

# LIONSHART

1993 Issue 1

January 1993

## PLANET REPLICA IN SERVICE



'Planet' replica during a private steaming for the sponsor, British Engine Insurance, October 1992. On the left, the Public Relations Manager for British Engine Insurance, on the right the Secretary of OLEO.

'Rocket' is the locomotive which everyone has heard of, but the 'Planet' class, which closely followed in time, represents a significant maturing of the principles brought together in the winner of the Rainhill Trials. The construction of the Liverpool and Manchester Railway cost some £739,000, of that total, £11,000 was spent on locomotives and rolling stock.

To celebrate the achievement of the Museum of Science and Industry in Manchester in creating a replica of 'Planet', we have brought together in this issue a number of references to 'Planet'. LION was to follow a mere eight years later and it is interesting to note the similarities and differences between the two locomotives.

# PLANET STEAMS AGAIN

by '41901'

Dr. Richard Hills, former curator at Liverpool Road Station, Manchester is quoted in the July 1984 'Railway World', when talking about the building of replica 1830 coaches, as adding "One day, if finances allow, the dream might be realised of building a replica locomotive of the same period to go with the coaches".

The site has now become the Museum of Science and Industry in Manchester - one of Europe's premier science museums - and, with the assistance of the Friends, British Engine and others, that dream has now been realised.

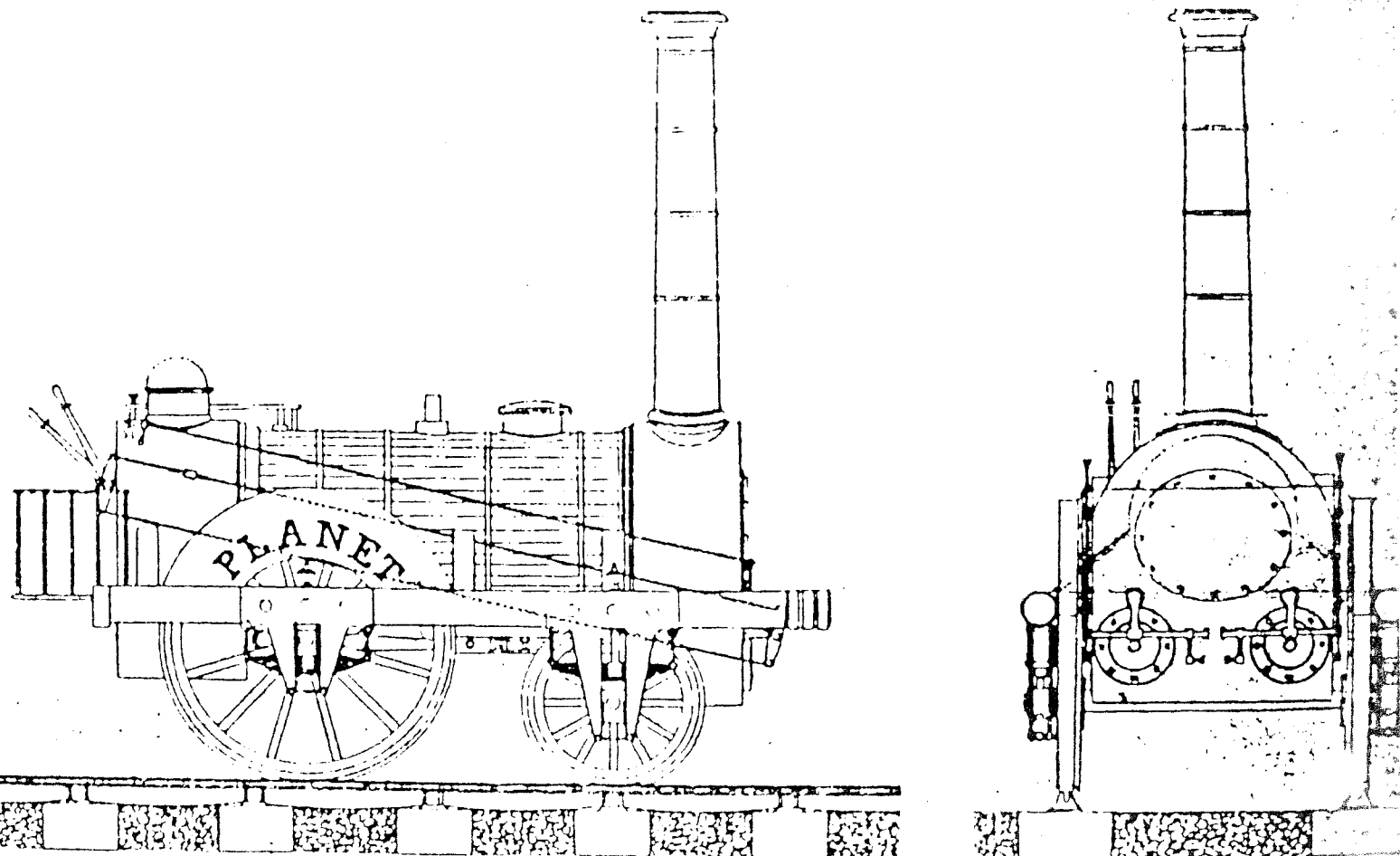
The direct descendent of Rocket was the 'Northumbrian', illustrated in the Shaw print on page 5. But the Shaw print of 'Planet' on page 7 shows the new direction which locomotive design embarked upon.

The single driving axle was retained (and this remained a feature of fast, free-running engines for many years)

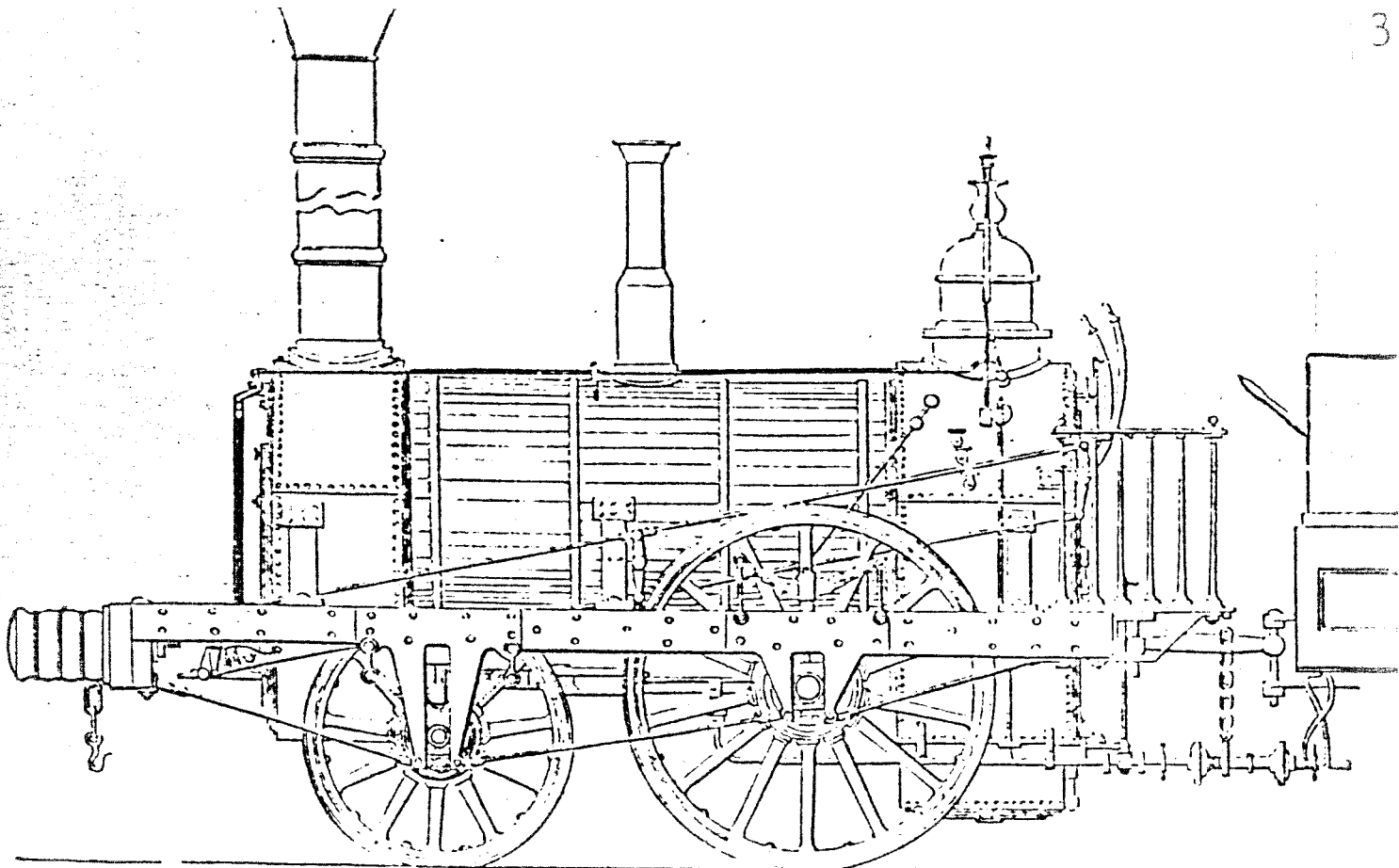
but the outside cylinders were moved inside. The position of the cylinders was also moved from the rear of the locomotive to the front, so the 0-2-2 wheel arrangement of 'Rocket' and 'Northumbrian' becomes 2-2-0 in 'Planet'. Probably the strongest motive for this change was the increased efficiency possible through enclosing the cylinders within the smokebox, enabling the cylinders to be kept warm. A consequence of the inside cylinders was the need for a cranked driving axle and, with 1830's technology, this presented serious manufacturing problems. Broken crank axles plagued railways for years to come.

The crank axle on 'Planet' was provided with inside bearings (like LION) but, for the first time, a substantial wooden frame appeared, allowing the use of outside bearings as well on the driving axle.

This undated lithograph of 'Planet' was published by Geo. Smith, Liverpool and is now in the Liverpool Public Library.



THE 'PLANET' LOCOMOTIVE ENGINE.  
on the line of the Liverpool and Manchester Railway



Passenger locomotive by Fenton, Murray, & Jackson, 1834. General type of the "Planet" Class, from Locomotive Engineering and the Mechanism of Railways A Treatise on the principles and construction of the locomotive engine, railway carriages and railway plant, by Zerah Colburn.

The Editor has assembled a number of illustrations of 'Planet' in this edition of LIONSHEART. Care is necessary in studying early reports and drawings. Many misunderstandings arose, particularly when artists who were unfamiliar with railway machinery attempted to represent these novel inventions.

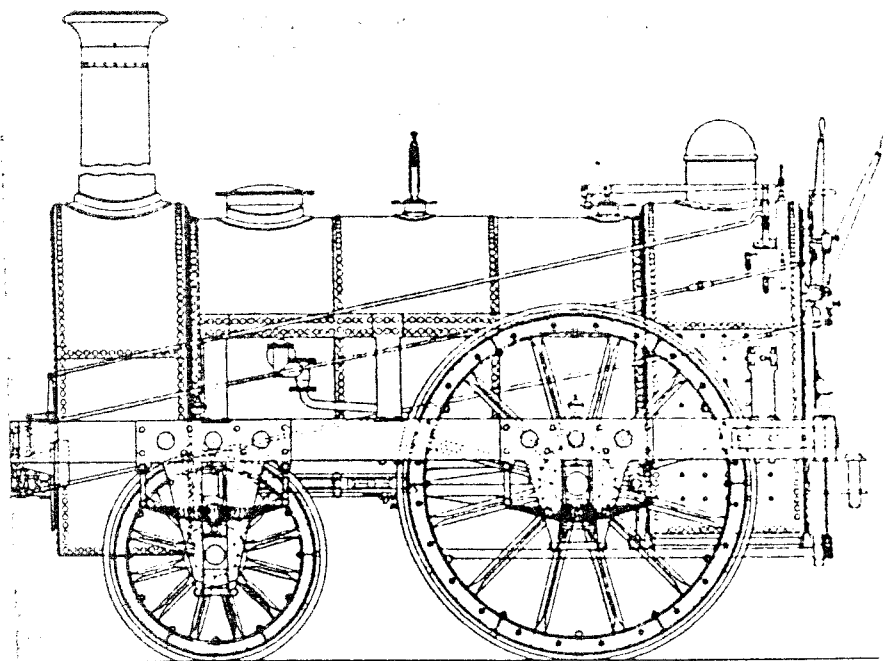
The diagram on page 2 gives a good overall impression of 'Planet'. In this view, 'Planet' has the name on the splasher. The splasher is also shown in the lithograph on page 14. I believe that the Science Museum model includes splashers (although they are not shown on the drawing on page 4). In general, other sources do not show 'Planet' with splashers. It has to be understood that locomotives of this period could vary in appearance during their lifetime. When a locomotive went in for 'shopping' it was taken down to its constituent parts, many of which might be replaced. Different ideas might be tried out, changing the appearance of the locomotive. Only partial records remain of all this work and it is difficult to be certain of the detailed history of locomotives of the period. This is certainly the case with LION, first built in 1838. Debate still exists about just how old the various parts of the locomotive are!

The diagram on page 3 is from Zerah Colburn's book (4) and shows one of the later 'Planet' locomotives built by Fenton, Murray & Jackson. The 'Planet' replica is quite similar to this diagram, but there are some detail differences.

Page 4 shows the drawing produced by the Science Museum. With the part sectional views, there's plenty of constructional detail to be studied.

Pages 6 and 7 are the Shaw prints of 'Planet'. One curious detail is the small, hinged door on the smokebox front. Artistic licence? Certainly, with about 12 bolts securing what is quite a heavy smokebox door, regular removal of smokebox char is hardly encouraged!

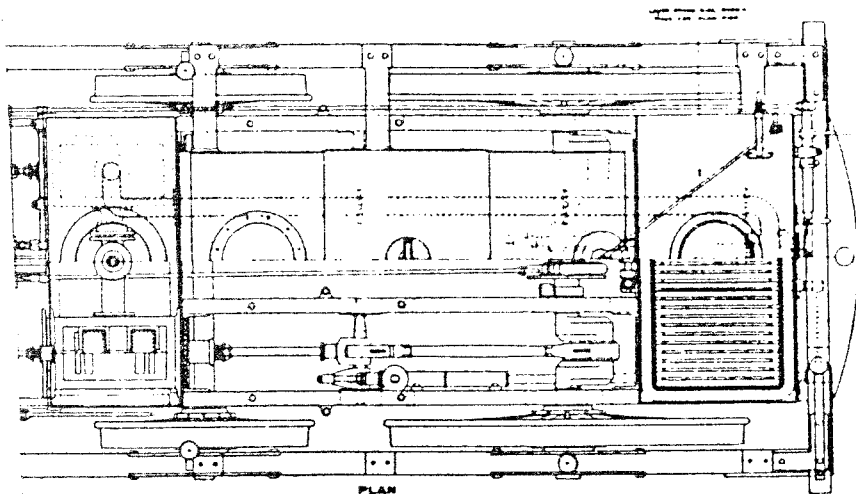
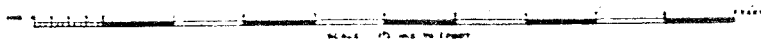
Warren's book (2) has some fascinating details of the design of 'Planet'. With his access to the manufacturer's records, these are probably the most accurate source we have. Pages 16, 17 and 19 are taken from Warren's work. Page 16 has overall views and sections. Apart from some details, the 'Planet' replica is similar in appearance. The arrangement diagram at the top of page 19 is a tracing of an original drawing in the records of the manufacturer. Below this tracing is the diagram 'PLANET' TYPE FRAME. The driving axle had six



SIDE ELEVATION

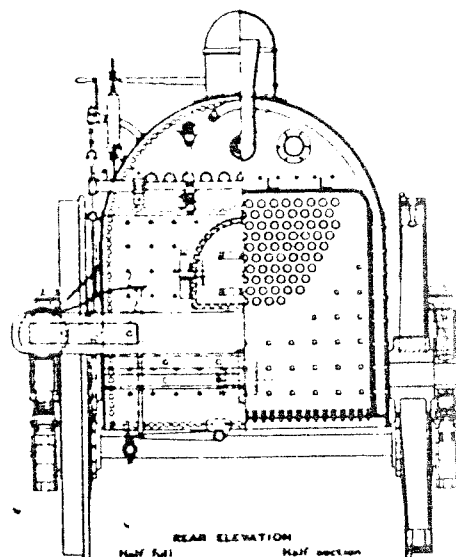
Details of a model of Stephenson's 'Planet' in the Science Museum, London.

From History of Railways, edited by E. L. Cornwell, published by the Hamlyn Publishing Group Limited in 1976.



PLAN

Top half full, lower half section (with part boiler removed)

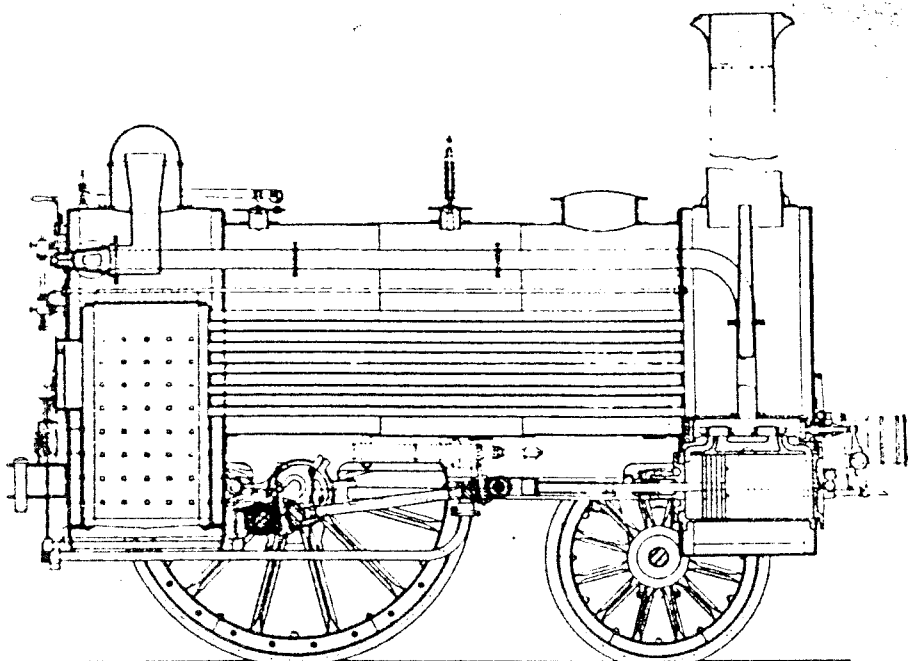


REAR ELEVATION

Half full Half section

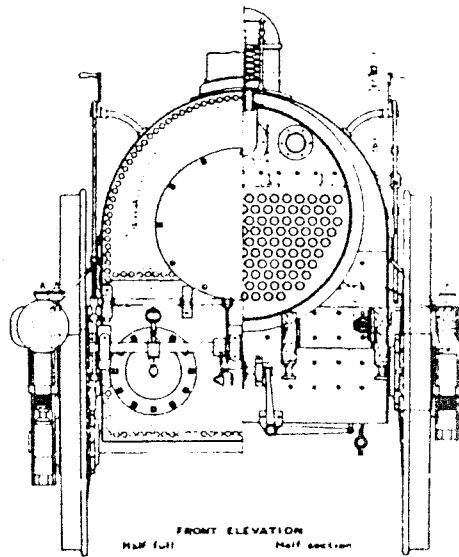
**MODEL OF PLANET LOCOMOTIVE 1825**

SCALE 1/2 INCH TO THE FOOT



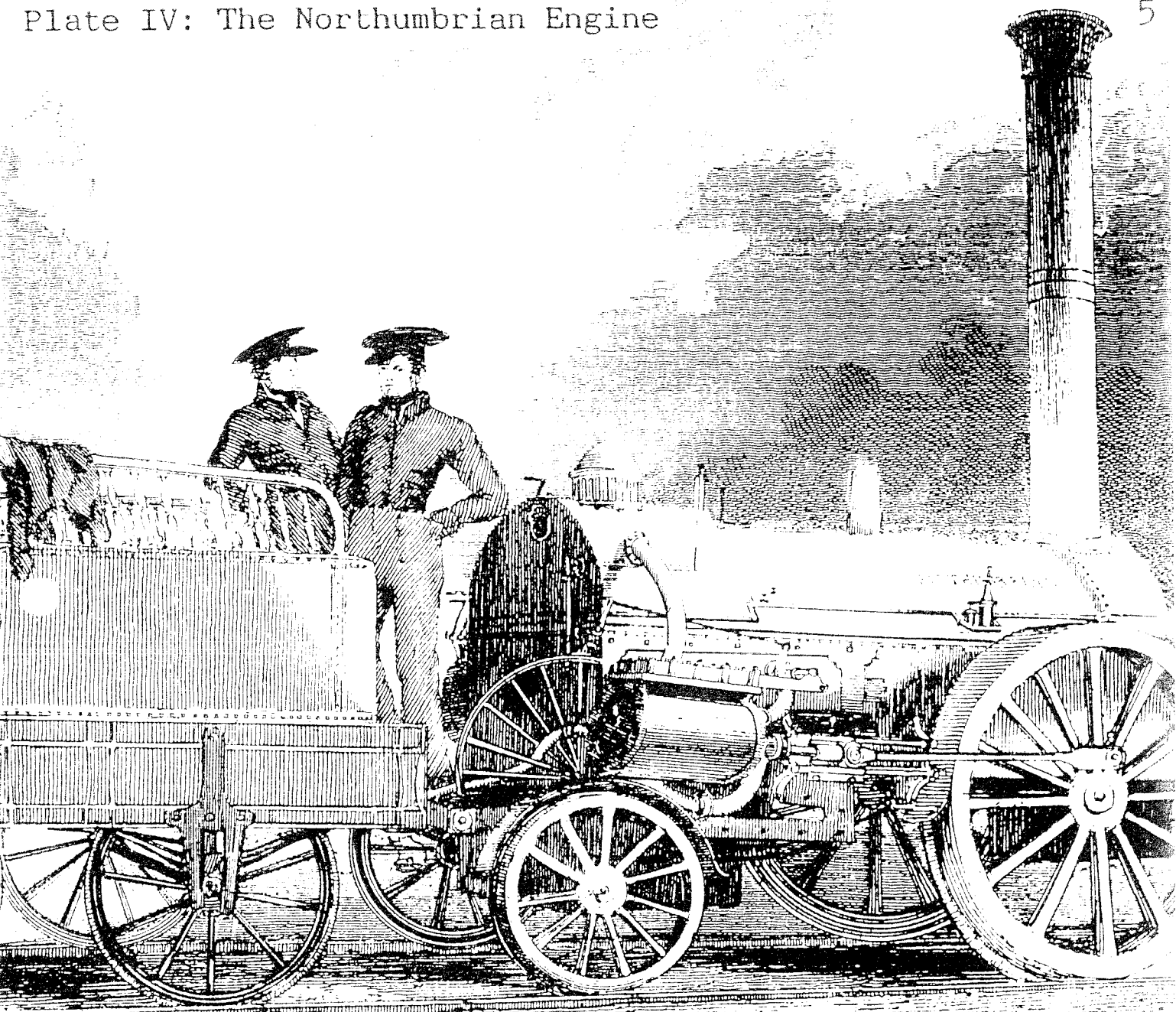
SECTIONAL SIDE ELEVATION

Through centre of boiler and right cylinder, with part of main frame removed to show right eccentric.



FRONT ELEVATION

Half full Half section



## EARLY RAILWAY UNIFORMS

In our July 1992 issue, Alan McKirdy referred to the 'Shaw Prints' showing railway uniforms. We reproduce some of these prints, showing locomotive crews and two locomotives. These are taken from the limited, facsimile edition published by Hugh Broadbent, Oldham in 1980. The originals were published in 1831 under the title 'Views of the most interesting scenery on the line of the Liverpool and Manchester Railway; and of other objects of public interest connected with it'.

Plate IV shows the Northumbrian Engine, Plate VII Rainhill Bridge and Plate VIII Planet Engine.

## BIRMINGHAM RAILWAY MUSEUM

Our friends at Birmingham Railway Museum, after a highly successful 1992 with the 'Learn to be a Driver' courses, do not intend to rest on their laurels.

Courses on the tank engines and 'Defiant' continue at present with 'Sir Nigel Gresley' arriving in March. Later in the year, there will be opportunities to drive both a 'Merchant Navy' and a 'West Country'. It is hoped that 'Britannia' will feature later in the year, with other possibilities yet to be confirmed.

(continued from page 3)

bearings - two on the outside wooden frames and four on the inside (also wooden) frames.

'Planet' had slip eccentrics to control the valves on each cylinder. By operating a foot treadle, the driver could set the eccentrics for forward or backward motion. This rather inconvenient motion was discussed in an earlier LIONSHEART (1). A diagram of the arrangement of the valve gear is reproduced at the bottom of page 19 of this issue, but I will not try the editor's patience with a detailed description here.

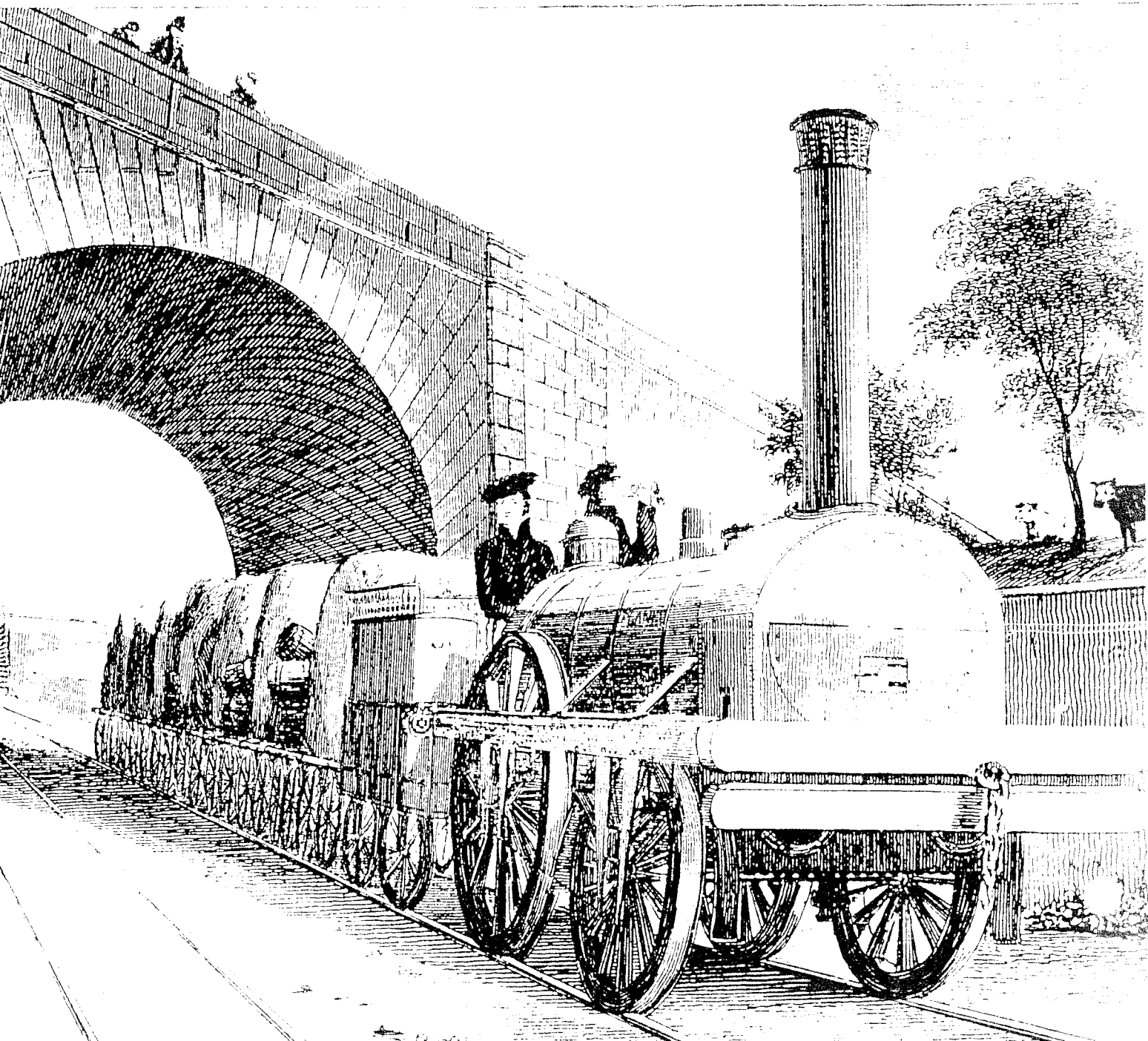
The 'Planet' boiler was very satisfactory and the construction is made clear by the diagram on page 16 of this issue. This is taken from Warren's

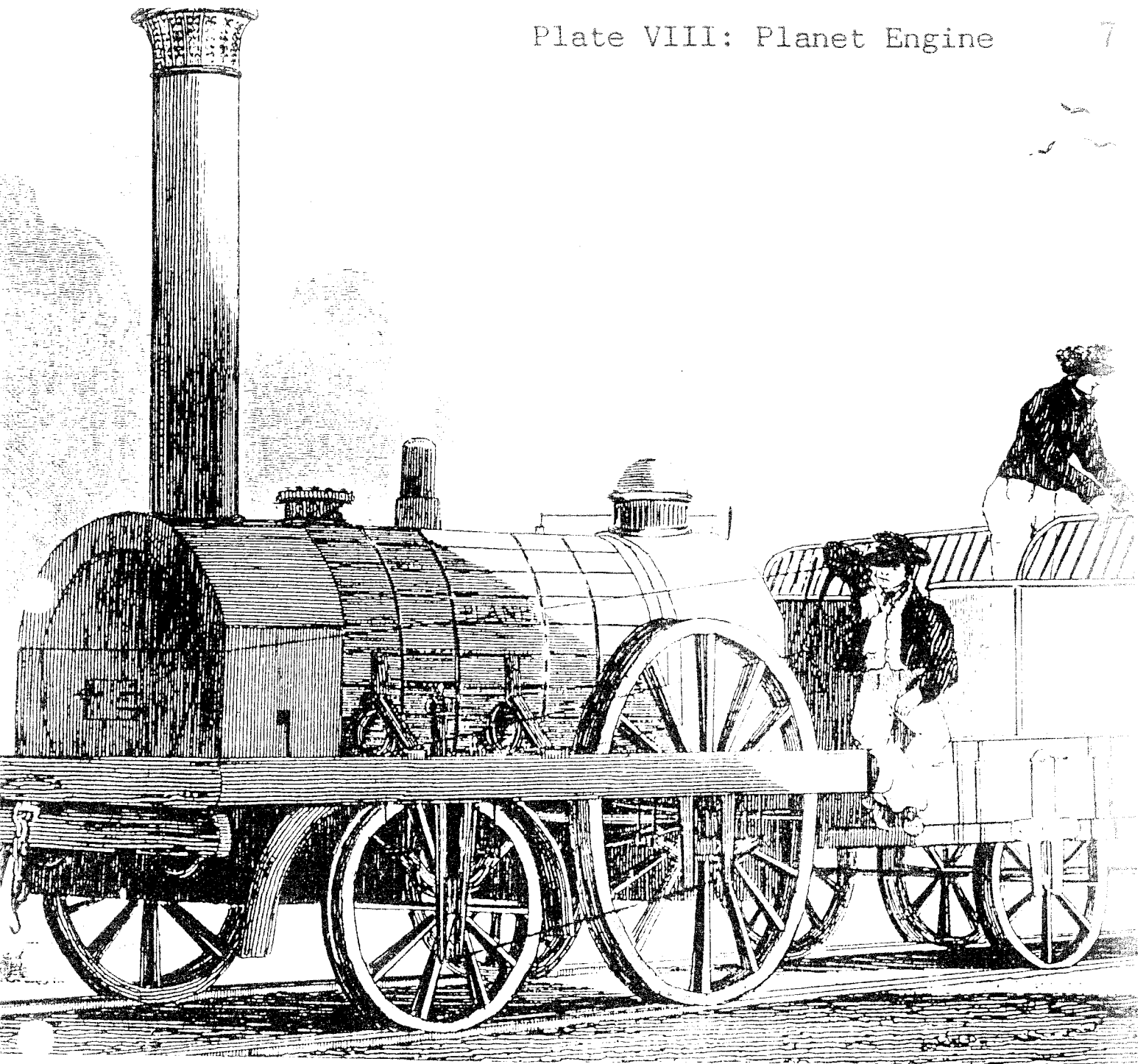
book (2), but he, in turn, copied it from De Pambour's Treatise on Locomotive Engines published in 1836.

On page 17 of this issue we reproduce a feast of details, including the cylinders. In this case, Warren drew upon 'Locomotives Stephenson circulant en Angleterre et en France, by Champon, published in Brussels in 1835. At the top of the page is the detail of the cylinder, with the slide valves working horizontally above the cylinder. Immediately below are details of the valves, valve rod and crosshead.

The two slip eccentrics are shown towards the middle of the page, together with the linkage from the foot treadle on the footplate which slides the eccentrics across the crank axle so

## Plate VII: Rainhill Bridge





as to engage in either the forward or backward position. Underneath is shown the eccentric straps and the eccentric rod, hinged at its point of attachment to the eccentric straps. The vertical lifting link on the right is used to disengage the eccentric from the valve rod, allowing the valves to be set by hand for starting.

Lower down the page is a detail of a wheel, showing the bolted-on tyre. Next to the wheel is shown details of an axlebox and its method of attachment to the frames via the spring.

At the bottom left of page 17 the regulator is shown. This view can usefully be compared with a somewhat later type shown in an earlier LIONSHEART (5).

Finally, the bottom right of the page shows the crosshead-driven force pump used for the boiler feed. Water at the bottom connection of the pump is

drawn into the chamber via the lower ball valve when the piston moves to the right. When the piston moves left, the lower ball valve closes and the upper ball valve is unseated, allowing the water out of the upper pump connection and into the boiler.

Adhesion is frequently the limiting factor on a locomotive. With a single driving axle, not all of the locomotive weight can be adhesive. In the case of 'Northumbrian', there was about 4 tons on the driving axle. 'Planet' pushed this figure up to about 5 tons, with around 3 tons on the carrying axle. For freight and banking purposes, it was desirable to make all the weight adhesive. Thus the four-coupled locomotive (similar to that shown on page 11) was also produced.

Any four-wheeled locomotive will have a rather uncertain gait when at speed and so it was logical that the

effect of carrying wheels at the rear of a locomotive should be tried. In a single-driver this produced a 2-2-2, in a four coupled an 0-4-2 (like LION). The improved riding was very favourably received and greater design flexibility resulted as engines became larger and power increased. On some designs, the wheels on the centre axle lost their flanges to facilitate rounding curves but attention to correct end-play of wheel sets in the frames allowed designs which could negotiate curves whilst retaining flanges on all wheels.

The development of locomotive design has been dealt with by a host of authors. The works of Ahrons are best known, but Clement Stretton's book (3) is worth reading. However, this last author publishes the notorious drawing of 'Planet' in her supposed original condition, with a low-slung outside frame passing underneath the driving axlebox. Warren discounts this arrangement, believing it to stem from early proposals never implemented.

From an ancient photograph. It shows a 'Planet' of the original single-driver type, the 'Pioneer' of the Bangor and Piscataquis Railroad, U.S.A., built by Robert Stephenson in 1836; possibly the only photograph ever taken of this type in service. The smokestack, whistle on dome, and bell were doubtless later American additions.

The 'Planet' type, with its inside cylinders under the smokebox driving a cranked axle, was a very notable advance. The original 'Planet' was delivered in October, 1830, and was still at work on the Liverpool and Manchester Railway ten years later.

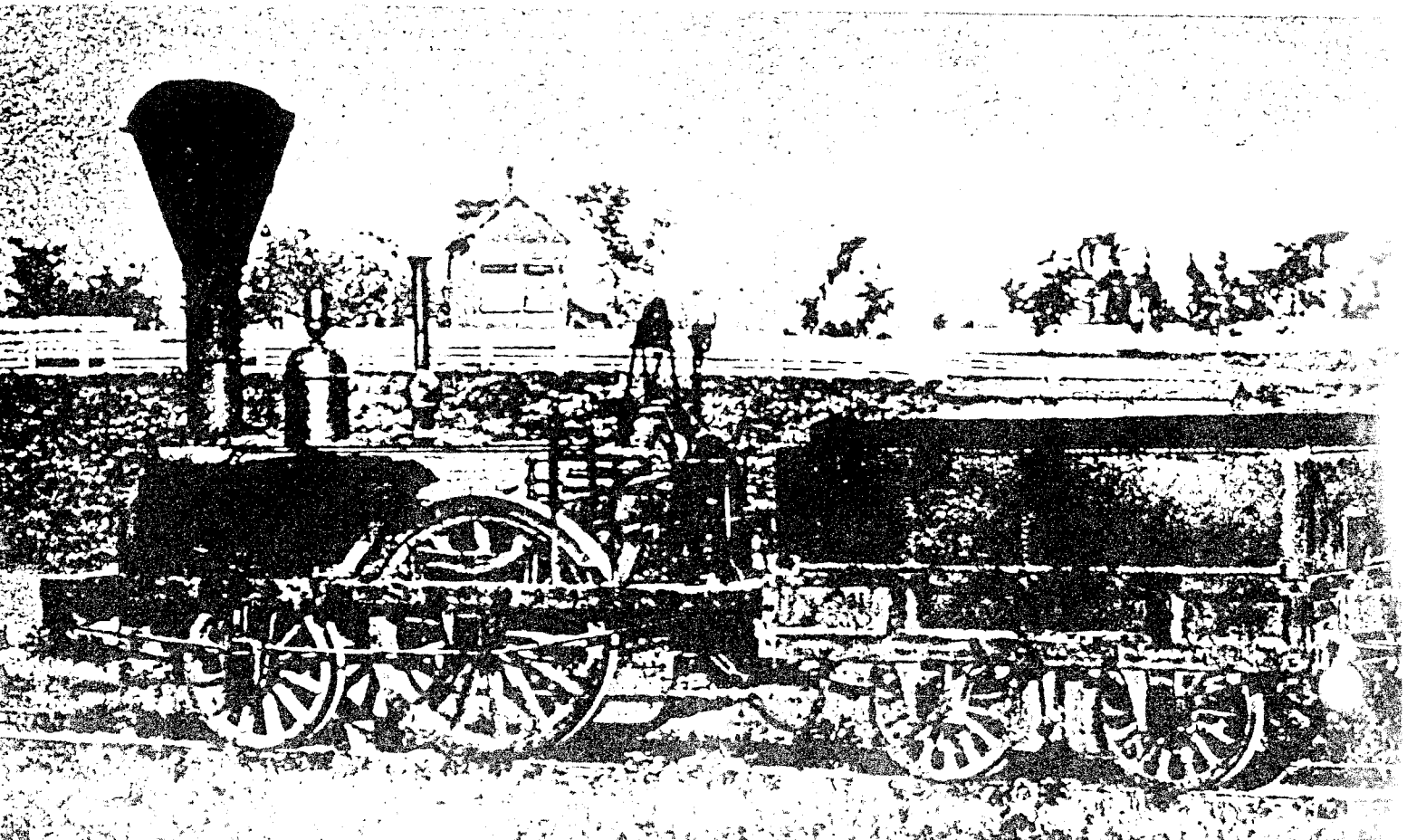
(From The Pictorial Encyclopedia of Railways by Hamilton Ellis, published by Paul Hamlyn, 1968).

Caution is needed in assessing the accuracy of different sources.

But, beyond any doubt, the 'Planet' class marks a very important phase in locomotive history and we welcome the Manchester replica as filling the slot between 'Rocket' and LION.

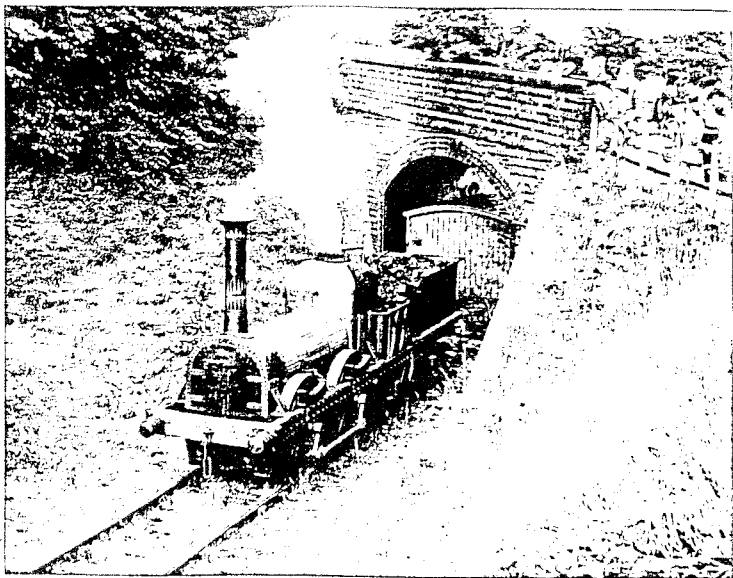
#### References:

- (1) 'Valve Motions', LIONSHEART, May 1992.
- (2) 'A Century of Locomotive building by Robert Stephenson & Co. 1823 - 1923 by J.G.H. Warren.
- (3) 'The Development of the Locomotive - A Popular History 1803 - 1896' by Clement E. Stretton.
- (4) 'Locomotive Engineering and the Mechanism of Railways A Treatise on the principles and construction of the locomotive engine, railway carriages and railway plant', by Zerah Colburn.
- (5) 'LION The Questionable Origin of her Boiler, reprinted LIONSHEART, September 1992.

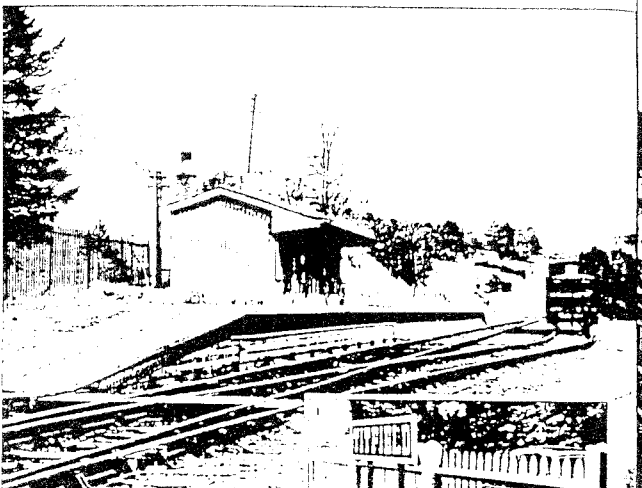




LION, of course, became famous for her starring role in the Ealing Films comedy 'The Titfield Thunderbolt'. The magazine 'Steam World' for October 1992 included a splendid photo-feature on the making of the film. Part of the feature is shown on this page.



# MAKING THE TITFIELD THUNDERBOLT

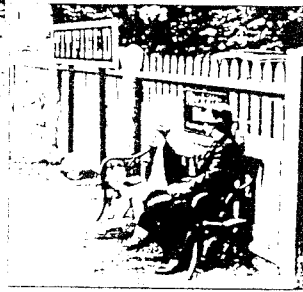


The camera opens on a tall railway viaduct. A British light Pacific hammers past, hooting a short express. There's a curious Peep pop of a two-tone whistle, quite wrong for the 14X2 0-4-2T which pops out from under the viaduct heading a cattle van, a bogie coach and a ubiquitous GWR. Head down a weed grown county branch...

**CHRIS LEIGH**

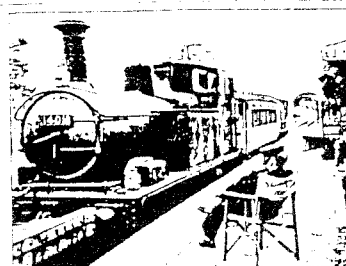
looks at how *The Titfield Thunderbolt* was made in its 40th anniversary year

The Midford station bus scene opens what is, without doubt, the most famous of all railway films. *The Titfield Thunderbolt*, made by the classic British film comedians Ealing Films, and released 40 years ago in 1952, has never been inspired by the story of the Talsi-Lybe Railway, which passed into preservation at that time; the film's scenario was the real versus rail engineers' decision into an all-or-nothing approach was the very comic comedy side of it, and the stars, John Gielgud, Curlew, Burt and Stanley Holloway, carried it off to perfection. They were the British stars of their day and the film also captured a year of the future



Top: Monkton Combe station before its transformation into Titfield by the film company. The station building is braced clad with corrugated iron on the nearer end. The GWR 'peep' fencing on the left should be noted (GWR)

Above: Two of the extra feet on a low-set station seat, but look closely at the pocket fence which has replaced the GWR's original. A that sign it is quite authentic, but the tin square posts are home-made from planks and fitted with separate pointed caps



Left: A quiet moment at Titfield. 14X2 0-4-2T No. 1401 wearing an BAC (Bamburgh) shed coat (1945) with the Worsack & Downer coach and 'Top' No. 4012. The architectural 'arrange' shot giving the film its continuity to give the impression of a film set.

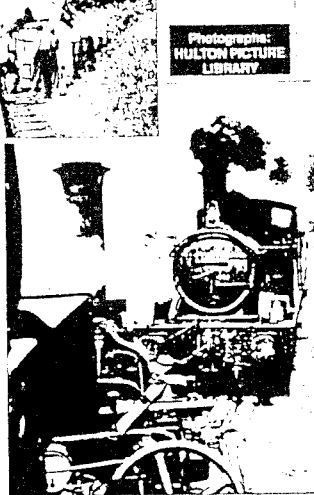
Below: Raising the signal at Titfield. Loring's strong recommendation of the famous American actor to give Raising the Flag at two Jims. The film crew sets about installing a home signal. It would be raised and lowered for access by the regular Great Central 'Beeper'.

Below left: The B17 free take a break during filming as *Thunderbolt* sets with cast members on the set plate.

Below right: No. 1401 again in action against Sid James's fire on road order during the scene in which a temporary board crossing was installed by the film company.

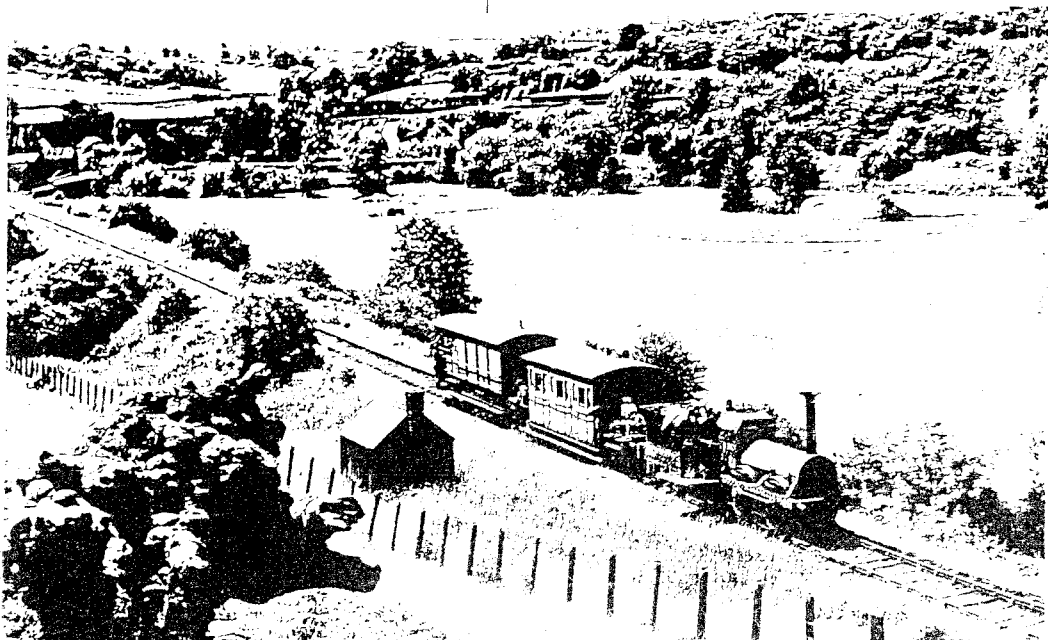


Sidney James, not supporting the latter most of the other railway movies, in *Titfield* the rail was raised a station and rather in a supporting one. The film required a great branch line to be taken over by the local people after the closure of the line. In the early 1950s, Beeching was still in his early days, and although there had been branch line closures, there was no great choice of lines which were closed but still in service. The mile fell to the line near



Lymington to Halloway, which the GWR had opened in 1910. It had closed to passengers from September 21 1925, but remained in use for freight traffic until 1952, when it was closed. At Midford the branch crossed underneath the Somerset & Dorset Railway's Midford Viaduct and at Monkton Combe the main passenger station was bypassed, passing up the hillside for the film makers. Film added a few yards of track with an artificial shelter for a carriage.

Photographs: HULTON PICTURE LIBRARY



## LINKS IN THE HISTORY OF THE LOCOMOTIVE

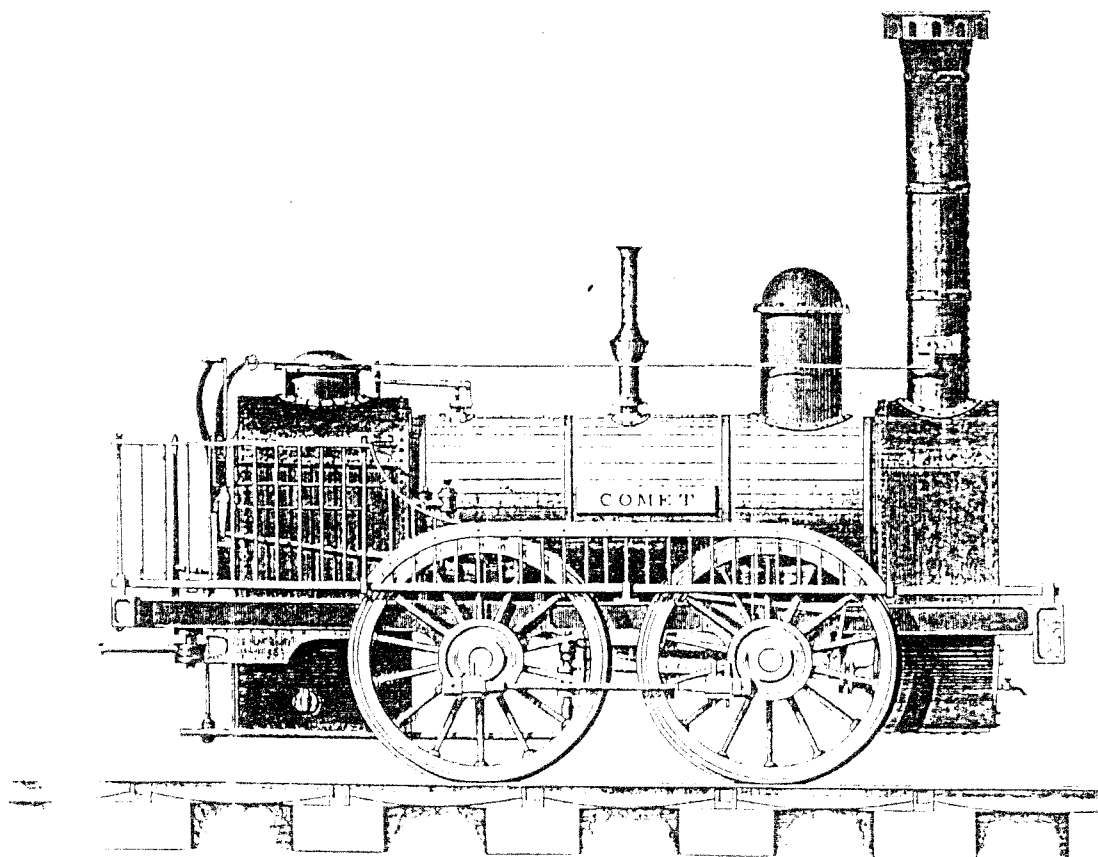
This article first appeared in "The Engineer" in 1881.

After the Liverpool and Manchester Railway had been open for a little time, it was found that engines of the Rocket type were not competent to deal with the considerable traffic. The anticipation of the directors was that the line would be employed mainly for the conveyance of goods, and especially cotton, to Manchester; and from Manchester to Liverpool, and the carriage of passengers was regarded as quite a secondary matter. But these anticipations were rapidly dispelled. The passenger traffic augmented with great rapidity, while the goods traffic came comparatively slowly. The carriage of goods by rail was expensive, and much dispatch was not wanted; but that a Manchester merchant should be able to run over to Liverpool in two hours, transact a good deal of business there, and get back to his own city in time for an early dinner, was a new thing well worth paying for. The railway brought two great centres of commerce within a couple of hours of each other and it was appreciated and patronised. The Rocket and its fellows were quickly displaced and engines of another type took their place. The progenitor of these locomotives was the Planet, the first engine made with horizontal cylinders set in the bottom of the smoke-box and fitted with crossheads and guides closely resembling those now in use. The engine had a crank axle, and a single pair of driving wheels. The valve gear was similar to Rocket in the first instance, but it is possible that it was subsequently fitted with gab gear.

It is somewhat singular that these new locomotives have never attracted much attention or been regarded with much interest, and yet they were in all respects as superior to the Rocket as that engine was to the old "Puffing Billy". It has been said that the Rocket contained all the principal features of the modern locomotive. This is not quite true, but the engines with which we are now dealing did. The Planet may be taken as the true progenitor of the modern locomotive. It had horizontal inside cylinders built into the base of the smoke-box. It had two side frames: of wood it is true, but they were the first true frames used. The horn plates were of the modern type bolted onto them. The Rocket's frames resembled the modern American bar frame than the plate frame but the great point of difference between Planet and Rocket was in the

boilers. If our readers will turn to the views of the Rocket published in our impression for September 17th, 1880, they will see that in it the firebox is an excrescence tacked on, so to speak, to a plain cylindrical boiler traversed by tubes. But in Planet this was not the case. The planet and its fellows had boilers into which the firebox was put, as in modern locomotive boilers, instead of being bolted against the end. In this way a host of advantages were gained. It is doubtful if the Rocket type of boiler could ever have been made to comply with modern requirements. The water had all to be led into it by two small pipes at the bottom, while the steam was taken off by other pipes at the top. It would have been impossible to keep up proper circulation in a large box this way. We do not hesitate to say that, whoever designed the boiler of the Planet - and on this point history is unfortunately silent - accomplished a great work. It is by no means certain that Robert Stephenson invented the Planet - for its design was the result of pure invention, or the highest class of what is known in the drawing-office as "scheming" - and it is nearly certain that George Stephenson did not. We should gladly see the name of this man, whoever he was, rescued from oblivion. Of course it may be that the Stephensons really did the work. If so, however, the fact has never been stated, save in very vague and general terms; and it is extremely probable that, at the time the Planet came into existence, the Stephensons had a regular drawing-office, and on the head of this office most of the work of carrying the general ideas of George and Robert Stephenson into practice would devolve. Who was the head of the office? Perhaps some of our readers can supply the information needed.

Through the courtesy of Mr. Harrison Aydon we are enabled to publish herewith information which has never been published before. At the end of this article will be found a table, originally prepared many years ago by Mr. Forsythe for Mr. Fyfe giving particulars and dimensions of nearly all the engines in use on the Liverpool and Manchester Railway in the year 1840. It will be seen that the numbers up to 9 and 10 are missing as well as a few others. No. 1 was, we believe, the Rocket and this engine with its companions had been withdrawn from active service some time before 1840.



The dates of the construction of all the engines named are given in the table. Some of the engines had boilers oval in section. Thus, for example, the Lion had a boiler 3'3" by 3'6"; as the pressures were small, say 50 lb. only, there was no difficulty in making the boilers strong enough. To cast additional light on the construction of the engines which immediately succeeded the Rocket, we illustrate herewith an

engine called the Comet, built by Messrs. R. and W. Hawthorn, of Newcastle-on-Tyne, in 1835. Our engraving is copied from an old copper-plate engraving, for which we are indebted to Mr. Wilson, of Loughborough. This engine is very similar to Stephenson's Planet, except that it had four coupled wheels, while the Planet had but two driving wheels and two leading wheels of smaller diameter.

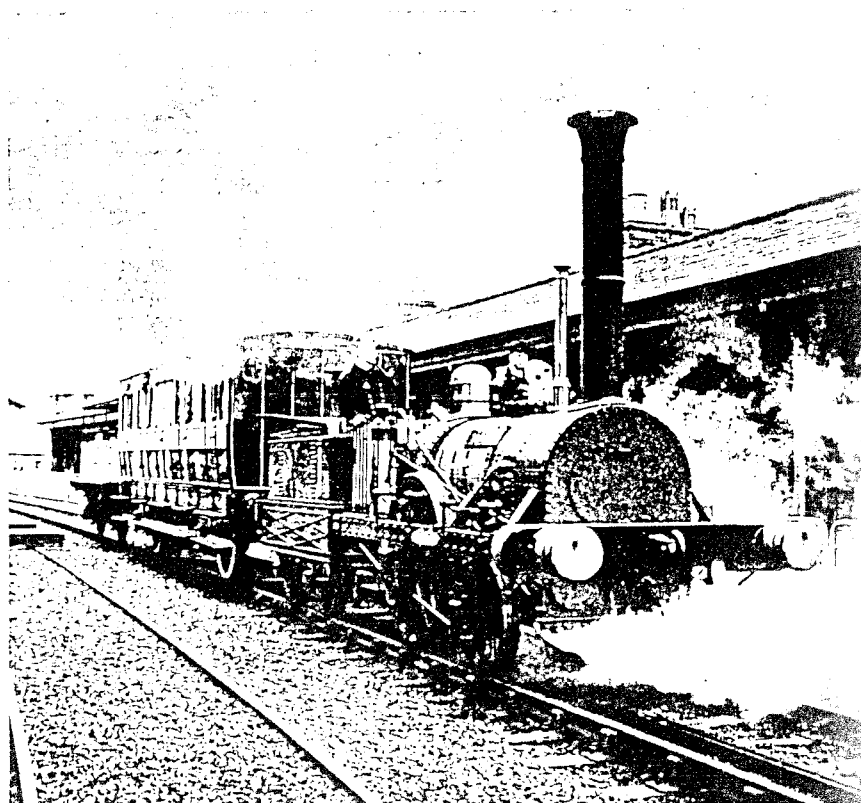
The Table referred to in this article appears on the next page.

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## PLANET STEAMS

This view of the 'Planet' replica appeared in the October 16th, 1992 edition of Steam Railway News. It shows 'Planet' after the official launch by the Lord Mayor of Manchester, Councillor William Egerton on October 2nd, 1992.

'Planet' entered public revenue service for the 'Railway Weekend' on 31st October and 1st November 1992. OLCO Members Charles Taylor-Nobbs, Vernon Smallwood and Jan Ford attended in period costume. Since Jan was also rostered for footplate duties, she eshewed a dress for period footplate attire. OLCO Members Eddie Ball and Jim Mercer also attended.



Locomotive Engines belonging to the Liverpool and Manchester Railway to the year 1840.

Number of engine.	Name of engine.	Date when made.	Cylinder.		Diameter of wheels.			Tubes.		Inside diam. of fire-box.			Boiler.		Chimney.		Heating surface.		Weight of engine with water and fuel.	Remarks.
			Diam.	Length of stroke.	Driving	Leading	Trailing	Number.	Length.	External diam.	Length.	Breadth.	Height from top of roof to top of boiler.	Diam.	Length.	ft. in.	ft. in.	sq. ft.		
9	Planet	1830	11	16	5 0	3 6	none	10	7 0	2 10	3 7 1/2	3 7 1/2	6 4	3 0	5 5	12	34 87	248 2		The first engines that were made with horizontal cylinders had both driving and leading wheels made of wood, with cast iron frames and wrought iron ties.
10	Mercury	1830	11	18	5 0	3 6	none	10	7 0	3 2	3 7 1/2	3 7 1/2	6 4	3 0	5 5	12	39 80	208 8		
11	Vulcan	1831	11	16	5 0	3 6	3 0	10	6 10	2 11	3 7 1/2	3 7 1/2	6 4	3 0	5 5	12	34 70	261 4		
19	Fury	1831	11	16	5 0	3 6	3 0	10	6 10	2 11	3 7 1/2	3 7 1/2	6 4	3 0	5 5	12	34 70	263 0		
21	Victory	"	11	16	5 0	3 6	3 0	10	6 10	2 10	3 7 1/2	3 7 1/2	6 4	3 0	5 5	12	35 34	251 1		
22	Atlas	1832	12	16	5 0	3 6	3 0	10	6 10	2 8	3 7 1/2	3 7 1/2	7 10	3 2	5 0	12	37 69	251 5		
23	Pluto	"	12	18	5 0	3 6	3 0	10	6 10	2 4	3 7 1/2	3 7 1/2	7 10	3 2	5 0	12	41 64	250 2		
27	Ajax	"	11	18	5 0	3 6	3 0	10	6 10	1 11	3 5	3 5	6 8	3 2	5 0	12	38 06	210 3		
29	Leeds	"	11	16	5 0	3 6	none	10	6 10	1 8	3 4	3 4	6 4	3 0	5 0	12	33 12	263 4		
30	Firefly	1833	11	18	5 0	3 6	3 0	10	6 10	1 11	3 4	3 4	6 4	3 0	5 0	12	40 82	260 0		
31	Patentee	1834	12	18	5 0	3 6	3 0	10	6 10	3 0	3 4	3 4	7 0	3 5	6 10	14	40 20	303 0	14 8 0	
33	Titan	"	11	20	5 0	5 0	5 0	10	8 10	2 1	3 3	3 3	8 5	3 0	5 0	12	40 58	322 5	13 7 2	
34	Orion	"	11	20	5 0	5 0	5 0	10	8 10	2 0	3 4	3 4	8 5	3 0	5 0	12	39 04	320 0		
35	Orion	"	11	20	5 0	5 0	5 0	10	8 10	2 0	3 4	3 4	8 5	3 0	5 0	12	39 50	241 7		
36	Swiftsure	1835	11	18	5 0	3 6	3 0	10	6 10	2 0	3 2	3 2	7 0	3 0	4 0	12	39 70	281 6		
37	Rapid	"	12	16	5 0	3 6	3 0	10	6 10	1 8	3 1	3 1	8 0	3 0	4 0	12	34 57	365 7		
38	Speedwell	"	15	16	5 0	5 0	5 0	10	8 10	2 0	3 2	3 2	7 11	3 0	5 8	12	45 90	329 2		
39	Hercules	1836	15	16	5 0	5 0	5 0	10	8 10	2 0	3 2	3 2	7 11	3 0	5 8	12	45 90	329 2		
40	Eclipse	"	12	18	5 0	5 0	5 0	10	8 10	1 10	3 3	3 3	7 6	3 2	5 2	12	37 15	340 2		
41	Star	"	14	12	5 0	3 0	3 0	10	7 11	2 4	3 1	3 1	7 6	3 2	5 2	12	40 00	280 7		
42	Star	"	12	18	5 0	5 0	5 0	10	8 10	2 11	3 3	3 3	7 11	3 0	4 10	11	37 80	313 3		
43	Vesuvius	"	12	16	5 0	3 6	3 0	10	6 10	2 14	3 0	3 4	7 7	3 3	6 8	12	37 33	284 2		
44	Thunder	"	16	16	5 0	6 0	6 0	10	8 10	2 8	3 5	3 5	8 4	3 3	5 10	14	40 30	325 1		
45	Lightning	"	12	16	5 0	3 6	3 0	10	6 10	2 2	3 4	3 4	7 7	3 2	6 8	12	42 02	285 6	11 11 1	
46	Cyclops	"	12	16	5 0	3 6	3 0	10	6 10	2 2	3 4	3 4	7 7	3 2	6 8	12	42 02	284 0	12 8 0	
47	Milo	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 0	3 2	5 2	12	43 60	318 0	12 10 2	
48	Phenix	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 0	3 2	5 2	12	38 08	301 6	12 2 0	
49	Part	1837	14	12	5 0	3 6	3 0	10	6 10	2 0	3 4	3 4	7 6	3 0	5 0	12	42 19	313 0	12 0 1	
50	Majestic	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	13 0 2	
51	Etna	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	10 13 1	
52	Arrow	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	12 12 0	
53	Son	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	12 12 0	
54	Metec	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	12 1 2	
55	Comet	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	12 12 2	
56	Vesta	"	14	12	5 0	3 6	3 0	10	6 10	2 6	3 0	3 0	7 6	3 0	5 0	12	42 19	313 0	12 12 2	
57	Lion	1838	11	20	5 0	5 0	5 0	10	8 10	2 0	3 0	3 0	7 5	3 3	5 2	12	39 42	380 0		Coupled tank.
58	Tiger	"	11	20	5 0	5 0	5 0	10	8 10	2 6	3 0	3 0	7 5	3 3	5 2	12	40 75	388 0		Engines ditto.
59	Rekely	"	11	18	5 0	3 6	3 0	10	6 10	2 6	3 4	3 4	7 6	3 3	6 0	12	45 84	384 0		14 15 2
60	Hederick	"	11	18	5 0	3 6	3 0	10	6 10	2 6	3 3	3 3	7 6	3 3	4 9	12	44 64	385 0		14 13 2
61	Mammoth	1839	12	18	5 0	5 0	5 0	10	8 10	2 4	3 2	3 2	8 2	3 5	5 6	13	41 03	223 4		13 10 0
62	Leopard	"	11	18	5 0	3 6	3 0	10	6 10	2 5	3 2	3 2	7 6	3 3	5 3	12	41 67	385 9		13 13 0
63	Mantodon	"	12	18	5 0	5 0	5 0	10	8 10	2 3	3 2	3 2	8 2	3 3	4 10	13	39 50	323 4		14 5 2
64	Panther	"	11	18	5 0	3 6	3 0	10	6 10	2 5	3 2	3 2	7 6	3 3	5 2	12	41 67	384 0		14 4 0
65	Elephant	"	14	20	5 0	5 0	5 0	10	8 10	2 6	3 4	3 4	7 6	3 6	5 0	13	388 0	388 0		
66	Samson	"	11	20	5 0	5 0	5 0	10	8 10	2 6	3 6	3 6	7 5	3 5	4 10	12	47 10	381 10		15 3 2
67	Buffalo	"	14	20	5 0	5 0	5 0	10	8 10	2 6	3 4	3 4	7 5	3 3	5 2	12	384 0	384 0		
68	Goliath	"	11	20	5 0	5 0	5 0	10	8 10	2 6	3 6	3 6	7 5	3 3	5 0	12	47 10	381 10		16 3 0

This Table was compiled for Mr. Fyfe, Locomotive Superintendent at the Oldham Works of the Liverpool and Manchester Railway, Manchester.

## EDITOR'S NOTE

The tables on pages 12 and 13 will repay careful study. The table on page 12 accompanies the article starting on page 10, which originally appeared in 1881. This table lists the Liverpool and Manchester locomotives in 1840, just 41 years before the article was published.

For comparison, we include the Liverpool and Manchester Locomotive List for 1834. The 1834 list is copied from 'The Development of the Locomotive - A Popular History 1803 - 1896' by Clement E. Stretton.

The 1834 list shows the 'Rocket' types, followed by the 'Planet' types. 'Samson' and 'Goliath' are the first four-coupled 'Planet' type locomotives. Page 11 includes a copper-plate engraving of a very similar four-coupled locomotive built by Hawthorn in 1835. Numbers 19, 21 and 30 are

Stephenson-designed 'Planet' types built by Fenton Murray and Co. (and illustrated on page 3). By 1834, the 6-wheeled 'Patentee' has appeared. Bury, Galloway, Sharp Roberts, Tayleur and Forrester make a numerically-small contribution to the stud.

Turning to the 1840 list, all the 'Rocket' class and most of the 'Planet' locomotives have been withdrawn. Stephenson's early choice of 5 foot drivers and 3 foot 6 inch carrying wheels has remained but the later engines are all six-wheeled, either 2-2-2 or 0-4-2. LION has appeared as a Bank Engine. Note the trend towards larger boilers, greater evaporative surface and increased weight in the later locomotives. LION also marks the introduction of oval boilers.

There is a wealth of information in these two tables.

[Copy.]

## LIVERPOOL AND MANCHESTER RAILWAY COMPANY.—LOCOMOTIVE LIST, 1829 TO 1834.

No.	Name of Engine.	Date.	Maker.	Diam. of cylinders.	Length of stroke.	Diam. of driving wheels	Design.	Remarks.	
1	Rocket ... ..	1829	R. Stephenson & Co. ... ..	Ins. 8	Ins. 16½	Ft.In. 4 8½	"Rocket" class	4 wheeled engines, outside cylinders, driving wheels in front.	
2	Meteor ... ..	1830	" "	10	16	5 0	" "		
3	Comet ... ..	"	" "	10	16	5 0	" "		
4	Arrow ... ..	"	" "	10	16	5 0	" "		
5	Dart ... ..	"	" "	10	16	5 0	" "		
6	Phoenix ... ..	"	" "	11	16	5 0	" "		
7	North Star ... ..	"	" "	11	16	5 0	" "		
8	Northumbrian ... ..	"	" "	11	16	5 0	" "		
9	Planet ... ..	"	" "	11	16	5 0	"Planet" class	4 wheeled engines, inside cylinders, driving wheels behind	
10	Majestic ... ..	"	" "	11	16	5 0	" "		
11	Mercury ... ..	"	" "	11	16	5 0	" "		
12	Mars ... ..	"	" "	11	16	5 0	" "		
13	Samson ... ..	1831	" "	14	16	4 6	"Samson" class	4 wheels coupled.	
14	Jupiter ... ..	"	" "	11	16	5 0	"Planet"	4 wheels coupled.	
15	Goliath ... ..	"	" "	14	16	4 6	"Samson"		
16	Saturn ... ..	"	" "	11	16	5 0	"Planet" class		
17	Sun ... ..	"	" "	11	16	5 0	" "	Vertical cylinders.	
18	Venus ... ..	"	" "	11	16	5 0	" "		
19	Vulcan ... ..	"	Fenton, Murray & Co. ... ..	11	16	5 0	" "		
20	Etna ... ..	"	R. Stephenson & Co. ... ..	11	16	5 0	" "		
21	Fury ... ..	"	Fenton, Murray & Co. ... ..	11	16	5 0	" "		
22	Victory ... ..	"	R. Stephenson & Co. ... ..	11	16	5 0	" "		
23	Atlas ... ..	1832	" "	12	16	5 0	"Samson"		4 wheels coupled.
24	Vesta ... ..	"	" "	11	16	5 0	"Planet"		4 wheels coupled.
25	Milo ... ..	"	" "	12	16	5 0	"Samson"		
26	Liver ... ..	"	E. Bury & Co. ... ..	11	16	5 0	"Bury's"		Vertical cylinders.
27	Pluto ... ..	"	R. Stephenson & Co. ... ..	12	16	5 0	"Planet"		
28	Caledonian ... ..	"	Galloway & Co. ... ..	12	16	5 0	(4 coupled)		
29	Ajax ... ..	"	R. Stephenson & Co. ... ..	11	18	5 0	"Planet"		
30	Leeds ... ..	"	Fenton, Murray & Co. ... ..	11	16	5 0	" "		
31	Firefly ... ..	1833	R. Stephenson & Co. ... ..	11	18	5 0	" "		
32	Experiment ... ..	"	Sharp, Roberts & Co. ... ..	11	16	5 0	Roberts design	Vertical cylinders.	
33	Patentee ... ..	1834	R. Stephenson & Co. ... ..	12	18	5 0	(6 wheels)	Inside cylinders.	
34	Titan ... ..	"	Tayleur & Co. ... ..	11	20	5 0	" "	" "	
35	Orion ... ..	"	" "	11	20	5 0	" "	" "	
36	Swiftsure ... ..	"	Forrester & Co. ... ..	11	18	5 0	" "	Outside cylinders.	

Dated 1834, Liverpool.

4

IN THE NEXT ISSUE: We'll return to the more normal format, with information regarding LION. National Museums and Galleries on Merseyside have kindly allowed us to publish extracts from their detailed report on the Pumping Shed at Princes Dock, Liverpool, in which LION served for so many years as a stationary pumping engine. We hope to have information for live steam modellers and there will be full details of the Annual General Meeting and associated activities, together with information on LIONSMEET. Please support us with articles, letters for publication and, particularly, your photographs. Photographs of LION, LION models and the 'Planet' replica are welcome. The address is on the back page.

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## GREAT CENTRAL RAILWAY

General Enquiries Telephone: Loughborough (0509) 230726



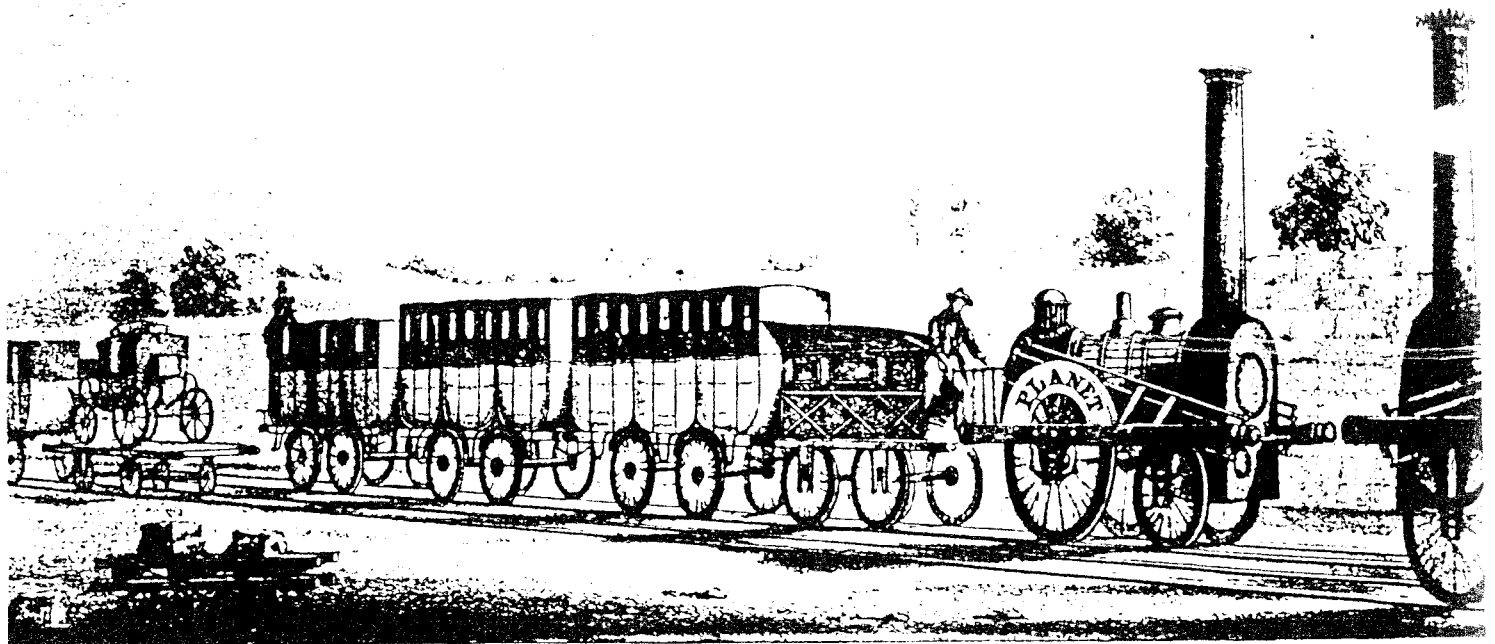
### PLANET AT THE GREAT CENTRAL

The builders of the 'Planet' replica are subjecting the locomotive to trials in order to determine her hauling capacity and coal and water consumption.

Because the demonstration line at Manchester is rather limited, these trials are being carried out on the full 8-mile length of the Great Central

Railway at Loughborough. The tests are currently scheduled for the week commencing 15th February 1993.

It is hoped that 'Planet' will be giving short, demonstration trips at Loughborough hauling passengers. This should be on the weekend of 27th and 28th February and possibly the two previous weekends.



*LOCOMOTIVE 'PLANET' on the G.C.R. at Loughborough and the G.C.R. at Manchester R.A. (1830).*

Stephenson's 'Planet' 2-2-0 i.c. locomotive, Liverpool and Manchester Railway, 1830. From a contemporary lithograph by H. Austen.

(From The British Railway Locomotive 1803 - 1853, published by the Science Museum).

# FEEDBACK

face when the engine returned complete with Ealing Films' extra paint.  
Yours sincerely,  
Charles Taylor

From: Charles Taylor

There is an article in Steam World (October 1992) on the filming of "The Titfield Thunderbolt" with some nice pictures of LION. The magazine is also offering a video of the film for £6.00 inc p&p, which is a bargain for any member who hasn't one.

The caption to one picture says that the boiler pressure of LION was 80 p.s.i. I remember us preparing the engine to go to Western Region but was not directly involved so can't verify this figure. I also remember the look of horror on the Paint Shop Foreman's

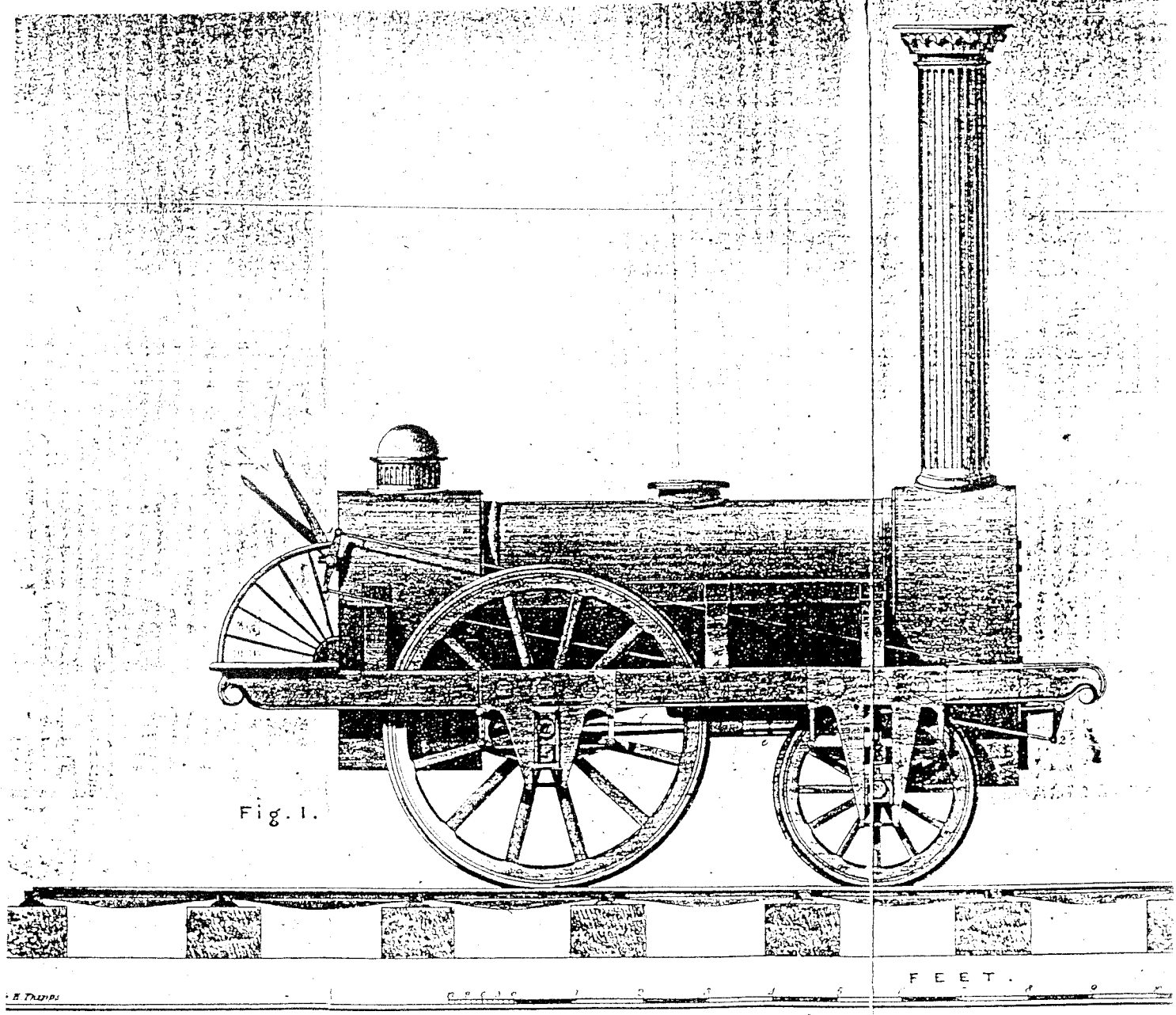
(Lion's nominal pressure is 50 p.s.i. - Ed.)

From: M. G. Satow

## LOCOMOTION

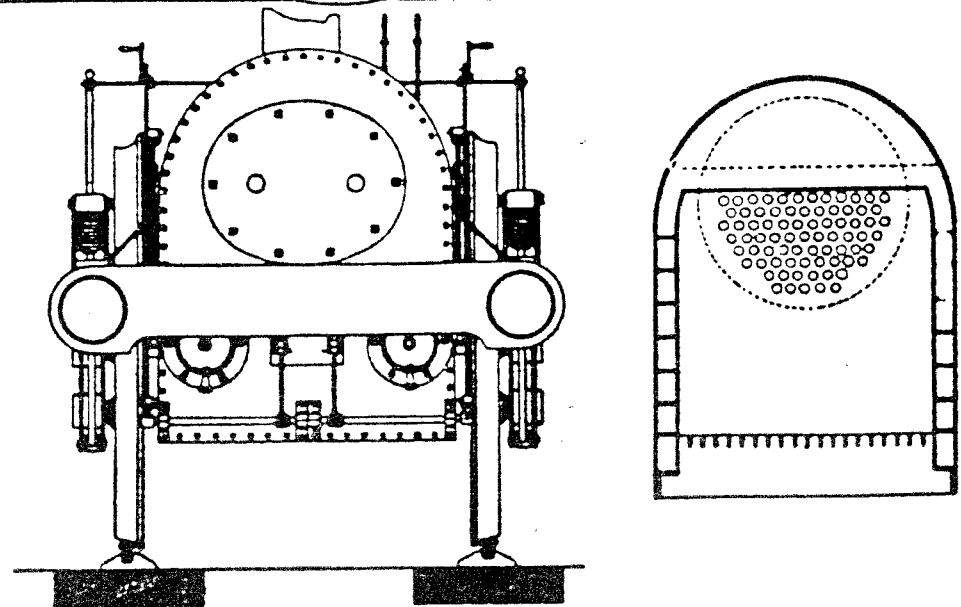
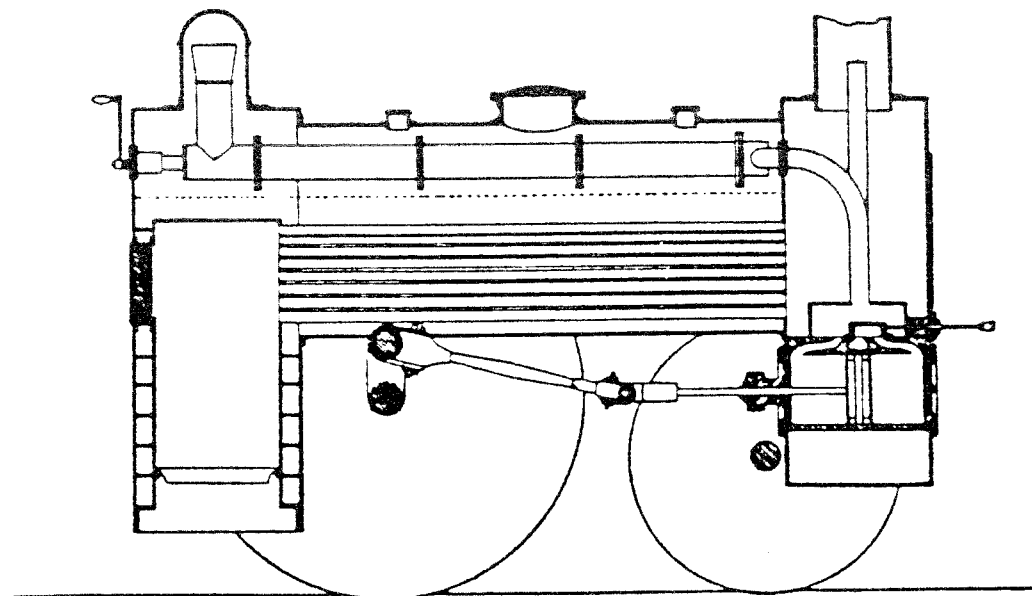
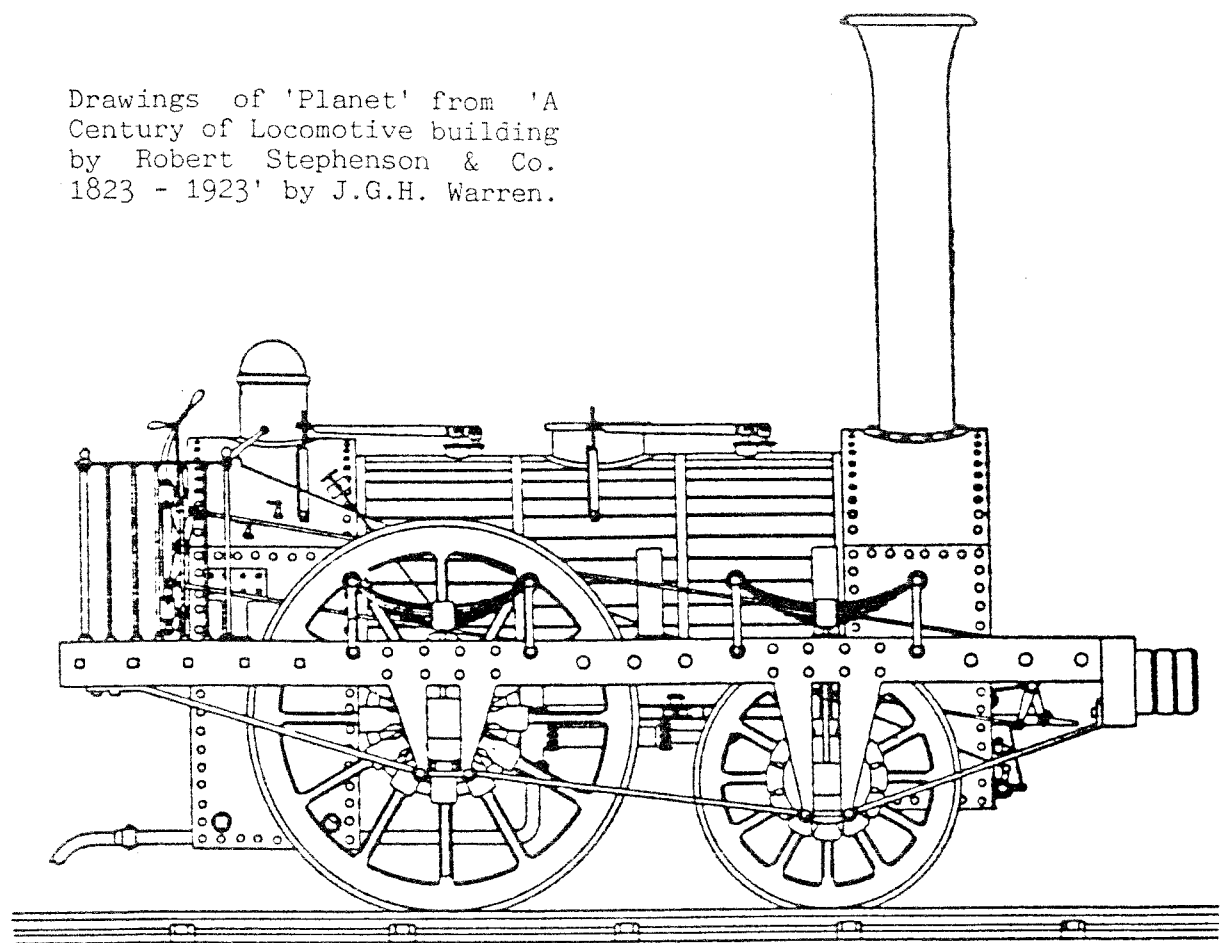
Re enquiry by Bob Davies of Bexleyheath for 'Locomotion' drawings etc. The Science Museum, London has copies on microfilm of the full set covering the building of the 1975 reproduction.

M. G. Satow

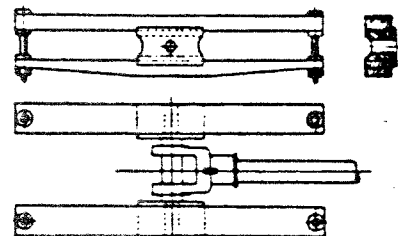
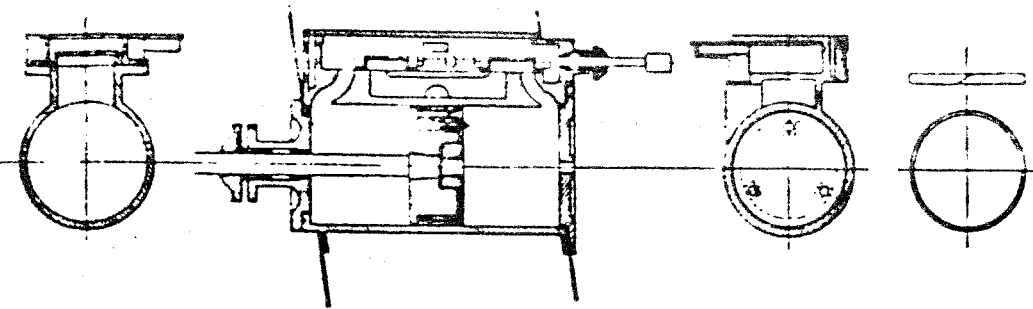


This attractive, but perhaps imaginative, view of 'Planet' forms the frontispiece to the second edition of A Practical Treatise on Railroads by Nicholas Wood, published in 1832. However, in another context, Zerah Colburn sharply comments in his own work Locomotive Engineering and the Mechanism of Railways "It is of course possible too, as was the case with nearly all the illustrations of Mr. Wood's book that ... (it) ... was not accurately drawn".

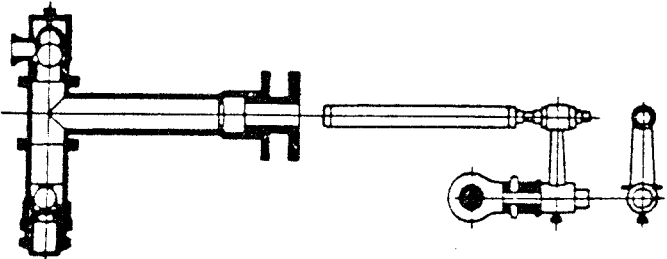
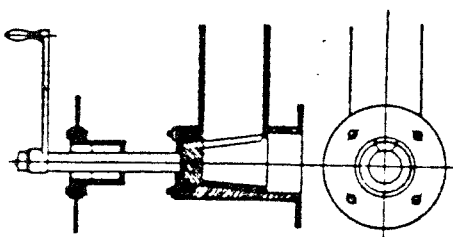
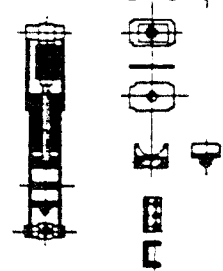
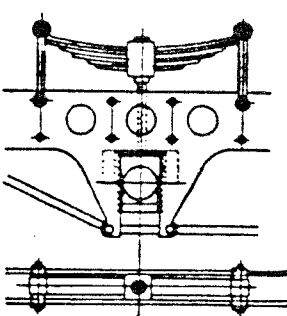
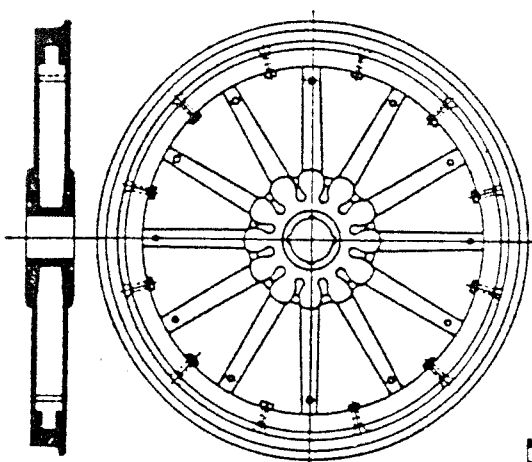
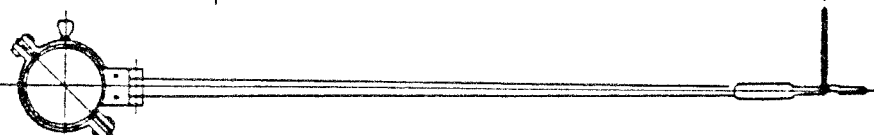
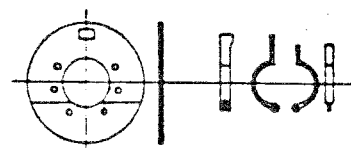
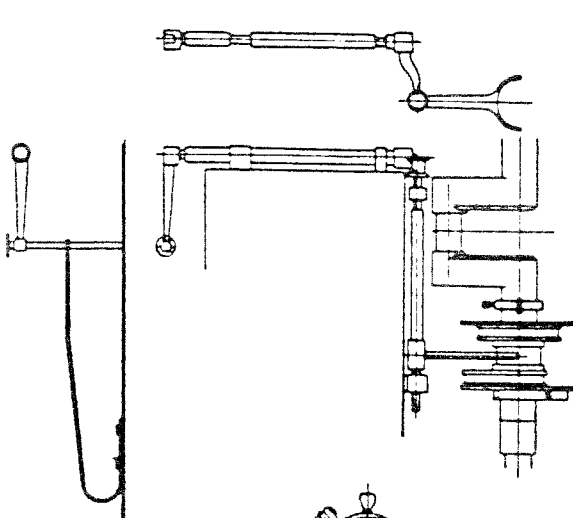
Drawings of 'Planet' from 'A Century of Locomotive building by Robert Stephenson & Co. 1823 - 1923' by J.G.H. Warren.







SCALE 0 1 2 3 OF FEET



SCALE 0 1 2 3 4 5 6 OF FEET

(re-drawn) from 'Locomotives Stephenson circulant en Angleterre et en France,' published Champon, Brussels, 1835.

DETAILS OF 'PLANET' TYPE

# FEEDBACK

From: Mike Fox  
President  
High Wycombe M.E.C.

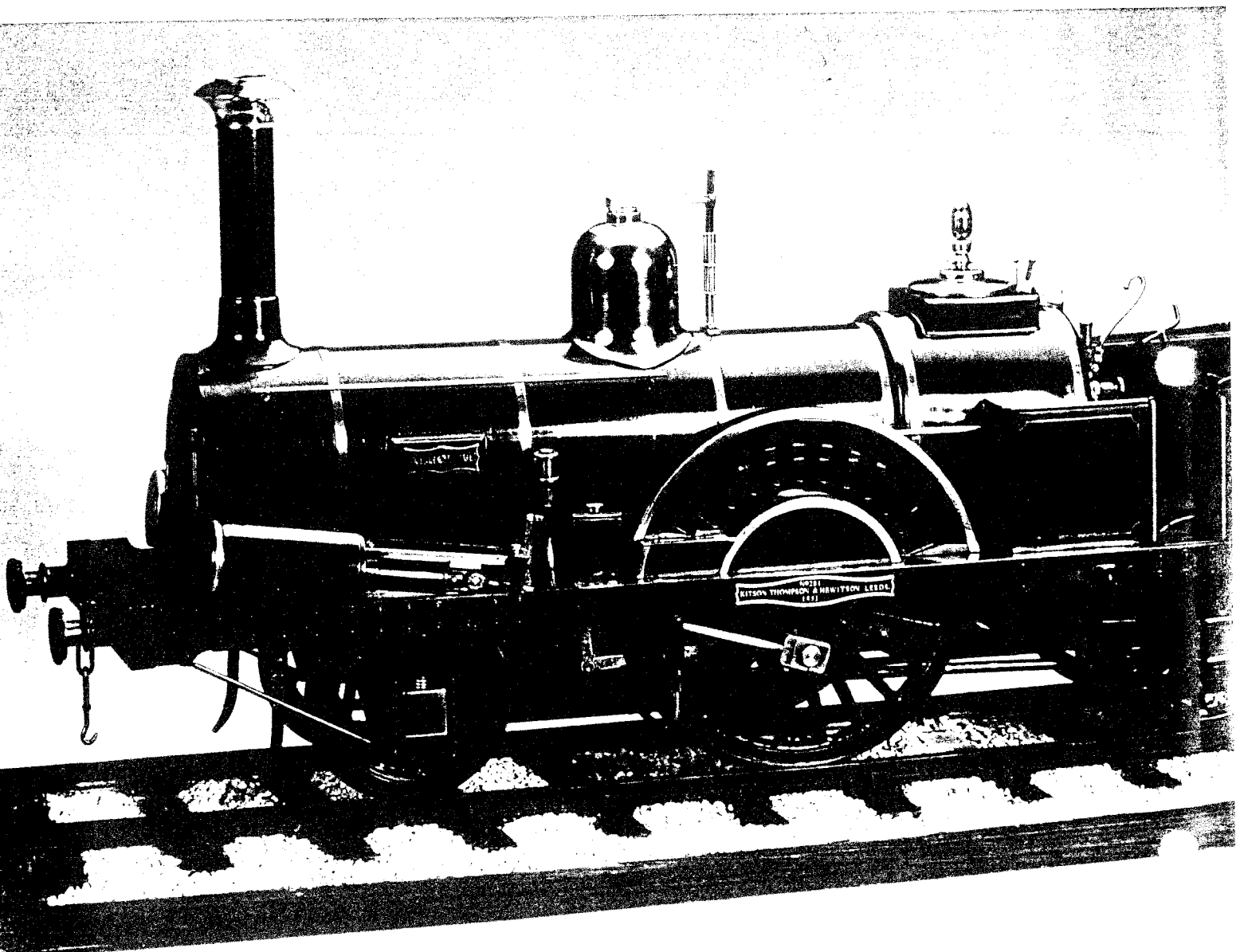
RE: LIONSHEART SEPT 1992

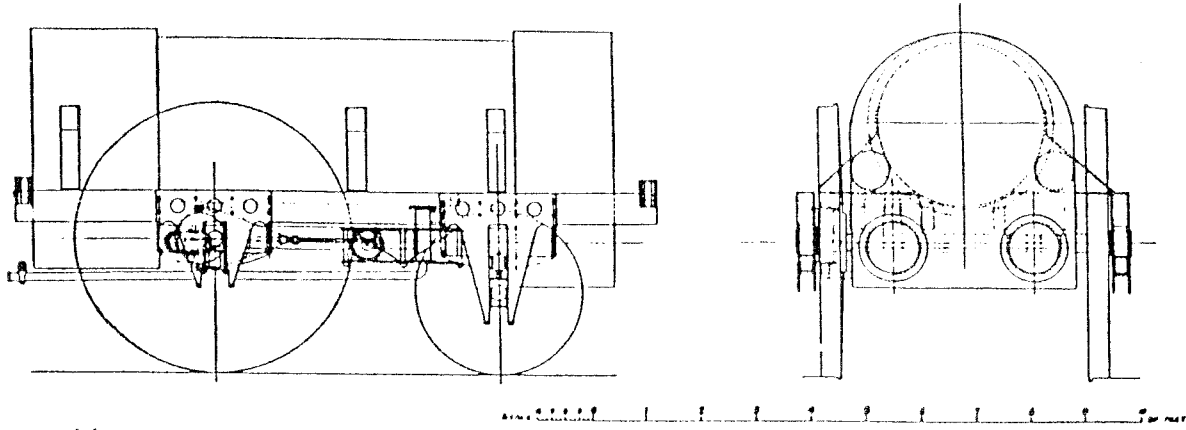
I was very interested in two items mentioned in the above newsletter. Firstly, your bar article on Steam in India. Jan Ford makes reference to the loco 'Hair Queen', built by Thompson, Eltson and Hewitson in 1875. I enclose a photo of my model of 'Aerolite', built by this firm in 1876, for exhibition at the Great Exhibition of 1876 in Hyde Park. The similarities between the two are very plain to see. The model is French made, and a very successful runner. Visually, it is reasonably accurate, but I cannot vouch for the accuracy of the valve motion, which, in view of the well tank, I had to design myself. It should be remembered that this 'Aerolite' is a miniature of the loco now preserved at York.

The second matter concerns the article on LIONSHEART. I am afraid that I have not attended these meetings in the past, except as an observer at Wroughton. The date on which it is held has not been convenient to me, as it is on the weekend of my local club's Open Day - or rather, it is the day before. As the owner and builder of one of the earliest 'Lion' models, first steamed in 1954, I would like to suggest the High Wycombe track would be a suitable venue. The track is raised 3.5" - 5" and 7.25", and about 1230 feet in length, suitable for all sizes of 'Lions'. It's an interesting track in the form of a folded circle, with one gradient of 1:80 (up), to make the railways work! You would have a problem, or even coffee!

I would suggest that an article in Model Engineer, and Engineering in Miniature, a month or so before the event, would produce much greater response.

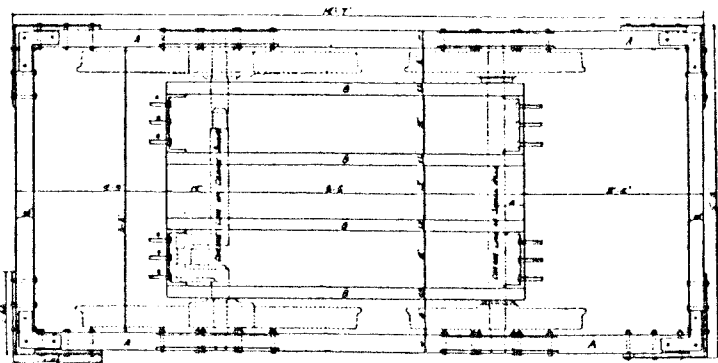
All the best to your club,  
Mike Fox





traced from an original drawing (undated), endorsed

NO. 10 L'POOL LOCOMOTIVE, MR. R. STEPHENSON'S

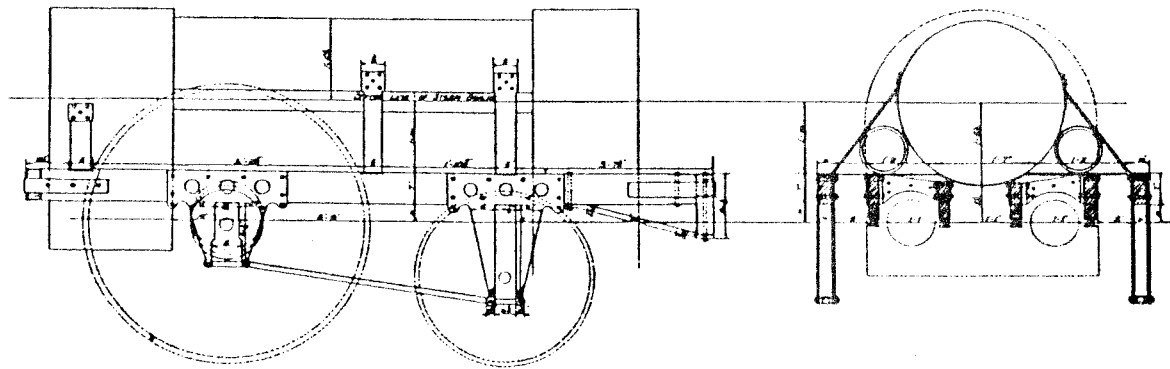


A.A.A. The outer frame of the engine was to support the plates for keeping the centres of the wheels of the iron rails all round.

B.B.B. The inner frame was to carry the bearings of the iron axles into the engine and keep the pistons round in a line.

The double brackets must be riveted on with great care as they are not to be loose.

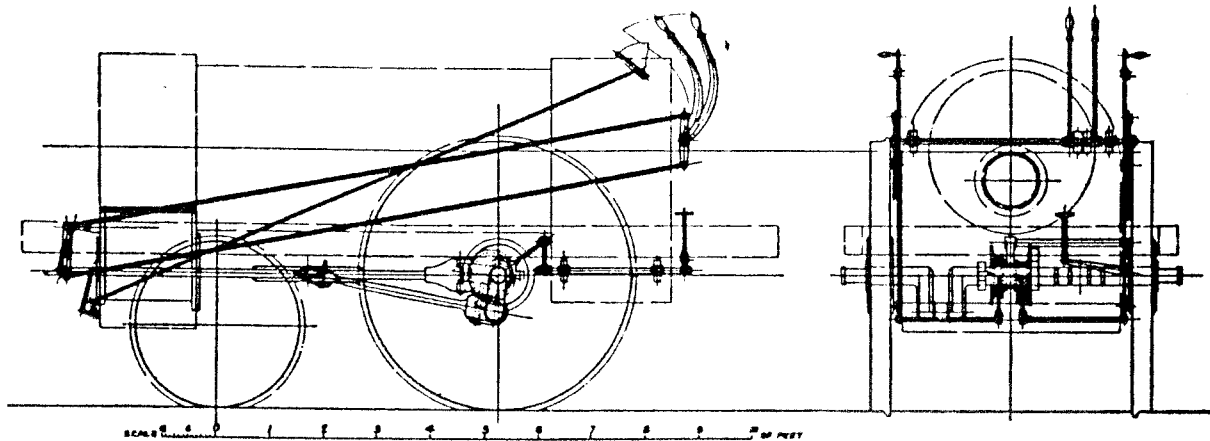
Copy of Working Drawing sent to Messrs. Fenton & Murray  
January 4<sup>th</sup> 1831



traced from the original, dated 4th January 1831.

'PLANET' TYPE FRAME

copy of working drawing sent to Messrs. Fenton & Murray



VALVE GEAR OF 'PLANET' TYPE

# THE EDITOR WRITES...

For the benefit of new readers, let me explain that LIONSHEART is the newsletter of the OLD LOCOMOTIVE COMMITTEE, published irregularly about four times a year. The OLD LOCOMOTIVE COMMITTEE is the 'supporters club' for the locomotive LION, built in 1838 by Todd, Kitson and Laird in Leeds. After steaming all over the country to celebrate her 150th birthday in 1988, LION returned to the Museum in Liverpool for display. LION is now in restoration workshops where the work necessary to return her to steamable condition is being carefully planned.

Our activities include a costume group, who may be seen in period dress where any old locomotive (or replica) is steamed and a modelling group who operate live-steam models of LION.

## MEMBERSHIP MATTERS

Thanks to all members who have now renewed for 1992-1993. If you have still not renewed, please let the Treasurer have a remittance.

Our 1993-1994 membership year starts in April, and subscriptions will be once again due. New members are also welcome.

Remittances should be made out to 'Old Locomotive Committee'.

Annual subscriptions for 1992-1993 and 1993-1994 are as follows:-

Junior .. .. .	£3
Individual .. .. .	£6
Family .. .. .	£8
Institutional . . . .	£12

Renewals directly to the Treasurer, please:-

Geoff Wright  
Broad Oak  
Orchard End  
Weybridge  
Surrey KT13 9LS

## DATES FOR YOUR DIARY

The A.G.M. and Annual Dinner will be held on Saturday, 22nd May 1993. The venue will be the Jodrell Arms in Whaley Bridge. Full details of the day's activities will be in the next edition of LIONSHEART.

LIONSMEET (the competition for live steam LION models) will be held on Sunday, 15th August 1993 at the track of the High Wycombe Model Engineering Club. Again, we will have full details in the next LIONSHEART.

Please try to support us on both these days - we guarantee that you will find the events enjoyable!

There is a competition for LION models each year, called LIONSMEET. We also have an Annual General Meeting, combined with a Dinner. There may be technical or historic visits relating to LION. When LION is not actually operating, LIONSHEART remains the important method of communicating and exchanging information relating to LION.

But, I make no apology for devoting so much of this issue to 'Planet'. Firstly, the commissioning of a replica of such an important prototype is a significant event. And secondly, the design of LION is heavily influenced by the experience gained during the early years of operation of the Liverpool and Manchester and similar railways with locomotives of the 'Planet' type.

## LOCOMOTION

Bob Davies has photographed the model of LOCOMOTION in the Science Museum, which also holds 88 microfilmed drawings of the full-size LOCOMOTION replica. Unfortunately, Locomotion Trust have not, as yet, given permission for these drawings to be copied.

Jim Rees from Beamish North of England Open Air Museum (the home of the LOCOMOTION replica) has invited Bob to visit and take measurements.

Ted Joliffe, editor of the Model Engineer, published an appeal for help and Bob has received a reply from Switzerland where a model engineer built a LOCOMOTION which won a Bronze Award at the 1989 Model Engineer Exhibition in London.

This engineer has supplied ten sheets of working drawings to Bob and let him know that his son is able to supply a set of fine castings.

Bob has also heard from a gentleman who has returned to England for retirement, together with patterns for a 7.25-inch gauge LOCOMOTION.

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LIONSHEART is published by OLCO

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Technical Editor: Charles Taylor-Nobbs  
Production Assistant: Jan Ford

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