

# Engineering of Stephenson's *Rocket* Michael Bailey and John P Glithero

12 March 2001

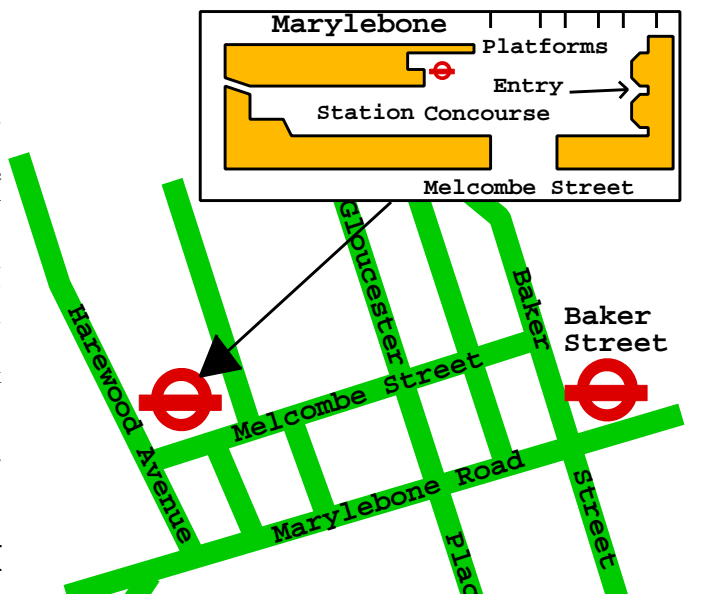
The group was very privileged to receive a presentation from two of the leading UK experts on early locomotives, who have recently completed a detailed investigation of *Rocket*. Michael started with the story of how the Science Museum and NRM invited them to make the investigation. At the Manchester Museum of Science and Industry, they headed the replica *Planet* project. They were then invited to Canada to examine two ancient engines, *Samson* - an 1838 Hackworth design - and the 1850s *Albion*. Dame Margaret Weston invited them to advise on the conservation of *Braddyll* at the Timothy Hackworth Museum. So came the *Rocket* project. The opportunity for the investigation arose because of the rebuilding of the Science Museum's transport gallery. *Rocket* was scheduled to spend one year at the NRM in York where the investigation was organised.

Michael gave a brief history of *Rocket*, noting that the Liverpool & Manchester Railway required locos with high speeds and reliability. The Stephenson's novel design had sprung driving wheels, inclined cylinders and a multi-tube boiler. After the trials *Rocket* was extremely popular, the public clamouring for "special" trips. Its working life was interrupted by accidents, following each of which it was repaired and improved. However, such was the pace of locomotive development, that it was soon displaced from front-line service. *Rocket* was then used in experiments, before being sold to the Earl of Carlisle for use at his Kirkhouse coal mines. It worked here until 1840, when non-ferrous parts were removed and it was put into store. Finally, it was donated to the Patent Museum - the predecessor to the Science Museum - in 1862.

John then took up the story of the physical investigation. They found the 1" thick wrought iron bar frames, like many components, have many redundant holes. When the cylinders were moved down from 38° to 8°, a new sub-frame and buffers were inserted at the front, and additional buffers for service at the Earl of Carlisle colliery were added later. The rough handling at Kirkhouse probably caused a bend at the frame front and footplate. The original firebox disappeared while the engine was in store at Kirkhouse. This had a jacketed cover in a horseshoe shape with a retro-fitted jacketed backplate. The exact form of the firebox was not known, but there are clues. On the boiler, sight glass and try-cock holes have been moved, illustrating the raising of the water level. Originally this was not much higher than the regulator. In the absence of a steam-collecting dome (which was not fitted until November 1830), priming was likely. The present wooden wagon wheels have cast iron crank bosses, with some cracked spokes secured by a reinforcing collar. The original 3½ inch diameter axle has been replaced by one of 4 ins diameter. The valve gear is a form of slip eccentric and shows several fitting marks put on at different times.

The frame is by not a precision assembly, being some 5/8" out of true. The firebox was also out of true, sticking out by some 1" and twisted - the erection fitters just had to work round it! This meant the backplate steam holes in the boiler are asymmetric and the cylinders-boiler spacing blocks had to be fitted individually to ensure the pistons aligned with the wheels. On the current *Rocket* exhibit this alignment is well out of true, especially on the right hand side, due to the 1860s reassembly for the Patent Museum. A deep groove in the axle was probably caused during the move from Kirkhouse to Newcastle. In 1862 the engine was in a poor state of repair and the Patent Office Museum asked the Stephenson Works to undertake its restoration. They managed to get the engine into a presentable form, but also put on some ridiculous additions, e.g. a petal top chimney, steam exhaust and tin firebox. These were removed in 1936 but an inappropriate set of trailing wheels and another wrong chimney were added! The result of all these investigations has allowed Michael and John to produce a diagram showing how *Rocket* looked when it was first made.

After a wide range of questions from the attentive audience, Dr Mel Draper proposed the vote of thanks. A report detailing the investigation is available as an NRM publication.



## Forthcoming Events

14 May 2001 *Diaries of a Train Spotter (1955-1968)*  
Michael G Harvey.

The Autumn season will commence in September. All meetings will be held in the Meeting Room at Marylebone Station. Please enter from the door between Upper Crust and W.H. Smith's Bookstall at the east side of the station concourse. The talks commence at 19.00 and there will be a person on the door to let you in from 18.30. If you arrive after 19.00 and find the door locked, please telephone 0771 554 9907. There will be a voluntary collection to help cover the cost - a donation of around £1 to £2 per head, tea or coffee included. Guests are welcome.

## Outreach Activities 2001

As described in the AGM report, overleaf, our series of visits concentrates on Model Railway events. These are essential this year in the absence of "Steam on the Met" and railway depot open days (the industry is understandably a little busy on other things at present!). On 17 February, we attended the East Bedfordshire Model Railway Exhibition, which has become one of our regular visits - so much so that we appear to be building up a regular clientele. We then took part in the London Festival of Model Railways at Alexandra Palace on 24-25 March. This proved a very popular event, making up for the relatively high entry fee.

Future events include:

30 June/ 1 July	Sandy Model Railway Exhibition
7 July	Trains at Trinity, Biggleswade
5 August	Old Warden (Military Pageant)
7 October	Old Warden
13/14 October	Farnham & District
20/21 October	Warley, NEC
27 October	Colchester Model Railway Exhibition
3 November	High Wycombe
17 November	Royston

If you would like to help at any of these events (free entry is normally included), please contact George Rutter.

## Contact Addresses for South of England Group

GROUP WEB PAGE - <http://Homepage.ntlworld.com/ms.draper/index.html>

Chairman :

George Rutter, 75 Upper Lodge Lane, Hazlemere, High Wycombe, HP15 7AS : Telephone 01494 716684

Briefing Editor: (**NOTE NEW E-MAIL ADDRESS**)

Mel Draper, 18 St Margarets Gardens, Biggleswade, Bedfordshire, SG18 8NU: Telephone 01767 316288 : e-mail [ms.draper@ntlworld.com](mailto:ms.draper@ntlworld.com)