, we're going round a bend then, up ahead, there's a light and suddenly we shoot out the other end and there's the Penge Gate platform and the brakeman is slowing the carriage, and stop. It's taken less than a minute to do a third of a mile - that's more than 20 miles per hour average. Wow!

Meanwhile, up at the engine shed the valve operator moves the big lever so the air for the fan is being sucked from the tunnel. The doors on the Penge Gate entrance have been shut to reduce the pressure in the tunnel. But the passengers know nothing of this. On the way back it starts as before. The brake operator lets go the brake and the carriage starts off. As it approaches the tunnel the gates are flung open. Air rushes in and the carriage gets caught up in this and accelerates quickly into the tunnel. Round the bend and start climbing. The fan has to keep the pressure low in front of the carriage so the air behind it will push it up. That's exactly what it does. At the top there is the run down to the gates

and up into the station. The valve operator disconnects the fan, the doors open and the brake operator lets the carriage run down out of the tunnel and up into the station.

Not bad for 6d and no smoke and very little noise. If only all railways were like this!