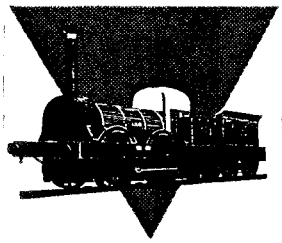
The Lionsheart



THE OCCASIONAL NEWSLETTER OF THE OLD LOCOMOTIVE COMMITTEE

8- Number Seven. EASTER 1986.

KITSON COLLEGE CELEBRATES SILVER JUBILEE.

'OLCO' INVITED TO PARTICIPATE.

KITSON COLLEGE OF TECHNOLOGY

The four major events planned as OLCO activities for 1986 will now be FIVE!

We have been invited to participate in the Silver Jubilee celebrations of the Kitson College of Technology, Cookridge Street, Leeds LS2 8BL.

The theme of the exhibition will take cognisance of the fact that 1986 is British Industry Year and there will be no less than 21 displays from Industry plus 7 from Educational and Public Service oranisations.

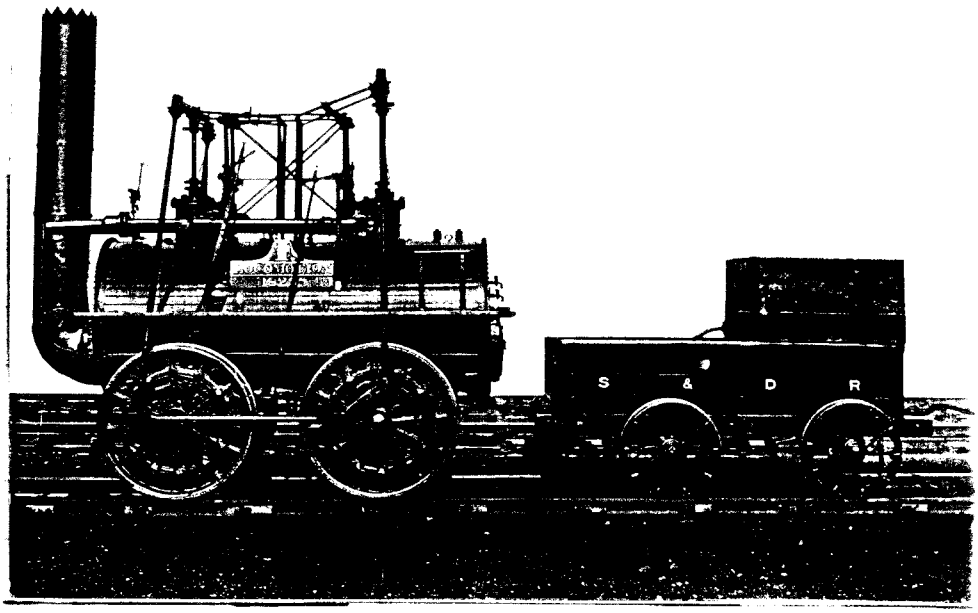
The College displays will of course feature not only their own work but much about the Kitson Company.

OLCO will also be exhibiting in addition to the Kitson exhibits that our Chairman, E.F.C. has been able to secure. His grandfathers 1/48th. scale model of the Kitson-Meyer locomotive on loan to the Science Museum is to be specially re-loaned for this important exhibition.
Keith Taylor-Nobbs' LION with the Maskelyne Memorial Trophy won at this years M.E. Exhibition will be on static display whilst two of our members, Peter Bell and Jim Mercer will have their models 'in-steam' for some of the time on the Colleges' track specially built for this event.

Jim's LION is interesting inasmuch as the firebox is, under the brass Haystack, a near exact replica of the prototype. Jim is a member of the Warrington and District M.E.S. and will no doubt be contributing much to the running of this years LIONSMEET on August Bank Holiday Sunday (24th.Aug).

The Lord Mayor of Leeds will open the Exhibition at 7 p.m. on Tuesday 21st April and it will be open from 10 a.m. to 8 p.m. on the Wednesday and Thursday, closing at 4 p.m. on Friday 25th. April 1986.

Although this is not a 'regular' or even annual OLCO activity it is a very important one. Members who can be in Leeds during that week are asked to give both the College and OLCO as much support as they can.



WILL 'LOCOMOTION' BE RUUNING AT WROUGHTON IN SEPTEMBER ?

WROUGHTON 1986.

This will be on Sunday 14th September.
We intend to hold our Autum meeting that weekend with barbeque on the Saturday nigh either on or in very clos proximity to the Wroughton site.

There is a very strong rumou that if LOCOMOTION is back fro Japan in time for Wroughton 198 we might, just might be invite to help again.

Shepherding the Public into th open coach and getting rostere for Train-guard is becoming familiar task and one which ever member is privileged to enjoy The only qualification needed i simply arrive at Wroughton fo the second weekend in September All necessary instruction i free.

After only two annual visits i seems a bit much to refer t ourselves as 'Wroughton regulars' but it is a very worthwhil weekend and one not be missed i at all possible. As 'regulars' w have found that tall-chimne engines really do have a ambience all of their own, tha 'certain something' which seem to make time stand still.

COMING EVENTS

SECOND A.G.M. TO BE HELD IN LEEDS.

SOME HISTORICAL NOTES ON 'SANS PAREIL'

It is often forgotten that by 1829 there were in fact some fifty 'travelling engines' (as locomotives were then termed) in existence in Britain with maybe 20-30 of them in regular use around and about the various collieries. ROCKET was probably the eighteenth engine built by George and Robert Stephenson and the all important multi-tubed boiler was not a new idea. It had been described some twenty years previously in scientific journals. An abortive attempt was made to patent the idea in 1826. Also M.Seguin had experimented with tubes on one of Stephenson's Killingworth colliery engines a whole year before the ROCKET was even on the drawing board.

Hackworth having designed the most powerful engine in the kingdom, ROYAL GEORGE, and being at best a gifted amateur at building engines when compared to the Stephensons he designed and built a good reliable 'Carthorse' for Rainhill. ROCKET, on the other hand was spefifically designed for the Trial and was really a 'Racehorse' by comparison.

It must have needed a great deal of energy and determination after working a 12-14 hour day for his employers for poor Hackworth to carry on in his own time and at his own expense!
Generously he was permitted the use of the firm's workshops to erect his 'Premium Engine'. Even so this would have left little or no time to study any reports or journals with information about any recent advances in technology. His very enviroment would have forced him to create an engine which incorporated the most effective features of the designs he knew best:- The colliery locomotives.
So sparse were his facilities that he had to go to the professional Locomotive builders to have his cylinders cast. The local firm was, of course, Stephensons, who also happened to be his rivals for the Trials. The old old myth that the little man was deliberately sabotaged by the industrial 'giant' of the day casting him a faulty cylinder has long since been exploded. Even now, one hundred and fifty years later, the 'SANS PAREIL' cylinders with intergral valve chest and ports are almost impossible to make. Mike Satow had to cast something in the region of 16 cylinders to get one decent pair and a few spares for the 'Rocket 150' Replica. It appears that the chest port cores tend to float on the molten iron.
By the time Stephensons came to build 'Invicta' (LBSC's 'Canterbury Lamb') for the Canterbury & Whitstable Rly. a year or so later they had solved the problem of the floating cores by casting the valve-chests and cylinders seperately as examination of the remanents of both the original engines will show.
Casting a duff cylinder 'on purpose' would have been impossible when it was so very difficult to cast a reliable one.

cylinders were bored to a diameter of 8 inches, the stroke being 16½ inches. The driving wheels were 4 feet 8½ inches in diameter, that of the trailing wheels being 2 feet 6 inches. The exhaust steam from each cylinder was carried through a pipe of considerable length, and turned upwards into the chimney. The two exhaust orifices were not, however, contracted so as to produce a strong blast. The multitubular boiler was suggested by Mr. Booth, the secretary of the Liverpool and Manchester Railway Company, and who was doubtless unaware of what had already been done by Neville and Seguin. The external surface of the twenty-five tubes was 117¾ square feet; and although this, as a mere matter of area, was much beyond the allowance of heating surface in any locomotive engine previously constructed—at least in England—experiments subsequently made by Mr. Robert Stephenson* and John Dewrance† showed that the heating surface afforded by small tubes was less than one-third as effective, for a given area, as that directly exposed to the fire in the fire box. And inasmuch as flame or active combustion cannot proceed in small tubes, their surface is correspondingly less effective for heating purposes than that of flues 12 inches and upwards in diameter.

The "Sansparicl" was a four-wheeled coupled engine, and, with water in the boiler, weighed 4 tons 15½ cwt., thus exceeding by 5½ cwt. the weight allowed, by the terms of the competition, to be placed upon four wheels. The tender, when charged with coke and water, weighed 3 tons 6 cwt. 3 qrs.

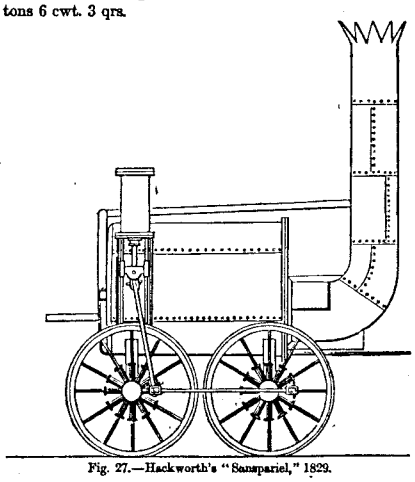


Fig. 27.—Hackworth's "Sansparicl," 1829.

No description (now accessible) of this engine states whether or no it was mounted upon springs. It is improbable that it would have been allowed to compete at all had not the stipulated condition in this respect been complied with; but if springs of any useful elasticity were really employed, it will appear, from the construction of the engine, that a violent up-and-down motion must have been imparted to the boiler at each double stroke of the pistons. The boiler was cylindrical, 4 feet 2 inches in diameter and 6 feet long, and was twice traversed, longitudinally, by a return flue, one length of which, enclosing the fire grate, was 2½ inches in diameter,

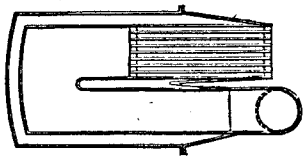


Fig. 28.—Boiler of "Sansparicl," 1829.

while the other, terminating in the chimney, was 15 inches. Both flues were prolonged 3 feet beyond one end of the boiler, a suitable water space being made around this part of the flues. The chimney was 15 inches in diameter. The fire grate was 5 feet in length, thus presenting 10 square feet of area; that part of the flue answering to an ordinary fire box was 15·7 square feet in extent; while the remaining part of the flue measured 74·6 square feet. The cylinders were vertical, and were 7 inches in diameter, the stroke of the pistons being 18 inches. The connecting rods worked upon crank pins, in one pair of wheels, with which the others were coupled by rods, all the wheels being 4 feet 6 inches in diameter. The exhaust steam from the cylinders was sent through pipes into a single contracted nozzle, or blast pipe, turned upward in the centre of the chimney.

The "Novelty" was a four-wheel tank engine, carrying its supply of coke and water upon its own frame. The engine, with water in the boiler and with water and fuel in the tank, weighed 3 tons 17 cwt. 0 qr. 14 lb. As an allowance was necessary for a part of the weight of the framing, wheels, &c. supporting the tank, in order to apportion the load in the ratio adopted for the other engines (the tender being reckoned as a part of the load), the weight of the "Novelty" as an engine only, or irrespective of its carrying capacity for fuel and water, was taken as 2 tons 13 cwts. 2 qrs. 3½ lbs.

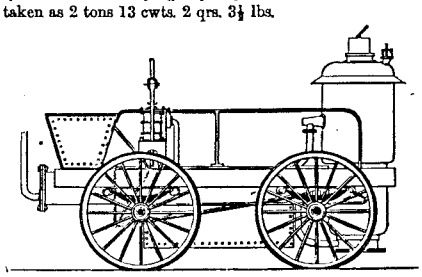


Fig. 29.—Braithwaite and Ericsson's "Novelty," 1829.

The boiler of the "Novelty" comprised an upright cylindrical vessel or fire box, and a horizontal barrel, 15 inches in diameter and about 12 feet long. The upright

* Wood *On Railroads*, second edition, 1831, p. 403.

† The late Mr. Dewrance was the locomotive superintendent of the Liverpool and Manchester Railway. For an account of his and Mr. Wood's experiments, vide *Three Reports on the Use of the Steam Coals of the Hartley District of Northumberland*, London, 1858, p. 60.

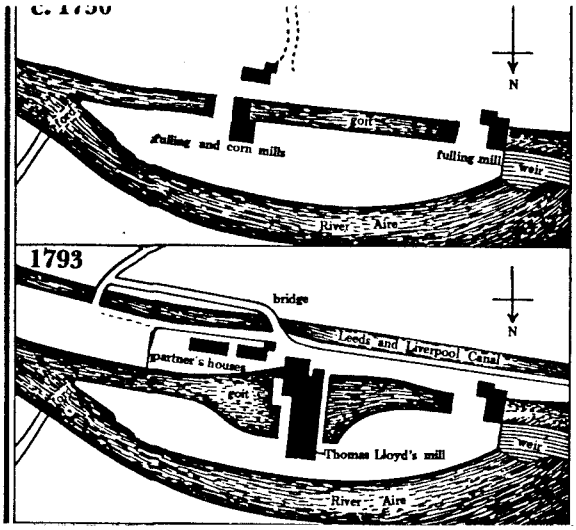
FIRING

The Fire-box is at the opposite end of the boiler to the drivers footplate. Firing the replica with it's single tube return flue and large, 5ft. long grate can be difficult. The trick seems to be to stoke just under the door then carefully push the fire forward. Very carefully! Those OLCO members who had the pleasure of a spell with the shovel were warned "....that them as push the fire round the 'U' bend go in and rake it out again."
Fortunately it didn't happen. That 'U' tube may well be 2ft. O.D. at the grate end, but it tapers off to 15" O.D just as it rounds the corner and we were reliably informed by one of the regular crew, who had once had to do it, that there is no filthier job in the annals of railway history.

2.

Page from Zerah Colburn
LOCOMOTIVE ENGINEERING
dated 1871.

Working up and down over Wroughton's 200yds. of track at very slow speeds must be ~~something akin to colliery~~ conditions Hackworth would have been used to. However it should be borne in mind that modern steam engines have a Heating Surface/Grate Area ratio at somewhere between 60:1 and 75:1. ROCKET had a ratio of approximately 23:1 but SANS PAREIL's was only 9:1. Couple this with the patchy fire the large grate causes and the high gas velocities which drag fuel through the flue and it would have needed some very skilful firing to maintain steam in the tiny boiler at the speeds the Directors of the L.& M.Rly would expect



HOW TO GET TO ARMLEY

By rail to Leeds City Station and then either:

On foot along the Museum of Leeds Trail (see separate guide) from the city centre.

By bus numbers 25 and 26 from the front of the Queen's Hotel, City Square, alighting at Yorkshire Television, then walking away from town, turning first left up Viaduct Road.

By car turn south off the A65 Kirkstall Road, one mile west of the city centre and near the Kirkstall Viaduct. Proceed up Viaduct Road to the Canal Bridge.

ANNUAL GENERAL MEETING.

Notice is hereby given that the second A.G.M. will be held on Saturday 14th. June 1986 at the Armley Mill Museum Leeds at 3 p.m.

Members wishing to have any item included on the Agenda must inform the Secretary not later than Wednesday 14th. May.

The Executive Officers have decided that it will be better value for the members to forgo the OLCO lunch this year and have an I.A. cruise on a canal narrowboat.

These cruises last about about three hours and a three course meal is served during the journey. The cost is about £10 per person commencing from Leeds city centre at 7.30 p.m.

The disadvantage is that the boat is very strictly limited to 46 places and wheres OLCO is getting some priority, members from other societies in Leeds are anxious to join us.

IT IS IMPERATIVE THAT MEMBERS WISHING TO BOOK FOR THEMSELVES, FAMILY AND/OR FRIENDS DO SO BEFORE THE 1st. MAY.

Sunday 15th. June will be a tour of the presumed birthplace of LION and other industrial sites of interest mainly associated with the Kitson Company and James Kitson I.

If demand is high enough we shall book a mini-bus otherwise a convoy of cars may suffice. Again if you intend to be in or near Leeds overnight on the 14th. June and wish to go on the Sunday morning trip please inform your Hon.Secy. by 1st. May so that arrangements may be made for your enjoyment and comfort.

The Lionshear

EDITORIAL.

The very prompt response to the appeal for subscription renewal in our last issue was most heartening. Thank you everyone.

About 15-20 copies of this Newsletter are also circulated to certain organisations and individuals who have some interest in the affairs of OLCO. It was very encouraging to have had seven of those readers send a subscription and become Members. Once again a very warm welcome to each of you.

The unique nature of our organisation is becoming to be appreciated in many quarters.
We are getting invitations to participate in events which are not just associated with LION herself but with the builder of LION and the well known firm of KITSON which he founded, as well as to other occasions involving tall chimney engines or their replicas.

This is in addition to our modelling activities, research work and public appearances with live-steam versions of LION.

In rather less than two years we have managed to achieve so much that it now is possible to look forward over the next two years into 1988 with an even greater certainty of being able to mark LION's 150th. birthday in some style.

C.E.T-N.

TECHNICAL QUERY.

Watchers of the Idiot's-lantern may have seen a recent series LOVEJOY about a less than scrupulous antiques dealer in East-Anglia who was a 'Divi'.
That means he had the ability to 'divine' an artefact, an instinct to say it was a fake without immediately knowing exactly why it was wrong.

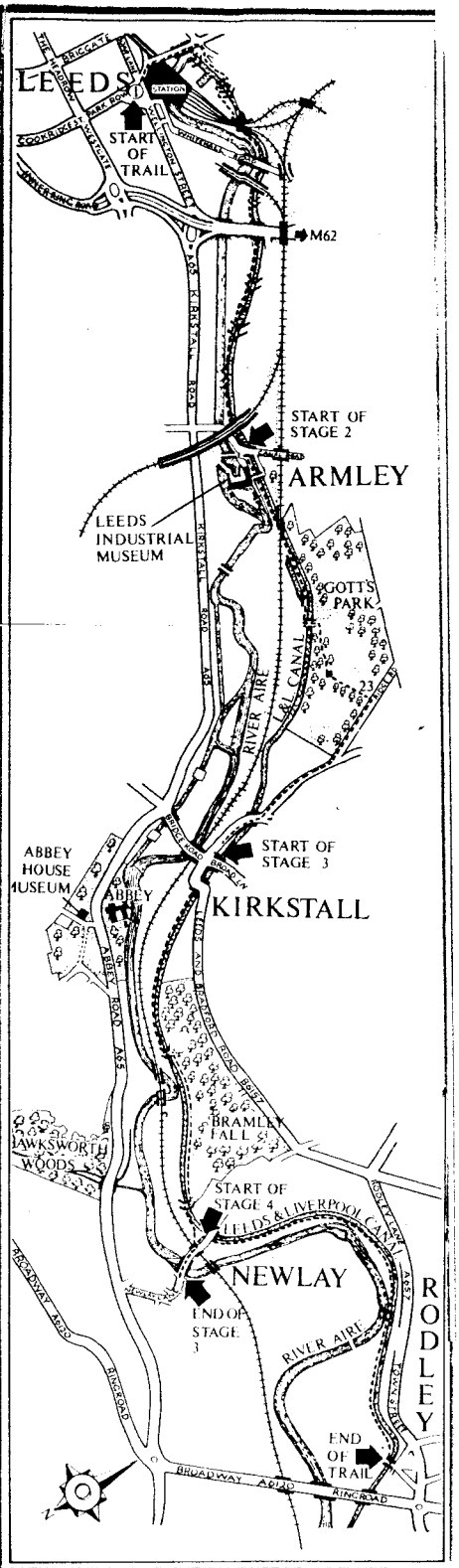
One story concerned a 19th. century painting which was 'wrong' because, as Lovejoy later realised, the girl in the full length portrait was wearing a lemon yellow dress!

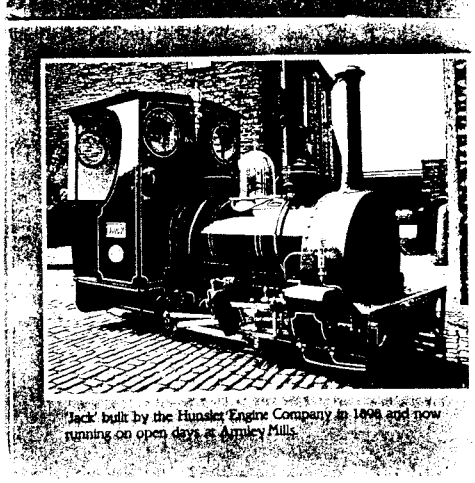
Apparently such a colour was a chemical yellow not available before the early 20th.Cent. (Why not just add white to Yellow ochre I ask myself).

Not being a paint technologist I am unable to say if this part of the story was 'fiction' or 'faction' but it has made me wonder about the lemon yellow wheels on the replica 'SANS PAREIL'.

Could the original have had yellow wheels that particular shade of yellow or not?

Readers comments please to the Editor.





'Jack' built by the Hunslet Engine Company in 1898 and now running on open days at Armley Mills.

Once the World's largest woollen mill

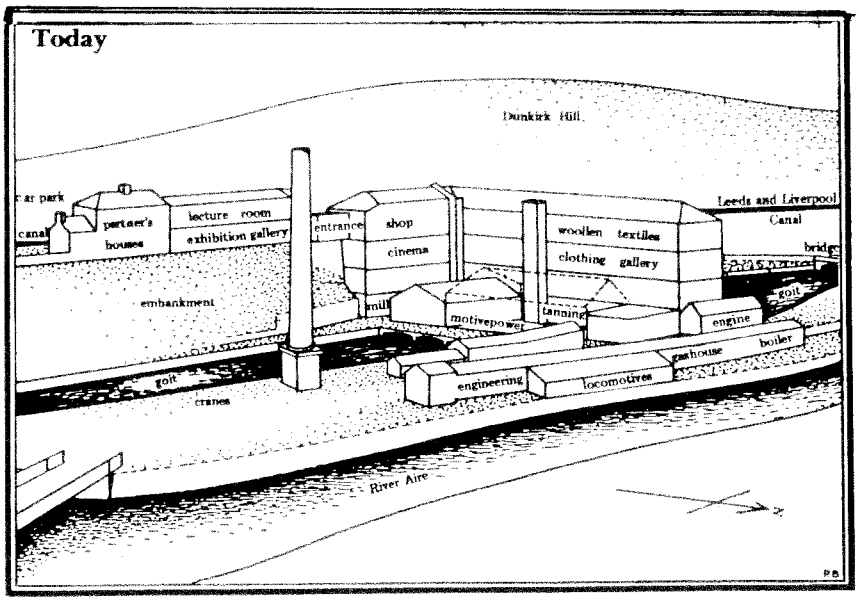
Armley Mills occupy one of the best sites in the whole of the West Riding for harnessing water power. Here the river Aire takes a sweeping curve around a narrow plateau lying beneath the bluff of Dunkirk Hill, its rocky bed providing a natural fall of water.

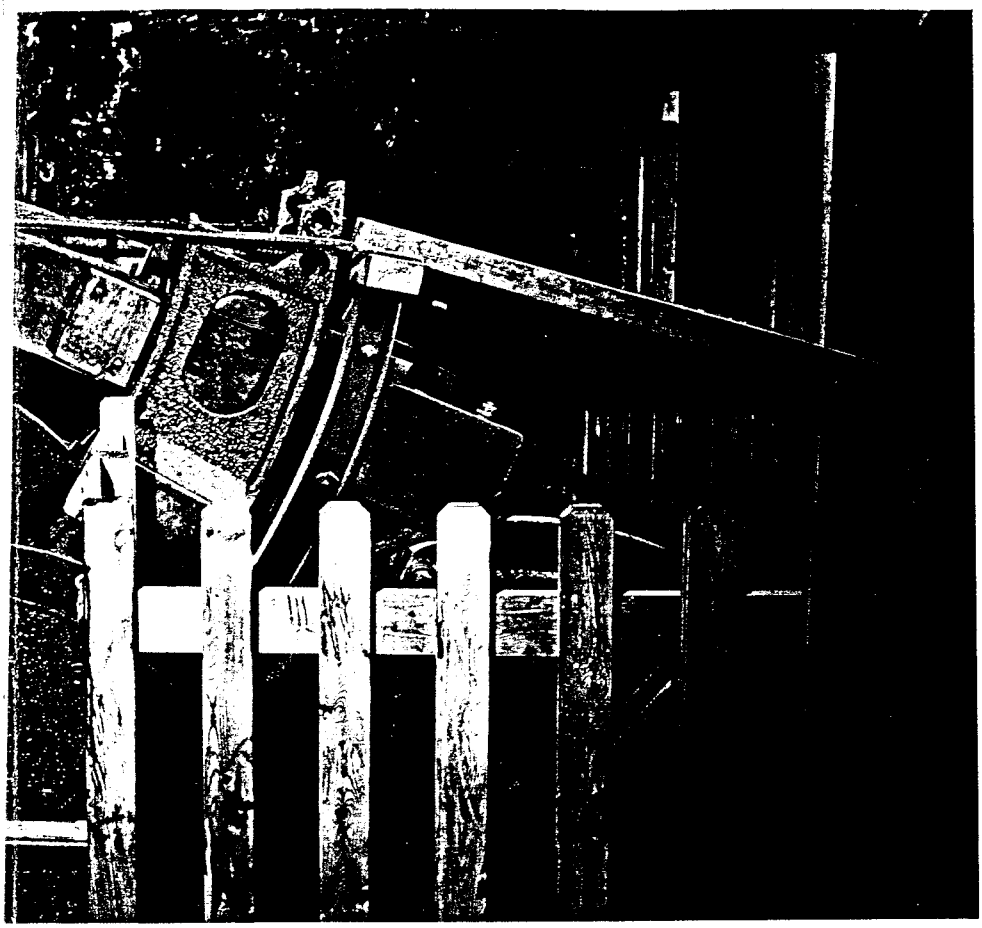
There is no record of a medieval mill on this site, for the powerful monastic and manorial landowners had established their mills elsewhere, but shortly after the Dissolution a Leeds clothier named Richard Booth was leasing the 'Armley Millnes' from Mr Henry Savile. The Savile family had acquired large tracts of former church land in the area and were gradually developing its industrial potential. With the aid of a dam upstream, water was now diverted along a newly-cut channel or 'goit' bypassing the curving course of the river, its power being sufficient to drive a number of water wheels.

At this period Leeds was establishing itself as the leading woollen town of Yorkshire, so that by the early seventeenth century it could boast of cloth production worth some £200,000 per year. This huge volume of cloth was entirely hand-spun and woven by the domestic clothiers, but they required the use of powerful and expensive fulling mills in order to complete the essential finishing processes. In the fulling stocks the water-wheel turned a large vertical wheel which had a number of stout pegs or tappits mounted around its rim. As these revolved, they raised great wedge-shaped wooden hammers which then swung down into narrow troughs where the cloth lay in an unsavoury liquor composed of stale urine etc. As this beating continued, the separate threads constituting the cloth were gradually felted together, causing the piece to become thicker and narrower, making it much warmer and more waterproof for the wearer, in addition to enabling it to be cut without fraying.

From Henry Savile, the new fulling mills at Armley passed into the hands of the Casson and Moore families, a document of 1707 describing them as 'that fulling mill in Armley known as Casson alias Burley Mills containing two wheels and four stocks with the mill house there unto belonging . . . . also the water corn mill and all the fulling mills adjoining under the same roof of the said corn mill containing one wheel and two stocks'. By the 1750's the mills had passed out of local ownership, and formed part of the estates of the Horton family of Chadderton in Lancashire. Instead of operating the mills themselves, however, they leased them out to a professional miller.

Between 1772 and 1788 the mills were leased to John Walker of Armley. During this period, the traditional methods of domestic cloth production began to change as a result of growing





mechanisation, one of the most significant introductions being the scribbling machine adopted from the cotton industry around 1780. Up to this date women and children had been employed to convert the locks of wool into light, fluffy 'rolags' by working them between small bat-shaped hand-cards clothed with thousands of short wire hooks. Using a series of rotating cylinders covered in similar card-clothing, the scribbling machine was able to complete the same operation with a great saving of time and labour, the wool emerging as a continuous flossy sheet. The earlier scribblers were either hand or horse-powered, but it was soon realised that they were best driven by water power, the combination of fulling and scribbling machinery within a single mill being most convenient for the clothiers. When John Walker left Armley Mills in May 1788, he was allowed to remove 'the Flour machines, all the Scribbling Engines', etc., thus proving that this was one of the earliest woollen scribbling mills in Britain.

On February 5th, 1788, the 'Leeds Intelligencer' advertised for sale or lease "All those Capital, Ancient and well accustomed Fulling-Mills, Scribbling-Mills and Corn Mills called . . . . Armley Mills' with their 'plenty of water and convenience for erecting a number of Mills thereon that no Situation in the West Riding of Yorkshire is superior if any equal thereto". This unrivalled potential for water power, combined with the increasing need for fulling and scribbling mills to serve the domestic clothing industry, attracted the attention of Colonel Thomas Lloyd, a cousin of Sir Watts Horton, then owner of the mills. In May, 1788, he therefore purchased the mills for £6,250.

Above: Fulling mallocks made by Pickles of Braintree in 1933.

Your plan will need to avoid LION running "under the wires" for a moment longer than necessary. For one thing high speed Electrics chasing after her tend to detract from her dignity, and with a given speed of 15-18 m.p.h. (max 20 m.p.h.) she will be in the way for too long.

Her exhaust steam is capable of forming a mini thundercloud and drawing some miniature lightning from the overhead.

With a consumption of approx. 17 Gallons per Mile she will need to be met by one of the Fire Engines every 2-2½ hours at roughly 40 mile intervals to take on water.

Your plan needs to list the sidings and passing places which are accessible by roads wide enough to take the Dennis Fire Trucks.
You will also require a detailed road route which will enable them to 'leap-frog' one another and maintain a two-hour stopping schedule.

There is no limit to the number of plans and alternative plans which may be submitted.
Some of the access points may, for one reason or another, have become inaccessible by 1988. Houses get built, Engineering work on the line etc. could alter the rail-route at the last moment, hence there can be no "right answer", simply "feasible ideas"

Suggested Routes and timings will be published in 'LIONSHEART' from time to time so that they may have the benefit of the critical scrutiny of those members who know about such things, as well as those with local knowledge who are able to keep us informed of enviromental changes.

This may well be the very last time LION will be permitted over the G.J.R. unless quite a lot of money is forthcoming in 1989 for another retubing.

LION's ROUTE FROM LIVERPOOL TO BIRMINGHAM IN 1988 ?

Request for Members (and Readers!) ideas reprinted from LIONSHEART No.1

CAN YOU PLAN A ROUTE ?

Some of you may recall that LION took part in the Centenary celebrations of the LONDON & BIRMINGHAM RAILWAY in 1938.
Could she take part again in the sesquicentenary due in 1988 ?

If so, then does she have to suffer the indignity of going all the way to Birmingham by Low-loader ?

Her boiler tubes will still be within the 10 year "life" that B.R. decrees all tubes have only got if they are to run over the Nationalised system.
A run to Birmingham under her own steam, over the road laid by the Grand Junction Railway is more or less possible and, not altogether improbable.

One major problem is that of supplying water.
That once most prominent feature of the railway scene, the Water Crane, is alas no more.
However the Museum has a couple of mobile water tanks in the shape of two thirty year old Fire Engines. A large Dennis F8 Tender, vintage 1953, which will carry 1000 Gallons, or 5 Tons of water, and a 1954 Dennis F12 Pump Escape which will carry 600 Gallons or 3 Tons of water.

The formal qualification of an H.G.V. licence is not a legal requirement to drive Fire Engines ! Any member with sufficient experience of handling vehicles of that size and weight is eligible to volunteer to "drive the water".

'OLCO' A LEARNED SOCIETY?

Sometime during the hectic months leading up to 'Rocket 150' when LION was being so generously refurbished at the Vulcan Foundry in Newton-le-Willows, there was talk of a society being formed to continue the research effort that the stripping of LION into her component parts had so uniquely provided.
At the time it was envisaged that such an organisation might become a 'Learned Society' and be able to publish authoritive papers on all it's deliberations.

Such a society was eventually formed and became OLCO as we now know it. The first eighteen months have seen a great deal of activity in the form of 'hands on' events with both the prototype and models of her. LIONSHEART has published some learned speculation in previous issues in particular the excellent work by Len Tavender.

→ P

It is with some pleasure that your Editor now records a letter from Jack Meacher of the 7.25"G. Society bringing OLCO yet another step nearer towards 'learned' status.

Readers may recall that in LIONSHEART No.4 (April 1985) we were able to publish the composition of LION's wheels from data in the 'Len Morris' file and that the Phosphor content was more than 40 times higher than might be expected.
Jack has written in answer to the question:- What does the high phosphorous content mean ?

"Early Bessemer steel tended to have a high P content due to the acid refactory used to line the convertors. This led to "hot shortness" which precluded the use of Bessemer steel for rails for a long time. The solution was produced by a Welshman (whose name escapes me now) who introduced a Basic lining which "neutralised" the Phosphorous.
Many Iron ores had a high P content and the Magnetite ores of Sweden and Cumbria were selected (at a cost premium) for higher grades of steel.
The fuel used in producing the basic cast-iron 'pigs' could also influence the P content.
One should also allow for segregation during the solidification of the casting when carrying out metallurgical investigations since an analysis elsewhere could be different and the 0.210% P atypical. I'm sure your people have thought of these things but I thought I'd mention them."

(Frankly Jack I don't any of us had thought it out quite so succinctly. Many Thanks. Ed.)

"There is, incidentally, an Archaeo-Metallurgy Society who could help, perhaps. They could be contacted through the Institute of Metals in London.
I have a number of old metallurgical articles in the loft- if there is anything that might be useful I'll send copies to you."

As good as his word and almost by the next post a fascinating article from METALLURGIA Nov.1957 p229 on the "History of the Railway Axle From Faggoted Wrought Iron to Forged Steel"
This will have to be the subject of a future article in LIONSHEART but it hasd already given several clues towards the task of accurately dating LION's wheels.

More correspondence of this calibre is of considerable help to our archivist.

Kitson Meyer Articulated Locomotives: Donald Binns,
Wyvern Publications, Skipton 1985
ISBN 0 907941 10 9 pp 128 Many b & w illustrations.
Obtainable from Wyvern Publications, 60 Long Meadow, Skipton,
North Yorkshire BD23 1BW, Price £14.95 + 50p. part postage & packing.

The articulated concept goes back to the earliest days of locomotive history and, in fact, continues with most railway prime movers today. The Kitson Meyer design came after the Fairlie in the steam era and was established at about the same time as the Mallett but well before the Garratt. That it failed to achieve the level of commercial success of the latter seems largely to have been due to lack of sales drive by its makers rather than any inherent defect in concept or design, both of which were excellent.
This book presents the fruits of 20 years or more research by the author who has assembled details and histories - in many cases photographs as well - of most of the 78 locomotives of this type built by Kitsons themselves as well as equivalent information for the similar machines supplied by other builders. It is salutary to be reminded that a narrow gauge example built by another firm as recently as 1952 is preserved in this country and that the last units supplied by Kitsons (for the Cirardot line in Columbia) were more powerful than any steam locomotive built for any British railway except for the LNER Garratt. Additional chapters trace the evolution of the design from the Semmering Trials and give details of the examples from other builders as well as of some Kitson Meyer schemes that were never constructed. Despite the fact that no index is provided, this book must surely be the definitive work on these magnificent machines, fully worthy of its fascinating subect.

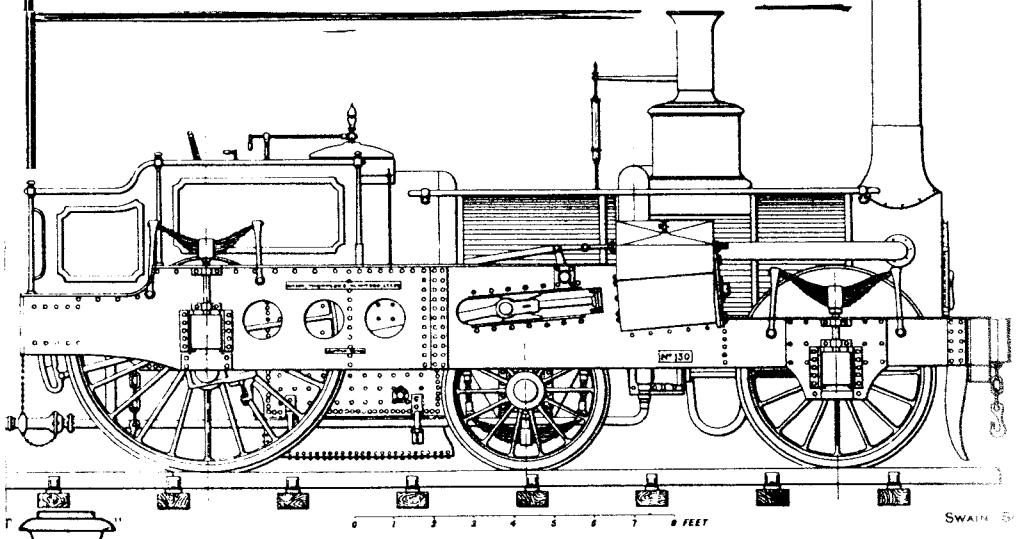


FIG. 75.—CRAMPTON ENGINE BY KITSON, THOMPSON & HEWITSON, MIDLAND RAILWAY, 1848

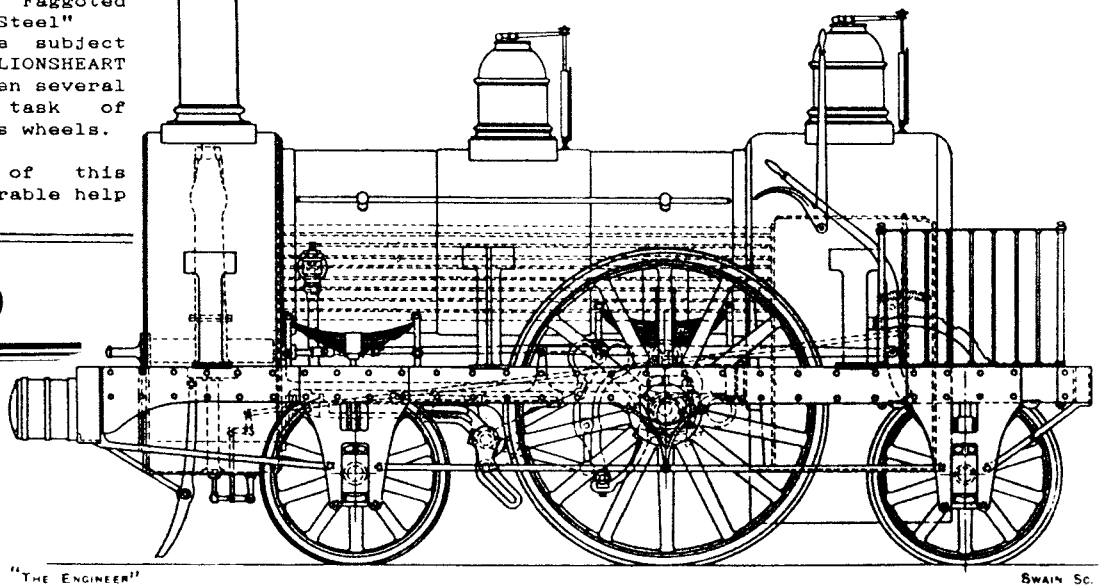


FIG. 76—GRAY'S EXPRESS ENGINE, BUILT BY SHEPHERD & TODD, HULL & SELBY RLY., 1840

OLCO

WILL BE AT THE GUILDFORD M.E.S. OPEN DAYS 19/20th JULY '86

SCIENCE MUSEUM Wroughton

Situated high on the Marlborough Downs and overlooked by the ancient hillfort of Barbury Castle the Museum provides the visitor with the opportunity to see National Collections of objects ranging from the curious and antiquated to the revolutionary and experimental.

WROUGHTON 1985.

A Report by Alan McKirdy.

Having aquitted ourselves very well as a support group for LION in 1984, an approach was made to our Secretary re the possibility of enlisting the help of some of our members in a similar capacity for the open day in September 1985.

(Although this was not going to be LION again our interest in 'tall-chimney' engines had been noted. In the end only six weeks notice was given of the fact that our presence would not only be desirable but actually essential!

Few of us had realised at the time that OLCO is probably the only group in the country with the interest and, more importantly, the ability, to be involved in a practical manner with 'primitive' engines. C.E.T-N.)

I arrived at Wroughton late in the afternoon on Friday 6th. September and found the replica of 'SANS PAREIL' sitting on the track gently simmering. She had been steamed during the day for the Press.
The first job on the Saturday morning was, as usual, to clean and polish the engine, tender and open coach.
The loco's wheels which should have been a pale yellow were a dirty grey due to a thick film of oil which refused to budge until a quick trip to Wroughton Village yielded a large tin of 'Gunk'.
By midday she looked resplendent with clean paintwork and gleaming brass and copper so it was time to light up.

RAISING STEAM

Return-flue boilers have far less heating surface than multi-tubed boilers and getting steam up takes several hours even when still warm.

(The original took so long at Rainhill that account was lost of the times taken to reach 'an elasticity of 50 lbs. per sq.in.')

Eventually the gauge crept up to 45 p.s.i. which is enough to move her.
Whilst waiting I became aware of a rather ominous notice on the passenger platform which read;-

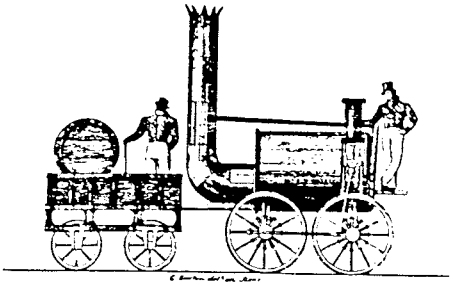
WARNING
SANS PAREIL EMITS
SOOT AND WATER.

After several trips up and down the track the pressure came up to the magical 50 p.s.i. thanks to the extra draught given by the blast pipe. I had by then come to appreciate the necessity of the warning to intending passengers!

SANS PAREIL throws out plenty oil along with the Soot and fairly hot water; in fact Mike Satow said she is the dirtiest engine he knows. A lot of our cleaning and polishing seemed to have gone for nothing!

THE CONTROLS

During the afternoon more and more OLCO members kept arriving and managed to to take the opportunity of a footplate ride.
The footplate is really nothing more than a wooden shelf on the leading end of the boiler and is quite high up. The controls are of course very basic, apart from the Regulator there is a lever and locking Gab for each valve and also Drain-cocks for the cylinders.
As a concession to 20th. Century safety there is an Air-brake, but with careful driving it's use can be reduced to a minimum. The valves are driven by two slip excentrics (Hackworth would not have recognised 'eccentrics' only 'excentrics') with very long rods which curve round the domed end of the boiler. One rod also works the boiler feed pump.
The timing of valve events is erratic to say the least due mainly to the Cylinders being mounted on the boiler and not bolted to the chassis in the conventional manner. This causes the distance between the valve levers and the Axle to vary with every bump in the track. Add to this the springiness of the very long excentric rods and as Mike Satow put it "Four beats anywhere in one revolution and the engine is timed!"
Reversing can best be described as an Art rather than a Science; after unlocking the gabs the valves are reset manually and the regulator opened gently, then, as the gabs pass the valve levers they are locked on again.
There is, however, a cheat method which is much easier; getting down on the track with a large spanner in one hand and using it to turn the right hand excentric strap in the opposite direction from that in which you wish the engine to go, then climb up again and start off.



The SANS PAREIL of Mr Hackworth of Darlington.
which drawing a load equivalent to three times its weight, travelled at the rate of 12 miles an hour — Coal for fuel per mile about two pence

[from the Mechanics' Magazine, Vol. XII., 24th November 1829.]

DRIVING EXPERIENCE

One's first impression on moving off is the alarming way the engine lurches from side to side due to the vertical cylinders thrusting directly downwards to the driven wheels. It was then that Robert Stephenson's reputed description of SANS PARIEL as "Hackworth's Steam Spring" came vividly to mind.
All in all it was a most interesting and highly instructive experience, particularly for me as a few weeks later I was able to have a short footplate ride on the replica of ROCKET.

Bearing in mind that the two locomotives were built concurrently there is really no comparison between them. SANS PARIEL can only be described as a primitive, although to be fair to Timothy Hackworth he was not only forced to build her in his spare time, but also to contract out the manufacture of a lot of the parts. Nevertheless the basic concept was outdated even by 1829.

PUBLIC DAY

On the Sunday morning the ever stalwart Peter Bell was out of his caravan early to get the boiler lit, and most of us were there soon after 9 a.m.
We did however have steam up by mid morning.
It is quite remarkable how a queue forms for rides as soon as an engine is seen to be moving up and down the track.

The auxillary Feed-pump on the Tender needed to be manned quite often because the excentric driven pump was not supplying enough water to maintain an adequate level in the boiler.

BREAKDOWNS

Early in the afternoon disaster struck; one of the valve levers sheared off. Service was suspended for about half-an-hour whilst a frantic search was made for welding equipment. The necessary repair was effected and we were off again. all went well for an hour or two then towards the end of the day one of the cast-iron excentric straps broke. This was not as serious as we first thought as Mike Satow had a spare strap hidden under the tool box on the tender, it was soon fitted and we were once again able to take passengers. When these delays occurred we told waiting passengers that we were re-enacting the breakdowns which Hackworth had suffered at the Rainhill Trials!

Finally mention must be made of the invaluable contribution of Dorothy Bell and Mary Jolliffe who, along with several other OLCO ladies, when not actually 'with the train', were keeping us supplied with innumerable mugs of coffee and sandwiches.
It was yet another most enjoyable, although grubby, weekend and one which will live long in the memories of those who participated. A.McK.

PROBLEM See Page 5

LION's ROUTE FROM LIVERPOOL TO BIRMINGHAM IN 1988 ?

SOME EXTRACTS FROM THE 1864 Edition of BLACKS GUIDE TO ENGLAND AND WALES (To assist in pondering the problem).

230 XCII. BIRMINGHAM TO LIVERPOOL OR MANCHESTER, BY RAILWAY, 97¼ Miles.

ON RIGHT FROM BIRM.	From Liverp.		From Birmin.	ON LEFT FROM BIRM.
	97¼	From Birmingham to		
Perry Hall, J. Gough, Esq.	93¾	Perry Bar St.	3½	Hampstead Hall.
	90¾	Newton Road St.	6½	Sandwell Park, Earl of Dartmouth.
Great Bar Hall, Sir F. E. Scott, Bart.		cr. river Tame.		Charlemont.
				Darlaston is ¾ m., and Bilston, 2½ miles distant.
2 m. distant is Walsall.	87¾	Bescot Junction St.	9½	
	85½	Willenhall St.	11¾	
Bentley Hall, the house in which King Charles lay concealed after the battle of Worcester. Moseley Court. Hilton Hall.	83	WOLVERHAMPTON. p. 237, (126½ miles from London.)	14¼	To Wrottesley Hall, (Lord Wrottesley) 5 m. Dunstall Hall, H. Hordern, Esq. Oxley Hall, A. Hordern, Esq.
	77¼	Four Ashes St.	20	Somerford Hall.
Hatherton Hall, Lord Hatherton.	75¾	Spread Eagle St.	21½	2 miles distant, Stretton Hall, and beyond Weston Park, Earl of Bradford.
Teddesley Hall, Lord Hatherton.	73¼	Penkridge St.	24	
Tillington House.	68	STAFFORD, p. 211. Here the Trent Valley line joins.	29¼	
3½ miles distant is Stone, on the line of the North Staffordshire Railway, which branches off at the Norton Br. station. Swinnerton, T. Fitzherbert, Esq., and beyond, Darlaston Hall, S. S. Jervis, Esq., and Meaford Hall, Viscount St Vincent. Trentham Park, Duke of Sutherland.	62¼	Norton Bridge St.	35	Seighford Hall, F. Eld, Esq. 2½ m. distant is Eccleshall, in the church of which Bishop Halse concealed Queen Margaret after her escape from Mucklestone. Near it is Eccleshall Castle, (Bishop of Lichfield,) founded at a very early period, and rebuilt 1510. (See p. 12.)
	58¾	Standon Bridge St.	38½	
Whitmore Hall, E. Mainwaring, Esq. Butterton Hall.	54¼	Whitmore, (from London, 155¾ miles.) Newcastle-under-Lyme is 4½ miles distant, and Stoke upon Trent 6½ miles distant. This station is fixed here as an accommodation to the potteries.	43	
To Newcastle-under-Lyme, 5½ miles; Potteries, 7 miles.	51½	Madeley St.	45¾	To Woore, 3½ miles, Audlem, 8 miles distant.
Betley Hall, C. Tollet, Esq.	43½	Crewe Junction St. (from London 166½ m.)	54	Crewe has now become an important centre of railway communication; lines to Chester, Manchester, Lancaster, and the Potteries, unite here, and there are extensive refreshment rooms, with every accommodation for passengers. Winsford village is celebrated for its salt-works. Vale-Royal (Lord Delamere), erected on the site of an ancient abbey.
Crewe Hall, Lord Crewe.	41¾	Coppenhall.	55½	
Manor Hall.	39	Minshull Vernon St.	58¼	
Stanthorne Hall.	36¾	Winsford St.	61	
2 miles distant is Northwich, the inhabitants of which are chiefly employed in the manufacture of salt, which is obtained from brine springs in the vicinity. Pop. 1363.	32	HARTFORD St.	65½	
Winnington Hall, Lord Stanley of Alderley.	29¼	Acton St.	68	
Marbury Hall, J. H. S. Barry, Esq.				
Wincham Hall.	25	Preston Brook St.	72	Aston Park, Sir A. J. Aston, G.C.B.
Belmont Hall, J. Leigh, Esq.	22½	Moore St.	74	Norton Priory, Sir R. Brooke, Bart.
Arley Hall (R. E. Egerton Warburton, Esq.) in the distance.	19	WARRINGTON, (and 190¼ m. from London.)	78	Bewsay Hall, Lord Lilford.

GUILDFORD M.E.S. OPEN DAY IS ALWAYS THE THIRD WEEKEND IN JULY.

PLEASE PUT 19th./20th. JULY IN YOUR DIARY NOW.

A formal invitation to add our display to this two day exhibition has been welcomed by the Executive Officers.
This is a major and highly prestigious event in the model engineering calendar. Invitations to exhibit are only extended to those organisations whose display is likely to be of a very high standard. OLCO have already shown that it can come up to a standard higher than might be expected for so 'young' an organisation so an invitation from the Guildford M.E.S. must be regarded a quite an honour.

We need models and Stewards to volunteer for all or part of the weekend. It will be a nice sitting down job just talking to the public and hopefully recruiting new members for OLCO.

The WINTERTON ARMS at Chiddingfold on the edge of the Sussex Weald has been reccomended to your Editor and is said to have a friendly ghost residing in the dining-room wall.
To book phone Wormley 3221 or 3566 and talk to Mike or Patricia.

The same display of models and LION memorabilia will be suitable for the static exhibition at Wroughton in September 1986 and we are almost certain of a place in Hanger C4 with the other society and club stands.

Many of those items will also have been on show at the KITSON COLLEGE OF TECHNOLOGY Silver Jubilee Exhibition from the 21st./25th. April in Leeds.
The task of mounting three displays this year (Four if you count LIONSMEET) is not too onerous but it is nice if members can turn up to extol our aims and aspirations to those amongst the General Public who might feel disposed to join us.

Please let the LIONSHEART office know if you intend to join us at any of the above shows. If it has to be a 'last minute' decision to attend we understand. So come along anyway