

MODEL ENGINEER

Join our online community www.model-engineer.co.uk

Manx Motor Museum

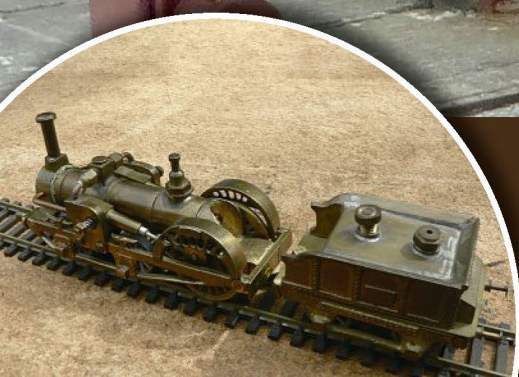
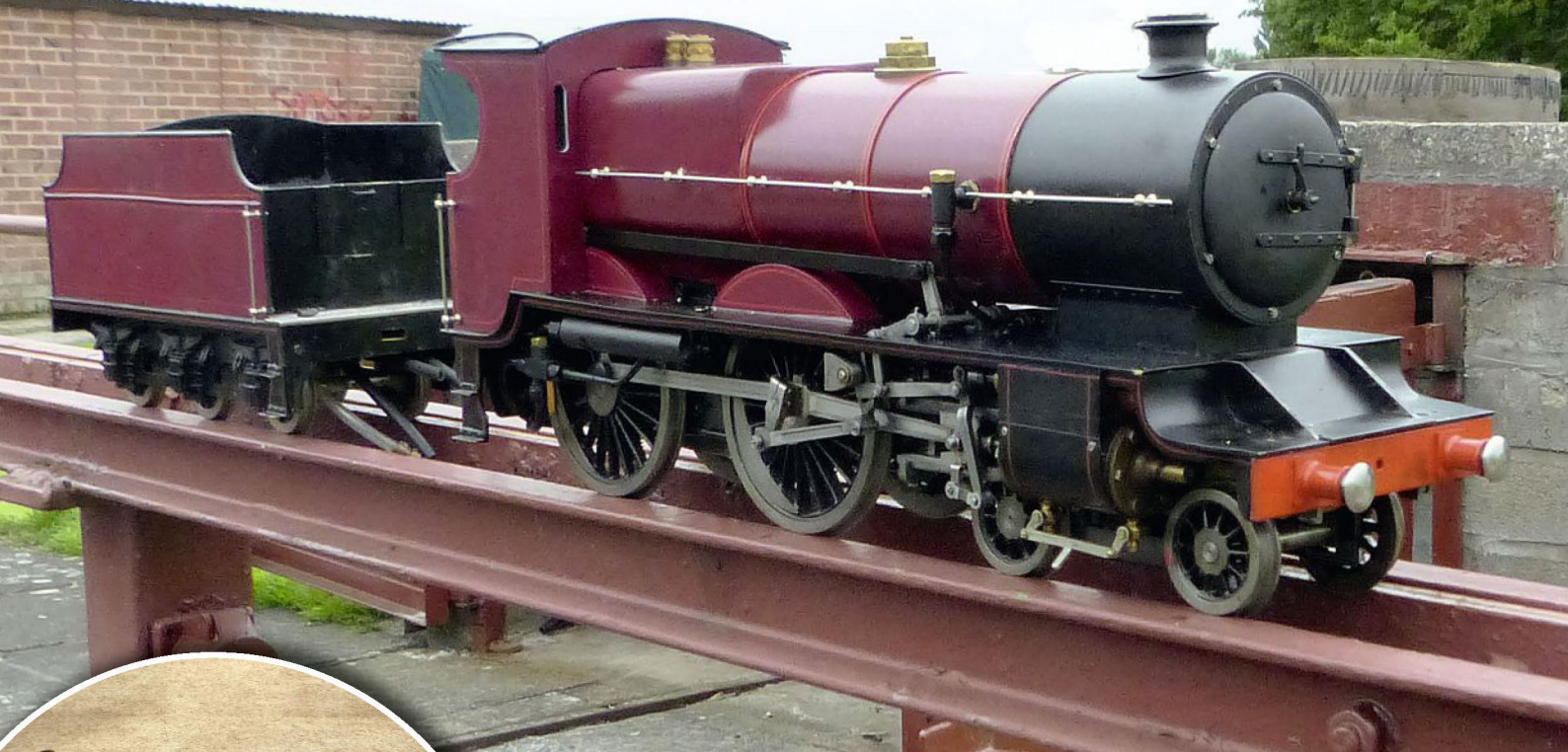
Geoff Theasby is our guide

Curtains

We discuss ways of
photographing models

Clupet Rings

How to make them



CRAMPTON

Stan Bray's 00 gauge Crampton loco



The brand you can trust. **Since 1975.**

Like Machines? **Join The Club.**

Sign up TODAY by visiting
warco.co.uk/MEW

- ✓ Exclusive Offers & GIVEAWAYS (yes, that's FREE stuff!)
- ✓ Invitations to Private Events
- ✓ Previews of NEW Warco products before general UK release
- ✓ Extra content including videos, machining tips and interviews

Metalworking lathes,
mills, drills, bandsaws,
metal-forming, small
tooling and accessories.

Engineer-focussed,
technical customer service
& comprehensive spare
parts department.

We only sell genuine
Warco machines.
First for quality and value.
Safe and fast UK shipping.

Call
01428 682929

Enquiries
sales@warco.co.uk

Buy Online
warco.co.uk

MODEL ENGINEER

Published by Mortons Media Group Ltd,
Media Centre, Morton Way, Horncastle, Lincs LN9 6JR
Tel: 01507 529589 Fax: 01507 371066
© 2023 Mortons Media ISSN 0026-7325
www.model-engineer.co.uk

EDITORIAL

Editor: Martin R. Evans
Deputy editor: Diane Carney
Designer: Druck Media Pvt. Ltd.
Club News: Geoff Theasby
Illustrator: Graeme Chambers
Publisher: Steve O'Hara

CUSTOMER SERVICES

General Queries and Back Issues
01507 529529 Monday-Friday: 8.30am-5pm
Answerphone 24hr
help@classicmagazines.co.uk
www.classicmagazines.co.uk

ADVERTISING

Group advertising manager: Sue Keily
Advertising: Craig Amess
camess@mortons.co.uk Tel: 01507 529537
By post: Model Engineer advertising, Mortons Media Group, Media Centre, Morton Way, Horncastle, Lincs LN9 6JR

PUBLISHING

Sales and distribution manager: Carl Smith
Marketing manager: Charlotte Park
Commercial director: Nigel Hole
Publishing director: Dan Savage

SUBSCRIPTION

Full subscription rates (but see page 546 for offer):
(12 months, 26 issues, inc post and packing) –
UK £128.70. Export rates are also available,
UK subscriptions are zero-rated for the purposes
of Value Added Tax.

Enquiries: subscriptions@mortons.co.uk

PRINT AND DISTRIBUTIONS

Printed by: William Gibbons & Son, 26 Planetary Road, Willenhall, West Midlands, WV13 3XB
Distribution by: Seymour Distribution Limited, 2 East Poultry Avenue, London EC1A 9PT

EDITORIAL CONTRIBUTION

Accepted photographs and articles will be paid for upon publication. Items we cannot use will be returned if accompanied by a stamped addressed envelope and recorded delivery must clearly state so and enclose sufficient postage. In common with practice on other periodicals, all material is sent or returned at the contributor's own risk and neither Model Engineer, the editor, the staff nor Mortons Media Ltd can be held responsible for loss or damage, howsoever caused. The opinions expressed in Model Engineer are not necessarily those of the editor or staff. This periodical must not, without the written consent of the publishers first being given, be lent, sold, hired out or otherwise disposed of in a mutilated condition or in other unauthorised cover by way of trade or annexed to or as part of any publication or advertising, literary or pictorial manner whatsoever.

MORTONS
MEDIA GROUP LTD



<http://www.facebook.com/modelengineersworkshop>

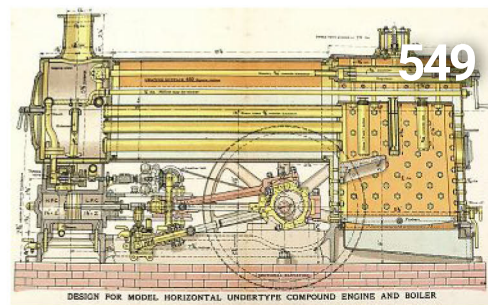


<http://twitter.com/modelengineers>



When you have finished with this magazine please recycle it.

Paper supplied from wood grown in forests managed in a sustainable way.



ISSUE IN THIS ISSUE IN THIS ISSUE IN THIS ISSUE

SUBSCRIBE & SAVE UP TO 49%
See page 546 for details.

Vol. 231 No. 4728 20 October – 2 November 2023

548 SMOKE RINGS

News, views and comment on the world of model engineering.

549 PERCIVAL MARSHALL

Ron Fitzgerald examines the life story of our founder and first editor.

557 A PEEK BEHIND THE CURTAINS

Steve Goodbody reveals the principles behind, and practice of, *adaptionism*.

560 LNER B1 LOCOMOTIVE

Doug Hewson presents a true to scale five-inch gauge model of Thompson's B1.

565 RADIAL VALVE GEARS AGAIN

Duncan Webster explores the subtleties of valve gear operation.

568 BOOK REVIEWS

Roger Backhouse reads a couple of books on the GWR Castle Class by David Maidment and Bob Meanley.

569 THE STATIONARY STEAM ENGINE

Ron Fitzgerald tells the story of the development of the stationary steam engine.

572 ISLE OF MAN MOTOR MUSEUM

Geoff Theasby pays an entertaining visit to a rather unusual museum.

575 A NEW WORKSHOP

Peter Seymour-Howell takes a break from building *Flying Scotsman* to build a new workshop.

577 A METHOD OF MANUFACTURING PISTON RINGS OF THE CLUPET STYLE

Martin Gearing exposes the secrets of making Clupet rings.

579 WE VISIT THE BRADFORD MODEL ENGINEERING SOCIETY

John Arrowsmith visits a club enjoying a history of over 100 years.

583 A FIVE-INCH GAUGE 0-4-0 PADARN RAILWAY TENDER LOCOMOTIVE

Luker presents *Fire Queen*, a Welsh slate quarry locomotive.

587 STAN BRAY'S CRAMPTON LOCOMOTIVE

Howard Lewis completes Stan Bray's 00 gauge locomotive project.

588 A MODEL ENGINEER'S CLOCK

Jim Clark uses modern methods to make a skeleton clock inspired by John Wilding.

591 BIRKETT TROPHY AND YOUNG ENGINEER AWARD

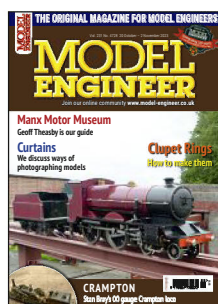
Bob Hayter presents this year's award to NAME's Young Engineer of the year.

592 CLUB NEWS

Geoff Theasby compiles the latest from model engineering clubs around the world.

595 CLUB DIARY

Future Events.



ON THE COVER...

Graham Hennessey's 2½ inch gauge 4-4-0 locomotive Annie Boddie (photo courtesy of Graham Hennessey).



This issue was published on October 20, 2023.
The next will be on sale on November 3, 2023.

www.model-engineer.co.uk

STEAMWAYS ENGINEERING LIMITED

LIVE STEAM LOCOMOTIVES

FROM 0 GAUGE TO 10 1/4" GAUGE



Steamways Engineering Limited builds working live steam locomotives from Gauge '0' to 10 1/4", Traction Engines up to 4" scale and stationary steam and launch engines – all to a high standard,

We also complete unfinished projects, finish paint and hand-line them.

The renovation and repair of steam models is sympathetically undertaken.

To assist you complete your own projects, we manufacture individual parts to order including supplying a range of fully certificated and EC PV Regulations compliant silver-soldered copper boilers up to and including 5 inch gauge.

Visit our Website

www.steamwaysengineering.co.uk

email us on **info@steamwaysengineering.co.uk**

or telephone us on **01507 206040** with your requirements for a no-obligation quote or discussion.

Steamways Engineering Limited

Dovecote House, Main Road, Maltby le Marsh, Alford, Lincs. LN13 0JP

Call: 01507 206040



POLLY MODEL ENGINEERING

*For all your Model
Engineering Requirements*

Extensive range of parts:
pressure gauges, injectors,
steam valves, superheaters,
lubricators, oil cans,
transfers, spanners,
taps and dies, draincocks
nuts and bolts etc.

Stationary Engines and Locos

- Contact us with your
requirements!



Polly Model Engineering
Unit 203 Via Gellia Mills,
Bonsall, Derbyshire,
DE4 2AJ, United Kingdom

www.pollymodelengineering.co.uk

Tel: +44 115 9736700

Find us on 

sales@pollymodelengineering.co.uk



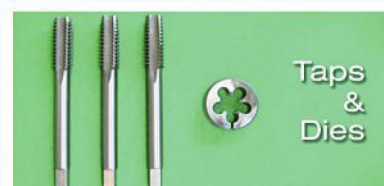
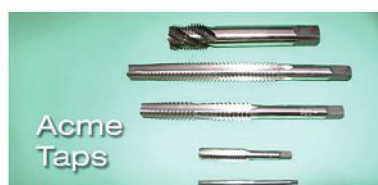
Tracy Tools Ltd
Unit 1, Parkfield Units,
Barton Hill Way,
Torquay TQ2 8JG

Visit our brand new website
www.tracytools.com

We ship anywhere in the world

PRODUCTS

- Taps and Dies
- Centre Drills
- Clearance Bargains
- Diestocks
- Drill sets (HSS) boxed
- Drills
- Drill set (loose) HS
- Endmills
- Lathe Tooling
- Reamers
- Slot Drills
- Specials
- Tailstock Die Holder
- Tap Wrenches
- Thread Chasers



Tracy Tools Ltd

Tap & Die Specialist, Engineer Tool Supplies

Tel: 01803 328 603

Fax: 01803 328 157

Email: info@tracytools.com

www.tracytools.com

WE ARE THE EXCLUSIVE UK DISTRIBUTOR FOR

WABECO

MACHINE MANUFACTURER since 1885



Wabeco milling machines
Prices from £3,999.00



On selected machines



Wabeco drilling stands
Prices from £165.00



Wabeco lathes
Prices from £3,995.00

Prices include VAT & Delivery Mainland UK

We offer a complete range of quality, precision machines for the discerning engineer.

Developed and manufactured in Germany, Wabeco products guarantee the highest quality standards. Whether your milling or drilling with Wabeco, you're sure to get the best results possible.

Emco distributes a wide range of machine tools, CNC machines, lathes, drills, printers, routers, 3D scanners and waterjet cutters for industrial and educational use.

Visit **emco.co.uk** to see the full range or call us on **02392 637 100** for more details.



isel **WABECO**
MACHINE MANUFACTURE SINCE 1885

Emco Education Ltd, Unit 4, Hayling Billy Business Centre, Furniss Way,
Hayling Island, Hampshire, United Kingdom PO11 0ED sales@emco.co.uk

emco
UK DISTRIBUTOR

Make your **Christmas** even better

Looking for gifts for friends and family, or just wanting to treat yourself? Well search no more! A magazine is the perfect pressie for loved ones (or even to yourself). Not only that, subscribe to *Model Engineer* for one year and we'll send you a free tshirt



Get your gift subscription today



If you enjoyed this issue,
subscribe or renew for
ONE YEAR
from just £65
and claim your
FREE GIFT

Visit www.classicmagazines.co.uk/xmasme
or call 01507 529529 and quote XMASME

TERMS & CONDITIONS: Rates are based on UK orders only – for overseas please visit: www.classicmagazines.co.uk/me-overseas. Subscriptions will start with the issue selected at the basket. Offer closes 31/01/2024. Full year subscription gifts are available while stocks last. Full terms and conditions can be found at www.classicmagazines.co.uk/terms Any gifts are for UK orders only and will not be mailed out until December 2023.

Try one of our other great titles too!

Get 6 issues of one of these mags for just £20



Your guide to buying, running and owning a classic. Broad minded with a practical twist.



Classic, twinshock or Evo, it's the place for you to dive into the dirty side of biking.



Real bikes. Real riders. Real rebuilds. Real Rides. RealClassic!



Celebrating the rich history of motorcycles and motorcycling, then and now.



The original and best mag for choppers, bobbers and all kinds of customs!



For news, innovative features, tech talk and practical tests, head to Fast Bikes.



Real-world tests of the latest bikes and kit, places to go and features not to miss.



Running, riding and repairing Japanese, European and US classics from the 70s onward.



The best for classic and modern scooters. For enthusiasts, by enthusiasts.



The personalities, legendary bikes and the race track heroes who mattered then... and still matter now.



The tools and techniques used by model makers, light engineers and restorers.



UK's biggest model flying mag packed with reviews, features and expert opinion.



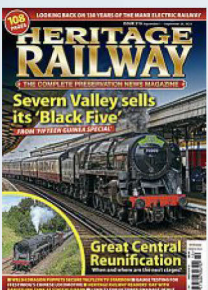
The bible of the British-US car scene. If it's American and got wheels, we've got it covered!



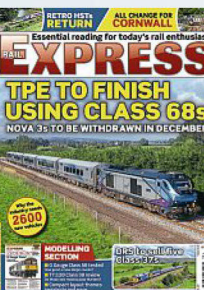
For those who like building model boats, or just enjoy soaking up this huge hobby.



Britain's best magazine for those who love to grow their own fruit and veg.



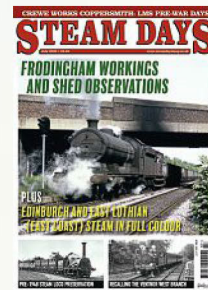
The best for news, features and images covering the UK's rail preservation movement.



Enthusiast-led content, news, in-depth expert features and outstanding imagery.



News and features for the modern traction and heritage modern traction enthusiast.



Recalling Britain's steam era through photos, recollections and historical features.



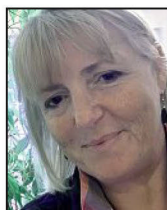
Simply Britain's biggest and best rail title - modern, steam and everything in between.

Visit www.classicmagazines.co.uk/xmas23dps Or call 01507 529529 and quote xmas23dps

TERMS & CONDITIONS: Rates are based on UK orders only – for overseas please visit: www.classicmagazines.co.uk
Subscriptions will start with the issue selected at the basket. Offer closes 31/01/2024.



MARTIN EVANS
Editor



DIANE CARNEY
Assistant Editor

IMLEC 2024

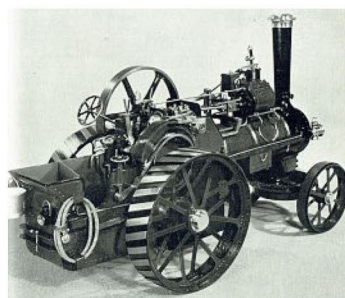
After a couple of years down south, the International Miniature Locomotive Efficiency Competition is moving up north. I am very pleased to be able to announce that next year's IMLEC will be hosted by the Southport Model Engineering Club. The club has hosted IMLEC twice before, in 2008 and 2017 and has both raised and ground level tracks for 5 and 3½ inch gauges. More details about the competition, including the rules and how to enter, will be posted here nearer the time.

Wordsearch Competition

I hope you enjoyed the wordsearch competition in issue 4723. As they say on the TV, 'the results are now in' and I can tell you who the lucky winners are. First place is taken by Ray Jenkins from Marlborough, who wins a selection of books, including Christopher Vine's *Peter's Railway* and a magazine subscription. The second prize goes to Sarah Goodwin from Lampeter, who also wins a selection of books. Third place goes to R. Caines from Pickering who receives a book on *The Duchesses* – presumably about steam locomotives rather than the doings of the aristocracy. Congratulations to all the lucky winners!

Burrell Traction Engine

In 1954, a 1½ inch scale Burrell traction engine built by William Higgs featured in *Model Engineer* (M.E.2759, April 8th). Mr Higgs's son has written to me wondering whether anyone



Burrell traction engine built by William Higgs.

knows the whereabouts of this engine (see photo) or even whether it still exists. If any reader can shed any light on it, I would be glad to pass on the information.

In This Issue

Regular readers will, I am sure, be pleased to know that Steve Goodbody is back (page 557), this time with some handy hints'n'tips on photographing models, in which he draws back the curtains to reveal all. Meanwhile, Geoff Theasby pops across to the Isle of Man to explore the motor museum there which, it seems, is rather quirkier than most. It provided Geoff, though, with a fine opportunity to add some interesting pictures to his photo album. As a bonus, Geoff reveals to us which car is his favourite (page 572). An odd choice it is too, in my opinion, preferring, as I do, the older models.

Back in the workshop, Martin Gearing begins his explanation of the process of making Clupet rings, which depends on doing things to cast iron which many of us might consider impossible.

If that is not enough, next time Roger Backhouse will, in our special Guy Fawkes issue, reveal the fun that can be had experimenting with explosives (don't try this at home, folks!).

Keeping Warm



Now that summer is well and truly over and – as they say – the nights are drawing in, it's important to make sure that we and, more importantly perhaps, our workshops remain warm over the winter. To this end, Machine Mart have introduced two new heaters.

The first of these models is the **Clarke Devil 370SPD Remote Controlled Quartz Halogen Heater**. Providing instant, clean, odour-free infrared heat, this heater is ideal when spot heating of objects or persons is required. The elements will only heat solid objects, rather than

air, which makes this heater extremely efficient as 95% of input energy is converted into heat output.

This model features a stylish LCD panel to show heating mode, an automatic shutdown timer, 6 programmed heating settings and a multi-function remote control for ease of use.

The heater has a maximum output of 2.8kW and a supply voltage of 230V.

The second model is the **Clarke Contractor Devil 351C Ceramic Heater**, an easy and convenient way to quickly warm rooms for heating and drying. With its minimal warm up time, and variable heat output, a constant and comfortable room temperature can be raised quickly and easily maintained. This model has a supply voltage of 110V with heating output ranging from 1200W to 2400W.

See www.machinemart.co.uk for further information.



Machine Mart

Martin Evans can be contacted on the mobile number or email below and would be delighted to receive your contributions, in the form of items of correspondence, comment or articles.
07710-192953
MEeditor@mortons.co.uk

Percival Marshall

PART 2

Ron Fitzgerald looks at the life of our founder and first editor.

Continued from p.503
M.E.4727 October 6

INASMUCH as economists are ever to be taken seriously, the success of the *Model Engineer* is a parable of Say's Law, an essay in a product inducing its own demand. Before Percival Marshall launched his concept of a journal for amateur engineers their activities were fragmentary and disparate. The magazine provided the first focus for enthusiast mechanics and electricians, model makers, boat builders, and motorcyclists. In the manifesto that formed the introductory editorial of issue No. 1, Marshall summed up the situation as he saw it:

...It is simply that there is at present no journal in this country which is exclusively devoted to mechanics and electricity from the amateur's point of view and the army of workers whose tastes lie in this direction has grown so large that there is a distinct want for a publication which shall make their interests its special care...

His intention was to support this body by offering:

...interest and assistance... in lathe-work in all its branches, tools and tool-making, model-engine designing and making, pattern-making, brass and iron founding, forging and sheet metal working...with...good illustrations and clear working drawings... We want all amateur mechanics to regard this as their journal and to make use of our columns to help each other by giving hints and helpful suggestions on workshop matters and by the discussion of such practical points as may call for the expression of various opinions ...

The magazine was intended to be a forum for correspondence and there was also to be a *Postal Query and Reply Department* that would draw upon a range of experts in the various subjects that the

journal dealt with. (Marshall promised that queries would be replied to within two or three days.) Finally, he announced a competition of four parts: 1. *My model engine and how I built it*. 2. *A Wimshurst machine: How to make and use it*. 3. *The lathe as a milling machine* and 4. *The best short article describing some workshop fitting or appliance likely to be of use to readers*.

A considerable personal act of faith lay behind the founding of the *Model Engineer*. Marshall's direct experience in publishing was limited. Between his return to England in 1895 and the launch of the new magazine, he had acted in the capacity of a sub-editor of the annual gazette, the *Hardwareman*, followed by editorship of the periodical *Photographic News*, both part of his uncle Horace Marshall's empire. This must have provided useful business experience but his decision to embark upon producing the journal owed more to intuitive confidence than that there existed a potential market. He would have been aware that model yacht building and sailing was already popular, encouraged by the pond facilities that a new generation of municipal public parks had provided. He also knew that there was a widely dispersed population of engineering model makers. Stationary and locomotive steam engines, built by both working engineers and non-engineers, were not uncommon, some of good intention but doubtful quality, others fully comparable in standard to today's best.

The growing interest in model engineering was also apparent in the spate of recent additions to the small core of commercial model and model component suppliers. Two old established firms, The Clyde

Model Dockyard of Glasgow and Stevens Model Dockyard, by then at 23, Aldgate, East London, had long supplied parts for model boat builders but recently both had added stationary steam engine and locomotive fittings to their range. Probably the first to offer castings for complete locomotives was Waller Martin of West Ham but Whitney of City Road followed in 1875 and, in 1884, The British Modelling and Electrical Company of Leek in Staffordshire began trading. Bond's of Euston came into existence in 1887.

The growing literature for modellers had also shown that a receptive market existed. Although not specialised, the *Boy's Own Paper* included several articles of the build-your-own-model variety and *English Mechanics* had occasional material of interest to modellers. Of a less ephemeral quality, a number of books exclusively devoted to model building had recently appeared. Steven's Model Dockyard produced its own *Model Dockyard Handy Book*, the Steady Stoker's *The Model Steam Engine: How to Buy, How to Use and How to Make It* was gaining considerable popularity and J. Pocock's *Model-Engine Making in Theory and Practice* was first published in 1888. The best of its ilk, according to L.B.S.C., writing fifty years later, was the American, Julius Alexander's *Model Engine Construction with Practical Instructions for Artificers and Amateurs*, available since 1891.

Whilst these may have been favourable auguries, Marshall was not blasé about the prospects and despite his family connections he seems to have been largely reliant upon his own limited financial resources. As he later wrote:

Personally I found it a rather anxious time. I was





ALFRED H. AVERY.



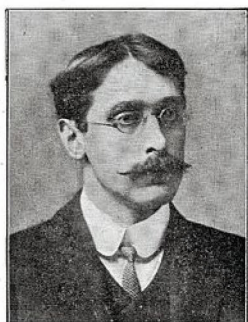
CHAS. W. COOK.



ALFRED DAWSON.



FRANK FINCH.



HENRY GREENLY.



THOS. D. GARSADDEN.



T. H. HAWLEY.



A. W. MARSHALL.



FRANK E. POWELL.



W. C. RUNCIMAN.



W. H. WILSON THEOBALD.



C. F. TOWNSEND.

Early staff and contributors to the Model Engineer (Model Engineer Supplement 1904).

newly married, I had just been flatly refused by a leading life assurance company and I only had enough money in the bank to buy a desk and a typewriter and to pay for the printing of the first number (ref 8).

In a pre-publication promotional exercise, he had circulated a prospectus and followed up with a number of personal visits. This proved to

be not entirely encouraging, particularly after his close friend, R. A. Lee, who had a modelling supply business in Shaftesbury Avenue, expressed the opinion that model engineering was dying out and that sales of 500 issues of the periodical were unlikely to be reached. A much more favourable response was met with from the other London

firms, Lucas and Davies, Stevens Model Dockyard and Waller Martin. Further afield Bertrand Garside of Warrington showed interest and asked for a number of copies which he undertook to distribute amongst his customers for small steam fittings (ref 9).

Lee, despite his extensive experience in the realms of selling to model engineers

proved to be profoundly mistaken. The first two issues, published in January and February 1898, were an instant success and Marshall was called upon to reprint both. In May 1900 a pink postcard was included with every copy which carried the question: *Do you wish the Model Engineer to be published fortnightly or weekly instead of monthly as at present?*

Replies were received not only from Britain but also from France, Switzerland, Italy, Holland, Sweden, Finland and Russia with later responses from America and the British colonies. The vote was for a twice-monthly and publication was altered accordingly from October 1900. Within five years of launching, sales had risen to thirty thousand copies (ref 10). In 1904 Marshall was able to write:

Six years ago I was preparing to put into definite shape my long cherished notions for a periodical for model engineers. ...I little thought I should be able to address a circle of readers extending to practically every country where mechanical arts and sciences are known...China to Peru...Northern Europe to Australasia.

Model Engineer has during its brief existence witnessed a revolution in the supply of the materials for model engineering. In the purchase of finished castings, parts and fittings...the model maker of today has ten times the choice of a few years ago. Design and workmanship have greatly advanced... The older firms have extended their business operations and new firms have sprung into being...there has been a huge improvement in the quality of models...how much of these changes are due to the influence of the Model Engineer I will not attempt to say... Its own pages during the period under notice perhaps afford the best reply to such a question (ref 11).

At the outset, Percival Marshall was the only full-time staff member. From a small room in Temple House, Tallis Street, close to Fleet Street, he

combined the roles of general manager, editor, draughtsman, typist, advertisement manager, book keeper and office boy. The publishing arrangements were handled by Dawburn and Ward of 6 Farringdon Avenue, literally round the corner from Tallis Street. Number 6 Farringdon Avenue was the first business address of the *Model Engineer*.

Over this start-up period Percival Marshall's written output was prodigious, for in addition to the regular editorial commentary he wrote articles on workshop practice and machine tools, he undertook book and trade catalogue reviews and where external contributions showed signs of flagging he provided impromptu to sustain the content. There was however a steady flow of material from outside contributors covering a wide range of interest: steam and internal combustion engines, model boating, cycling and motor cycling, clock making and electrical device making, including the construction of a personal X-ray machine (!). The first article devoted to railway locomotives came from Dr. John Bradbury Winter who had recently completed one of the most spectacular model engineering achievements of all time, the 1 inch scale L.B.S.C.R. 0-4-2, D2 locomotive *Como* (ref 12) which survives today in the collection of Brighton Museum and Art Gallery. There were a number of other railway articles including one by W. J. Tennant on a proposed G.N.R. 2-2-2 and another by Frank Powell on the construction of a five-plank goods waggon for 3½ inch gauge but railways were by no means as dominant as they later became.

The confirmed success of the new magazine gave Marshall the resources to begin employing permanent staff (photo 5). The first was the above-mentioned Frank E. Powell who was appointed editorial assistant. Trained at the North London Railway's Bow Works, Powell had skills in mechanical and electrical

engineering; he was a gifted draughtsman and a talented writer. Moreover, he was an established model engineer. He had built a multi-gauge garden railway, 2½ inch, 3¼ inch and 4¾ inch, the gradients of which could be varied for testing purposes (ref 13).

In early 1901, Alfred Dawson, who had previous industrial experience in the Sheffield and Huddersfield areas, joined the staff as advertising manager and also assumed responsibility for the publishing department. At the same time William (Bill) Evans began his 56-year career with the *Model Engineer*, starting as office boy aged 13 but rapidly proving to be a competent sub-editor.

A major but now largely forgotten figure in the formative years of the magazine was Percival's elder brother Alfred. Alfred's background in engineering was more conventional than Percival's. Since childhood he had shown an intense interest in both railways and boats and, as a youth, he possessed a copy of the Steady Stoker's book. His professional engineering career began in February 1881, when he entered into an apprenticeship at David Napier & Son, York Road Works, Lambeth, makers of high-quality coining mint machines and weighing machines. Napier's had been amongst the premier engineering firms in London but at this time it was in seemingly terminal decline; the firm's great revival as a motor car manufacturer under M. S. Napier and S. F. Edge was not to come until 1895. Alfred Marshall's interest in electrical engineering was stimulated by his observations of the Brush Electrical Engineering factory which was on the opposite side of York Road, where he saw Brush arc lighting dynamos being transported through the street. After five years he emerged from Napier's with a certificate testifying to his experience in turning, fitting, erecting, work with machine tools and the forge but in parallel to his day work he studied at evening classes.

During the winter session he frequently spent Saturday afternoons doing practical work in the college laboratories and, to widen his practical experience, he visited works and factories. His academic achievements were recognised by the award of a City and Guilds of London Institute silver medal in electrical instrument making.

After the completion of his indentures he progressed to being a journeyman improver and, as such, his first employment was with Maudsley Sons and Field, once the Capital's greatest name in engineering. Although the firm was approaching the end of its life, it gave him experience in the construction of engines for warships and he was sent to the Victoria Dock to work on *H.M.S. Benbow*, then being engined by the firm. His next situation was as a draughtsman with Messrs. Nalder Brothers & Co., electrical and scientific instrument makers. This consolidated his knowledge of electrical engineering and at 25 years of age he started his own business making dynamos, motors and electrical appliances for theatres and light mechanical work. In 1904, his business amalgamated with the Crypto Works Co., after which he became a full time *Model Engineer* employee but he continued to carry out consultancy work alongside teaching evening classes in machine drawing and mechanical engineering.

Alfred Marshall's first contribution to the magazine, which pre-dated his permanent appointment as a staff member, was a substantial series on *The Construction of Model Dynamos and Motors* which commenced with issue number 1. Subsequent articles from his pen (sometimes under the pseudonyms of *Inchometer* and *Phantom Pen*) displayed his wide range of expertise and in 1914 he carried out what were probably the first systematic experiments on stresses in small boilers (ref 14). If he had a central

enthusiasm it was boating. A member of the Clapham Model Yacht Club, the first of the model yacht clubs, he sailed a three-rater cutter at the same time exploring the possibilities for steam, clockwork and electrically driven model boats. Outside the model world he was present at the first motor show at Tunbridge Wells and in 1899 he was judge's observer in the first automobile trials. The whimsical side of his nature showed in a number of ghost stories that he wrote, several of which appeared in the *Model Engineer* whilst others were published as small books (ref 15).

A contemporary of Alfred Marshall in joining the *Model Engineer* permanent staff was Walter Castles Runciman. Runciman was related to the ship building family of the same name. Like the Marshall brothers, he had a firm background in both academic and practical engineering. Although a native of Newcastle, he commenced his engineering education at the recently formed South Western Polytechnic in Chelsea but subsequently returned to the north-east to serve an apprenticeship at Doxford's Pallion Shipyard and at a number electricity generating station in the area. This led to his being employed at the Great Central Railway's Electrical Generating Station at Marylebone. He subsequently took a senior post on the staff of Messrs. Capel & Co., gas and oil engine makers of Dalston. A man of wide technical knowledge and ability, Runciman was equally at home in mechanical and electrical engineering and a craftsman in both wood and metal. His main hobby interest was ships and boats, model and full-size, and he owned a small cruising yacht with auxiliary engine which he kept at Sunbury on Thames. He was also an accomplished cellist. His initial area of responsibility at the *Model Engineer* was the Query Department but he wrote many of the early articles including a notable series on

building a gas engine. He later became associate editor and when he died Percival Marshall was to pay a heartfelt tribute to his colleague:

...I could not wish for a more loyal and considerate colleague or for one who more truly exemplified the spirit of the Model Engineer in its endeavour to give service and encouragement to its readers...

It is unlikely that Percival Marshall would feel inclined to express similar sentiments about Henry Greenly, the man subsequently to become most prominent amongst this first generation of *Model Engineer* staff members. Greenly became a *Model Engineer* employee in May 1901. His father was a Great Western Railway passenger train guard, who was working out of Birkenhead at the time of his son's birth in June 1876. Henry had a Board School education in Birkenhead up until 1887 when his father was transferred

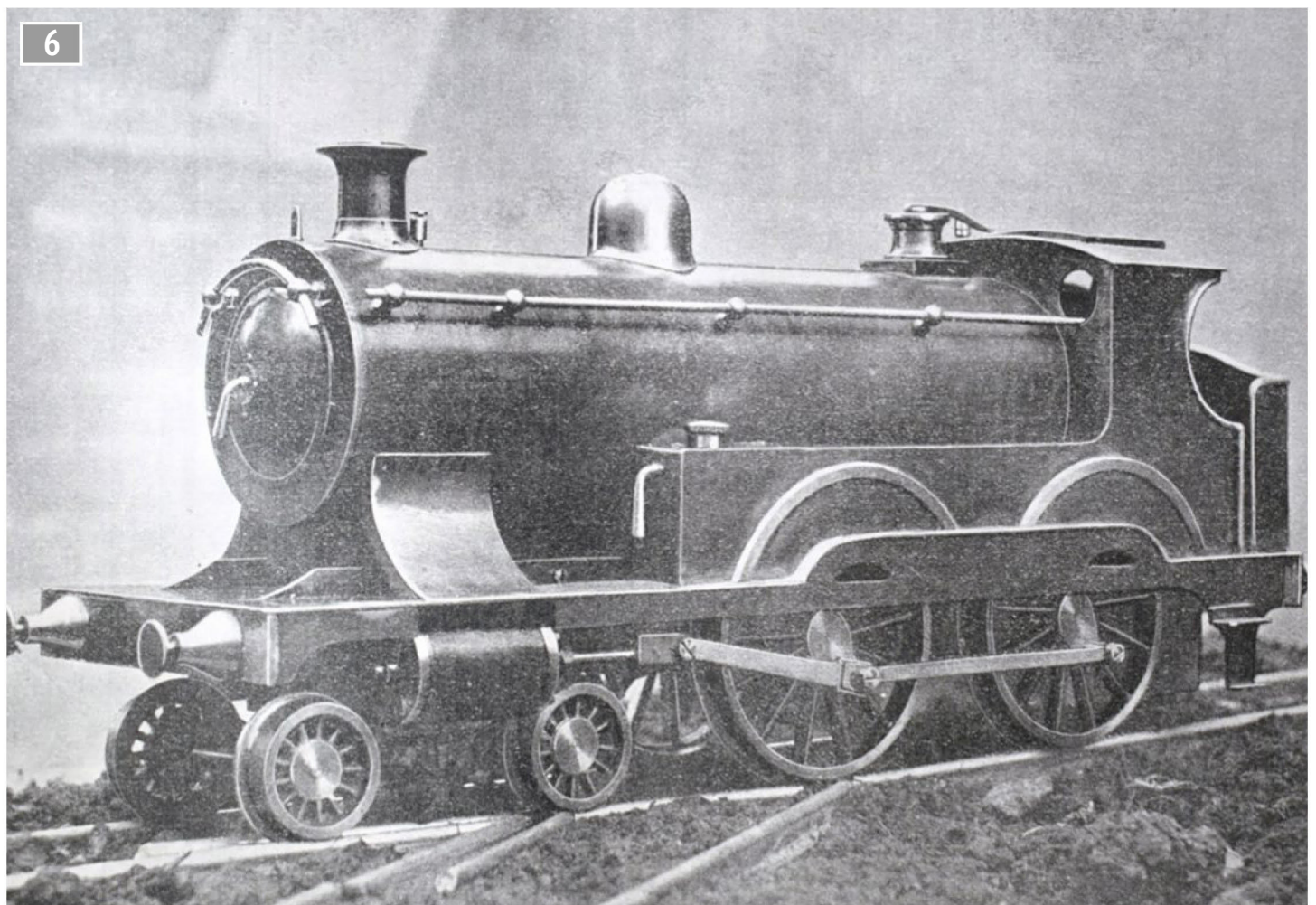
to Westbourne Park, the shed for Paddington. His new school was the Beethoven Street Board School, built in 1881 where, four years later, a pioneering class in woodworking was started, later adopted by the City and Guilds Institute. In 1889, Greenly was awarded a London County Council scholarship but he was debarred from taking it up by the regulations which stipulated a residence qualification of three years in London. With further education temporarily closed to him he entered into a period of employment in the jewellery workshops of William Whiteley in Bayswater but this proved to be brief and from March 1891 he was working as a messenger boy for a firm of solicitors based in Bread Street.

Greenly re-applied for the scholarship after an appropriate lapse of time and passed all subjects with distinction. This gave him entry to Kenmont Gardens Science School, another

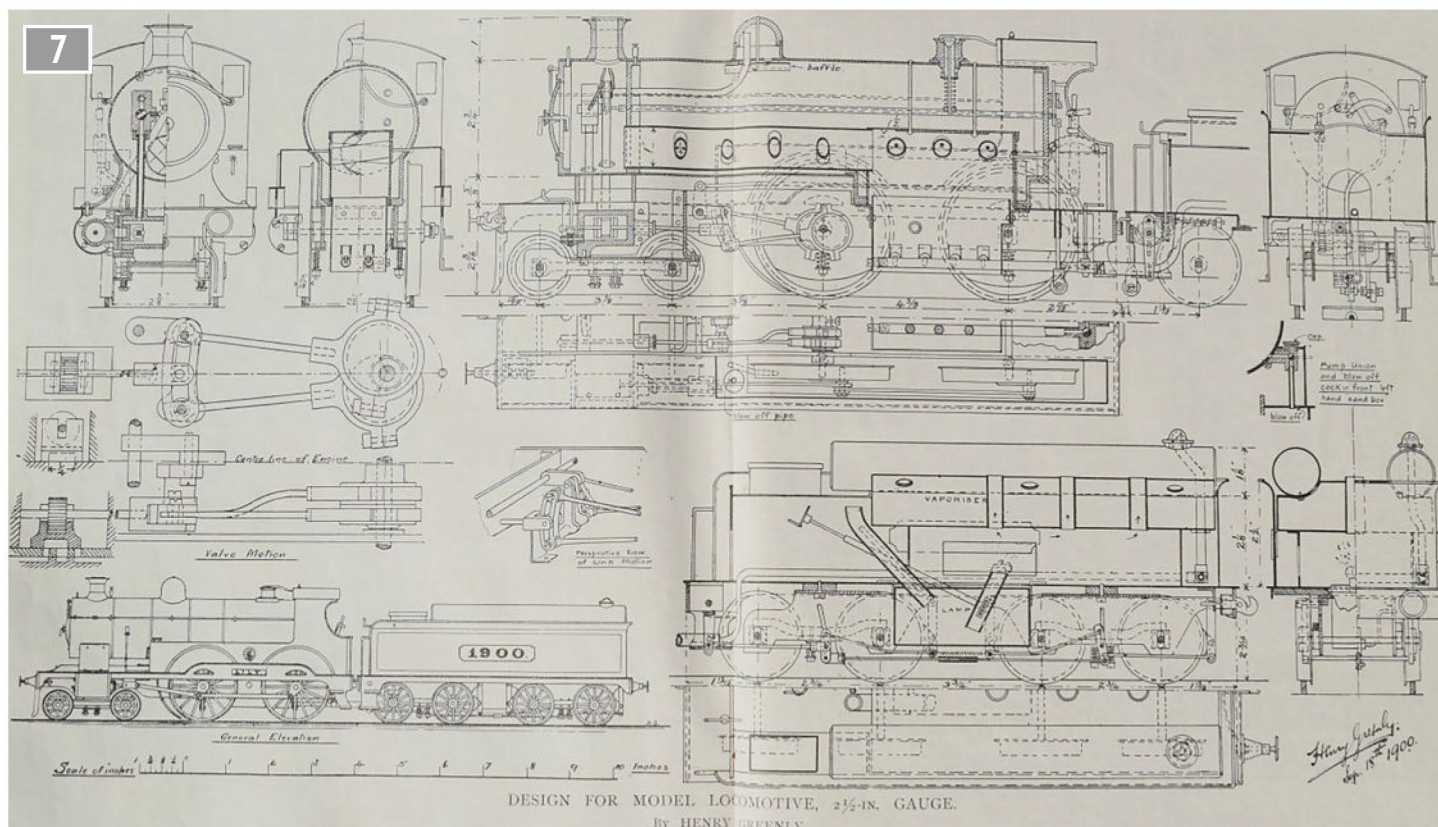
London Board School with extra-mural technology teaching facilities. After three years he qualified for student entry to the Regent's Street Polytechnic. The Royal Polytechnic Institution dated back to 1838 as a science and arts foundation but in 1881 it closed and was taken over by the Christian philanthropist Quintin Hogg, to re-open as the Young Men's Christian Institute. Once again, the City and Guilds Institute became interested and a charitable endowment supported by funds from a public appeal led to its being reconstituted as The Polytechnic-Regent Street in 1891, the first British Polytechnic. From 1896 to 1900 Greenly attended as an evening student, gaining First Class Certificates in Advanced Machine Construction, Drawing, Applied Mechanics and Geometry. Second Class passes were awarded in Elementary Steam Technology

and Building Construction and finally, a pass in Elementary Steam Engine Design.

Three years before his graduation, in February 1897, he was successfully interviewed for a post in the drawing office of the Metropolitan Railway and he joined the Met. staff at Neasden Works on the 22nd of the month. At first employed in the Locomotive and Carriage Drawing Office, an intemperate exchange with a stores clerk resulted in his being transferred to the Architect's and Building Department. This marked a change in the direction of his academic studies and at the Polytechnic he enrolled for Architecture and Building with a view qualifying for the Royal Institute of British Architects whilst continuing his engineering studies. Much of his time was spent in land surveying and in this department the impression that he made was evidently more



Henry Greenly's prize winning gauge one locomotive.



Henry Greenly's working drawings for a 2½ gauge version of the prize winning locomotive.

favourable as he was promoted to the position of assistant to the departmental head in 1899.

Since childhood Greenly had been avidly interested in both ships and railways but partisanship for the Great Western Railway was inbred. A drawing of one of Dean's gauge-convertible locomotives which he executed around 1895 was accepted for publication by the Great Western Magazine. At this time he was drawn into the correspondence that took place in the journals *The Engineer* and *Engineering* between Clement Stretton and George Nokes concerning the first generation of Great Western locomotives. Clement Stretton was an established but notoriously inaccurate railway historian whilst George Nokes was relatively unknown but as G.A. Sekon, in 1897, he was to found *Railway Magazine*. The dispute concerned the number of early Great Western locomotives with ten foot diameter wheels and geared transmission. Nokes was a meticulous researcher and he correctly stated the situation, in which he was confirmed shortly after, by G. F. Bird writing

in the recently established *Locomotive Magazine* (ref 16). Greenly waded in with great conviction but, unfortunately, in support of the wrong side.

Nevertheless, the correspondence in these two authoritative journals brought Greenly into public attention as a railway historian as he doubtless intended it should and, in 1896, he was invited to join a panel constituted to propose a national railway museum. The driving force was Clement Stretton and amongst the eminences that he persuaded to participate were Archibald Sturrock, John Ramsbottom, J.M. McDonall and R.H. Burnett, all distinguished former mechanical engineers of leading English railways. Literary interests were represented by Charles Rous Martin, the first great chronicler of locomotive performance, and J. M. McDermott, who was later to write the standard history of the Great Western Railway. Nokes was not invited to join. In the event the committee achieved virtually nothing and within the next twelve months Stretton was to be responsible

for the greatest loss that the archival history of the railways of Britain was ever to suffer.

The standard biography of Henry Greenly (ref 17) seems to suggest that his membership of the Society of Model and Experimental Engineers provided the means by which he came to Marshall's attention. He made a contribution to the S.M.E.E. discussion surrounding standardisation of model railway track gauges but his suggestions had little lasting impact. It is likely that Greenly's successful entry into the *Model Engineer* competition launched by Marshall in the first issue was more influential. The locomotive that Greenly submitted was awarded first place in its class (photo 6). It was an impressive, 4-4-0 tender machine with outside cylinders and a boiler fired with spirit vaporised in the tender and led forward to two rows of four burners in a firebox with a single flue fitted with cross tubes. Marshall invited him to contribute an article to the *Model Engineer* which duly appeared on December 1st 1900. As

illustrated in the photograph, the model was built for 17/8 inch gauge but in the text and accompanying drawing the gauge was proposed as 2½ inch (photo 7). At the same time Greenly argued for a further enlargement to what the S.M.E.E. was advocating as a standard, 3½ inch gauge (ref 18).

Greenly did not build the machine himself; it was the product of the professional model builders, Whitney and Co., of City Road. This characterised Greenly's approach to model engineering both at this time and during the rest of his life. He was a skilful design draughtsman who saw his role as issuing a set of working drawings accompanied by the type of detailed specification that he was familiar with from his days with the Metropolitan Railway. There is nothing to show that he ever considered himself as anything beyond a drawing-board man, leaving others to translate his designs into works of miniature engineering (ref 19).

The fact that construction was delegated does not seem

was published in February 1903, explicitly under Greenly's name, describing a travelling Post Office sorting van, built for Lt. Col. Robert Harvey's famous $\frac{3}{4}$ inch scale garden railway in Norfolk. The overall design was by Greenly but the bogies were built by Fred Smithies, an engineer of growing reputation for his modelling skills and also for the first really successful spirit fired-boiler. The article was illustrated by two photographs, almost certainly taken by Greenly, who was now effectively the staff photographer for the *Model Engineer*.

The quality of Greenly's draughtsmanship is apparent in the frontispiece supplement of January 1903 which prefaced his constructional series for a compound, under-type steam engine (**photo 8**). The design subsequently attracted many builders and a version was used as a cover photograph of the *Model Engineer* as late as the nineteen-fifties.

Sadly, what appears to have been an equally exquisite drawing of a Metropolitan Railway 0-4-4 condensing tank locomotive contained the July edition of *Notes and Queries* was printed to a smaller format and in monotone, losing much of its original quality. It is probable that this is the drawing referred to in his biography as having been drawn before he left employment with the Met. (**ref 22**).

The terms offered in Marshall's letter by which Greenly was employed were liberal and generous (**ref 23**). He was obviously valued and trusted by Marshall and he rapidly assumed the role of external representative of the *Model Engineer*. With his chief, he went to the Glasgow Exhibition in 1901 and he accompanied him on his frequent visits to model engineers and trade suppliers. In this way he was introduced to Stuart Turner, Bassett Lowke, Arthur Drummond and Edward Twining, all just starting in business. He was allowed considerable latitude and, in the summer of 1901, Greenly

went with Bassett Lowke to Germany where important contacts were developed with the German toy manufacturers, particularly Stefan Bing. A further trip followed in 1903 when Greenly preceded Bassett Lowke, acting as his envoy, a pattern repeated over the following few years.

At the same time Greenly continued to extend his activities as an independent consultant, employing his own staff without reference to the *Model Engineer*. At an early stage he was producing scale drawings of locomotives to various gauges which were sold by Bassett Lowke, Stuart Turner and Bond's and for which he retained the originals and the copyright. For Stuart Turner he designed the well-known vertical compound engine and his association with Bassett Lowke became closer (**ref 24**).

Greenly almost certainly undertook the design work involved in combining the superbly engineered Bing cylinders and valve gear to the Smithies boiler which was to prove to be the Bassett Lowke's breakthrough in the smaller model field. The lovely Midland Railway compound 4-4-0 built for $3\frac{3}{4}$ inch gauge which was enthusiastically reviewed, probably by Percival Marshall himself, in the September 1903 *Model Engineer* was possibly another Greenly design. In 1904 Percival Marshall & Co., also published Greenly's first book *The Model Locomotive* which was to run through many editions. Greenly did not confine himself to writing for the *Model Engineer*; his work appeared in other publisher's periodicals and, according to his daughter and son-in-law, the Steels, he also worked on the Bassett Lowke's *The Model Railway Handbook* although Fuller, in his history of Bassett Lowke, credits several other authors but not Greenly.

During his visit to the Glasgow Exhibition in 1901, Greenly had seen the 15 inch gauge American Cagney locomotives in operation hauling passengers. This

caught his imagination and also that of Bassett Lowke who went on to launch Miniature Railways of Great Britain Ltd with R. Proctor Mitchell whose family was connected with the Regent Street Polytechnic where the famous 18 inch gauge Stirling Single had been built in 1899 for R. Notter, the shed master of at King's Cross. In 1903 Greenly designed his first large scale steam locomotive *Nipper*, a 10 $\frac{1}{4}$ gauge 0-4-4 tank engine intended for the Bricket Wood Railway laid down by Fred Smithies with his partner George Snooks. Bassett Lowke purchased the Bricket's Wood Railway and relaid it in a field adjacent to Abington Park, Northampton. This confirmed Bassett Lowke in his view that miniature passenger hauling railways held a commercial future for Miniature Railways of Great Britain Ltd., working in partnership with his engineering firm J. T. Lowke as builders and Henry Greenly as designer of locomotives, rolling stock and civil engineering. The first wholly new railway built by the company was at Blackpool's South Shore in 1905 and the single locomotive was the Greenly designed *Little Giant* (**ref 25**). The events that followed have been described elsewhere but the business of building miniature railways was to increasingly pre-occupy Henry Greenly.

This situation was clearly one that held the potential for divided loyalties. Marshall, by reputation good-natured and amicable, seems to have accepted Greenly's professional double-life until it began to have an impact upon the *Model Engineer's* production. In June 1908 Greenly began a series of articles on what would have been a very attractive model, a Fowler single-cylinder traction engine. Episodes continued through to September then a hiatus followed. By the end of the year his long running series on railway rolling stock came to an end and the sole continuation article on the traction engine for 1909 was

published in January of that year. Fourteen months passed before the next episode came, along with a short article on model stations.

At what point Marshall reached the limit of his toleration is not known but the following (undated) letter was sent from his domestic residence 53, Radnor Road, Harrow, rather than from his business address:

Dear Greenly,
I saw Mr. Tilley today as arranged at the Bun Shop (publisher's or printer's premises?) and waited and hoped to see you there. He tells me that, bar one copy of the Rag, he has never had any sent to him. Now you gave me your word in front of other people that these should be sent each month, which it appears you have failed to carry out. It may be a small matter to you but to use a Scripture Text, "He that is not for me is against me" and I concluded from the friction we have had these last two or three months that you intend to make everything a one man show, in which your ideas are always right and everybody else is wrong. I am perfectly willing to consider myself in the last category and while there is time, part company.

There are, of course, many other things besides the small matter I have mentioned and as Mrs. Greenly is also interested I should esteem it a favour if you and Mrs. Greenly will meet me at Harrow or Watford (Greenly's personal address) say Friday evening...we can either wind up all relations or else clear the atmosphere as I certainly will not continue to be treated as a child or a schoolboy.

At the same time I must point out that you have put five of the best years of your life into the paper, which you appear to be simply throwing away. This seems a pity as I feel sure the work you have put into it would eventually repay you.

Percival Marshall (ref 26).

In addition to the missing contributions the letter gives the impression that there

were more fundamental underlying conflicts. Whether the proposed meeting took place or not is now unknown but from this point on Greenly ceased to play a substantive part in the publication of the *Model Engineer* (ref 27).

It is a measure of Greenly's ungracious conduct towards the man who gave him the

opportunity to enter the world of model engineering at a professional level that he was prepared to launch a rival periodical. *Model Railways and Locomotives* first appeared in January 1909, with the publishing office given as Bassett Lowke's shop, then at 257, High Holborn (ref 28). The magazine was clearly

aimed at the *Model Engineer's* market as it encompassed all types of model and competed for advertising (Stuart Turner took a regular front cover, quarter page). The challenge to the position of the *Model Engineer* was made overt when disappointing sales figures prompted Greenly to suggest that the title should be altered

to *Models, Railways and Locomotives*. The insertion of a comma after the word *Models* did nothing to increase sales and the magazine made no lasting impact. In May 1919 it was taken over by George Newnes and merged with *Everyday Science*.

● To be continued.

REFERENCES

- Ref 8** Supplement M.E. No. 1500, February 6th 1930.
- Ref 9** M.E.1266 July 30th 1925. Smoke Rings.
- Ref 10** The business records for the *Model Engineer* have been destroyed making it difficult to verify the figure but Marshall's statement to this effect is almost certainly to be trusted.
- Ref 11** Supplement M.E. No. 141, Jan 7th 1904.
- Ref 12** Actually partially based on another member of the D2 class, *Lyon* [M.E. Vol 879, 1918].
- Ref 13** Powell left in 1906 to emigrate to New Zealand where he became a successful civil engineer.
- Ref 14** The results were later published in the S.M.E.E. Journal and in the *Model Engineer*.
- Ref 15** *A Strange Christmas Eve*, A. W. Marshall, M. E. December 24th 1908, p. 601.
- Ref 16** *The Locomotive Magazine, Volume VI, The Broad Gauge Locomotives of the Great Western Railway*, p. 45 et seq.
- Ref 17** *The Miniature World of Henry Greenly*, E. A. Steel and E. H. Steel, pub. Model and Allied Publications Ltd. 1973.
- Ref 18** Between March and July Greenly had won two other competitions. For each he published articles illustrated with plans and drawings. The first was a response to competition number 12, a large oval layout in 3½ inch gauge and this was followed by a design for a signalling system to suit. [M.E. No. 45, March 15th 1901 and No. 50, June 1st 1901].
- Ref 19** It is difficult to know whether he ever had a home workshop of the type familiar to model engineers. The only reference to such a workshop relates to his home at Heston near Hounslow in 1929 but here he employed a full-time mechanic. [Ibid. *The Miniature World of Henry Greenly*, Steel and Steel, p.198].
- Ref 20** Quoted Ibid. *The Miniature World of Henry Greenly*, Steel and Steel, p.52.
- Ref 21** See *Model Engineer*, November 24th 1927 for an example by W. D. Miller of Brighthouse.
- Ref 22** Op. cit., *The Miniature World of Henry Greenly*, Steel and Steel, p.53.
- Ref 23** Marshall also employed Henry Greenly's youngest brother Arthur but Arthur's over-estimation of his own worth led to his departure after a short time.
- Ref 24** *The Bassett Lowke Story*, Roland Fuller et al., pub. New Cavendish Books 1984.
- Ref 25** Ibid. *The Bassett Lowke Story*, Roland Fuller, p. 20.
- Ref 26** Quoted op. cit., *The Miniature World of Henry Greenly*, Steel and Steel, p.90.
- Ref 27** Steel and Steel in *The Miniature World of Henry Greenly* maintain that he continued to answer queries and submitted articles on freelance basis. The evidence of the magazine however indicates that it was twenty years before he again became a regular contributor.
- Ref 28** Notably Bassett Lowke was also indebted to Marshall for his support in the first days of his commercial career.

A Peek Behind the Curtains

PART 1 – REUSING THE CANVAS

Steve Goodbody shares his experiences of photographing models.



My goodness, I bet you thought you'd seen the last of me for a while, didn't you? You poor, astonished Reader. However, like bad pennies, presidential elections and episodes of Coronation Street, it seems I am destined to make yet another unbidden appearance into your otherwise peaceful life. So please lie back, put on some soothing music, think happy thoughts and, like a visit to the dentist, rest assured that the discomfort will soon be over. Oh ... and please accept my apologies for whatever pain may occur in the meantime.

Adaptionism

In *The Eating of Elephants*, that recently concluded seventeen-part trilogy which, even though you are gifted with the superhuman patience typical of all model engineers, you undoubtedly read with one finger poised above the 'Unsubscribe Me' button, you perhaps noticed that the author, although probably a decent chap in many respects, tended to extract the maximum amount of return from his outlay. You may even have used the word 'tight' and if you did, then I forgive you, for I can see where you're coming from.

In my defence, I'd like to point out that, while I do try to avoid unnecessary expenditure and waste, I am not actually averse to parting with the hard-earned cash. However, I also admit that I like to get as much value out of it as I can and I find that one of the most satisfying ways to achieve that goal is through adherence to the principles of *adaptionism*.

Now adaptionism – the active desire to use things for multiple purposes, ideally in a manner the originator would never have envisaged – is a word I've just coined but, from the moment our ancestors first donned clothing made from the hide of the unfortunate animal they'd recently consumed and stuck its surprised head on the cave wall as a decoration to impress the neighbours, it is a concept as old as humanity and something which I believe we model engineers are very good at. If you think back, I'm sure that you'll recognise several examples of adaptionism in *Elephants* – which, incidentally, is the first and only time those words will ever be combined into a sentence and make any sense – for you will perhaps remember the *cloches-cum-windows*, the *workshop-cum-painting-booth* and the *painting-rotisserie-cum-chicken-cremator*, all examples of adaptionism in action.

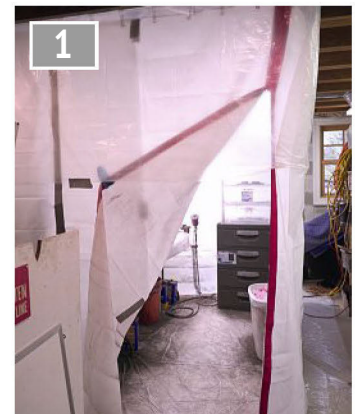
But did you spot the others? No, I didn't think so, but they were there nonetheless, often in full view and this brief two-part article is about a couple of them. I hope that it's of interest and helps prompt further adaptionist ideas of your own.

Adaptionism in the visual arts

Over the course of two long and arduous years spent applying paint to *Jennifer Ann's* various bits and pieces, while bright lighting was easy to achieve from the start, it quickly became apparent that *bright* lighting was not the same as *good* lighting. On the contrary, good lighting, with few shadows and accurate colour rendition,

but without harsh highlights or distracting reflections, was, in my experience, far more difficult to attain and required a succession of trial-and-error attempts to get right. However, after stumbling upon a reasonable solution, the process of painting became a less uncertain and error-prone experience which, let's face it, is not something we often get to say.

Now, as you may recall, the walls of my dismantlable painting booth consist of a multitude of off-white plastic shower curtains, the kind you hang behind a fancy outer curtain to keep the water from flooding the bathroom floor and which, while not fully transparent, transmit plenty of light through their frosted surface so you can see where the soap has landed when you drop it (although if you're like me you'll probably tread on it first anyway). But that semi-transparency was an important feature in the quest for good painting-booth lighting because, during daylight hours, natural sunlight would shine gaily through the windows of the workshop and diffusely through the shower curtain walls and the result would be a workspace with a glowing white interior which, when combined with the daylight-white LED lights in the ceiling above, largely eliminated the annoying shadows which might otherwise bedevil the painting process (**photo 1**).



The author's painting booth in its usual form, assembled in the middle of the workshop. The backlit shower-curtain wall provides good, diffuse lighting at the painting bench.



Taken from the same location as photo 1, after a further bout of adaptionism, the painting booth becomes a photography location. A pillowcase helps soften the LED light in the foreground.

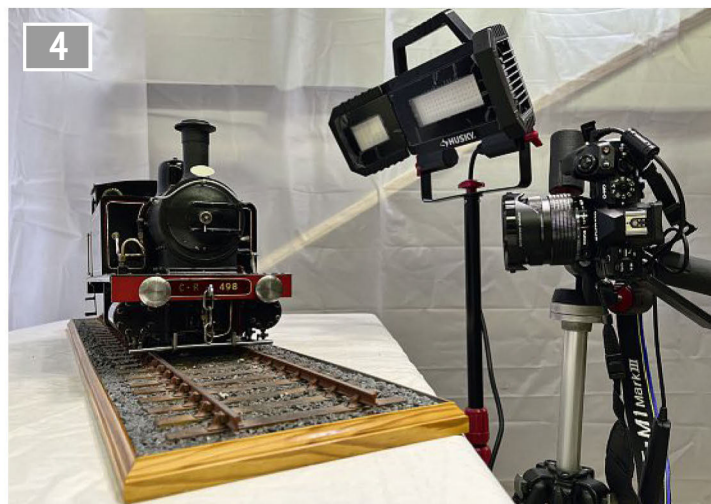
Even better, after further trial-and-error experimentation, I discovered that, on cloudy days or when the sun had set, a similar result could be obtained by shining a stand-mounted LED lamp through the shower-curtains beside the painting bench, replicating the sunlight from that direction, which extended both the hours and the days on which painting was a practical proposition.

Furthermore, when the painting was finished, those shower curtains, hanging from ceiling-mounted curtain tracks, could be easily unhooked and

packed away for future use and, just as easily re-hung, should the need for another bout of painting arise, as it occasionally does.

Beside the fact that a collection of shower curtains helped turn a workshop into a functional painting booth, however, what has all this got to do with adaptionism? A good question and I'm glad you raised it, so let me explain.

As I began writing *Elephants*, it soon dawned on me that I was going to need some decent pictures of *Bluebell*, *Rob Roy* and *Jennifer Ann* in



In this set-up, with neither backlighting nor foreground lighting turned on, the overhead lights generate annoying shadows around Rob Roy.



The result of the photo 2 arrangement.

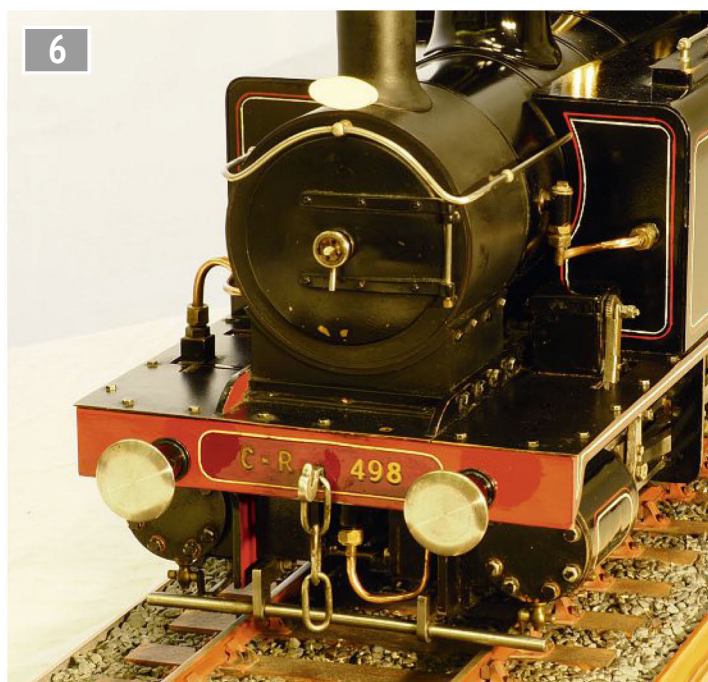
their finished and final forms. However, unfortunately I had none whatsoever of *Bluebell* or *Rob Roy* and I felt the pictures taken of Jennifer Ann upon her completion were of insufficient quality to illustrate an article in this fine magazine. And so, after finishing the preamble to Part 1, away went the magic typewriter and out came the camera for an extensive period of picture-snapping.

Now that is all well and good, but anyone who has tried taking photographs of

models, or perhaps I should say *miniatures* to avoid confusion, knows that it can be the devil's own job to get a reasonable result. If the aperture is too large, then the depth of field suffers; too small and the shutter must stay open for an untenably long time. Set the ISO too high and noise becomes a problem, too low and the shutter must again stay open longer or the aperture must increase as before. A wide-angle lens improves depth of field but generates



The same set-up as photo 4, but the shadows worsen with the foreground light added, drawing attention to the boundary between table and backdrop, a real distraction if a picture were taken with this lighting arrangement alone.



6 With backlighting added from behind the shower curtain wall, here is the result of the set-up in photos 4 and 5. Although a few shadows are still present at track level from the foreground light, they are much improved overall and the boundary between table and curtain, while visible, doesn't distract the eye.

distortion, a longer lens lessens the distortion but narrows the focus. All in all, photography is quite the juggling match.

And then there's the backdrop, an absolute necessity if you want the viewer's attention focused on the subject and not, for example, on the cluttered surroundings of your workshop. And if you intend to take pictures of a large model then you will need a large backdrop and it will need to be as bland and innocuous as you can make it.

But in my experience, all the preceding aspects pale into insignificance when compared to the last piece of the photography puzzle - the lighting. By far the most difficult and frustrating part of the process in my opinion. If the darned lights are positioned too close then they're too bright, too far away and you may as well not bother. Annoying reflections appear if the lights are positioned too high, too low, too far left, or too far right and annoying shadows occur whatever you try to do. But, if you can solve the lighting conundrum, then you will have greatly improved your chances of resolving the other pieces of the photography maze, so

it's worth the effort to try. And, by the time you're finished, you will have a definite admiration for the designers of stage and movie lighting - they earn their salt, believe you me.

But just suppose you had already created a space with large, blank, moveable plastic backdrops which you knew could be lit to provide diffuse and shadow-free lighting. Wouldn't that make an ideal place to take photographs of a model?

Well, the answer of course is yes and **photos 2 to 8** illustrate the first example of hidden adaptionism in *Elephants*, for you will see that a portion of *Jennifer Ann's* painting booth, with very little additional modification, was repurposed into an ad-hoc photography studio, although *studio* is far too grandiose a word and was the location for many of the pictures appearing in that article. Personally, I think it worked rather well!

Next time, we'll look at another example, the underlying basis for every picture of *Jennifer Ann* which was taken in this adaptionism-inspired location.

●To be continued.



7 In this alternative set-up, the foreground light has been moved to Rob Roy's front to eliminate the shadows at track-level and the lens replaced with one of a longer focal length to reduce the depth-of-field and soften the boundary between table and curtain.



8 The result of the photo 7 set-up, while achieving both goals, was not used in *Elephants*. The author felt the lighting was now too flat and did not serve the picture's main objective - to depict the letters painted on Rob Roy's buffer beam. Photography still remains a real challenge to get right!

PART 30 – THE BOILER

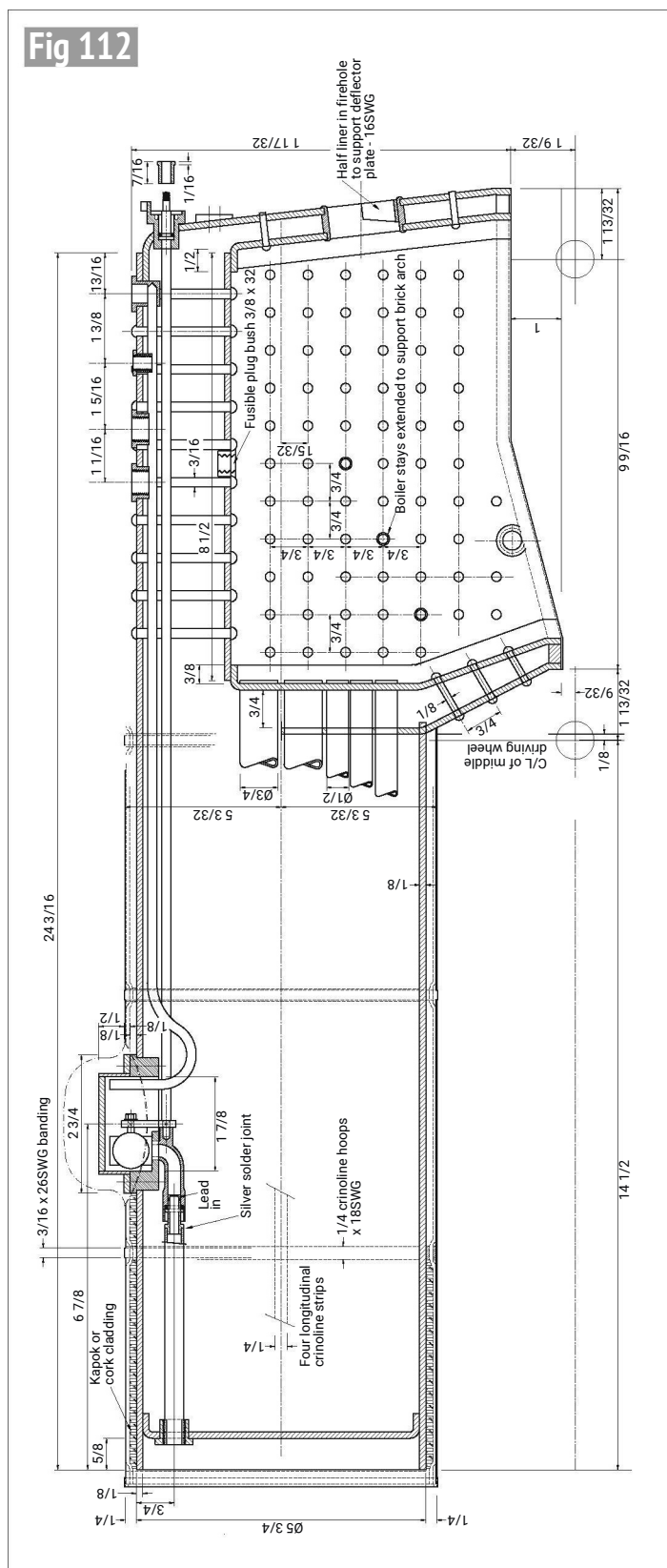
presents an authentic 5 inch gauge version of Thompson's B1 locomotive.



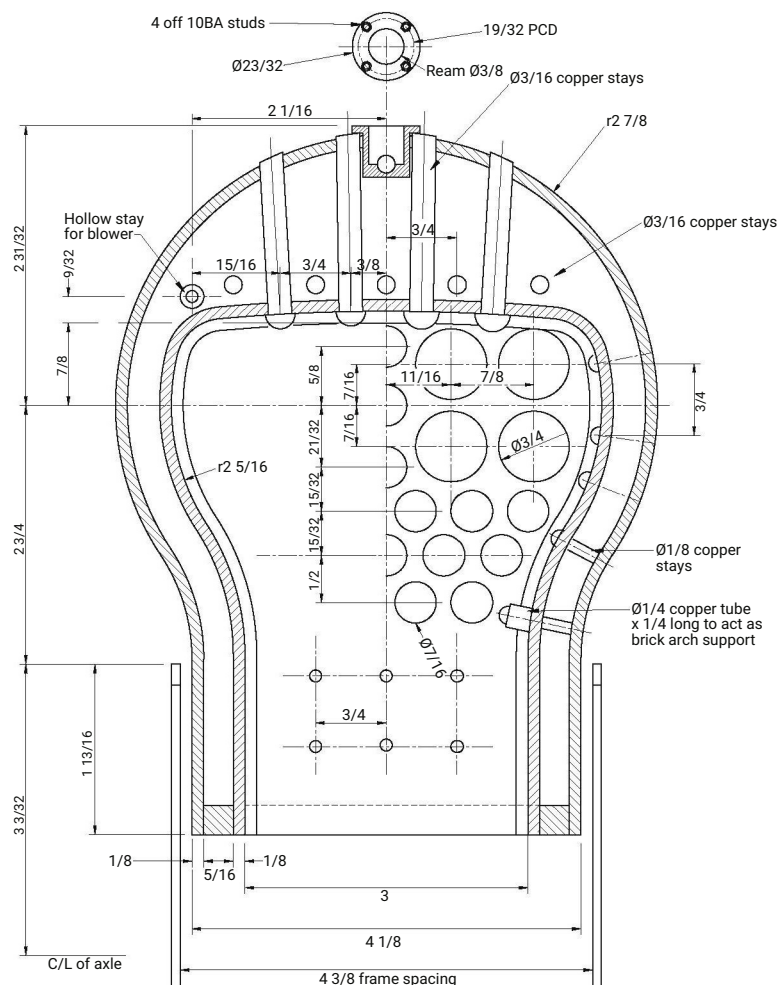
We now come to the largest part of the engine, the boiler. I thought that it deserved a slight modification in that it must have a proper LNER 100A boiler. This proved to be quite a universal boiler as it was fitted to a lot of other engines. This was followed by the K1s which had a slightly shorter version and the LNER 2-8-0s, a lot of which had them fitted too. The 01s were fitted with them and the 04/8s were re-built with the B1 boilers, as were the 02/4s. I have also taken the opportunity to introduce you to a higher superheat than what you are used to on a 5-inch gauge engine.

I decided that we did not use high enough superheat on our 5-inch gauge locomotives when I embarked on building my BR Standard 2-6-4 tank engine (4MT). I cannot tell you what a great success this has been. I looked at the tubeplate of 80072 when it was sitting outside Llangollen loco shed. It suddenly occurred to me that I could do this on my 4MT, even if it meant having to re-build the boiler if I was proved to be wrong. However, I was so pleased with my superheaters that I have since designed all my boilers the same way. I have designed my boilers now to have a double row of superheater flues in them.

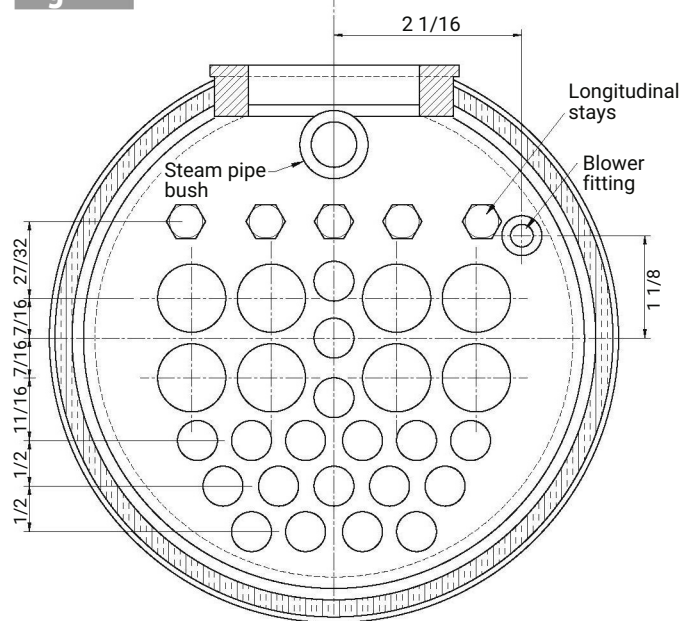
Eddie Gibbons on Tyneside, who commissioned my 4MT, took it to Gilling one day to give it a try along with his son Joe. They hooked ten of our BR Mk1 coaches behind it and set off. Joe drives the engine quite a bit faster than Eddie but they drove the engine for two hours each and when they compared notes they agreed that they only had to top the boiler up every six laps or so. Gilling is 440 yards round so that means it was travelling about 1.5 miles before the boiler needed a bit



560

Fig 113

Cross section of boiler.

Fig 114

Front tube plate.

(snifting valve) can be just plugged into the top of it with an 'O'-ring seal. The whole of the boiler plates are 3mm or 1/8 inch copper. The superheater flues are all 3/4 outside diameter x 18swg and the boiler tubes are 1/2 inch diameter. You will see a photo of mine (next time) which shows my 4MT which has the eight flue tubes in the boiler so that is what you can expect from me. Katy at the Steam Workshop emailed the other day to say that they had just received a new stock of the elements for my superheaters.

I have taken the liberty of fitting three stays inside each side of the fire box in case you wish to fit a brick arch in there. However, this will need a bit of thinking about as the fire box is more than twice the width of the fire hole door so even if you were to make it in two pieces, I don't know how you would get it in there! I just think it would be advisable to make it in three pieces as that would still be very awkward to get it in there without fitting it whilst the boiler is upside down.

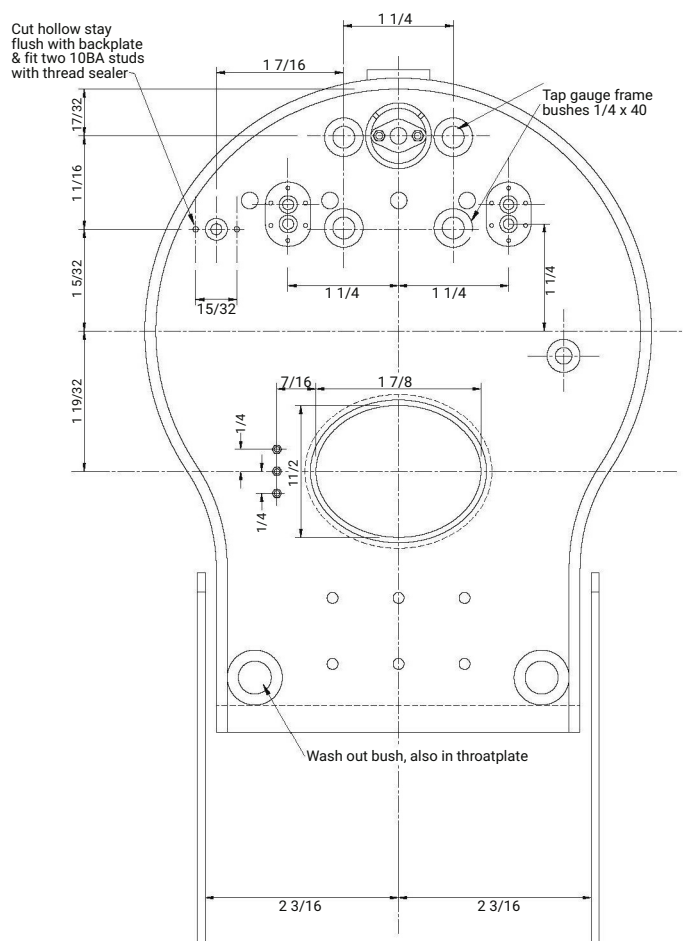
One thing that I always feel is essential is a fusible plug and that is fitted in the firebox crown. They should have a loose rivet fitted in it and be fixed with soft solder. If you are fitting the rocking fire grate you should be able to get to that with no problem. If you are not fitting the rocking fire grate you will have to make a hole in the bottom of the ash pan so that you can get a box spanner to the plug and fit a little stainless steel cover over it as you will need to ensure that the ash pan is airtight so that you can work it with the damper control rod. I have also silver soldered a half liner in the fire hole door opening in case you would like to fit a baffle plate into the fire hole opening. To fit this all you need do is to make sure that the baffle plate is a good fit and it should just clip into the fire hole.

If you are used to building boilers all well and good but, if not, I would give this a bit of serious thought. If you are thinking of building your own boiler you will need a gas torch, a pickle bath, lots

of a top up (if my calculations are correct!). Even if it were half of that I would have been over the moon!

There is 126 feet of superheater element in my boiler and I am hoping that you will do the same too. I have used two rows of four elements in the boiler, the top row of which is doubled back on itself over the fire making them radiant. The backplate of the boiler now slopes inwards as it should, and so does the firebox throatplate. I have used a slightly smaller diameter tube for the barrel so that a decent amount of lagging can be used without affecting the overall diameter.

The superheater header is similar to mine although a skim needs taking off the top so that the anti-vacuum valve

Fig 115**Backplate.**

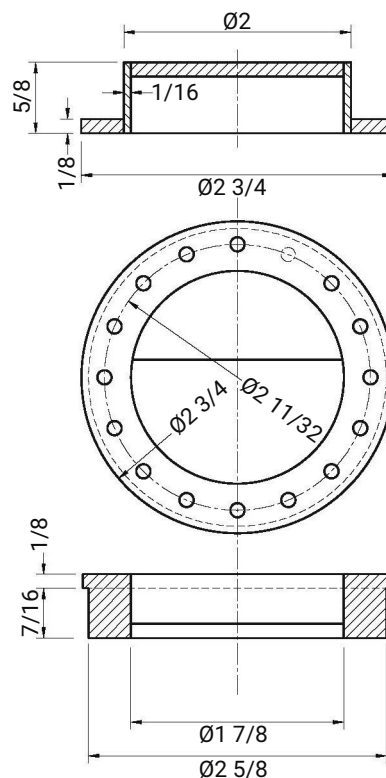
of silver solder, a good hose pipe for washing down your boiler, some blacksmith's sturdy tongs, some stout leather gloves, preferably a good apron and I would not attempt it without some help from a good mate who will pick the silver solder up just when you need it! Together we have built numerous boilers, so it becomes easy then. However, we have also had our little disasters and that can get quite expensive were it not for another mate who was a model engineering scrap dealer and supplied us (at one time) with all the copper sheet that we all needed.

There are a few little jobs which you need to do before you can tackle the silver soldering. One thing you could do is to make the inner dome cover so that you can seal the top for boiler testing. You will also need make the dome cover bush and also the regulator bush. The rest of the

boiler can be plugged up with screwed bushes.

Now, I still haven't had anyone come forward with a drawing of the 'proper' vacuum brake ejector yet. I have had several Gresham and Craven 'SJ' vacuum brake valves offered to me but they all appear to push backwards for 'brake on' but I need to see a general arrangement of one which pulls forwards for brake 'on' so that I can describe the thing for you chaps. Can anyone please help! I have got Chris Kelly at Grosmont Shed looking out for me as they have three locomotives based on the North York Moors Railway, all of which have the proper 'SJ' ejector on them, apart from the B1 which has now left the NYRM.

Photograph 207 shows B1 61296 on York turntable just outside the shed where Geoff Bird was Shedmaster until he retired and at the same time it became the National Railway

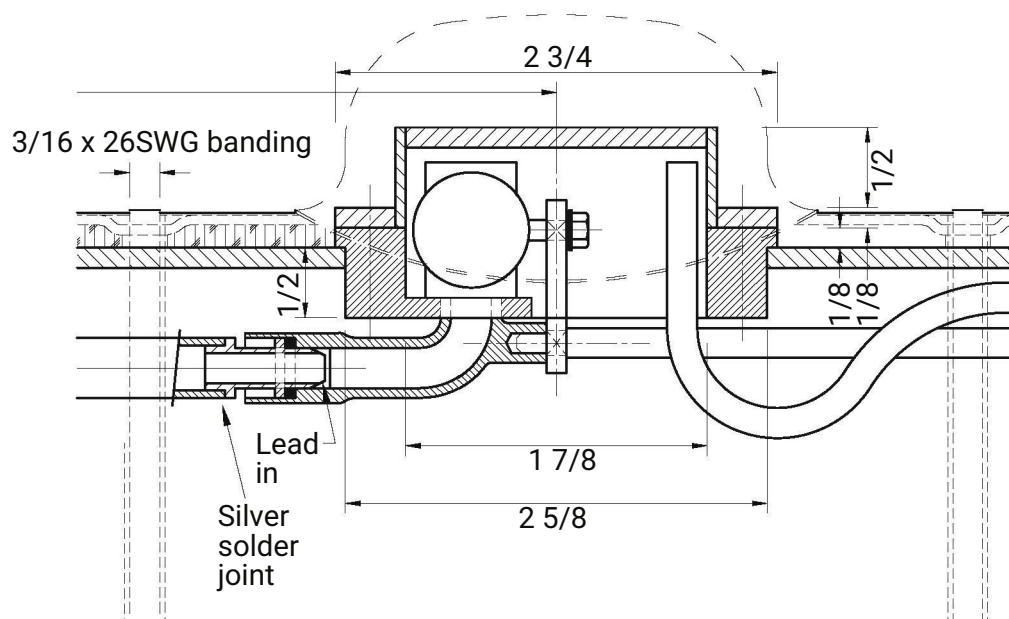
Fig 116**Dome bush and cover.**

207



B1 61296 on York turntable (photo by Rail Online).

Fig 117



Inner dome.

208



A very clean B1 61135 with neat riveting (photo by R.C. Riley).

209



Another clean B1 61310 with no visible rivets.

Museum. **Photograph 208** is a nice clean B1 for you to look at and it has nice rows of rivets around both ends of the smokebox and on the

buffer beam. **Photograph 209** is another nice clean B1 but note on this one there are no rivets at either end of the smoke box, and neither are

there any on the buffer beam. It has one of the larger doors and is in BR livery.

● To be continued

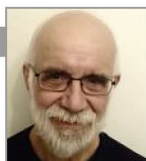
NEXT TIME

We make the superheaters.

Radial Valve Gears Again

PART 11 – MORTON'S VALVE GEAR

Duncan Webster sheds light on what is often seen as a complex subject.



Continued from p.527
M.E.4727 October 6

I set out to model this gear as an exercise to learn Python, with the essential help of the chap who writes on the *Model Engineer* forum as Silly Old Duffer. Let me assure you he is anything but silly or a duffer, whether he is old depends on your definition.

I first came across this gear in a series of articles by K.N. Harris ([ref 18](#)), and then again when I came across an I.Loco.E. paper ([ref 19](#)). Permission to reproduce figure 1 from this paper has been granted by the I.Mech.E. Probably because I'm so used to valve gears where point *h* runs up and down a curved slide my first thoughts were that this drawing was wrong but that was erroneous.

Figure 57 is extracted from the I.Loco.E paper and **fig 58** is just a redraw with pins identified to aid identification.

Fig 57

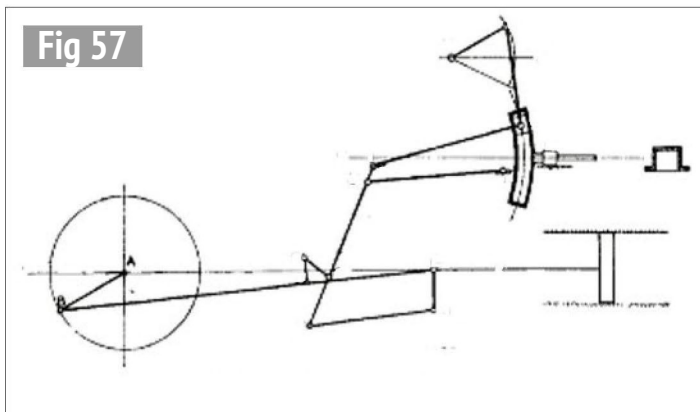


Figure 1 from ref 19 (Institute of Locomotive Engineers).

Small red circles are fixed points. The curved member is attached rigidly to the valve rod, which is constrained in bearings to move horizontally.

How does it work? Way back in part 7 (M.E.4724 August 25), I introduced the concept of a straight-line motion to correct for the angularity of *gh*. In this case it is easier to

imagine the connecting rod (and hence points *d1* and *f*) being constrained to move in a straight line. What we want is that point *h* stays at the same height as *j* and does not rise or fall. Links *d1e* and *fg* combined with *gh* constitute a Scott Russell straight line motion and link *d1e* lifts *gh* at the extremes of stroke to correct the

Fig 58

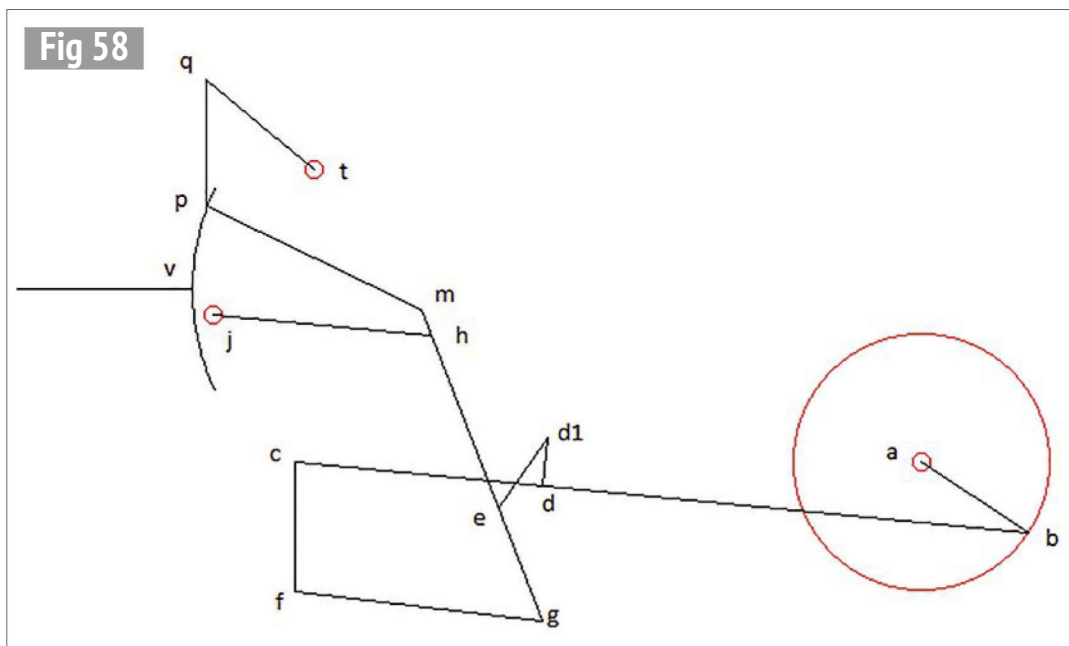


Figure 57 redrawn for clarity and annotated.

[illegible]

angularity of gh . The next thing is to calculate their lengths. The main dimensions of the gear are taken from the LYR example in part 7.

K.N. Harris recommended no more than 25 degrees for α , and as $d1e$ is effectively lifting point e , I decided that β should not exceed 45 degrees. If we now move the connecting rod so that gh is vertical, the height of h is

$$ab = 1.5101$$

This value of ab should be the half stroke, which in my case is 13 inches, so simply multiply the above values of $d1e$ and eh to get $d1e = 1 * 13/1.5101 = 8.6086$ and $eh = 2.1492 * 13/1.51 = 18.5018$.

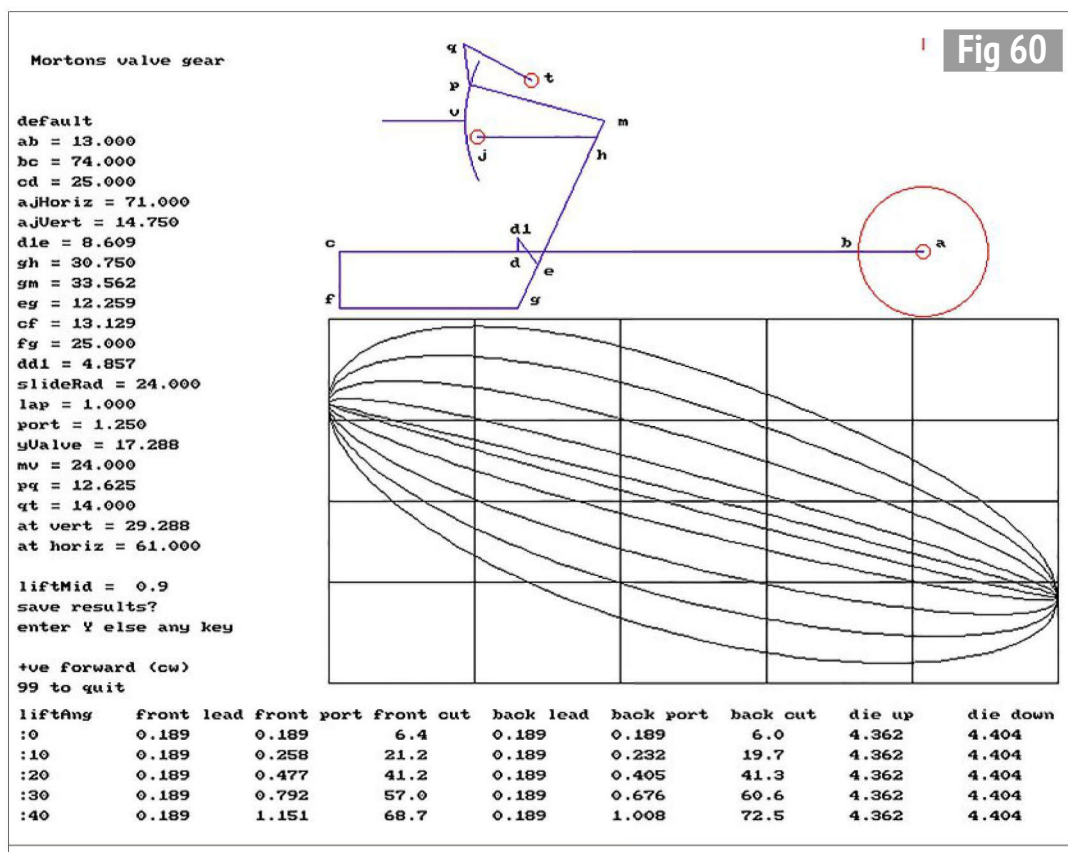
Length gh is $13/\sin(25) = 30.7606$.

If you then set point *d1* on the connecting rod centre line, you will probably find that point *m* (top of the vibrating lever) is well below the valve spindle

centre line, so it is set above as shown and some more sums are needed. In my case the lap + lead is $(1 + 0.1875)$ so $mh = 1.1875 / \sin(25) = 2.8125$ inches (in round fractions). The valve spindle is 17.25 inches above the cylinder axis, so the ideal height for j the slide axis is $17.25 - 2.8125 * \cos(25) = 14.701$ inches - call it 14.75 inches. Now it will be seen that $dd1$ is $14.75 - eh * \cos(25) + d1e * \cos(35) = 8.609$ inches, and some similar trigonometry gives cf (the drop arm connected to the cross head) as 13.129 inches. Points $d1$, j and f may be moved up and down at will. These values give a point m level with v , which is desirable but not essential. To make all this a bit less tiresome I wrote a simple program but a spreadsheet would be equally useful.

Having sorted out the drive to point m , it will be seen that if p were held on v by the lifting link pq , vertical (outphase) movement of m would have very little effect on the horizontal movement of v , but if p is moved away from v , vertical movement of m starts to move the curved member horizontally, but as shown in fig 58, upwards motion would produce more travel than downwards - more on this later. As pq swings to and fro it imparts a small vertical motion to p , and so there is some small die slip. My first attempt had point q at midgear vertically above the mid travel of v . This seemed reasonable but when qt is rotated to lift mp , point q moves so that it is no longer above the mid travel of v , and in any case it should be over the mid travel of p , and so pq is not swinging equally each side of vertical, giving more dieslip and some distortion. The values now in **figs 60 and 61** have qt slightly longer to compensate, but not optimised. This would not be difficult, but is anyone *really* going to build this in the flesh?

Having gone through all this how good are the results? The answer is 'not at all bad', despite my reservations on distortion. I took dimensions



566

for *mp* and *jh* by scaling fig 57 - note that *mp* is slightly longer than *jh*. The position of *t* is an educated guess. I have no doubt that these dimensions could be fine-tuned to get still better results.

Version 2, JMG gear

K.N. Harris introduced Joy/Morton/Greenly gear in his article (ref 18), so I decided to model that as well. I have not included the straight slide/offset top joint but instead I have a link *hp*, pivoted at *p* to a curved member. The centre of this curved member is coincident with the position of *h* on front and back centres. Point *p* can be moved along this member to change cut off but does not then move - no die slip. The curved member could equally be another link pivoted at *j*. The nomenclature 'slide' is a carryover from earlier programs - in this case it is the angle between *hp* and horizontal at front and back centres. Again, results are quite good (fig 62).

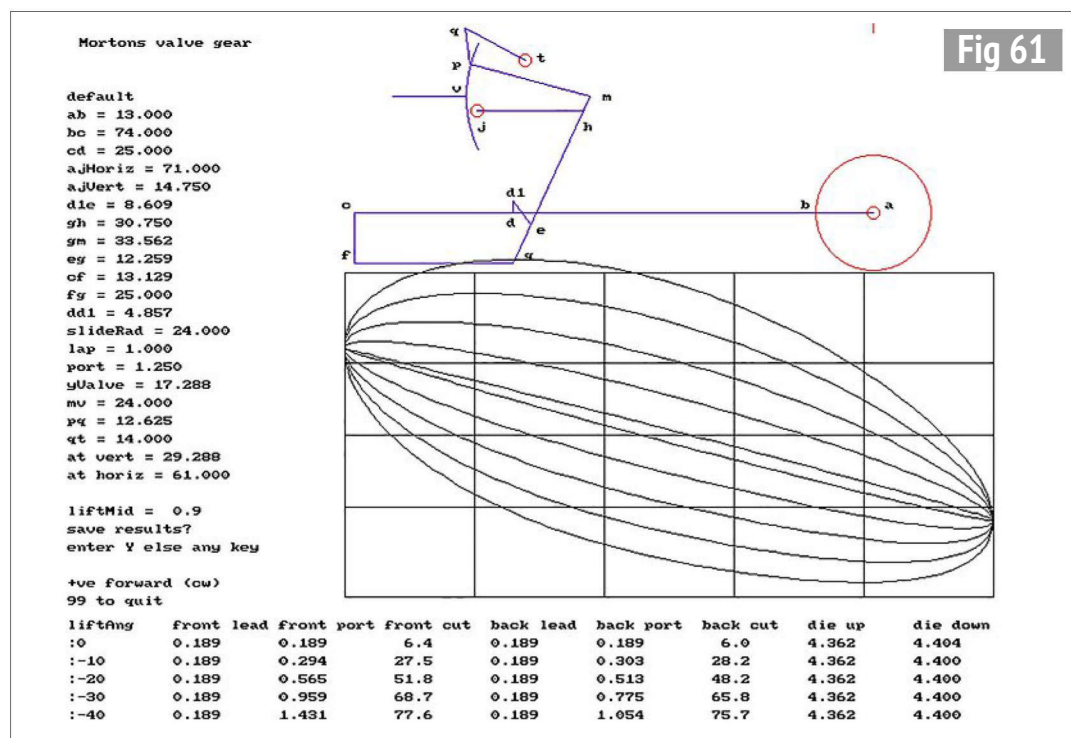
Would I fit it to a model locomotive? Well, I did have a quick look for my current project but to get a balanced set up you need to have two links *d1e*, one each side of the connecting rod and then a tuning fork shaped *gh*, so it all gets a bit wide and would have collided with the coupling rods. This doesn't apply to inside cylinders, or indeed to a stationary engine, but that long drop arm *cf* doesn't look too good either. Shields says the gear was primarily used on small locomotives but was tried on the North British and Great Eastern Railways. As the patent is dated 1882, these probably had inside cylinders. I have failed miserably to find a photograph of a locomotive fitted with this gear.

Finale

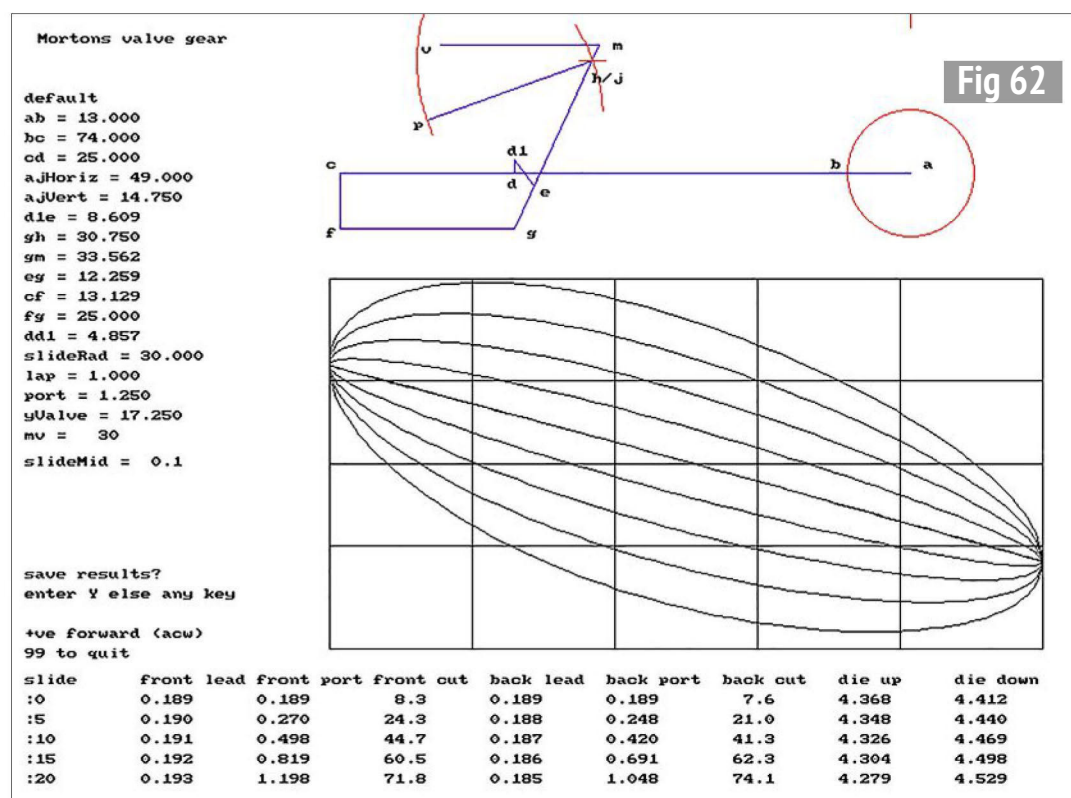
I think this makes seven valve gears in this series and enough is enough! With the exception of Hackworth they can all produce good events.

Which is best?

Well, horses for courses but, as the reason for the correcting



Morton's valve gear - reverse gear.



Joy/Morton/Greenly gear forwards.

linkages is to eliminate the error caused by vibrating lever angularity, it is worth noting that Joy gear reduces this at source by reducing the fore and aft travel of the bottom of the vibrating lever and then deals with the residual error. Heywood's claim for his gear was that nothing went closer

to the rails than the big end of the connecting rod, which is important in locomotives with small wheels.

Next, we will move to the Walschaert's type gears.

●To be continued

REFERENCES

Ref 18. K.N. Harris, *Model Engineer*, starting 7 January 1972.

Ref 19. *The Evolution of Locomotive Valve Gears*, T.H. Shields, *Journal of the I.Loco.E*, November

Book Review

Great Western Castle Class 4-6-0 Locomotives 1923-1959

David Maidment
and Bob Meanley

Great Western Castle Class 4-6-0 Locomotives - the Final Years 1960-1965

David Maidment

Published by Pen and Sword
Transport 2022
(www.pen-and-sword.co.uk)
ISBN 978-1-39909-530-3
£40, 307pp, hardback
ISBN 978-1-39909-534-1
£30, 180pp, hardback

One of my happiest railway memories remains going on the footplate of 7029 *Clun Castle* when it was in steam at Gloucester shed. My brothers were with me and, unusually, my mother. The fireman proudly showed us the workings and the enormous firebox. It was vast with an area of 29 square feet area (2.7 square metres), heavy work for a fireman to keep going.

Although I saw *Castles* occasionally at Hereford, Worcester and Gloucester sheds had the nearest allocations. At that time *Clun Castle* was polished up for steam farewell rail tours and was withdrawn at the end of 1965, one of eight preserved.

Both authors have personal experience of the class. David Maidment's came through trainspotting, working at Old Oak Common shed where he maintained locomotive record cards and then as a British Rail management trainee where he enjoyed many cab rides,

often firing where no doubt the fireman was glad of a willing volunteer. Bob Meanley was in charge of Tyseley Locomotive Works where he oversaw the maintenance and restoration of ex-GWR locomotives.

This four-cylinder class originated in 1923 as rebuilds of the *Star* class carried out during C.B. Collet's time in charge at Swindon but most were new builds and construction continued up to 1950. *Castle class 4-6-0 locomotives 1923-1959* has a list of all the locomotives, their shed allocations and details of modifications like double chimneys, plus an explanation of where the castles after which they were named are located. (Some were insignificant and the Great Western scraped a few barrels; whilst Ludlow castle remains a proud structure Lyonshall castle is just a few broken walls!)

Castles could perform excellent work. In 1939 4068 *Builth Castle* became the first GWR locomotive to achieve an authenticated 100mph, albeit downhill on Honeybourne bank. Other locomotives later matched that achievement.

More significant was their work on the *Cheltenham Flyer* where they sustained high speeds from Swindon through the Thames Valley. In 1932 *Tregenna Castle* managed the 77.25 miles from Swindon to

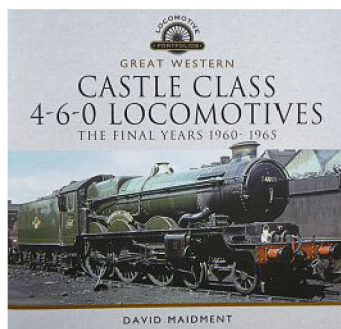
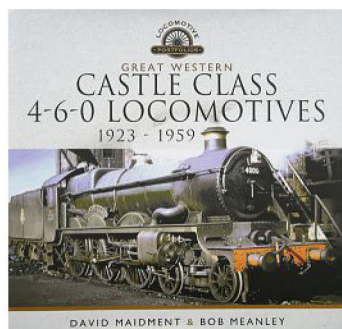
Paddington start to stop in just under 57 minutes, an average speed of 81.68mph. Post War the *Bristolian*, usually *Castle* hauled, was the crack service, not only on the Western Region but on British Railways.

One of my complaints about this series is that engineering detail is often lacking. Thankfully this has now been remedied in *Castle class 4-6-0 locomotives 1923-1959* with an excellent chapter about the design by Bob Meanley. There are works drawings and considerable detail plus pictures of the some of the models available. I heartily recommend *Castle class 4-6-0 locomotives 1923-1959* for its detail.

David Maidment's account of the final years of the class is more like others in the *Locomotive Portfolios* series. Copiously illustrated, plenty of personal reminiscences plus appendices with details of locomotives, shed allocations and some logs of notable runs. Although an attractive book it gives little engineering detail and nothing helping would-be modellers. But for the many who loved the class, as did the author who recalls them as his favourite, this is also a book to buy.

Royalties go to that excellent charity founded by David Maidment *The Railway Children*.

Roger Backhouse



The Stationary Steam Engine

PART 51 – THE TREVITHICK DYNASTY

Ron Fitzgerald takes a look at the history and development of the stationary steam engine.

Continued from p.404,
M.E. 4725, September 8

In the search for a more flexible, beam-free steam engine the name of Richard Trevithick stands pre-eminent. Like Murray, he was prepared to defy Boulton and Watt through his attempt to produce a viable alternative to their machine but he was more radical, rejecting Watt's doctrinal position on higher steam pressures. Trevithick diverted the development of the steam engine into an entirely new direction with results that were profoundly consequential both for its mechanical progress but also for the emerging physics of the heat engine.

Trevithick's achievement has become submerged in the partisanship of the heroes and villains school of history. At the root lies his son Francis's biography of his father which has remained the primary source for subsequent accounts of his career (ref 267).

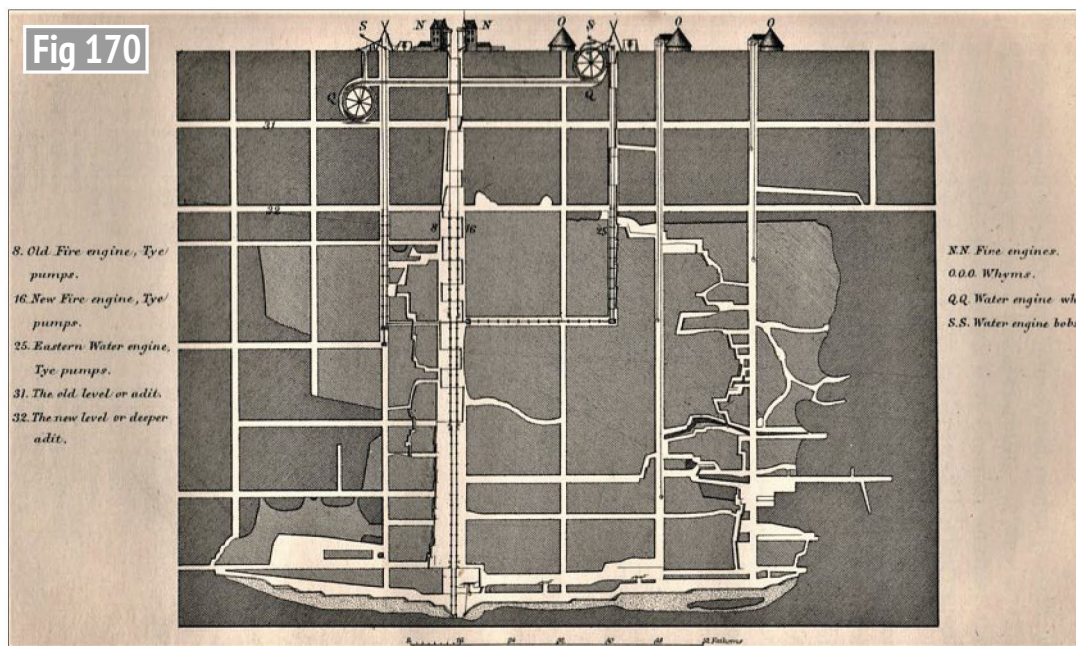
In a century that produced numerous engineering hagiographies, Francis Trevithick's *Life of Richard Trevithick* must rank amongst the most extreme. Born in 1812, Francis was the third of Richard Trevithick's four sons and the only one to attain any eminence in the world of engineering. His father was absent in South America between 1816 and 1827 so that Francis was fifteen years old before he knew him. In spite of atrocious paternal neglect, the boy clearly idolised the father and after Richard's death Francis increasingly came to believe that his father's work was unjustly neglected

(debatable even at the time). He seems to have begun to compile his *Life of Richard Trevithick* after Sir Robert Peel made some comments at a public meeting in 1846 lauding George Stephenson as the inventor of the steam locomotive in Stephenson's presence. Stephenson accepted these accolades without reference to the debt he owed to Trevithick, which aroused the ire of Francis who was in the audience. The great contractor, Thomas Brassey, restrained him from challenging the statements from the floor of the meeting and instead urged him to write down his version of events (ref 268) which occupied Francis for the next twenty-eight years. The result, the *Life of Richard Trevithick, Inventor of the Locomotive Engine*, is an eight-hundred page work of filial piety, tendentious, misleading and sometimes fictitious. Its most egregious sin is the book's woefully bad organisation, as Pendred wrote in 1921, Francis Trevithick had: *...collected a great deal of matter - much of it is very valuable - but ... presented it in way that is the despair of the reader* (ref 269).

The *Life* draws upon Francis's own memories but the main part of the book is the result of undeniably diligent research in the course of which he consulted and reproduced many documents, some of which have now disappeared. He also took affidavits from people who had worked with his father. The value that

attaches to these memorials is that he did not confine himself to 'genteel' sources but interviewed artisans who had been responsible for building his father's engineering creations. Notwithstanding its chaotic arrangement, the book remains the principal source for virtually all subsequent histories of both Francis's father and for his grandfather, also called Richard.

The father of the better-known Richard Trevithick was born in 1735. Francis Trevithick states that by 1765 Richard Trevithick Senior had risen to the position of mineral agent for Lord Dedunstanville and Basset and was managing mines including Dolcoath and the adjoining Pool mine (later known as North Wheal Crofty), Wheal Chance, (later Roskear), Wheal Treasury, Eastern Stray Park at £2 per month per mine. This has been questioned by Professor Harris (ref 270). Harris examined the Trehidy estate papers including the payments books and showed that there was no record of payments to Richard Trevithick senior until December 1775 when he received an initial £1/10/-. Until August 1777, Roger Vivian headed the payroll with £2/10/- per month whereas Trevithick senior received only 15/- per month. It is reasonable to assume that in terms of the Trehidy hierarchy Trevithick acted under Vivian for a period of two years commencing in December 1775. After August 1777, he had risen to head the payroll with £2. Vivian was no longer



Dolcoath Mine, the Bullan Garden workings. Trevithick's New Adit (drainage level) is marked 32 on the section. Mineralogia Cornubiensis - A Treatise on Minerals and Mining in Cornwall, W. Pryce, 1778.

paid on a monthly basis but still countersigned the accounts.

If Trevithick senior's rise to the position of senior manager of the Deduntandville mines should be dated twelve years later than Francis Trevithick supposes, he was nevertheless sufficiently established in 1765 to submit a proposal for working part of the Dolcoath lode as, on the 19th August of that year, he applied for: *...a sett of North Entral Lode in Entral Tenement viz: 100 fathoms at the Western Extent for 21 years and the rest of the loade for 7 years with 10 fathoms on each side thereof and leave to drive in the deep adit from Brea...*

It can be assumed that Trevithick was either the Captain (manager) or engineer for a group of Adventurers, the usual partnership that contracted for working the copper mines of Cornwall. The reply was deferred to September when the Memorandum Book records:

...Mr. Basset thinks it will be expedient on behalf of and at the expense of future Adventurers in Dolcoath to drive the end from Bullan Garden eastwards on the course of the lode at the level of Cook's Kitchen deep adit and to sink a shaft at a convenient distance between the said end of the

Eastern extent of Dolcoath sett to the level and at that level to drive two ends East and West on the course of the lode for bringing the said Cook's Kitchen deep adit with due levels more speedily into Bullen Gardens (fig 170).

Notwithstanding Francis Trevithick's confused chronology, the fact remains that Trevithick senior was accepted as one of the leading Cornish mine Captains by the time he had reached middle age. Davies Giddy (Davies Gilbert following marriage to an heiress) was intimately involved with the Trevithick family over many years. He wrote in 1839 (ref 271):

...(Richard Trevithick, Senior) was the chief manager of Dolcoath mine, and he bore the reputation of being the best informed and most skilful captain in all the western mines; for as broad a line of distinction was then made between the eastern and western mines (the Gwennap and the Cambourne mines) as between those of different nations...

In the seventeen-eighties Trevithick Senior was responsible for introducing into Dolcoath Mine the German mining technique of breaking the rock down from overhead rather than from underfoot, leaving the drainage and

haulage ways undisturbed, subsequently standard practice in Cornish mining.

In his *Life* Francis Trevithick gives this account of his grandfather's involvement with steam engines at Dolcoath:

...When Trevithick (Senior) was appointed Captain of Dolcoath the main engine was a 63 inch. In 1775 Trevithick supplemented this machine by removing the old Carloose 45 inch cylinder Newcomen engine to Dolcoath where it became known as the Dolcoath New or Bullen Garden Engine. The cylinder and the working beam with its chain gear of the old Carloose engine were retained but the valve gear and valves were rearranged to facilitate operation. The greatest improvement involved the boiler which originally had a flat top weighted down by granite slabs. Trevithick removed the cylinder from its previous position over the boiler and gave the boiler a domed top.

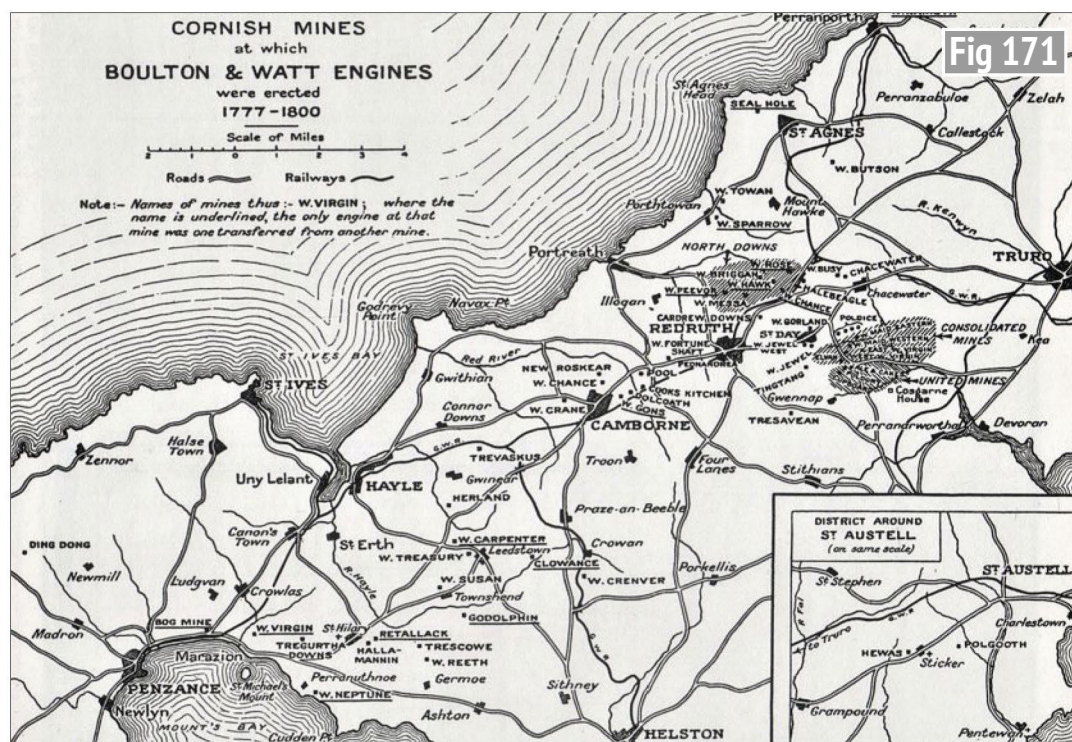
In 1976 K.H. Rogers published his book on the Newcomen Engines of the South-West (ref 272) which provides more detail concerning the situation at Dolcoath immediately before Trevithick senior installed the Carloose 45 inch engine. Rogers drew upon the Thomas Goldney account book which

Goldney kept as a record of his agency for the Coalbrookdale Ironworks, virtually the exclusive supplier of cylinders, engine components and much of the iron pumping equipment to the Cornish mines over the Newcomen engine period. Most of this ironwork passed through Goldney's hands.

Prior to the mid-seventeen-sixties Dolcoath had two engines, both of which used Coalbrookdale parts, a 40 inch diameter cylinder machine dating from 1746 and a 54 inch machine erected in 1753. The earlier engine could have been built by John Jones and Co., described as engineers of Bristol. The second engine is ascribed, more reliably, to John Wise, a well-known Cornish engineer of that date. These engines were located on an older shaft at Dolcoath whereas the Goldney accounts in 1768 refer to *Dolcoath New Mine* which is likely to have been the Bullan Garden working noted above in connection with Trevithick senior's proposed venture. The 1768 Coalbrookdale entry relates to the supply of a 63 inch cylinder, 10 feet in length with cylinder bottom, a piston, and various cast iron pipes. This consignment cost £257 and subsequently £560 was paid for additional pump work including a working barrel and 63 pit barrels (riser pipes). The engineers for the installation were almost certainly John Wise and John Budge, both extremely accomplished engine builders. This 63 inch Newcomen engine is mentioned by Watt as: *...Bouge's (Budge's) with open topped cylinder.*

Rogers thus establishes that the third engine, the 63 inch, was erected in 1768 and that John Wise and John Budge should be credited with its erection.

The engine removed from the Carloose Mine to Dolcoath in 1775 was to work the same Bullen Garden shaft as the 63 inch. Such double engine working of a single shaft was known as Shammalling in Cornish mining terms and this



The Cornish mining districts showing distribution of Boulton and Watt engines in 1800. James Watt and the Steam Engine, Dickinson and Jenkins.

second engine for the Bullen Garden shaft subsequently became known as the Shammall engine. It was a partial rebuild based upon the cylinder assembly and boiler parts from Carloose for which £414/12/3 was paid. John Commins received £93/8/9 ... for the boiler top etc., per bill... Other payments included £131 to Coalbrookdale Ironworks for pumps and £139 to John Jones and Co., of Bristol for pumps

and gudgeons. The total cost was about £2000.

This 45 inch Shammall engine, which in the above quotation Francis Trevithick claims for his grandfather, Harris attributes to John Budge who was paid £63 for erecting it. As noted above Richard Trevithick senior was not included in the mine payroll until December 1775 and his rank remained well below that of Roger Vivian until August

1777. It is not impossible that Trevithick may have played a part in the rebuild of the Carloose engine but Budge must be assumed to have been the leading figure. Budge was acknowledged by Watt to be the leading Cornish engine builder of that period and notwithstanding Watt Junior's derogatory comments with regard to his engines it was the coal consumption of the latter's Wheal Chance engine that formed the basis upon which Boulton and Watt's Cornish premiums were first calculated.

Trevithick senior's role in the story of the Newcomen engine's later years in Cornwall was almost certainly less significant than that of the three Johns, Budge, Wise and Nancarrow, and more important still, Jonathan Hornblower, whose family name had been attached to the Newcomen engine since its earliest days. The Hornblowers were responsible for more Cornish engines than any other builder and it was Jonathan who had ordered the pioneering Boulton and Watt engine for Ting Tang Mine, thereafter playing a key role in securing the success of the Watt engine in Cornwall (fig 171).

Three years after the Shammell engine was built at Dolcoath, Budge erected at Wheal Virgin, the last Newcomen engine to be built in Cornwall. The subsequent progress of the Watt engine in the county has been dealt with in an earlier article in this series. The first two Boulton and Watt engines at Ting Tang Mine and Wheal Busy Mine were at work by January 1778 and the epoch-making replacement of Smeaton's Chacewater engine was under way. By 1780 there were eleven Boulton and Watt engines at work in the copper mines and the Soho firm was about to enter into the largest single contract up to this date: five engines for the Consolidated Mines Company, formed in 1782 when Wheal Virgin, East Wheal Virgin, Wheal Maid, and Carharrack were amalgamated. The five Boulton and Watt engines at Consolidated replaced seven Newcomen engines.

James Watt's early encounter with Trevithick senior has been remarked upon previously when Trevithick, visiting Soho, had attempted to steal a drawing of the Boulton and Watt engine. Watt had little love for the Cornish mine engineers generally but reserved a particular odium for Trevithick senior, who he characterised as ...*impudent, ignorant and overbearing*...

Trevithick reciprocated this hostility but he was forced to acknowledge the superiority of the Watt engine and in 1783 Soho delivered a 63 inch cylinder machine to Dolcoath, then under Trevithick's charge. The engine was erected near to Budge's two on the Bullen Garden shaft. Trevithick senior subsequently ordered Watt engines for Wheal Treasury and Wheal Chance.

● To be continued.

REFERENCES

- Ref 267** *Life of Richard Trevithick, Inventor of the Locomotive Engine*, Francis Trevithick, C. E. Pub. E. and F. N. Spon London 1872.
- Ref 268** *Life*. Op. cit. Vol I, p.203.
- Ref 269** *The Mystery of Trevithick's London Locomotives*, L. St. L. Pendred. T.N.S. Vol. I 1920-21. Pendred and his father before him owned and edited *The Engineer* and it is clear that the father knew Francis Trevithick at the time that the book was being touted for publication. When the manuscript was offered to Bennett Woodcroft (a noted engineer and head of the Patent Office) for comment he advised the need for an editor who would have excised the many repetitions probably cutting its length by half. Francis Trevithick rejected this advice.
- Ref 270** *Engineering in Cornwall before 1775*, T.R. Harris, T.N.S. Vol. XXV, 1945-7, p. 111
- Ref 271** Letter from Gilbert April 29 1839 to J.S. Enys.
- Ref 272** *The Newcomen Engines of the West of England*, K. H. Rogers, Moonraker Press, 1976.

NEXT TIME

We look at the early career of Richard Trevithick II and Edward Bull.

Isle of Man Motor Museum

**Geoff
Theasby**

shares with
us the latest additions to
his photo album.



Aston Martin Lagonda; my favourite car, ever!



Facel Vega Excellence 1959. No B post meant that if you opened both doors on the same side, the body sagged and you couldn't close them again - mentioned by novelist Gavin Lyall in The Most Dangerous Game.

This collection, located at Jurby, in the north of the Island, is the property of Mr. Cunningham, who was present when we visited. He has amassed a wonderful collection of vehicles, cars and motorbikes, capable of keeping petrolheads quiet for hours. These pictures do not include the bikes, an equivalent number to the cars, since I scarcely know one from t'other, so this is really a half review, suitable for those with half a day to see it, and half a mind to stay.

There is also a collection of models, railway and stationary, unfortunately not labelled, but Mr. C. said that they were all made on the Island. There was, in addition, rolling stock and related items and a period workshop, including a Paragon lathe, which does not appear on Tony Riley's comprehensive lathes.co.uk website. I was also interested to see the collection of used magazines for sale, including *Model Engineer*.

In my electric Luggie, I could roam hither and yon for hours, whilst Debs enjoyed it too, more than she expected. I conveyed our sincere thanks to Mr. Cunningham and said we would come again. The collection is pictured as follows - each vehicle has a card nearby giving brief details about the exhibit, how it was acquired, and is written by someone with a good sense of humour.



Cutaway Talbot 90, 1948.



Not the fastest Lamborhini.



An American take on a Rolls-Royce; the ugly front is only exceeded by the hideous rear end. A Chevrolet GMC.



Yamaha YP260 - from a man with a shed...



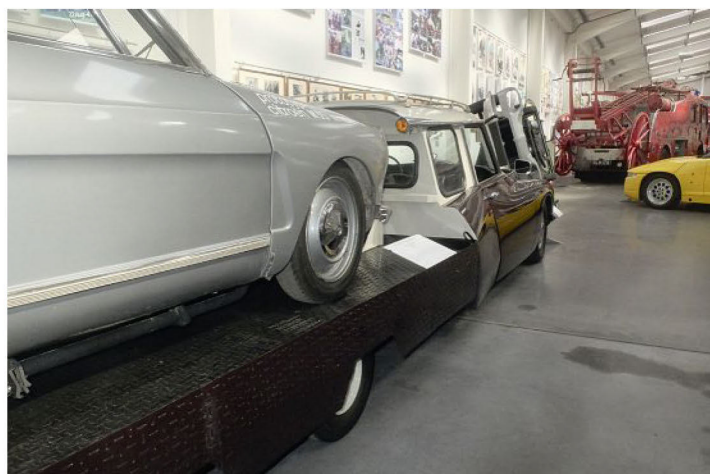
Willys Station Wagon 1953.



Stretch Checker cab.



Zagato made some beautiful cars ... and this: a Zele, 1974.



Citroen DS23 Tissier car transporter 1973.



The front half is a Lincoln Continental.



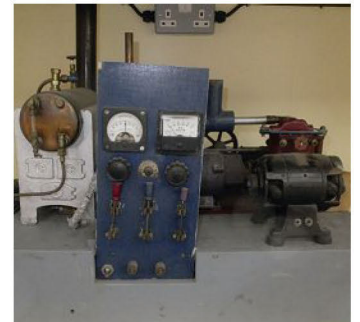
Could this be Jake Thackray's 'Grim Limousine' from Sister Josephine? 1975 Lincoln Continental (Mafia staff car...?).



Dodge La Femme 1956, aimed at female drivers, pink roof. Matching handbag, lipstick.



A charabanc, once very popular.

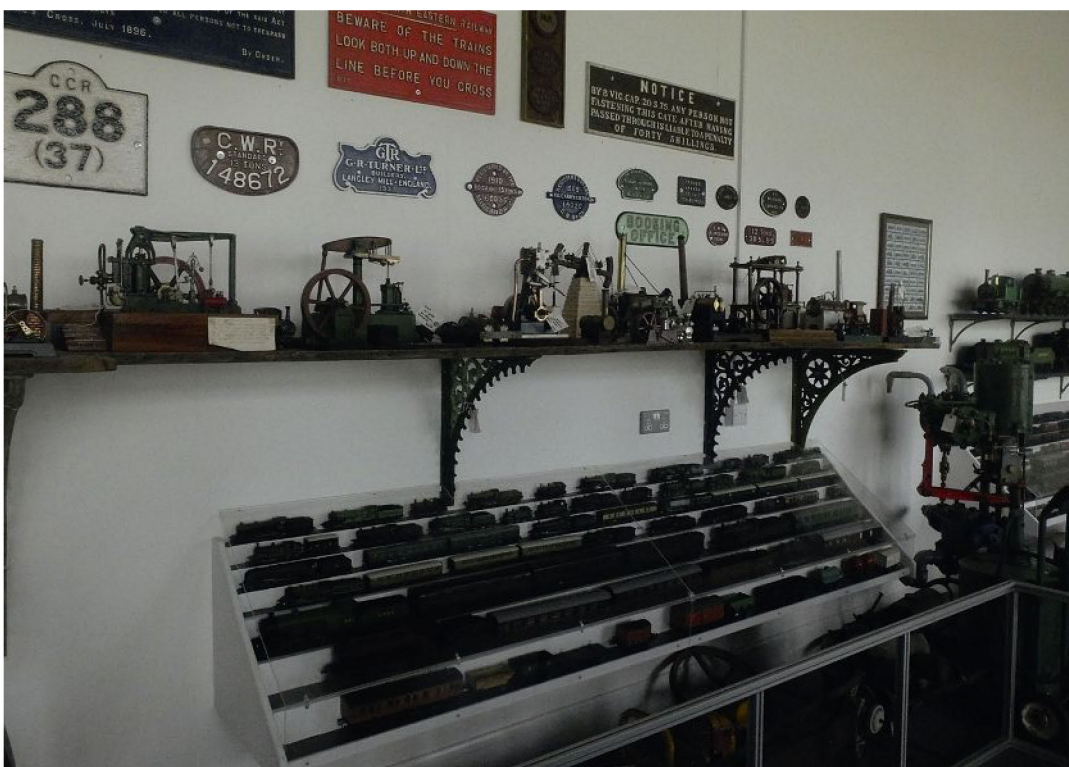


Model steam plant. Compare with the 13A sockets on the rear wall.

As in a pinball machine, I shot from one car to another, fascinated (or appalled) as I viewed the products of a very different mindset. Hearses, for instance - party vehicles or a desire to make the biggest, baddest bolide the mind can comfortably conceive. One reminded me of Jake Thackray's 'grim limousine' in Sister Josephine and others of Jessica Mitford's *The American Way of Death*. I tootled around unable to take it all in. When I found myself hurtling towards a Facel Vega, half asleep and running over the information card, I decided I had better withdraw before I wreaked unimaginable damage on some priceless artefact.

I must mention the lovely café which serves full meals and the staff were all very friendly.

I mentioned having seen the Peter Black collection in Keighley and the receptionist said she knew of it, as she lived in adjacent Bingley for a while (small world!). That collection is no longer open to the public.



Models: no details known but Mr. C. said all were made on the Isle of Man.

ME

A New Workshop

PART 5

Peter Seymour-Howell

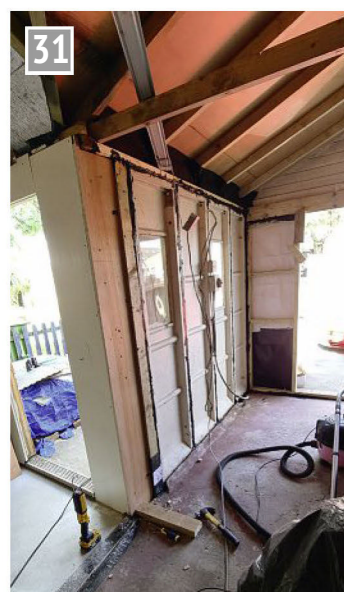
builds a new workshop before continuing work on *Flying Scotsman*



Continued from p.325
M.E.4724 August 25

With the new section now at an advanced stage I turned my attention to the original garage structure. This of course meant moving everything around again but I'm getting a dab hand at that now with the advantage that with each new section I have less to move as some of the gear finds its home. As before the top of the wall where it meets the timber roof frame is sealed with a waterproof membrane and also bonded with the industrial mastic which keeps out the draughts.

In **photo 31**, you can see the black membrane and also the mastic doing its job between the panels and also along the top between the panel and roof support. The corner has now been clad with 18mm ply and once the wall is also clad the timber connecting post (new to old) will also be hidden. The old RCD unit seen here will be disposed of for a new consumer unit. Luckily the garage was already supplied by proper underground armour cable which saves a lot of



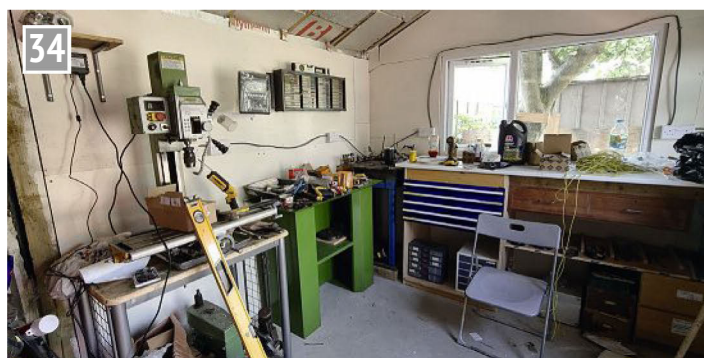
The wall sections are well sealed before panelling.



The first section of panelling is complete.



The new consumer unit.



The mill finds a temporary home while panelling proceeds.

time, and the circuit of both the house and workshop was tested as fit for purpose. This area is planned not to have a bench as it will be used for any freestanding machinery.

Photograph 32 shows the wall clad (this time in 12mm ply) and the consumer unit fitted to the wall, I boxed in the windows with 2 x 1 inch timber which will be painted later to match the wall.

Here's a close-up of the consumer unit (**photo 33**), not an expensive item, just under £70 from Screwfix. There are plenty of switches for later expansion if required, mostly for outside lighting etc. as most things will be run on the ring main. If I add a welder later I'll run a separate line appropriately rated.

Looking back to the new section (**photo 34**) we can see that some of the gear that needed moving for me to work

on the next section has now found its home, well at least for now. All wiring (currently exposed) will be sleeved in conduit when completed. The mill has now been cleaned and the DRO fitted. The mill isn't in its final resting place yet but once the panels next to it have been clad the mill will be moved over a little to give more room for the X travel and the lathe.

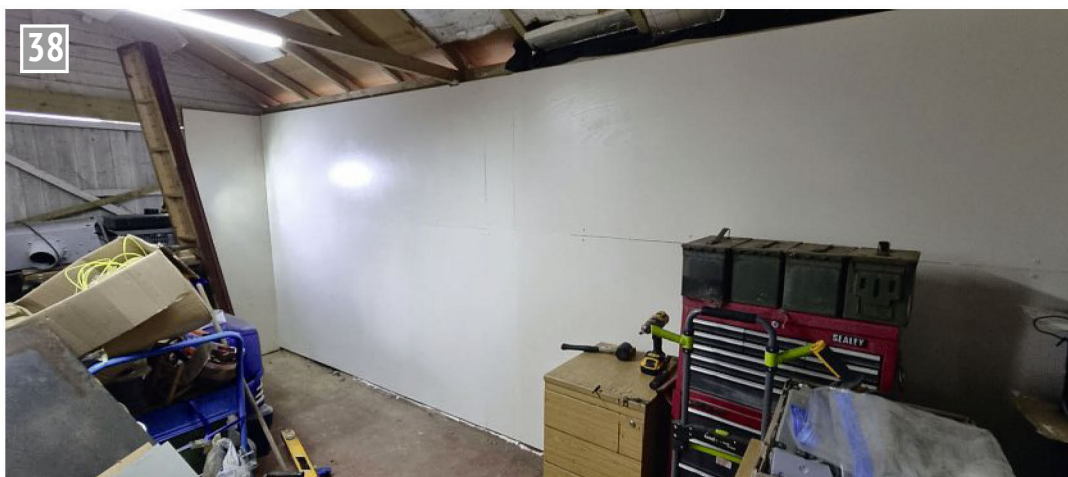
The internal panelling can now be completed and the workshop's structure is nearly there. The procedure is the same as for the other walls but this time I have made the decision to leave the floor as it is to save some time. The original garage floor is pretty level and in good shape. It does have some cracks but none too deep and I can patch these up for now (well later) using the same compound but mixing it thicker and using it as a paste/filler. The main reason for



The back of the workshop is next for panelling.



The longest wall is prepared for panelling.



All the walls are now panelled.

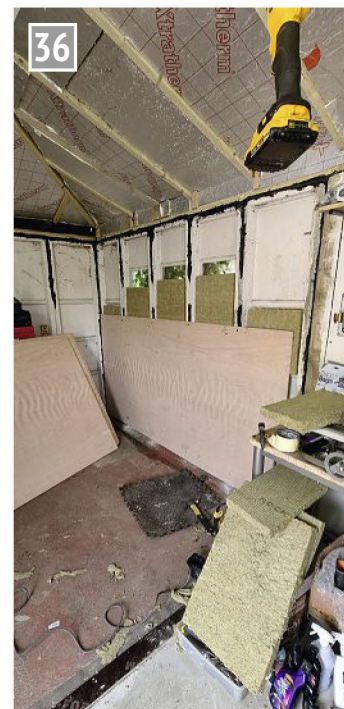
doing this is to save me from having to keep moving all that heavy gear, something that I really shouldn't be doing. The added bonus is that I can get back to *Flying Scotsman* a little sooner. I may paint the entire floor later to tidy things up.

Photograph 35 shows the next area to be panelled cleared and ready to work on. **Photograph 36** shows the

three small windows along the boundary wall being covered over - not really losing much light as the boundary fence is close to the windows. This also gives me more wall to attach things to (I may fit the TV here). This may well become the main assembly area for all model engineering work with the new section (already covered) bench/window area being used

for close detail modelling and soldering work where I'll need lots of natural light. Again, the panel seams have been sealed and the Rockwall insulation cut to fit. Also, note that the roof insulation is fitted too.

With the boundary wall completed including two coats of paint, this left just the longest (5+ metre) wall to do (**photo 37**). After once again



The three windows are blanked off to provide more wall space.

moving everything out of the way and giving the area a good clean I made a start on fitting the membrane between wall and roof. It was a bit long-winded but to keep everything inside and away from any bad weather, I fitted two 8 x 4 ply sheets first, painted and then moved what gear was left in my way to where I had just been and then panelled the final wall area (**photo 38**). Note that I have also panelled the front side wall on by the side of the door. The middle section above the door will also be covered thus sealing the doorway, once insulated with suitable draught insulation.

I have also been taking a look at what to cover the roof in for the best amount of light but not too heavy, to make life a little easier. I decided to use a white-backed hardboard and curve it at the top to help direct as much light downwards as possible. The plan is to run LED lights down the middle of the roof, filling the length of the underside of the roof. There will be a further two lights lower down directly over the main working areas. I'll be using bright daylight LED lighting and this will become clearer later.

●To be continued.

A Method of Manufacturing Piston Rings of the Clupet Style PART 1

Martin Gearing discovers how to make these rings himself.



One of the biggest problems with being involved with mechanical engineering is that there is usually more than one way of doing things correctly, depending on cost and facilities, and a great many more ways of doing them incorrectly, usually by ignorance or sometimes cost cutting. Sadly, in the short term all of the methods seem to work.

The impetus behind this article stems from what is my lifelong curse of having an intrinsic motivation to ask the question 'How on earth was that done in an earlier time with simpler, more basic tools?'. This usually means I keep returning to the subject until a result is achieved, for as long as it takes to reach an understanding of the process and prove it by actually making a good working example.

Should the object perhaps have a wider interest, the experience provides the information to enable describing how to repeat the process for others, thus allowing them to consider/make similar objects, and perhaps saving information that may soon be lost. This is becoming more important with every day that passes, because small volume production becomes increasingly uneconomic (in this country) and more people only consider 'Commercial Readymade' as a means of doing anything they see as 'practical', creating a situation where fewer people

want, can, or are able to spend time themselves even if they have the skills and access to the required facilities.

This particular quest has run in excess of forty five years as I first encountered the Clupet style piston ring in the late 1960's as an apprentice, when involved in overhauling the water end of an old reciprocating steam driven pump. This had each of the water end pistons fitted with a pair of rings made from a Tufnol like material to this style/design. Over the time that has passed since that event, I've collected any information that passed me by in the hope of actually understanding how this intriguing style of piston ring is manufactured.

Several times over the years, people I've worked with made passing comments about the use of Clupet rings, usually as a means of maintaining/restoring compression in worn internal combustion engines, as it seems they were able to cope with working in slightly tapered bores. Generally, the engines described were larger heavy-duty engines used in industrial or road haulage vehicles. Also the comment was made that unlike 'Chord' Laminated Steel Compression piston rings, popular for a few years for smaller engines (for the same reasons and supposedly better oil control), Clupet rings were less likely to wreck the bores as Chord rings had a reputation in some 're-ring' applications. They were however specified

as original fitment in some engines - indeed I've just fitted some to one of the compression grooves of the new pistons of an engine being reconditioned.

In recent years I've heard mention of Clupet rings being used in the restoration of full-size steam traction engines and the people involved stated they were their preferred choice.

Then in 2015, my wife purchased a 21 year old 5 inch gauge Simplex locomotive that, after the fitting of a new boiler, was returned to service for a year to see what, if any, further work was required, before being given a full mechanical overhaul. The piston rings were of conventional pattern and were one of the items that showed advanced signs of wear. About that time, I read an article giving the contact details of the Clupet Piston Ring and Gauge Company (ref 9, repeated 10 & 11) who, it appeared, were the sole manufacturers of Clupet rings commercially.

Because at that time I'd still not been able to discover how they were made, I thought the very reasonable cost was a small price to pay for the chance to perhaps learn by studying the machining marks, how to 'reverse engineer' them, so ordered a set for the standard 1.500 inch diameter bore and one set 0.015 inch oversize in case I had to rebore the cylinders. As luck would have it, both sizes were in stock at the time of my enquiry. ➤

Well, the rings arrived (I nearly said 'turned up!') and they were things of beauty! But the machining marks that were visible gave not the slightest inkling of how they had been created – in fact the marks looked impossible to create by any method I was familiar with – let alone able to re-create!

As it happened, because time was limited when the overhaul was done, I fitted new standard form piston rings that I had in stock, as the Clupet rings would have needed new pistons being made to accommodate their greater width.

Then, in September 2018, I happened upon an excellent video made by Simon and John of The Steam Workshop, who together went through the process that they used to manufacture Clupet style piston rings for the engines they work on, actually showing the set-ups and a mention of the proportions used for the process of manufacture (ref 1). After repeated viewings I began to understand how the machining marks had been created on my commercial rings!

The actual process was fascinating to watch - mainly because it completely turned on its head the notion that cast iron was brittle! I just had to make time and have a go at making some, if only to see if what the video had described was really possible. I can confirm that I did, and it was! Watch the video and you will see what I mean.

I'll nail my colours to the mast at the start – I had to go through multiple versions/ amendments/reviews/ attempts before the whole process actually worked to a standard I found compared with the commercial articles!

I will first cover the disasters/ failures/and nearly successful (?) results of my attempts briefly, in case anyone wanting to have a go thinks they might improve on my final suggested method by unknowingly following my path.

At this point please forgive me for being unconventional and listing all my references collected since the 70's before

my method description, rather than the end, but it will hopefully help to explain the confusion and reasons for some of my failed attempts before producing what I consider is a successful set

of Clupet rings by means of a repeatable method.

Clupet piston ring manufacturing references

In the *Comments - As related to this article* column, the

reference authors temperature recommendations for heat treatment are identified, with text highlighted **Red NOT LESS than 700 degrees centigrade** and **Green – DO NOT EXCEED 650 degrees centigrade**

Ref	Source	Comments - As related to this article
1	Steam Workshop (YouTube Video.) Clupet Ring Manufacture Sept 26 2018	The impetus behind this whole exercise, as the first time I'd seen an example of the actual production of a Clupet ring that looked possible for me to consider undertaking. (Later sources suggest temperatures given would benefit from being lower)
2	Ian Bradley ME - 22 nd Oct 1942.	Covers eccentric turned plain piston ring manufacture only, no heat treatment – (eccentric turning produces a more even wall pressure utilizing the material 'spring').
3	Michael W Smart ME - 16 th Aug, 6 th Sept 1974.	Very informative discussion of how piston rings aid sealing - but only considers PTFE ring manufacture and all that it entails.
4	Prof D H Chaddock ME – 21 st April 1967 and 2 nd July 1976.	Articles giving conventional piston ring properties required and proportions. Practical comments on manufacture. No temperature details in either article. Set out ring proportion known as the 'Chaddock Rules'.
5	John M Tollock EiM - July/ Aug? 1979.	Detailed short article covering all aspects of conventional plain piston ring manufacture – Other later sources suggest temperature advised (800 degrees centigrade) too high.
6	George Trimble – ME – 17 th Aug 1984	Article specifically on heat treatment but no details how the temperatures (circa 800 degrees centigrade) used were controlled.
7	George Trimble Strictly I.C. – Feb/Mar & June/July 1989	As the source indicates the article is directed primarily at the manufacture of piston rings for I.C. engines but contains information applicable to all types. Very detailed. Acknowledges heat treatment (circa 800 degrees centigrade) is unlikely to be carried out in 'ideal' conditions.
8	Tubal Cain (Ted Walsall) ME – 21 st Jan, 18 th Feb, 18 th Mar, 15 th April, 17 th June, 15 th July, 19 th Aug, 16 th Sept 1994.	A most comprehensive all-encompassing detailed research into commercial piston ring requirements, how this relates to the smaller sizes, with a full description of a method to heat treat the blanks in the home workshop with temperatures. A specific warning using too high a temperature (circa 800 degrees centigrade) with the reasons. Recommends circa 650 degrees centigrade. And full endorsement of the 'Chaddock Rules' with regards to proportions.
9	Tubal Cain ME July 1995	An answer to a readers problem, in which the Clupet ring is suggested as being a solution to an oversize bore.
10	Keith Wilson ME - 15 th Dec 1995.	General discussion on piston rings in general, with specific mention of considerations for installation of commercial Clupet rings.
11	Martin Wallis ME – 7 th May 1999.	Comment on the success he'd had with Clupet rings and that he'd learnt of them from Keith Wilson.
12	Neville Evans ME 23 rd July 2004	Introduction to the problems with heat treatment (550 degrees centigrade) in a home workshop and mention of his preference for Clupet rings.
13	Alan Beasley ME - 24 th April & 22 nd May 2009.	Excellent detailed article on conventional piston ring manufacture with proportion calculations, suggestions for temperatures and dealing with oxidation during heat treatment. Recommends not exceeding circa 600 degrees centigrade
14	John Dickenson ME – 22 nd Feb 2013	Manufacture using materials' inherent 'springiness' no heat treatment considered.
15	Dwight Giles MEB – Issue 28. 2013	Article concerned with IC engine oil control ring manufacture – However referred to the 'Trimble' method of heat treatment. (circa 800 degrees centigrade) Recommends circa 650 degrees centigrade.
16	Ben Crowdy ME – 27 th Nov 2015.	Piston ring (conventional) manufacture without heat treatment or hammering to provide tension.
17	Matt Jeffery – LS&OR – Nov/ Dec 2018.	Very practical article covering all dimensions and allowances required to manufacture 'standard' piston rings. Stresses not to exceed "black heat" approx. 537 - 580 degrees centigrade using simple methods.
18	Mick Collins – Scale Model Exchange - Oct 2020.	A most comprehensive article giving reference sources of information, covering all aspects for the manufacture of Plain Piston Rings in cast iron and bronze. Most importantly he highlights the common misunderstandings of using temperature too high in the heat treatment process. Recommends not exceeding circa 650 degrees centigrade. Gives workable method for heat treating.
19	John Parkin & David Fletcher – Jones both ex Wellworthy (Lymington). Nov – Oct 2020	John Parkin a metallurgist and David Fletcher – Jones Senior Project Engineer who both worked for Wellworthy Limited before its closure. Gave reasons for not exceeding circa 650 degrees centigrade.
20	(Correct as of Oct 2020) www.technicalsupermarket.com	R 14 Universal (U) – 1000C - 2 Shelves – 2016 240V - 750W Electric Muffle Kiln

After viewing the Steam Workshop video I now had an understanding of the proportions, jigs/ fixtures and sequence to physically produce a Clupet style piston ring, and so informed I had a go!

●To be continued.

We Visit the Bradford Model Engineering Society

John Arrowsmith drops in one of the oldest model engineering clubs in the world.



I had felt that visiting one of the oldest model engineering societies in the world would be quite daunting but I needn't have worried; it turned out to be a very interesting and informative day with like-minded model engineers welcoming me to their club. Northcliff Park, the home of the Bradford Model Engineering Society was bathed in warm summer sunshine when I arrived for my visit and I was soon engrossed in their working day. However, firstly I think a little about the history of the club itself would be appropriate.

The origins of the club go back to before 1908 when a small group of working men formed a model engineering club but apparently this did not continue. The reasons for its demise are not known but in 1908, a group led by a Mr. Amos Barber, who was a renowned model engineer – indeed, whose models from that time reside in the Bradford Industrial Museum to this day - formed the Society that, to this day, continues working hard and encouraging model engineers. There have been a number of notable events over the years. For example, in 1945 the club was at the forefront of the forming of the Northern Association of Model Engineers and in the late 1940s they supported a Holidays at Home project in Lister Park. Today that would be called a 'staycation' so the club was way ahead of the curve (to use a modern expression). Also in the 1940s the club's first permanent track was built at Thackley near Bradford. This was their base for about 20 years until, in 1966, they applied to the then Shipley Council for permission to relocate to Northcliff Park which is where

they can be found today. Having built a new multi-gauge track at their new site, the 7th September that year saw an amazing endurance run take place where a 5 inch gauge freelance locomotive called *Pamela* ran non stop for 60 miles round the track. Unfortunately, no other details can be given at the moment but that was no mean feat for whoever was doing the driving as well as the support crew!

In 1977 the club organised a model engineering exhibition in St George's Hall in Bradford which attracted a large number of visitors. This was followed in 1979 by the construction of a new plywood portable track which was a significant improvement on the old steel track they had been using.

The subsequent years have seen the construction of a 5 and 7¼ inch gauge ground level track which serves them well for their public open days at Northcliff. The club's Centenary year was 2008 so the year 2023 means that the club have been in existence for 115 years which makes them the fourth oldest model engineering club in the world, which is some record and one of which they are rightly proud. With a history like this you perhaps understand my trepidation in visiting such an eminent society.

Arriving at Northcliff I was met by President Jim Jennings who was busy preparing his 5 inch gauge Crampton locomotive for a run on the track (**photo 1**). This was a fine piece of model engineering and looked really good in the bright sunshine. What a great start to my visit. The whole area looked to be in excellent condition and well maintained,



Jim Jennings prepares his Crampton for a steaming.



Members busy renovating the raised track steaming bays.



The small workshop within the storage area.

but maintenance must be quite a task as the site is set over a number of different levels. Members were busy renovating the steaming bay metalwork ready for re-painting (**photo 2**). A commanding club house looks out over the raised track section; this was previously the park bandstand but now provides some fine

accommodation. It has recently been refurbished with a new kitchen and library (**photo 3**) and an extension on the rear of the building provides a good storage and workshop space (**photo 4**). The main club room is also furnished with a very nice clock (**photo 5**) built and bequeathed to them by David Brimacombe.



The unique bridge from the storage shed, fully extended and secure for access into the shed.



The revamped kitchen serving counter in the clubroom.

The difference in ground levels across the site has led to some innovative solutions to enable the 2000 feet long ground level track to be fully operational. For example, the locomotive storage for this track is located at the rear of the club house but, to give access into the building, a winch operated bridge has been built in order to provide this service (**photo 6**). It can be operated by one man and gives a safe and secure means of using the space on one side. The other side of the storage building is accessed directly from the track via a permanent bridge and an access line to the main line leads on from this bridge. Storage for the raised track stock is under the main club house (**photo 7**).

Part of the ground level track has a substantial turntable built into the ground but it is fully contained within a masonry circle and is quite



A beautifully made clock by long standing member David Brimacombe who passed away in 2017.

a major feature (**photo 8**). The raised track covers the whole of the area immediately in front of the club house, albeit at a lower level. It measures about 1/12 of a mile and is fully fitted with an anti-tipping rail. The running rails are secured to the sleepers with



More storage for raised track stock located under the club house.

a double clip that keeps the back to back dimension as it should be (photo 9). It is oval in shape and has a nice footbridge which connects the centre of the track area to the woodland paths.

Membership at the club currently stands at 105 and has a number of different sections of interest such as stationary engines, clocks and boating. They can usually count on around 25 to 30 members attending functions and working groups at Northcliff. Regular monthly meetings are held in the Saltaire Methodist Church Hall where speakers on a variety of topics are available for members and they can also enjoy refreshments during the meetings. They enjoy a good working relationship with the Friends of Northcliffe and usually support activities which may be organised there. The large area of the ground level track is completely open to the park visitors – indeed there are no boundary fences of any description except around the station area (photo 10). The boating facility is located in another park at Wibsey where there is a good size lake for marine activities. It is a figure of eight shape with a good launching and landing jetty and there is always plenty of tea and coffee available. The local authority was very helpful when this section of the club was set up and they

enjoy Sunday morning boating activities. (I wasn't able to visit this section hence there being no photos.) The railway, of course, is the main revenue earner and, as they are a club, these funds are used for the benefit of all the different sections. They are not allowed to charge for rides but invite donations. Vice chairman, Adrian Shuttleworth who was showing me round told me that they are very fortunate that the local community support them very well in this respect, regularly donating sufficient for them to operate successfully. One of their main events of the year is the Rae Gala. This gala is held in memory of Norman Rae, a local landowner who bequeathed Northcliff Wood to the local authority many years ago.

They have two petrol hydraulic locomotives, *Amos* and D2342 (photos 11 and 12) which are quite powerful, each being about 6½ hp. Having driven one, I can vouch for the power these engines have and with the gradients on this track, all this power is needed when there is a full complement of passengers!

The track itself rides well and is a tribute to track superintendent, Ross Coppin who is also the 'comms' guy for the track control system. It has some interesting crossovers and sections; it can handle three trains at a



A substantial structure for the ground level turntable.



The double track clips used on the raised track.



Taking the middle line in the station the 0-6-0, with the president at the controls, waits for some passengers.



Emerging from storage at the rear of the clubhouse is the petrol hydraulic club 0-6-0 locomotive.



Recently refurbished, the other petrol hydraulic 0-6-0 Amos.

WHAT IS AVAXHOME?

AVAXHOME-

the biggest Internet portal,
providing you various content:
brand new books, trending movies,
fresh magazines, hot games,
recent software, latest music releases.

Unlimited satisfaction one low price

Cheap constant access to piping hot media

Protect your downloadings from Big brother

Safer, than torrent-trackers

18 years of seamless operation and our users' satisfaction

All languages

Brand new content

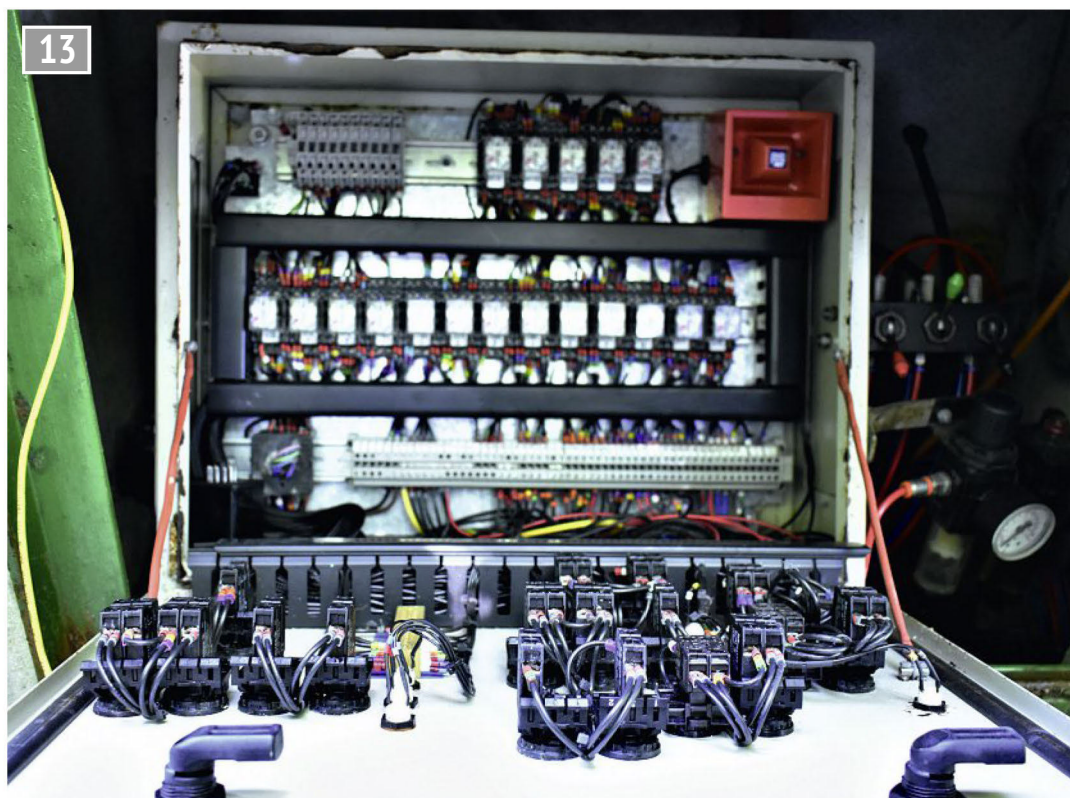
One site



AVXLIVE ICU

AvaxHome - Your End Place

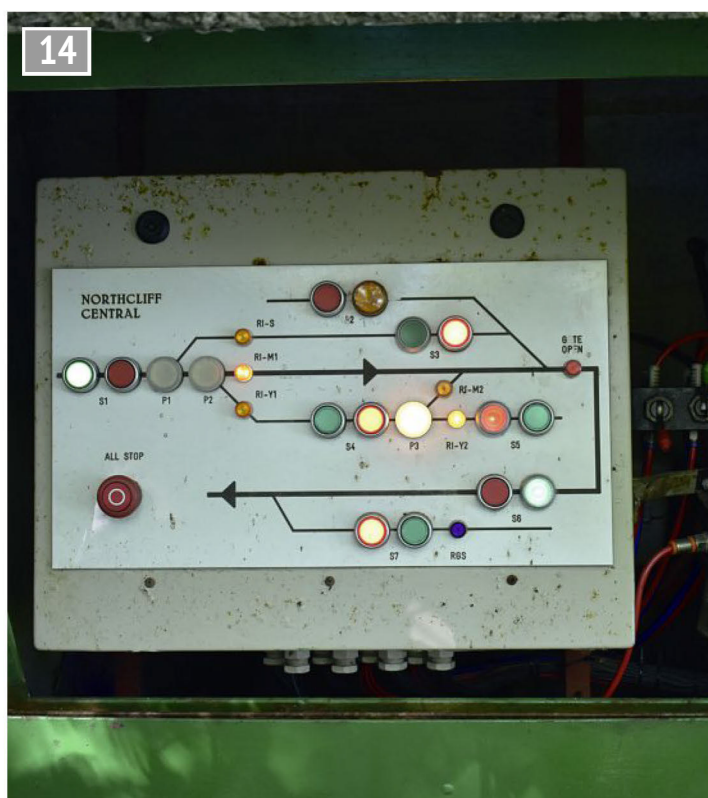
We have everything for all of your needs. Just open <https://avxlive.icu>



Relays galore in the system control panel.

time and these are controlled from the Northcliff Central control box (**photos 13 and 14**). This electro-pneumatic system allows full interlocking of points and signals so that trains are isolated from one another.

An unusual storage facility for ground level stock has been built into the site by using two large concrete pipes buried in the ground (**photo 15**). Using this facility means there is no requirement for member to lift the carriages into position for



The track control panel which is an electro-pneumatic system.

operations - but Adrian didn't tell me who had to get into those pipes, when they were positioned, in order to load the ballast and fix the track! It is certainly useful storage for the club stock.

This is a hard working club who strive to maintain the old traditions whilst living within the modern way of doing things. I really enjoyed my visit to the fourth oldest model engineering club in the world and would like to thank Jim Jennings, Adrian Shuttleworth and Ross Coppin for their hospitality and help during my visit. You have a fine club, gentlemen, situated in a beautiful woodland area and I hope it continues to progress and prosper. You certainly seem to have a good team in place to make it do so.

ME



Adrian Shuttleworth brings some carriages out from their underground storage bunker.

A Five-Inch Gauge 0-4-0 Padarn Railway Tender Locomotive

PART 14

Luker builds a five inch gauge model of a Welsh slate quarry locomotive.



Continued from p.531
M.E.4727 October 6

The blow-downs

The blow-downs are rather inconveniently located to the side of the boiler behind a melange of rods and links (**photo 139**). Non-the-less they are accessible for blowing down the locomotive and filling the boiler. All my locomotives (from the smallest 3½ inch to my largest 7¼ inch gauge) blow downs have a common ¾ inch fitting at the end, so I only need to make up one filling line, and I never bring the wrong line on a steam day. For the model I had to make an adaptor for the filling line to keep the blow-downs to scale (**photo 140**). The threaded hole on the

underside isn't really visible, even on the raised steam track at our club, so very few people notice.

The spindle for the blow-down (**photo 141**) is designed not to screw out totally, which would be bad while in steam. This configuration requires the threaded part of the shaft to be larger than the rest. Machining a solid stainless bar can be a chore, so I played around a little with alternative methods of making the spindle. One method that worked rather well was to solder a bronze piece to a stainless steel rod. A hole was drilled in the centre to



The model blow down components.



The blow downs on the large scale Fire Queen (photo courtesy E. Lander) and the model.



142 Blow down shafts with the phosphor bronze piece to be soldered to the stainless spindle for easier machining and tapping.

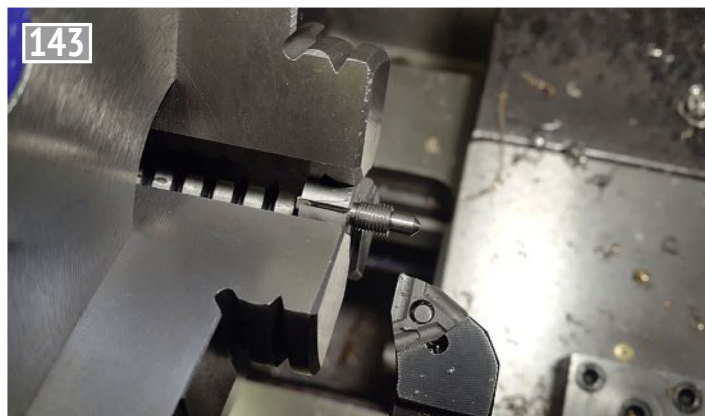
feed the solder making sure it filled the capillary gap properly (**photo 142**). Machining the thread is then a simple lathe turning operation on a much more forgiving material. A nice little trick to hold small shafts like these in a large three jaw chuck is to make a split collar. Basically, it's a cylindrical piece of scrap bar faced and drilled through. A mark is made opposite each chuck jaw and three slits cut using a hacksaw in the vice on these three marks. One slit needs to break through to the centre hole. This little DIY collet is incredibly handy for holding all manner of small shafts (**photo 143**).

The fire door and fire hole shelf

I racked my brain a little in trying to understand what the shelf above the fire door was intended for. It's not flat, so a tea station is unlikely. If I were to hazard a guess, it is a heat shield for operating the regulator with the fire door open. Of course, this begs the question, why bother? Just close the door when fiddling with the regulator. Mr. Lander surmised the boiler could have been second-hand and came from some other steam service. It is possible the shelf protected something in its previous life. Of course, the model incorporated this

detail. The 'shelf' was easy to make and only required a little bending and brazing to get a good looking proximate.

The fire door was laser cut and fits perfectly in the backhead fire door hole without the 3mm oval ring welded in place. This makes alignment for drilling and marking out the hinge etc. a much easier exercise. The hinges were made by folding 0.8mm plate and riveting the folded ends to form the hinges, just like the large scale. The hinge straps are held to the oval plate with countersunk rivets. The latch was a simple filing exercise, with the chain ring end, bent out to match the prototype. There needs to be a chain from the latch to the top of the backhead to keep to the prototype; this prevents the door from banging the inside splashers. The little catch, limiting latch movement, was bent using two pliers and a whole lot of patience. With the assembly completed the mounting holes on the backhead can be drilled and tapped (preferably before the boiler is welded closed). As with the prototype the fire door is held in place with two neat little studs. On final assembly some packing (the same thickness as the fire door) will be required behind the hinge to get a reasonably flat fit on the firebox hole (**photo 144**).



143 A simple little collet made using scrap bar for holding small shafts in a large three-jaw chuck. This was the one-piece stainless version of the spindle.

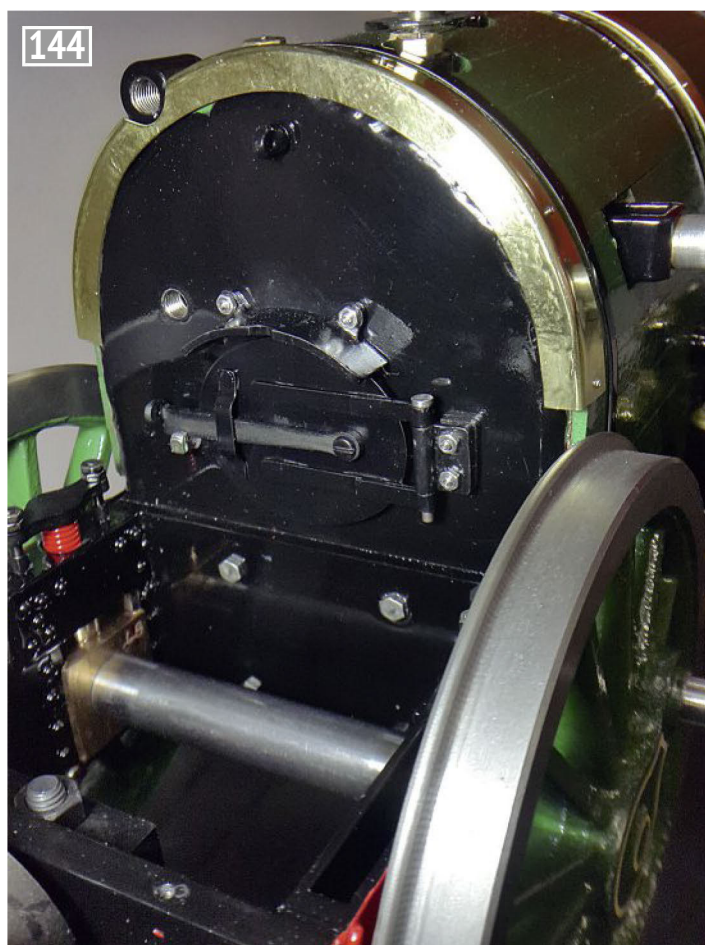
Hand rails and stanchions

The hand rails on the large scale were made from brass pipe with ornamental fittings at the ends. The stanchions were steel, which made these items very different to any steam locomotive hand railing I've come across.

The hand rail stanchions are fully detailed and require a number of forming tools. When machining something like this,

which will require repetitive operations for a number of components, I normally zero the feed dial gauge on the first 'final cut' operation, with all subsequent operations marked on the dial with a pencil. Let me explain with a little sketch (**fig 27**).

For the railing, a drilling jig is made from some scrap 12mm square bar, by drilling a 6mm hole roughly 24mm deep, for drilling the cross holes. The



144 The fire door assembly with all its fittings and the very odd shelf that seems to serve little purpose.

stanchion needs to protrude a little at the base end from the jig for clamping in the vice to fix it in place for drilling. The cross hole can then be drilled through the jig and first stanchion (dead centre of the 6mm hole). All other components are drilled using the same set-up and the hole in the jig as a guide (**photo 145**). This whole debacle was filmed for a fellow model engineer and posted on YouTube if you want to brave the internet when the workshop is a little cold (search terms: Luker, Model engineering, Making Stanchions).

The little stanchion for the water pump lever is much easier to make than the main stanchions, but when I was doing the write-up I could not, for the life of me, remember how I bent it. Thank goodness I take photos as I go for the write-ups which remind me how I did the job. From the pictures - I made it from steel and it didn't require any heating. The hole is aligned to the bar stock so presumably it was bent (by clamping the base in the vice with soft jaws) in an iterative fashion by checking it to the splasher until the bar stock was perpendicular to the pump lever. This was most likely done by eyeballing on the assembly. Finally, the hole was drilled (**photo 146**), the stanchion was parted off and the end rounded with a little sand paper by hand. *The designer wipes his brow to remove the panic sweat from not remembering how something was made just the other month - getting old!*

To finish off the back end of the locomotive the reversing hand wheel is needed and the tiny water pump handle (**photo 147**). The little handle was actually very easy to make. 2mm stainless welding rod was gripped in my normal split clamp and two shallow recesses formed with a round nose cutter. This was parted off and soldered into a cross-drilled hole in a piece of 3mm stainless round bar. The 3mm bar was held in the 3mm split clamp (in the lathe) and the centre hole drilled and tapped, and the part parted off neatly.

Fig 27

5. Finish off the top sphere with the ball former, again, making a mark on the dial gauge when the ball is the correct size. The final tool should not part the stanchion off but should leave around 1mm. The part can then be broken off by hand.

2. Plunge the HSS base former to get the first round of the bottom square base. This can be your first zero on the cross slide.

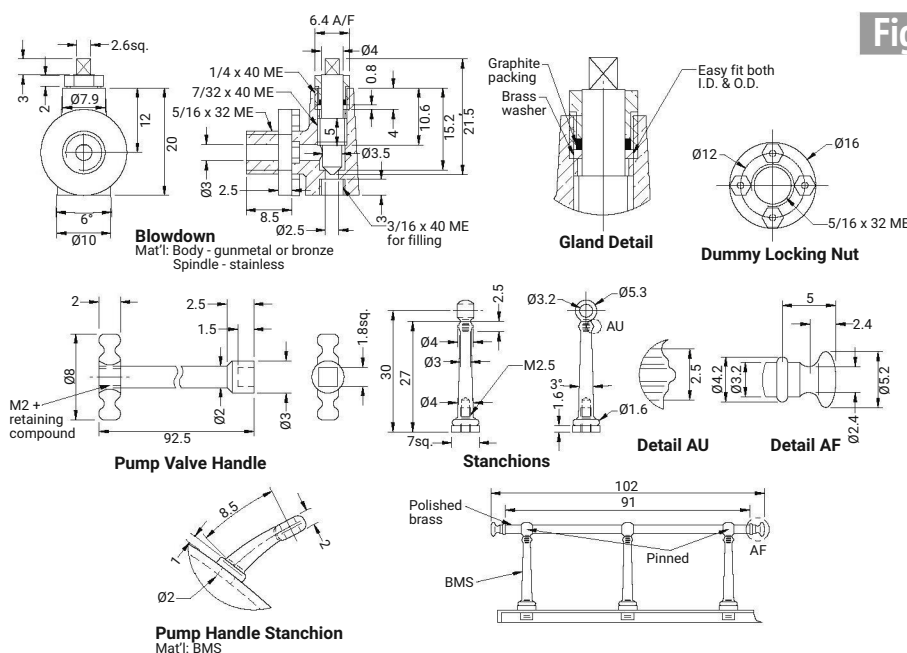
1. Chuck a piece of square bar in a ring collet for use in a 3-Jaw chuck. Or if you're a sucker for punishment, the 4-Jaw. First drill and tap the mounting hole

4. Use a HSS forming tool to make the top ring. Plunge and mark the depth on the dial gauge.

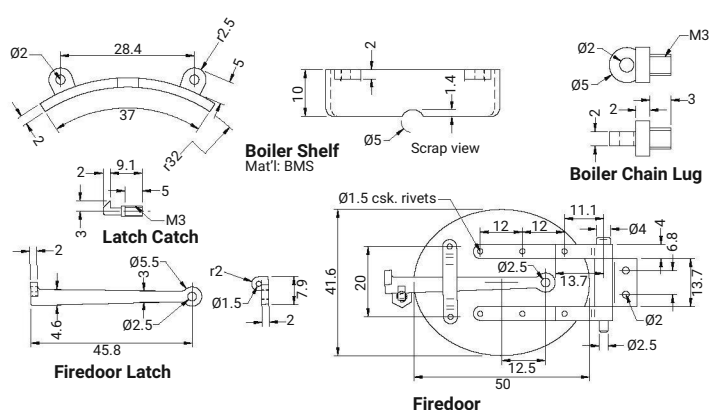
3. With a round nose cutter, touch the base of the ring that's just been machined. Thin the main shank and mark the depth of cut. Using the taper slide cut the taper to the base of the top round.

6. The part can now be completed. All the stop positions for the next couple of components have been marked, making the job go much faster.

Process of machining a stanchion with multiple repetitive operations in mind.

Fig 28

Blow-down, pump handle and stanchions.

Fig 29

Boiler fire door and shelf,



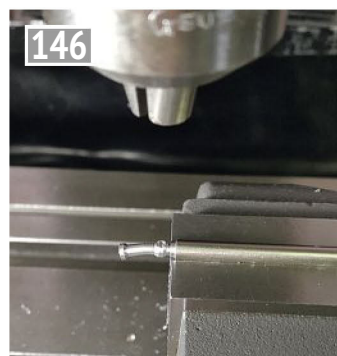
The stanchions and hand railing fitted to the back splasher assembly.



Teeny-tiny handle for the water pump lever.



The handles as they came out of the casting sand.

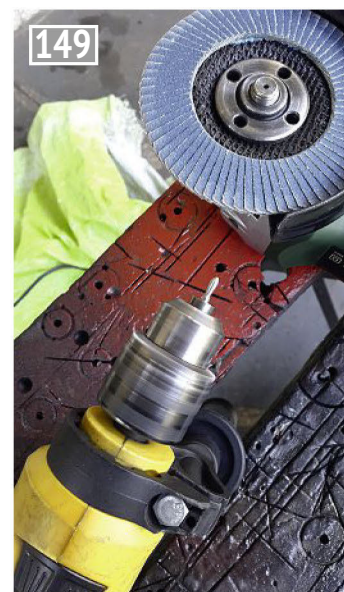


The water pump lever for the air bleed valve - drilling the lever hole after bending.

The big steering wheel (reversing and tender brake handle)

I've called this component the big steering wheel because one of the first things that one of the young lads in our builders group asked when I posted a few pictures was: 'What's the steering wheel for?' Of course, it's to change the locomotive gears! A little banter, but it is one of the eye-catching elements on the model. I cast these from a 3D printed pattern and they only required a little sanding and cleaning (photo 148). The pattern was, as it should be, a split pattern with a boss for the upright handle, which I made from stainless steel.

Machining that little nugget of stainless steel would have been a major challenge, especially



Shaping the stainless handle.

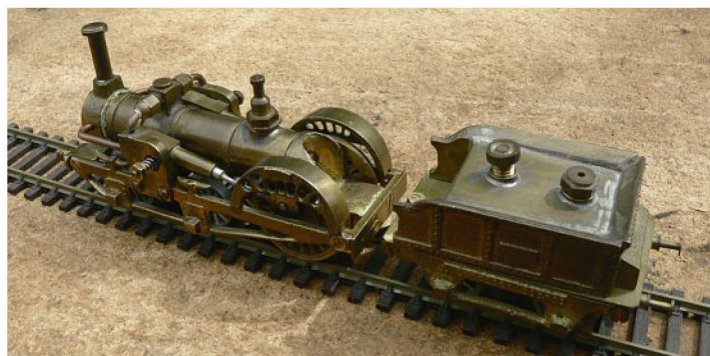
with the equipment I have at my disposal. The shape actually doesn't need to be perfect so I opted for a grinding process using a hand drill and a flapper disk on an angle grinder (photo 149). The end result, I thought, looked superb and matched the model perfectly (photo 150). I thought I would get substantial differences in the handles using the grinder but with a keen eye and the first sample in the line of sight I managed to get three out in a few minutes, all identical (measured by eye).

● To be continued.



The completed 'steering wheel' assembly.

Stan Bray's Crampton Locomotive



Howard Lewis
completes
Stan's last project.



A friend of Stan Bray designed a live steam 00 gauge Crampton locomotive and made up lost wax equipment to produce castings for it. Two sets of castings were produced, one of which went to Stan.

He duly made up the model. It was driven by a small oscillating cylinder on each side, so was intended to move in one direction only. At one of the Festival of Model Railways shows, he exhibited it, and it was placed alongside a 5-inch gauge Crampton, made by another member of the Peterborough Society of Model Engineers, as 'Little and Large'.

Subsequently, there were two tragedies. Firstly, the lost wax patterns were damaged, so that there would only be two models left in existence. Even worse, Stan dropped his model and broke one of the driving wheels, bending the axle.

After a long time, Stan managed to have two new wheels cast. He stripped down the model with a view to repairing it.

Very sadly he died before repairs could be completed. While we were clearing his workshop, his son said that he would be pleased if I would take ownership of the model and attempt to repair it.

Eventually, I opened the box and examined the contents. All the major components

appeared to be there, with a small plastic bag and a pair of tweezers (which were invaluable in handling the small components) and numerous small screws. Just a crank pin had been added to one of the replacement wheels.

It was reasonably clear how most of the components went together, but it was still a bit of a jigsaw puzzle as to the sequence of what went where, and when - particularly the screws, some of which seemed to have no home.

A small jig was made to enable the bent axle to be straightened. The new wheels appeared to be lost wax castings which would only require a little fettling before drilling to be ready for assembly. Neither wheel had been drilled to take the axle (the ends of which differed VERY slightly in size) but one crankpin had been fitted and the other was still in the broken wheel.

Using number drills, the sizes of the holes in the old wheels were found. The new wheels were drilled for the axle and for the other crankpin, which had now been removed from the broken wheel. The crankpin was fitted by placing the wheel in a pan of water, and boiling it for several minutes, before pushing the pin into place. The same technique was used for fitting the first wheel to the axle but less successfully when it was time to fit the second driving wheel with the axle fitted to the chassis.

In the meantime, as many parts as possible had been assembled, the correct sequence being found by trial and error with several revised sequences. Eventually, the second wheel was secured to the axle with Loctite. The axle was very nearly secured to the frame, so had to be removed

and the axle liberally oiled to prevent any recurrence. The wheels were quartered by eye, and the anaerobic adhesive left for an hour or more, to cure.

Now the side frames could be fitted to the previously loosely assembled smokebox, boiler and backhead assembly, with the two non-driving axles. This entailed fitting four short 8BA screws on each side, to be left slack. One countersunk screw secured the side frame to the front buffer beam, one to the rear and two pan heads to the cylinder block, with more countersunk screws to secure the rear 'drawbar' beam to the backhead/footplate. With very over-scale hands, more 3/8 BSW than 8BA, this was eventually achieved, and with everything lined up, the screws could be tightened. A little Vaseline on the screw head and screwdriver helped the screw to stay in place long enough for it to be engaged in the thread.

There appeared to be no fixing to retain the burner bar to the rear beam but there was a long setscrew with a nut, which fitted the tapping. This was shortened, so that the screw would pass through the coupling between locomotive and tender, and the nut could be used to secure the burner bar. A spare 8BA nut was used in similar fashion to fix the coupling bar to the tender and to clamp the body of the tender to the tender chassis.

The locomotive was now complete, except for a piece of tubing to connect the fuel tank in the tender to the burner bar. Since there is no intention to ever steam it, this will not be fitted and the locomotive will now be kept for exhibition and as a memorial to a good model engineer and friend.

ME

A Model Engineer's Clock

PART 3

Jim Clark makes a skeleton clock making good use of modern manufacturing methods.



Continued from p.510
M.E.4727 October 6

The motion work and hands

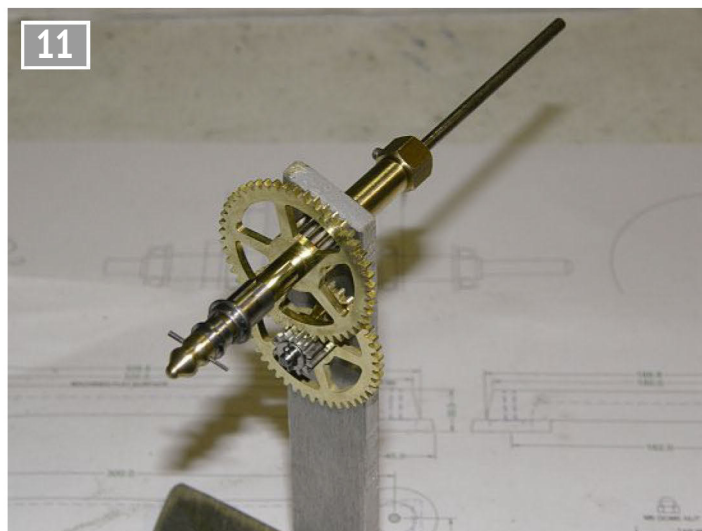
Another item of interesting horological ingenuity is the motion work, which is that part of the works that takes the rotation of the centre wheel and arbor which turns once per hour (therefore indicating the minutes as it revolves) and reduces it down by 12 to indicate the hours.

Very old clocks have the hour and minute hands as two separate dials but, at some point, someone worked out a way of making them concentric about the same shaft. This involves some complexity, as the hour hand needs to revolve on the minute hand which in turn is running on the centre arbor. Obviously, both the hour and minute hand need to rotate in the same direction, so a reversing wheel and pinion are required in addition to the first wheel and pinion, and these together must provide the overall 12:1 step down. I used a 3:1 followed by a 4:1 ratio.

I used wire cut wheels and pinions. A few other fiddly turning exercises were required to make the supporting tubes and bushes. Also, a friction clutch of some sort is required between the centre arbor and the minute hand so that the indicated time can be adjusted by pushing the minute hand around, without upsetting or damaging the rest of the clock.

The friction clutch was made by slitting the minute wheel tube along its length so that it presses in against the centre arbor enough to provide the friction drive, while being easily moveable by hand.

This simple test jig for the motion work (**photo 11**) was another step in verifying the design that paid off – it allowed us to assemble the motion work and test it for proper function and free movement.



The motion work for our clock shown set up on a small test jig.

As it turned out, the theoretical pitch between the wheels and pinions was slightly too tight and simply re-drilling a new piece for the test jig to pitch them an additional 0.5mm apart solved that problem.

This change was then incorporated in the CAD drawings - not something that could have been done so easily on the actual clock frames themselves!

(A side note here – when manually making clock wheels and pinions, it is usual practice

to use a 'depth gauge' to work out the actual pitch of a wheel and its associated pinion, to accommodate manufacturing tolerances. However, as we are working with CAD and EDM to a precision of microns, this should not theoretically be necessary for us. But in this case, theory was wrong!)

A cast base plate

A clock of such large proportions as this one needs a solid base, both to keep it



Here is one of the base castings emerging from the sand mould, after being cast at the 'C&C Foundry'.



The raw casting, cooling off ready for fettling and machining.

steady while operating and so it doesn't fall over when trying to wind up that very large main spring.

Traditionally, clock bases are made from polished wood with fancy edges, but as this is a Model Engineer's Clock, there will be no wood involved!

What better than a solid brass casting? Ron and I are fortunate to be able to cast our own components (**photos 12 and 13**) and call our amateur set-up the 'C&C Foundry'. The 'C&C' part can stand for either 'Collins and Clark' or 'Clark and Collins' – depending on who is taking



The finished base plate.

the blame and who is taking the credit on any given day!

Just for the record, the maker's names are cast into the underside of the bases; it is interesting to speculate who might read them in the future and wonder who James Clark or Ron Collins were.

The finished base plate has adjustable feet with pads under each corner and a bull's eye spirit level in the centre, so the clock can be levelled and stabilised when in position. A fancy edge was machined all around the top to provide a bit of artistic flair (**photo 14**).

Making the frames

Ron and I have slightly different style preferences – his is more functional while mine tends to be more elaborate. Therefore, we drew up two different frame profiles using, of course, the

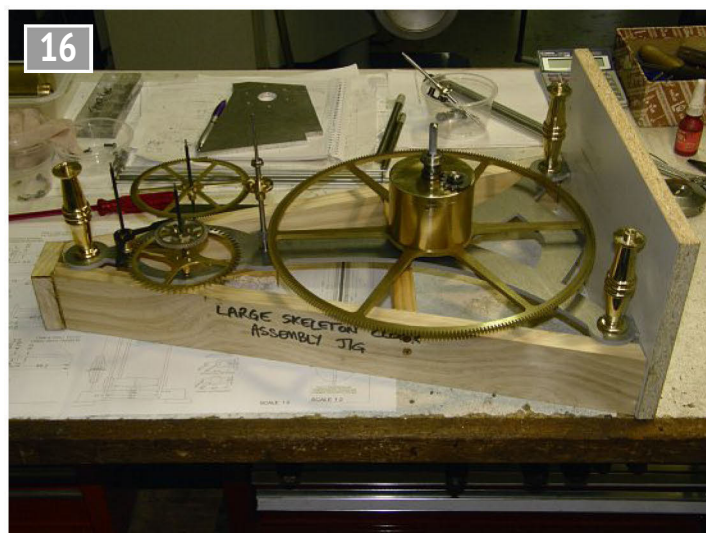
same centres for all the pivots and fixing points.

Originally, I had intended to make the frames in aluminium and have them anodised but Ron had a part sheet of 5mm brass which would make a much nicer set of frames. To avoid making any mistakes with this expensive rarity, we decided to cut out a test set of frames from a sheet of 5mm aluminium (**photo 15**). This would allow us to completely assemble one prototype clock and check that everything fitted and worked according to plan.

As it is a large and relatively fragile frame with some quite heavy parts (the spring barrel in particular), an assembly jig was required to support the clock, lying on its back while the various parts are fitted (**photo 16**).



The aluminium test frames, sitting on one of the cast brass bases.



Parts for the test clock coming together on the assembly jig.



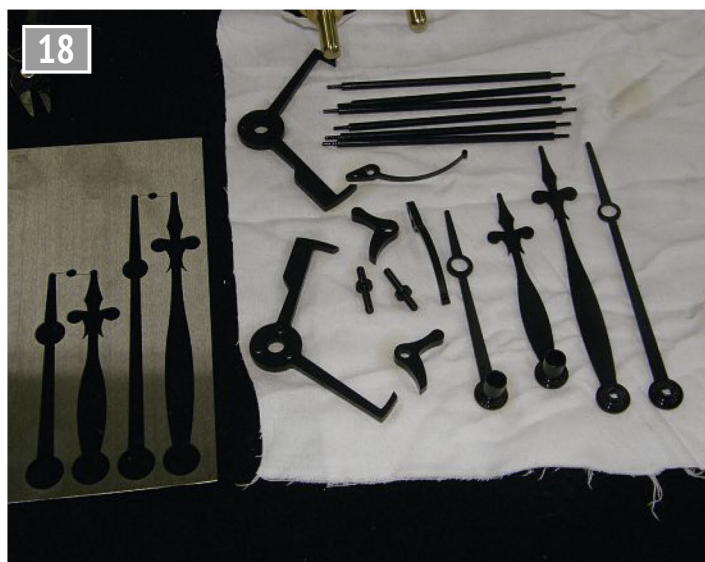
Two sets of pillars that hold the two frames apart top and bottom.

The top pillar (the two on the left in **photo 17**) has an extension from which the pendulum is suspended, to give room for maximum pendulum length within the height of the frames.

Photograph 18 shows the steel parts for the clock. On the

far left is the sheet of spring steel from which the two sets of hands were wire cut. Note the two different styles of hands, to suit the two slightly different clock styles.

The top half of the frame contains the escapement and third wheel (**photo 19**), which



A selection of steel parts that have been chemically blackened, both for appearance and to prevent rusting.

was previously tried and proven on the escapement test jig. In the middle is the motion work and a set of hands, and below that a spring barrel and click mechanism in place.

Still missing are the great wheel and centre wheel, yet to be cut out. However, this stage gives

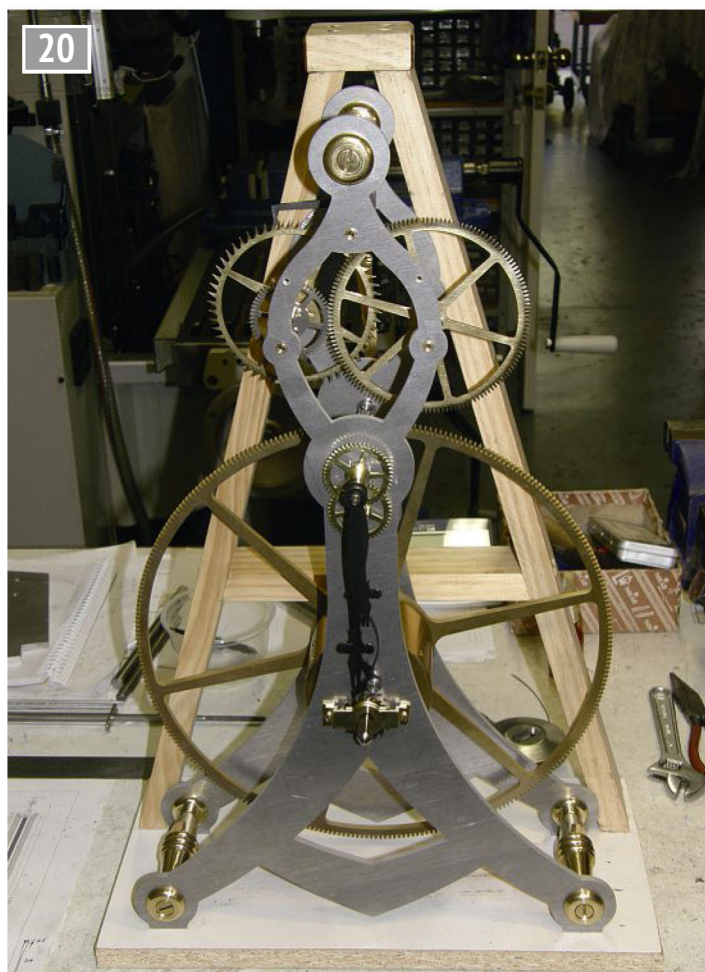
us the confidence to continue with the rest of the drive train.

The assembly jig allows the clock frame to be stood up vertically after assembling the parts, as shown here (**photo 20**). It can then be handled and moved with care.

To be continued.



A trial assembly of some of the previously made parts.



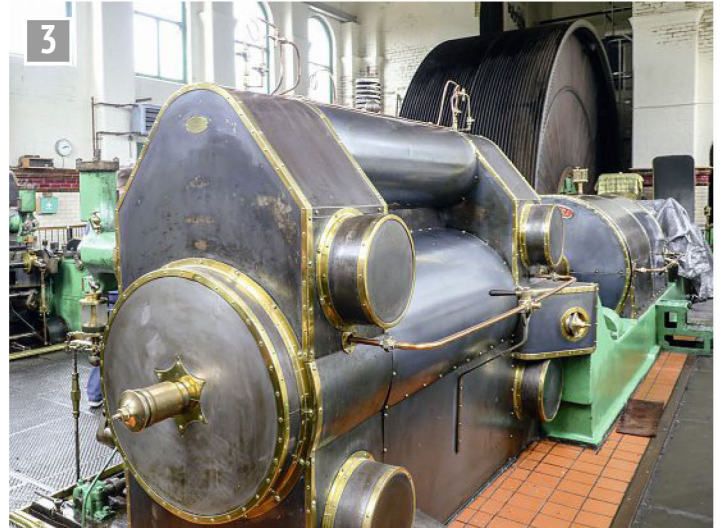
Here is the next stage of assembly, with the great wheel now in place.

Northern Association of Model Engineers

Birkett Trophy and Young Engineer Award



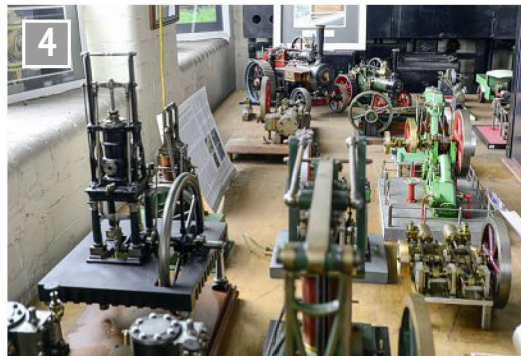
Dean Allsopp receives the Birkett Trophy from Paul Birkett.



The main engine at Ellenroad Steam Museum showing the 82½ ton flywheel.



Bob Hayter presents the NAME citation.



Some of the models on display at Ellenroad Steam Museum.



Dean's family and the group from Stapleford Miniature Railway - left to right: Richard Gretton, Karen Allsopp, Mark Allsopp, Dean Allsopp, June Tricklebank, Wendy Gretton, Ian Tricklebank.

Bob Hayter
reports from
Ellenroad
Steam Museum.



One of the major activities of NAME is to encourage young people to partake in model engineering. This is achieved each year by awarding prizes to young people who have made a significant contribution to the hobby. The Young Engineer award is presented to a person under 25 years of age who has been nominated by their club and passed scrutiny by the awards group. The young engineer award incorporates the Birkett trophy awarded in memory of David Birkett, a natural and prolific engineer

who has, unfortunately, passed on to that big, clean workshop in the sky.

On Saturday 16th September this year's winner, Dean Allsopp of Stapleford Miniature Railway, gathered with family and friends at Ellenroad Steam Museum, Rochdale, for the awards ceremony. Presentations were made by Paul Birkett, David's brother, and Bob Hayter on behalf of NAME.

Nominations are now open for the 2023/24 awards. Contact the NAME Secretary, Alan Budd for details. Contact details can be found on the

NAME website at
www.name-1.org

Photographs by Jason
Pattinson, Sale MES.

ME



NAME

Geoff Theasby reports on the latest news from the clubs.



I acquired some stuff in with a couple of wanted items at an auction, including two radio control transmitters, motors, servos and lots of metal bar offcuts in several materials. Other items ranged from pop-pop boats to servo testers, Meccano, Fischertechnik and some minor test equipment. That would keep me busy, if I were not so already. The Fischertechnik Handbook is available online and has also been very useful.

Robert Postlethwaite writes from the **National 2½ inch gauge Association** informing us that the Society has a large number of castings (two tons) from a scrap dealer who in turn got them from the family of the closed Bond's O' Euston Road. The astute dealer saw them for what they were and did not melt them down, so the Society bought them. They have been stored for 50 years but are not seriously rusty. Soaking overnight in citric acid then wire brush, then oiling will protect them. There are 2½ inch scale, and also some 3½ and 5 inch, wheels, frame parts in cast Iron, plus bronze steam chests, valves, cylinder covers



2½ inch castings 1 (photo courtesy of n25ga).

and horns (but no cylinders). Pictures are on their web site, bondscastings.n25ga.org, as well as **photos 1 and 2**.

W. www.n25ga.org

Here is a picture of 'my' locomotive, referred to in M.E.4721, a Ruston 48, before being rescued. I lifted this picture from somewhere but I have not been able to identify the copyright holder so, if it is you, please advise and I will be happy to acknowledge (**photo 3**).

In this issue, robots, torsion meters, a famed model

engineer, life membership, a mystery locomotive, a growing club and a trainee writer.

Worthing Society of Model Engineers are first out of the trap with their autumn newsletter. In it we learn that the new shed is up and filled with electric battery chargers. Treasurer Martin refers to the charge made for a ride at their public running days - it is currently 50p, and has been so for many years. He often meets people who bring their children and it was 50p when they were growing up. An event was held



2½ inch castings 2 (photo courtesy of n25ga).



Ruston 48 as acquired.

specifically aimed at recruiting new members by offering small scale talks and teaching them how to drive steam engines. One or more traction engines were to be in attendance and so on. It was deemed successful, recruiting two new members. Robert Adams writes a blow-by-blow account of how he rescued a part-build 'Speedy'. Neil Furze explains that whilst the German language has no word for *Schadenfreude*, it was witnessed in actuality when a member who shall be nameless dumped his bag on the driving trailer of his locomotive, inadvertently landing on the 'Start' button. The ensemble engine, carriage and lunch bag set off round the track, to the consternation of its owner. Quick-thinking on the part of junior members managed to intercept it by running athletically across the site and dislodging the food bag, stopping the runaway train. This caused acute embarrassment to the said (well, unsaid, actually) member who will no doubt fit an isolating switch to his pride and joy.

W. www.worthingmodelengineers.co.uk

From today's paper: 'When do you think robots will enter the domestic house?' 'We've had one for years, it's the dishwasher!'

Another decent picture of a train on Sheffield SMEE's open day - the garden railway is becoming very popular (photo 4).

York Model Engineers Newsletter for September opens with a photo of a Hattersley Dobby loom weaving

Yorkshire tartan. The Dobby was invented by Hattersleys and is a simplified version of the Jacquard loom. The process is achieved by pegs engaging in slots to select a colour, thus weaving the more complex patterned cloth. Rayon, or artificial silk, was invented at Courtaulds in nearby Silsden and the company therefore contrived a loom to weave it, thus the Hattersley's Silk Loom. The company still makes narrow fabrics, including paraffin lamp wicks and also hand looms, which are in demand in the Scottish Hebrides, for producing 'proper' Harris Tweed. Philip Purkiss trained as a factory inspector and discovered at the Home Office Industrial Safety Museum a forgotten model of a 1:14 scale Victorian workshop driven by a co-sited steam boiler. It bears a date, 1936, hidden inside the mechanism, and the name Adrian Hands. When the museum closed he was able to acquire this model, which still works. Mr Hands was town clerk of Dorchester, the 20th Century's longest serving member of that profession*. His model was awarded a silver medal at the 1936 MEX. Tony Simons has saved a little bit of York History. It is a small electric locomotive from York Power Station, built in 1912 and retired in 1968. Since then it has led a precarious existence until it became likely that it would go for scrap. Editor Roger Backhouse reviewed a book by David Pendleton, about the Thames Clyde expresses.



Roundhouse Fowler on the SSME garden railway.

Whilst never a dedicated trainspotter, I do recall noting when this train passed our house, which was then only a few yards from the lines. A wolf was killed by a train in 1904 and its head was mounted in the Midland Railway boardroom. Wolves became extinct in the UK in 1760 but this was reputed to be an escaped animal from a local private zoo.

W. www.hattersleyaladdin.co.uk

W. www.yorkmodelengineers.co.uk

That was followed by **Pickering Experimental Engineering & Model Society** whose contribution begins with Mel Doran, who showed a 6 volt clock, battery powered (4 AA cells), which may have been a car clock, as it has a settings knob at the front, and car electrics were 6 volt at the time. David Proctor then writes in the rest of the newsletter (17 pages) on torsion meters for low power measurements.

Sheffield Society of Model & Experimental Engineers advises that a 5 inch gauge, WD 2-10-0 locomotive, *Dame Vera Lynn* is for sale, with an autographed genuine NYMR limited edition print No 71/100. The 'Forces Sweetheart' captured servicemen's hearts with song but was not a devotee of engineering, as far as I know.

W. www.sheffieldmodelengineers.com

Ryedale Society of Model Engineers' Mike Aherne

notes that there are several favourable reports on the RSME in Trip Advisor, and prints some of the responses: 32 five stars and 2 four stars. Preparations for the August main line rally were doing well. Maintenance, kitchen, signalling and marshals were all preparing for the hordes to arrive in their millions (well, – ish). Editor Bill escaped the washing up to take a few photographs. He reckons he must have the cleanest hands in model engineering. Did your tea taste better, that day or what? Two of the visitors had journeyed from Huddersfield, in a somewhat sceptical mindset. They didn't even know the locomotives were powered by coal and water. After some conversation, they understood a bit more and left with a few leaflets. Another visitor came all the way from Oz. A sight not often appearing in model engineering is the very clean clubhouse floor after Mary's attentions. (The first to sully its smart condition risks Armageddon... Who dares, sins!)

W. www.rsme.org.uk

Steam Chest, July, from the **National 2½ inch Gauge Association**, opens with a fine picture of Graham Hennessey's 4-4-0 *Annie Boddie*. Graham writes briefly on his locomotive, which he says was interesting to build, but not the painting (it



Annie Boddie (photo courtesy of Graham Hennessey).

looks very fine to me – Geoff) (photo 5). Finding that the backhead mounted regulator cross shaft on his Gresley A4 was a little puny, Mike Boddy installed a centre bearing. After some difficulty in obtaining and machining a suitable part, he had it CNC milled in China. A very good job they made of it too and only a few days between order and delivery. A young man attending the same event in New York as David Garrison, who said he made bronze jewellery, and the conversation turned to model making. He said his great uncle had been active

in that field and, when asked, said his name was Greenly. He was astonished when told that the name of Greenly was well known in the model engineering world. So, after more conversation, the current Mr. G would be interested to learn, or does anyone know, of any of H.G.'s relatives around today. A five-minute video by Tom Ingall covers the building of two brand new steam locomotives in Sheffield www.youtube.com/watch?v=OGe9B00mqWE&list=WL&index=7 Neil Heppenstall made a drill sharpening jig from an idea in *Model Engineer* in

the 1930s. John Baguley has been awarded life membership of the **n25ga** on account of the years of hard work and freely given help to members. An alternative fuel sometimes used is methylated spirit and in 1939 a Victor Shaddock wrote a very good article on it. This is reproduced in the newsletter and has been tried on many locomotives. Victor was keen to spread the word to prospective users of meths so, wary of copyright issues, it is here rewritten. The Model Engineers International Convention will be held in January 2025 at Hamilton Model Engineers in NZ. Plenty of time to book your tickets... Questions to Keith Betts (secretary@hme.co.nz) - more details later.

Norwich & District Society of Model Engineers has a question. The A3 which appeared at Eaton Park, the club site, in the early years of the millennium, has been restored to working order by Chris Shingles, so it is time to find out a little more of this scale A3 locomotive. Thought to have been made contemporaneously with the originals, it may be a display model. If you can help, please let NDSME know, as the Society would like to create a history

of this allegedly well-travelled engine. Brian Parker tried an alternative to anthracite, *Stoveheat*, with the following result: 'Stoveheat does not produce sufficient heat to power an efficient boiler'. Congratulations to the Society for raising more than £5,000 for their chosen charities. A less well-known form of railway safety is in the posters of Tom Eckersley (1914–1997), who was one of the UK's foremost graphic artists. He made many posters on safety in industry, as well as government and publicity work. A detailed biography is a good, informed read.

W. www.ndsme.org

A reader of *The Whistle*, September/October, from **British Columbia Society of Model Engineers**, noticed that there was no mention of the garden railway in the celebrations report. This will be rectified in the next issue. Marie Rogers, communications director, has analysed recent membership figures and finds membership still rising. Junior member numbers have risen over the same 10-year period; 'teeming with youngsters' as one person put it. Brian Ruebottom, a recent new member, has written a condensed history of the locomotive, which began as an assignment in a university course. (It is good to see a new member getting in at the deep end, especially when he starts with inky fingers rather than greasy, metallic activity... - Geoff.) This is because there will come a time when the presses will fall silent after I and my ilk go to that great wastebin in the sky. (Sob!)

W. www.bcsme.org

*In the matter of notable town clerks, Keighley once had one called Julius Caesar - not that he could compete on longevity. The Roman version lived until he was 56, serving as Caesar for only five years. Ours lasted rather longer.

And finally: 'Darling, what's my computer password again?' – 'The date of our wedding'.

ME



From Sheffield Steam Rally 2023.

Club Diary

18 October – 10 December 2023

October

18 Bristol SMEE

Talk: 'Steam Launches and Engines', Begbrook Social Club BS16 1HY, 19:30.

Contact : secretary@bristolmodelengineers.co.uk

19 Warrington & District MES

Talk: Jeremy Nichols on 'British Railways in WW1', St Mary Magdalene Church, WA4 3AG, 20:00. See www.wdmes.org.uk/events

20 Rochdale SMEE

AGM, Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

22 Bristol SMEE

Public running at the Ashton Court Railway BS8 3PX, noon-17:00. Contact : secretary@bristolmodelengineers.co.uk

22 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

22 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

22 Tiverton & District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

22 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

26 Guildford MES

Open day, 10:00-13:00. See www.gmes.org.uk

26 Newton Abbot & District MES

Club night at Rydon Community Hall, Kingsteignton. See nadmes.org.uk

26 Sutton MEC

Afternoon run from 12 noon. Contact: Paul Harding, 0208 254 9749

28 Brandon & District SME

Hallowe'en run, Weeting track, 14:30 until dark. See www.brandonanddistrictsme.com

28 North Wilts MES

Hallowe'en run at the Coate Water Railway, 15:30-20:30 (booked slots). See www.nwmes.info

28/29 LOWMEX

Lowestoft Model Engineering Exhibition at East Coast College, Lowestoft NR32 2NB. More details: www.lowmex.co.uk

29 Bristol SMEE

Public running at the Ashton Court Railway BS8 3PX, noon-17:00. Contact : secretary@bristolmodelengineers.co.uk

29 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

29 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

29 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

November

1 Bradford MES

Autumn auction, Saltaire Methodist Church, 19:30. Contact: Russ Coppin, 07815 048999

1 Bristol SMEE

Talk: 'Use of Machatronics at the Crofton Pumping Engines', Begbrook Social Club BS16 1HY, 19:30.

Contact : secretary@bristolmodelengineers.co.uk

2 Sutton MEC

Bits and Pieces evening 20:00. Contact: Paul Harding, 0208 254 9749

2 Warrington & District MES

Projects/natter night, St Mary Magdalene Church, WA4 3AG, 20:00. See www.wdmes.org.uk/events

3 Rochdale SMEE

Talk: 'Garden Railways', Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

4 Tiverton & District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

5 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

5 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

5 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

12 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

12 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

12 Sutton MEC

Track Day from noon – 16:00. Contact: Paul Harding, 0208 254 9749

12 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

15 Bristol SMEE

Talk: 'Meccano – a History', Begbrook Social Club BS16 1HY, 19:30.

Contact: secretary@bristolmodelengineers.co.uk

16 Warrington & District MES

Talk: Clive Jones on 'Aerospace Materials', St Mary Magdalene Church, WA4 3AG, 20:00. See www.wdmes.org.uk/events

17 Rochdale SMEE

General meeting, Castleton Community Centre, 19:00.

See www.facebook.com/RochdaleModelEngineers

18 Sleaford & District MRC

Charity model makers' show, 10:00 to 16:00 at St George's Academy, NG34 9BY. Contact: Eddie King, 07821 618718

19 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

19 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

19 Tiverton & District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

19 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

26 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

26 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

26 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

30 Newton Abbot & District MES

Club night at Rydon Community Hall, Kingsteignton. See nadmes.org.uk

December

1 Rochdale SMEE

Talk by Bob Hayter, Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

2 Tiverton & District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

3 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

3 Guildford MES

Open day, 11:00-15:00. See www.gmes.org.uk

3 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

3 Warrington & District MES

Running day at the club track. See www.wdmes.org.uk/events

6 Bradford MES

Film night, Saltaire Methodist Church, 19:30. Contact: Russ Coppin, 07815 048999

7 Sutton MEC

Bits and Pieces evening 20:00. Contact: Paul Harding, 0208 254 9749

7 Warrington & District MES

Projects/natter night, St Mary Magdalene Church, WA4 3AG, 20:00. See www.wdmes.org.uk/events

10 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

10 North Wilts MES

Public running at the Coate Water Railway, 11:00-dusk. See www.nwmes.info

10 Small Model Steam Engine Group

Open meeting. 14:00-17:00. See www.gmes.org.uk

10 Sutton MEC

Track Day from noon – 16:00. Contact: Paul Harding, 0208 254 9749

CLOCK CONSTRUCTION & REPAIR

Books by:

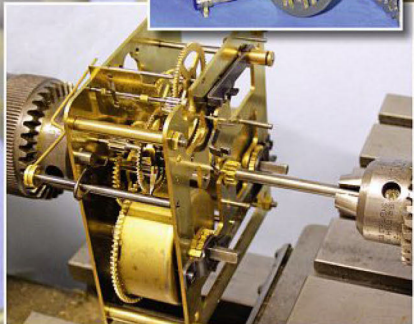
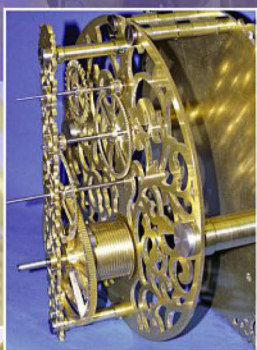
John Wilding MBE
FBHI, E. J. Tyler,
John G. Wright, Eric
Woof, John Tyler
and others.

**SPRINGS
BEARINGS
FRAMES
DIALS etc.**

**FREE
Catalogue**

Telephone: +44 (0) 1420 487747

www.ritetimepublishing.com



NOGGIN END METALS

(+44) 07375 958713

[Www.nogginend.com](http://www.nogginend.com)

We supply a wide
range of metals
and engineering
plastics in small
quantities for
model engineering.

Including Brass,
Aluminum,
Cast Iron, Bronze,
Copper, Steel,
Stainless Steel,
Nickel Silver,
Gilding Metal,
Nylon, PTFE, Peek
and Fluorosint.



EIM Boiler Metal Pack £146.95

WANTED

Model Railway & Collectables

Top Prices Paid

**For all makes, all gauges and live steam,
aeroplane kits, boats, die cast etc.**

Instant cash paid

Will travel to collect

**LITTLEWORTH
MODELS**

email: littleworthmodels@gmail.com

01775 630385

07578 708785

Woodgate Cottage
New Road,
Deeping St Nicholas,
Spalding, Lincs, PE11 3DU

MODEL MAKING METALS

1/32in. to 12in. dia. bright steel, stainless steel, bronze, spring steel, brass, aluminium, silver steel, steel tubes, bolts, nuts & screws, tap dies + drills, white metal casting alloys.

Fine materials, chain plastic.

Lathe milling machines and equipment, new and secondhand.

Mail order nationwide and worldwide callers

Mon-Fri 9-5pm. *All cards welcome.*

Send now for a **FREE** catalogue or phone

**Milton Keynes Metals, Dept. ME,
Ridge Hill Farm, Little Horwood Road, Nash,
Milton Keynes MK17 0EH.**

Tel: (01296) 713631 Fax: (01296) 713032

www.mkmetals.co.uk

email: sales@mkmetals.co.uk

LIVE STEAM MODELS LTD

Drawings & Castings for a range of
3" – 6" Traction Engines including
Burrell, Foster, Fowler,
Ruston-Proctor.



A Comprehensive Range of Model Engineering
Materials. BA and BSF screws, nuts, bolts and
rivets, boiler fittings and accessories available.

We also offer Technical Support,
Full Engineering Services, and Wheel Building
for all our Models

Phone - 01332 830 811

Email - info@livesteammodels.co.uk

or visit

www.livesteammodels.co.uk



MAXITRAK.COM

The best of model rail and road.

Tel: 01580 893030 Email: info@maxitrak.com



**5" Gauge J94
Austerity**

Painted Kit From £5,150
Ready to Run From £6,175



**7 1/4" Gauge
SE & CR R1**

Painted Kit £12,850
Ready to Run
£13,935

**5" Gauge EM
Baldwin**

Painted Kit From
£2,375
Ready to Run
£2,750

Radio Control
options
available



**TIG
Welded
Boilers**

MAIDSTONE-ENGINEERING.COM

One stop model engineering shop
Leading suppliers of fittings, fixings,
brass, copper, bronze and steel

Tel: 01580 890066 Email: info@maidstone-engineering.com

Visit us: 10-11 Larkstore Park, Lodge Road, Staplehurst, Kent, TN12 0QY

**MAIDSTONE
ENGINEERING
SUPPLIES**

Model Engineer Classified

WESTERN STEAM
Model Engineers
Founder Member Assn of Copper Boiler Manufacturers (ME)
COPPER BOILERS
For Locomotive, Traction, Marine & Stationary engines, to PER cat 2. All copper construction, silver soldered throughout using quality materials to the standards required by the APCB(MME), PER, & relevant Model Engineering Associations. CE marked and certificates of proof test and conformity supplied.
Write or phone to Helen Verrall:
Unit 4A, Love Lane, Burnham-on-Sea
Somerset, TA8 1EY
Tel: 01270 780 097
Visit our website: www.westernsteam.co.uk

MODEL ENGINEER
To advertise here
please contact Craig
Tel: 01507 529537
E: cames@mortons.co.uk

Complete home Workshops Purchased
Essex/Nottinghamshire locations
Distance no object!
Tel: **Mike Bidwell**
01245 222743
m: 07801 343850
bidwells1@btconnect.com

MODEL ENGINEER BUILDER
Civil Engineering
Marine Engineering
Internal Combustion
Model Railway
Steam Engines
Plant
Workshop
1000s OF MODEL ENGINEERING, AIRCRAFT & MARINE PLANS
sarik hobbies
www.sarikhobbies.com
01684 311682 info@sarikhobbies.com

Meccano Spares
New Reproduction and Pre-owned Original Meccano Parts.
www.meccanospares.com sales@meccanospares.com
Tel: 01299 660 097

Model Engineer

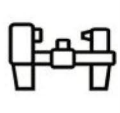
To advertise on these pages contact Craig Amess at cames@mortons.co.uk or tel: 01507 529537

HORLEY MINIATURE LOCOMOTIVES
7 1/4" Drawings and Castings
Dock tank
BR STD Class 2 2-6-0
BR STD Class 2 2-6-2T
BR STD Class 4 2-6-4T
BR STD Class 5 4-6-0
BR STD Class 7 4-6-2
BR STD Class 9 2-10-0
L.M.S Coronation Class 8 4-6-2 (Duchess)
5" Castings Only
Ashford, Stratford, Waverley.
7 1/4" Castings Only
Dart, Roedeer, Green Queen
HORLEY MINIATURE LOCOMOTIVES LLP
Phone: 01293 535959 Email: hml95@btinternet.com
www.horleyminiaturelocomotives.com

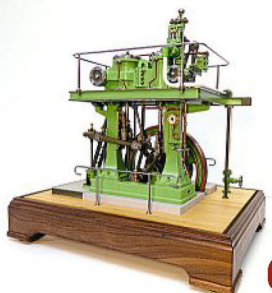
FOR SALE
American 5" Gauge F7 in authentic Great Northern colours

LOCO has authentic sound system power plant.
2 car batteries installed.
Reduced! Was £4,500, now only £3,500 O.N.O
Enquiries to verayarwood@gmail.com

PUT TOO MUCH PRESSURE ON THAT OLD BOLT? SNAPPED? STRIPPED THE THREADS? DON'T WORRY THAT'S WHERE WE ARE SPECIALISTS!
 **UNI-THREAD** 
SUPPLIES QUALITY THREAD REPAIR KITS, INSERTS AND INSERT TAPS IN BSC, BSF, BSW, BA, UNF, UNC & METRIC. BY SPEEDY MAIL ORDER SERVICE.
WE ALSO STOCK QUALITY TAPS, DIES, REAMERS, DRILLS, ETC.
WWW.UNI-THREAD.COM
CALL 01803 867832 Or Fax 01803 867982 for your free catalogue
CARBON STEEL TAPS & DIES NOW AVAILABLE
20% OFF ALL CARBON TAPS. 30% OFF ALL CARBON DIES

webuyanyworkshop.com
Re-homing model engineers' workshops across the UK
 It's never easy selling a workshop that has been carefully established over a lifetime. I will buy your workshop so you don't have to worry about finding a new home for much loved workshop equipment and tools. 
Please email photos to andrew@webuyanyworkshop.com
Or to discuss selling your workshop, please call me on **07918 145419**
All equipment considered: Myford, Warco, Chester, classic British brands etc
Polly steam locomotives also purchased, especially those needing a bit of 'TLC'

ALL LIVE STEAM ENGINES WANTED
ANY SIZE & CONDITION INCLUDING PART BUILTS
Stationary Engines inc. Stuart Turner, Bing etc
Traction Engines and Locos in all sizes.
Especially wanted 4" and 4 1/2" gauge Traction Engines.
Any Locos from gauge 1 to 7 1/4".
Also any Electric models locos, buses etc
Will collect personally. Distance no object.
Call Kevin on 01507 606772 or 07717 753200





To advertise on these pages contact Craig Amess at cames@mortons.co.uk or tel: 01507 529537



• MODEL RAILWAYS •



MARKETPLACE



A new era of buying & selling scale models is coming...

The all-new Hattons Marketplace represents a new way to shop with one of the world's largest hobby retailers!

Our Marketplace is evolving to provide you with 1000s of listings from manufacturers and traders across the world, opening up a huge inventory of products - many of which have never been listed on hattons.co.uk before.

Experience the same great customer service we have always offered and make use of our existing services, such as the award-winning Trunk to take complete control over your orders.

The screenshot shows the Hattons Marketplace website. At the top is the Hattons logo and a navigation bar with 'Shop' and 'Sell' buttons. A currency dropdown menu is set to 'British Pounds (GBP)'. On the right, there are links for 'Trunk', 'Basket', and 'Login', along with the website URLs 'Hattons.co.uk' and 'HattonsModelMoney.com'. Below the navigation bar is a search bar and a list of recommended searches: 'Steam Locos', 'OO Gauge Steam Locos', 'OO Gauge Carriages', 'OO Gauge Wagons', and 'Buses'. A 'Products' sidebar on the left lists various filters like 'By Scale', 'by country', and 'recent additions'. The main content area features a video titled 'Our Marketplace' and a 'Helpdesk Open' banner with hours '9:30am-1pm 2pm-5pm (UK Time) Mon-Sun'. At the bottom, there are 'Login' and 'Create an account' buttons, and a 'Featured Categories' section with images of model trains and a wagon.

Early mockup - final design TBC

Stay in the loop...

Launching 2023 - TBC

Interested in our Marketplace or want to become a trader?

Visit: www.hattons.co.uk/marketplace for more information



COMING SOON!

BMFA Model Engine & Aircraft Auction

Two Day Auction - Live & Online

27th/28th October

**Goldsmith hangar at
BMFA Buckminster
Grantham NG33 5RW**

Friday 27th live viewing 9.00am to 12.00pm
followed by live auction 1.00pm to 5.00pm.

Saturday 28th live viewing 9.00am to 10.00am
followed by live auction 10.30am to 4.00pm.

Commission rates 10% buyers and 5% sellers.

- Lotting fee £2.00 including 2 x catalogue images.
- On-line catalogue coming soon and hard copy available in advance and on the day.
- Live and online bidding.

For a PDF catalogue, Terms and Conditions
and to register to bid visit:
www.nationalcentre.bmfa.org

General enquiries:
lisa@bmfa.org or manny@bmfa.org

Camping and on site catering
available.

*Images used are for advertising purposes only



For information: www.nationalcentre.bmfa.org

Tel: 0116 2441091 Email: manny@bmfa.org