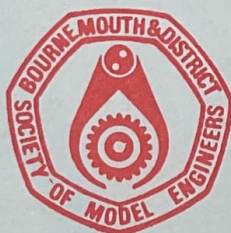


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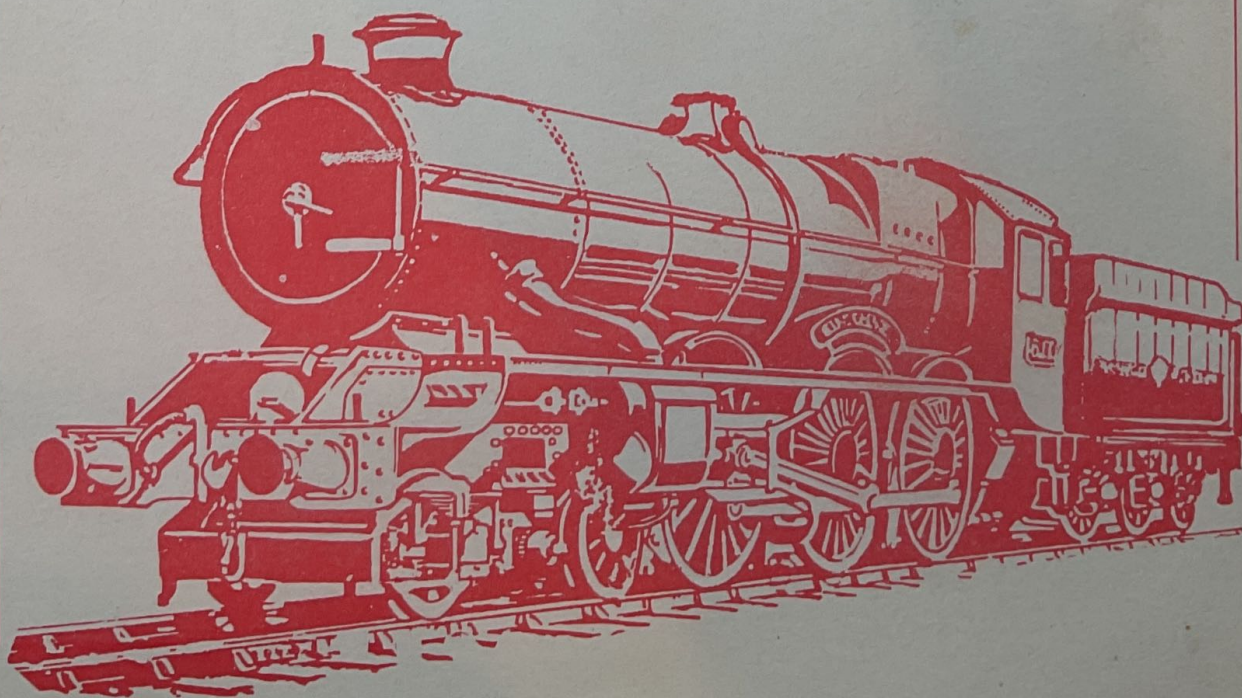


18th International Model Locomotive Efficiency Competition

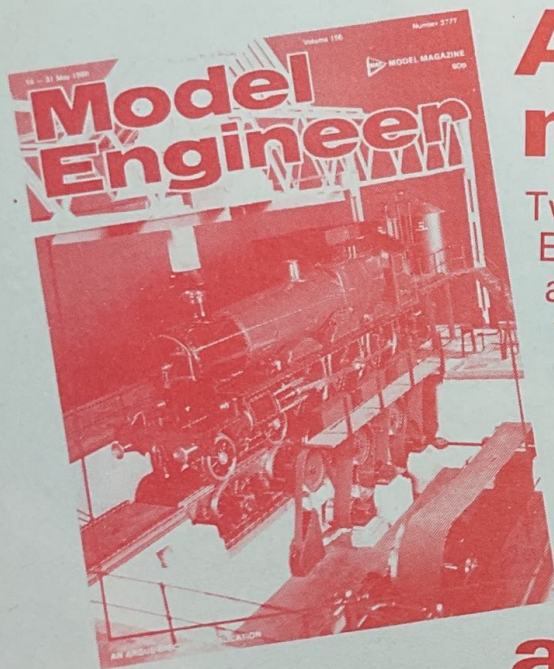
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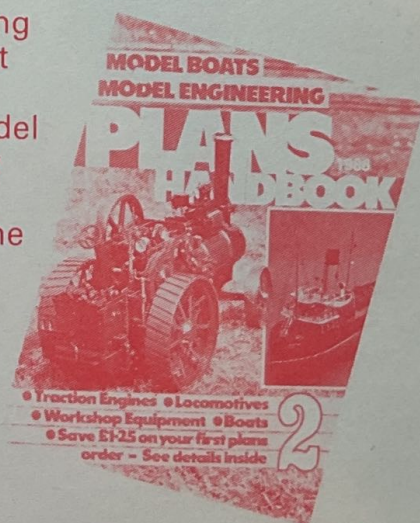
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THE EIGHTEENTH INTERNATIONAL MODEL LOCOMOTIVE EFFICIENCY COMPETITION

for the
Martin Evans Challenge Trophy

at KING'S PARK, BOURNEMOUTH
Saturday, 5th and Sunday, 6th July, 1986

Prizes to be presented by Don Young, Esq., Author, Locomotive Designer
and Model Engineer.

The Overall Winner will receive the Challenge Trophy and £50. Second: £25.
Third: £10 and a special award. Fourth: One Year's Subscription to Model Engineer. A
Special Prize will be awarded to the best 3 1/2 inch gauge performance if not in the first
four.

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Judges for this Competition are: Dick Ganderton, C.Eng., M.I.E.R.E., (*Chief Judge*)
and M. Styles. The decision of the Judges is final.

Computer Calculations by Messrs. D. Bliss and N. Horder

Ann, Geoff & Nick Swift with support from 'Rolle' welcome you to their travelling "steam propelled" shop at this year's IMLEC where we will be able to supply those very special items that are unique to Ashdown Models of Crowborough.

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ASHDOWN MODELS

On the 19th/20th July, we shall be at the Guildford Club show at Stoke Park, and for those in the South near to Brighton, our travelling shop will be in attendance at the model Show being staged at Plumpton Race course near Lewes August 16th/17th.

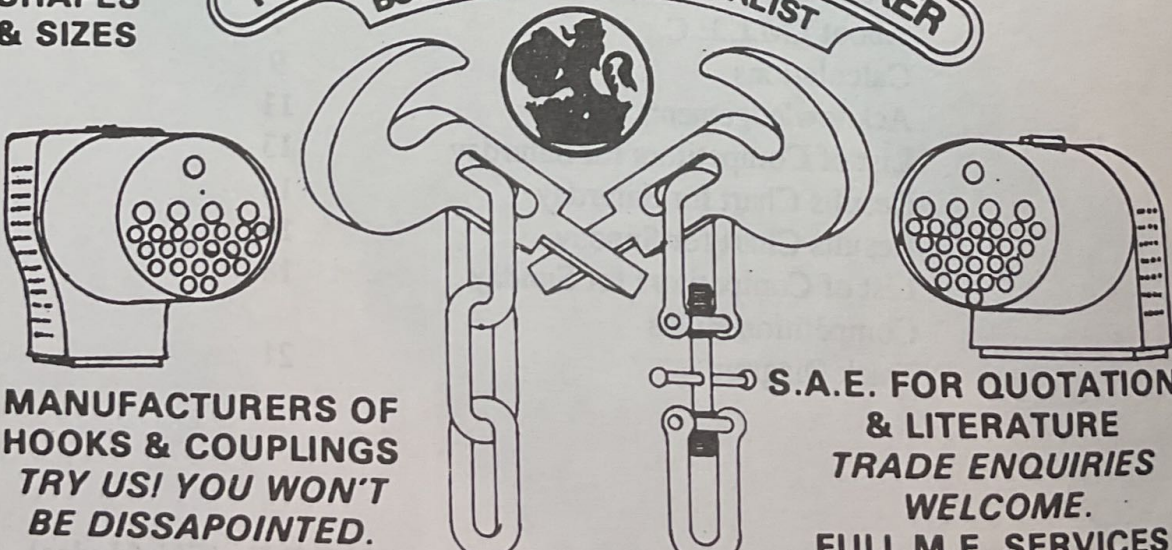
We hope that the weather will be kind, and wish all the competitors the best of luck for the IMLEC weekend.

Our thanks too, to the Bournemouth Club for making us all welcome this year at their track.

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Saturday 9.00-12.00

Welcome to King's Park

It is once again my pleasure to welcome both visitors and competitors to Bournemouth. This will be the second time that we have hosted this event at our King's Park Track and it is our wish that this year's competition will prove to be at least as successful as when we ran the event in 1981.

I would also like to take this opportunity of thanking members of the Bournemouth Society for the efforts that they have put in to make this competition possible.

We are a relatively small Society with few resources, so you will all appreciate that a small band of people have put in a great deal of effort over a considerable time to ensure that we all enjoy a good event.

Finally, my thanks to Don Young for agreeing to present the prizes, to Ted Jolliffe, Editor of *Model Engineer* for his help over the past months, a wish that the weather is kind to us over the weekend, and last, but not least, the best of fortune to all competitors - may the best man win !

Dick Mantle
Chairman, IMLEC'86 Committee



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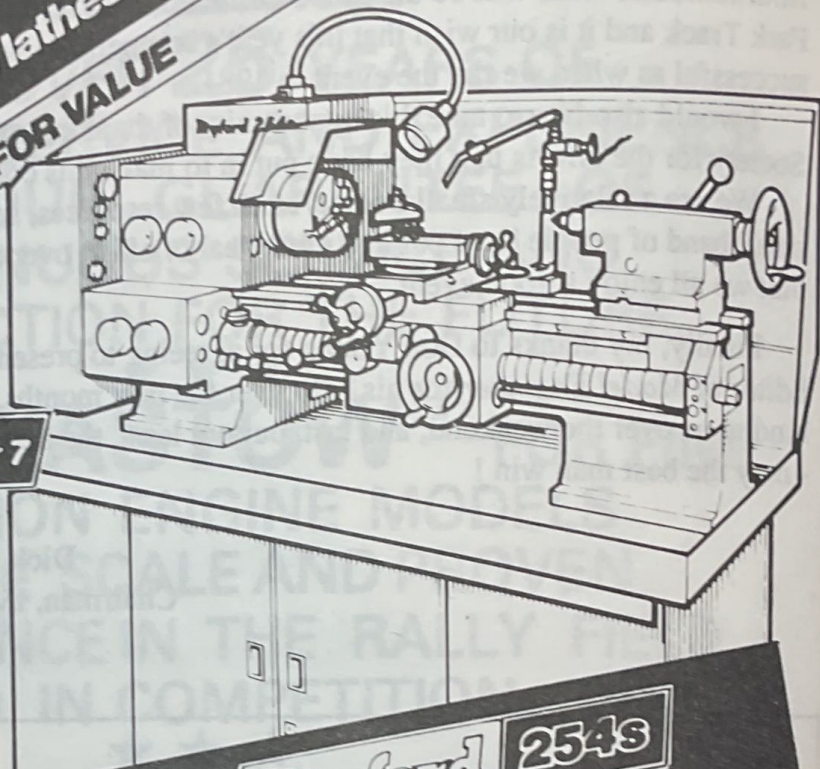
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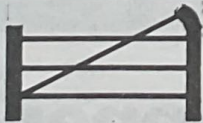
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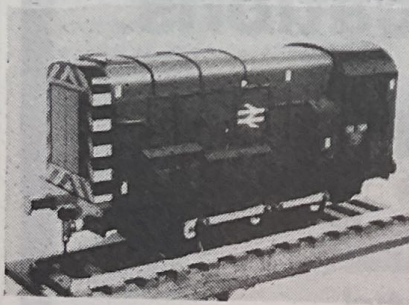
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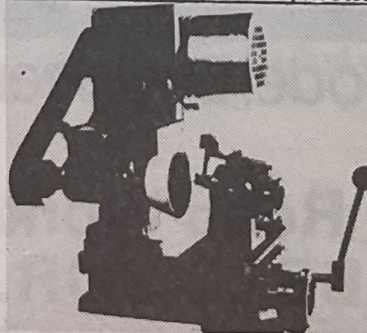
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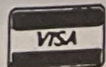
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Calculation of Results

The dynamometer car measures and gives a direct reading of Total Work Done* in foot pounds and Total Distance Travelled* in feet. In addition the Overall Run Time* (minutes) and Weight of Coal Used* (pounds) are recorded. Parameters marked * are shown on Results Board

From these parameters the following calculations can be made:—

$$\text{Average Draw Bar Horse Power} = \frac{\text{Total Work Done (ft. lb.)}}{\text{Overall Run Time (mins.)} \times 33,000} \text{ h.p.*} \dots\dots\dots (1)$$

$$\text{Coal Consumption Rate} = \frac{\text{Weight of Coal Used (lb.)} \times 60}{\text{Overall Run Time (mins.)}} \text{ lb./hr.} \dots\dots\dots (2)$$

$$\text{Specific Fuel Consumption (S.F.C.)} = \frac{\text{Coal Consumption Rate}}{\text{Average Draw Bar Horse Power}} \dots\dots\dots (3)$$

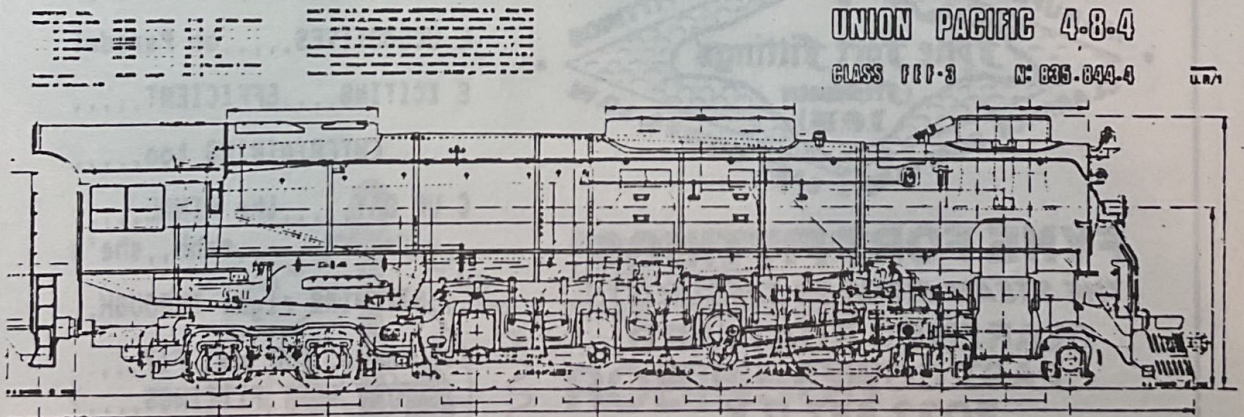
$$\text{Substituting (1) and (2) in (3) S.F.C.} = \frac{\text{Weight of Coal Used (lb.)} \times 1,980,000}{\text{Total Work Done (ft. lb.)}} \text{ lb./D.B.H.P. hr.*} \dots\dots (4)$$

$$\text{Now, Overall Thermal Efficiency} = \frac{\text{Work Output} \times 100\%}{\text{Heat Input}}$$

Assuming the calorific yield of the coal to be 14,000 B.Th.U/lb., 1 lb. of coal will yield 14000 x 778 ft. lb. of heat where 778 is the number of ft. lb. per B.Th.U.

$$\text{From (4) Overall Thermal Efficiency}^* = \frac{1,980,000 \times 100}{\text{S.F.C.} \times 14,000 \times 778} = \frac{18.1785}{\text{S.F.C.}} \% \dots\dots\dots (5)$$

The locomotive which returns the highest Overall Thermal Efficiency is the winner.



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Acknowledgements

The Bournemouth & District Society of Model Engineers extend their grateful thanks to the individuals and organisations mentioned below for their help in making IMLEC 86 a success.

The Directors of AFC Bournemouth for the valuable help with car parking arrangements and toilet facilities.

The St. John Ambulance Brigade.

The Borough of Bournemouth Parks Department.

The Birmingham Society of Model Engineers Ltd. and The Bristol Society of Model and Experimental Engineers for the loan of their dynamometer cars.

N. Goddard, Esq. King's Park catering concessionaire.

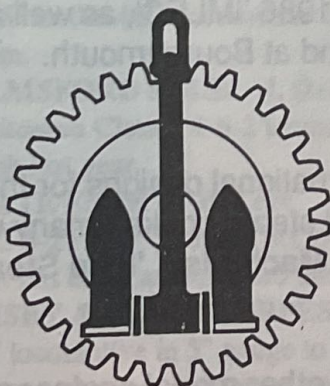
Richard Knott for providing the public address system.

Steve Hunt for the cover design.

Rob Mackie for help with the drawings.

And by no means last, all the enthusiasts whose unfailing support helps to make *IMLEC 86* so successful.

The fuel provided for all competitors has been most generously donated by *Western Fuels Ltd.* of Ashley Road, Boscombe, Bournemouth.



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extend best wishes to all Competitors in the 1986 'IMLEC', as well as to visitors, and hope they all have an enjoyable weekend at Bournemouth.

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Competitors for Saturday

- 1. NORTH WALES M.E.S. - H. Barton**
LMS 4-6-0 *Patriot* Class locomotive in 3 1/2" gauge. Seventeenth at Urmston last year.
- 2. WIGAN D.M.E.S. - B. Ellis**
CNR 2-8-0 locomotive in 3 1/2" gauge to Martin Evans' *Buffalo* design. The frames were started about twenty years ago and then left alone. Work re-started last January when the builder was made redundant and the loco was steamed at Easter.
- 3. GRAVESEND M.M. & E.S. - M. Staniforth**
NER 0-8-0 Locomotive in 3 1/2" gauge to the LBSC *Netta* design. Entered by the youngest competitor this year - 19 years old and the club secretary.
- 4. S.M. & E.E. - P. Wardropper**
CR 0-6-0T locomotive in 3 1/2" gauge to Martin Evans' *Rob Roy* design this loco last ran in *IMLEC* at Bristol two years ago. It has since had fully radiant stainless superheaters fitted.
- 5. VAUXHALL/BEDFORD M.E.S. - L. Taylor**
LMS Stanier 2-6-4T No. 2570 in 3 1/2" gauge to the *Jubilee* design by Martin Evans.
- 6. STAINES S.M.E. & C. - L. Morgan**
BR Standard Class 4 locomotive in 3 1/2" gauge to the LBSC design.
- 7. TAUNTON M.E. - F. Dodden**
GWR 4-6-0 *King* Class in 3 1/2" gauge. "King George V" was completed three years ago to the Clarksons of York design. The builder, who is retired, has built several locomotives.
- 8. CANVEY R.M.E.C. - B. Baker**
GNR 2-8-0 5" gauge locomotive to the Martin Evan *Nigel Gresley* design. Named "Freda", both loco and owner/driver are first time *IMLEC* entrants.
- 9. ROLLS ROYCE M.E.C. - I. Mackenzie**
BR Class 4 2-6-4T locomotive in 5" gauge. Placed eleventh at Urmston last year.
- 10. WIRRAL M.E.S. - I. Jameson**
GWR 57xx 0-6-0PT locomotive in 5" gauge. Retired last year with a mechanical problem.
- 11. CHELMSFORD S.M.E. - J. Dalton**
BR *Britannia* Class 7 4-6-2 locomotive in 5" gauge. "William Wordsworth" came fifteenth last year.
- 12. PRIVATE ENTRY - P. Care**
GWR 2-6-2T in 5" gauge. This locomotive is the work of last year's "*Curly Bowl*" winner. His entry at Guildford ended with a de-railment.
- 13. GRIMSBY & CLEETHORPES M.E.S. - M.A. Halliday**
0-6-0T locomotive in 5" gauge to the Martin Evans *Simplex* design. Mods include two radiant superheaters and larger capacity water tanks. His first 5" gauge steam loco.
- 14. LINDSEY M.S. - M. Gregory**
GER Y4 Class 0-4-0T locomotive in 5" gauge. Built to the Ross Harrison design this is his first engine and won the *Locomotive Cup* at the '85 Grimsby & Cleethorpes M.E.S. Exhibition. It took four years of spare time to build.
- 15. WESTLAND M.E.S. - A. Mattock**
LNER Class V1 2-6-2T locomotive in 5" gauge to the Martin Evans *Enterprise* design.

Competitors for Sunday

16. **STROUD S.M.E. - V.E. Hicks**
GWR 4-6-0 *Manor* Class locomotive in 5" gauge to Martin Evans' design. The builder is a carpenter and is building a GWR *Castle* Class loco.
17. **CANNOCK CHASE M.E.S. - J.E. Acton**
GWR 45xx "*Small Prairie*" 2-6-2T locomotive in 5" gauge to the Martin Evans *Firefly* design. Mods include a smokebox drum-type feedwater heater, four-element superheaters and moped piston-rings!
18. **WELLING S.M.E. - F. Stubbs (builder) M. Alan (driver)**
MR 0-10-0 *Lickey Banker* locomotive in 5" gauge, built from the "Works" General Assembly drawing and photographs. Four cylinders, crossed ports and Walschaerts valve gear to the outside cylinders!
19. **WORTHING D.S.M.E. - L. Filppance**
BR *Britannia* Class 7, 4-6-2 locomotive in 5" gauge. "Coeur de Lyon" is his first attempt at model engineering and came second last year.
20. **DYFED M.E.S. - G. Thomas**
GWR *Hall* Class 4-6-0 locomotive in 5" gauge.
21. **ROMFORD M.E.C. - A. Jacobs**
Liverpool & Manchester Rly. 0-4-2 locomotive in 5" gauge to LBSC's *Titfield Thunderbolt* design with mods by the builder. Built as a birthday present for Mrs. Jacobs, "Jeannette" was started in October '84 and steamed in May 85.
22. **PORTSMOUTH M.E.S. - L. Morley**
GWR 45xx "*Small Prairie*" 2-6-2T locomotive in 5" gauge to the *Firefly* design by Martin Evans. It was entered in the 1983 event at Guildford but retired.
23. **NEWPORT M.E.S. - J. Rodway**
0-6-0ST locomotive "Carodoc" in 5" gauge based on the Martin Evans *Simplex* design. Named after a local colliery engine driven by the builder's father.
24. **BRISTOL S.M. & E.E. - R. Pullen**
GWR 57xx 0-6-0PT locomotive in 5" gauge to the LBSC *Pansy* design.
25. **SUTTON COLDFIELD & NORTH BIRMINGHAM M.E.S. - P. Smith**
I.o.M. Rly. 2-4-0T locomotive No. 17 in 5" gauge. "Crellin" is in the style of the Beyer Peacock locos used on the Isle of Man, and was designed by the builder.
26. **STITCHING MINIARUUSTOOM SPOORWEGEN - J. Merlijn**
BR *Britannia* Class 7 4-6-2 locomotive in 5" gauge. One of the increasing number of model engineers on the Continent, Jan entered the locomotive at Guildford but had to retire.
27. **CHINGFORD D.M.E.C. - K. Moonle**
L & SWR *Jubilee* Class 0-4-2 locomotive in 5" gauge. Kelvin, who came second at Bedford in 1980, designs his locos and makes most of the patterns for the castings.
28. **URMSTON D.M.E.C. Ltd. - D. Edlsbury**
Leek & Manifold Rly. No. 2 "J.B. Earle" in 5" gauge.
29. **FAREHAM D.S.M.E. - E.C. Stevens**
LMS *Duchess* Class 4-6-2 four-cylinder locomotive in 5" gauge built from drawings and castings supplied by the now defunct firm of Clarksons of York.
30. **PRIVATE ENTRY - A. Crossfield**
LNER 2-8-0 loco in 5" gauge to the *Nigel Gresley* design by Martin Evans. This is last year's *IMLEC* winner defending his title.

RULES OF THE COMPETITION

RULES AND ORGANISATION

1. On arrival, competitors should register at Reception where all necessary information concerning the day's events will be available, including the approximate time of run.
2. One hour before the start of each run, the driver will be called to prepare his locomotive in the presence of an Official Observer who will also be at hand to offer any assistance required.
3. Two sizes of fuel will be provided in pre-weighed bags.
4. As much charcoal, wood and paraffin as required will be provided for raising steam. The change to weighed coal will be at the driver's discretion, but he must have a good coal fire before starting the run. This he must be ready to do immediately on the conclusion of the previous run.
5. The train with dynamometer car will be prepared to carry the number of passengers chosen by the competitor. Every train hauling passengers on vehicles other than the dynamometer car will carry a brakeman who will be provided by the host Society.
6. The duration of the run will be a nominal 30 minutes. When 26 minutes of the run have elapsed the driver may, at his discretion, decide to finish his run at the conclusion of that lap. No penalty will be incurred should the driver choose to adopt this course of action. No time allowance will be made for any stops other than derailments. The timekeepers will keep competitors informed of their progress and indicate when on the last lap. The run must finish at the start/finish point to unload passengers. Should a driver stop short of the station due to shortage of steam, water or coal, even though he has been running for the full thirty minutes, he must "blow-up" and complete the run to the station.

7. Should the load prove too much for the locomotive, one or more passengers may be off-loaded wherever it is safe to do so.
8. Water will be handed to competitors as required in suitable containers so that they may top-up without stopping.
9. At the end of the run, the locomotive will return to the steaming bay, when all unused coal will be collected and weighed in the presence of the driver. No allowance will be made for unburned coal left in the firebox.
10. The results will be calculated by the Society's Officials and displayed as soon as possible.

DISQUALIFICATION

11. A maximum speed limit of 12 m.p.h. will be in operation for the competition. The Official Observer will advise drivers if this speed is approached. He will give a warning if the speed limit is exceeded. Three such warnings may result in disqualification.
12. During the measured run, trains must not be assisted externally in any way; all work must be provided by the locomotive. Competitors must not lean on the locomotive or tender in such a way as to increase the drawbar pull. The use of the hand pump is not permitted except in an emergency when all other means of water feed have failed and the engine must then be retired. Infringement of any part of the rule will result in disqualification.
13. A locomotive fitted with working sanding gear may use it at the driver's discretion. However, sand will not be provided by the host society for any competitor.
14. The decision of the Chief Judge is final. Judges will be appointed by the Bournemouth and District Society of Model Engineers.

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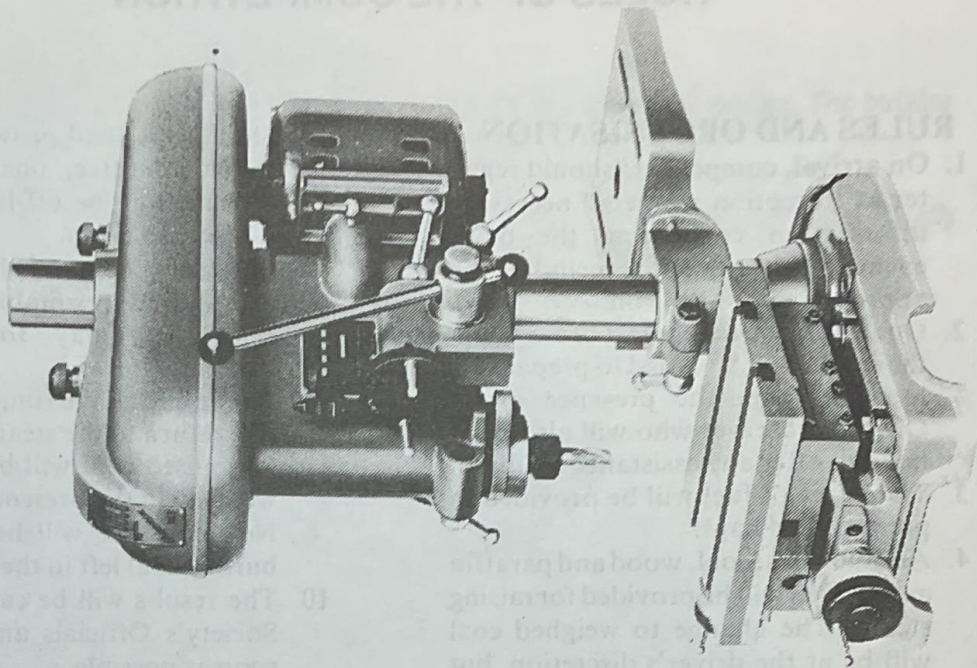
DRILL CHUCK
No. 2 MT COLLETS
VERTICAL FINE FEED (illustrated)
COMPOUND TABLE
MORTISING ATTACHMENT

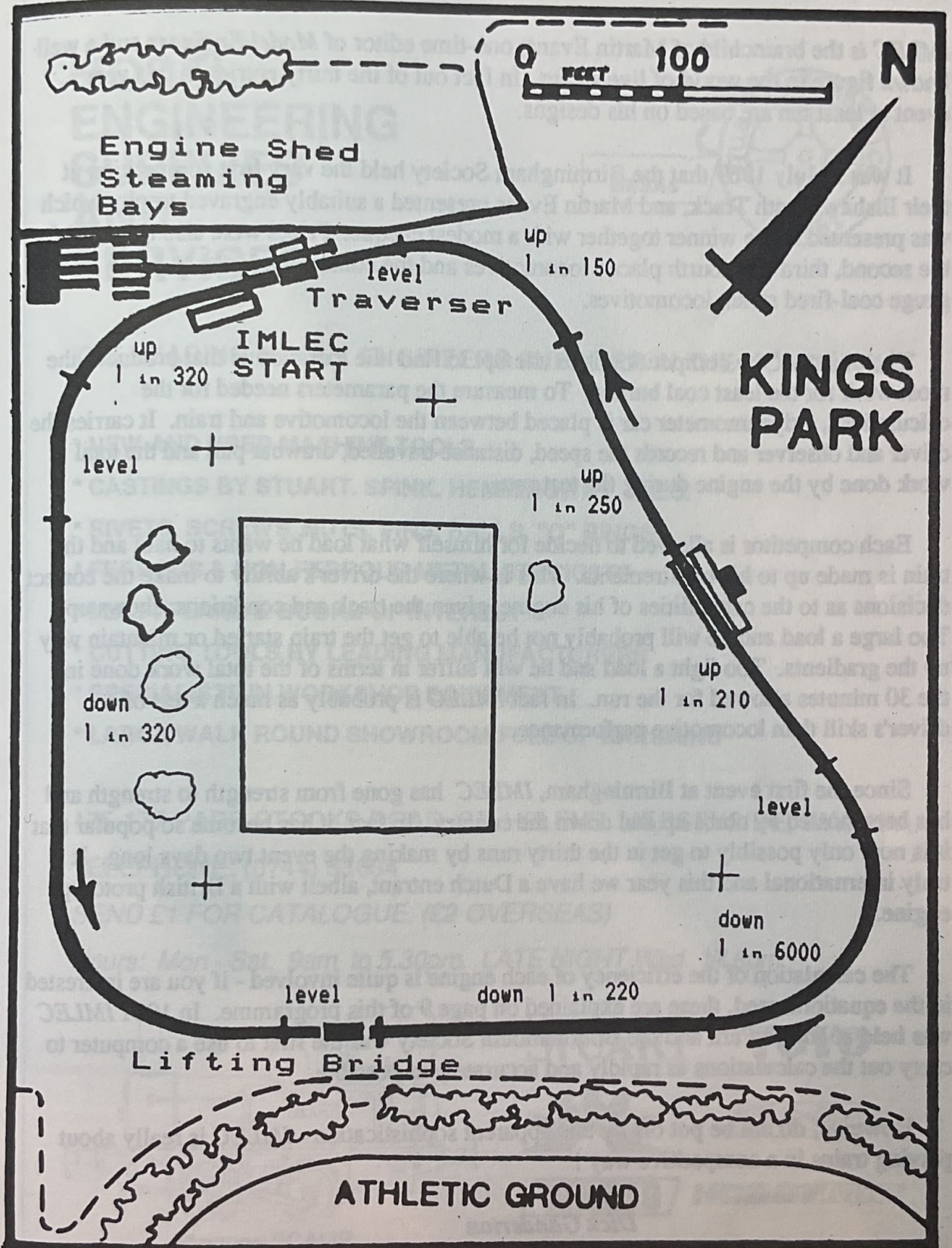
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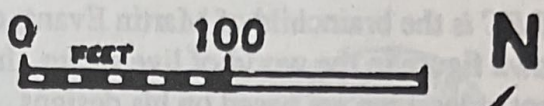
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up
1 in 150

level

up
1 in 250

down
1 in 320

up
1 in 210

level

down
1 in 6000

level

down 1 in 220

Lifting Bridge

ATHLETIC GROUND

About I.M.L.E.C.

IMLEC is the brainchild of Martin Evans, one-time editor of *Model Engineer* and a well known figure in the world of live steam. In fact out of the thirty entries in this year's event at least ten are based on his designs.

It was in July 1969 that the Birmingham Society held the very first competition at their Illshaw Heath Track, and Martin Evans presented a suitably engraved trophy which was presented to the winner together with a modest cheque. Prizes were also arranged for the second, third and fourth placed locomotives and the contest was open to 3 1/2" and 5" gauge coal-fired steam locomotives.

The object of the competition is to attempt to find the locomotive that produces the most work for the least coal burned. To measure the parameters needed for the calculations, a dynamometer car is placed between the locomotive and train. It carries the driver and observer and records the speed, distance travelled, drawbar pull and the total work done by the engine during the test run.

Each competitor is allowed to decide for himself what load he wants to haul and the train is made up to his requirements. This is where the driver's ability to make the correct decisions as to the capabilities of his engine, given the track and conditions, shows up. Too large a load and he will probably not be able to get the train started or maintain way up the gradients. Too light a load and he will suffer in terms of the total work done in the 30 minutes allowed for the run. In fact *IMLEC* is probably as much a test of a driver's skill than locomotive performance.

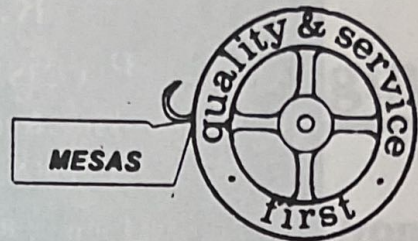
Since the first event at Birmingham, *IMLEC* has gone from strength to strength and has been hosted by clubs up and down the country. In fact, it has become so popular that it is now only possibly to get in the thirty runs by making the event two days long. It is truly international and this year we have a Dutch entrant, albeit with a British prototype engine.

The calculation of the efficiency of each engine is quite involved - if you are interested in the equations used, these are explained on page 9 of this programme. In 1981 *IMLEC* was held at King's Park and the Bournemouth Society was the first to use a computer to carry out the calculations as rapidly and accurately as possible.

However, do not be put off by this apparent sophistication - *IMLEC* is really about playing trains in a competitive way !

Dick Ganderton
Chairman,
Bournemouth & District Society of Model Engineers

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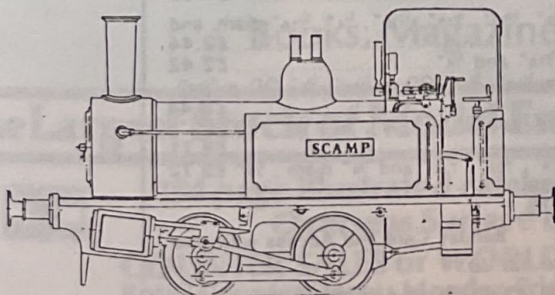
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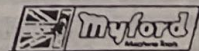
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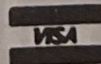


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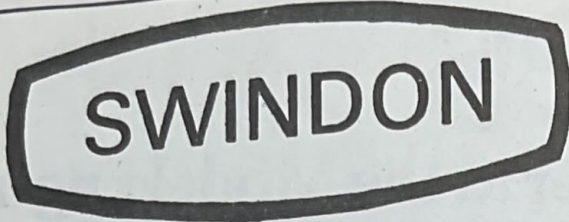
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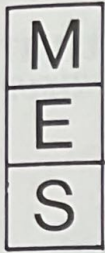
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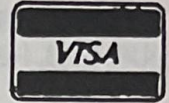


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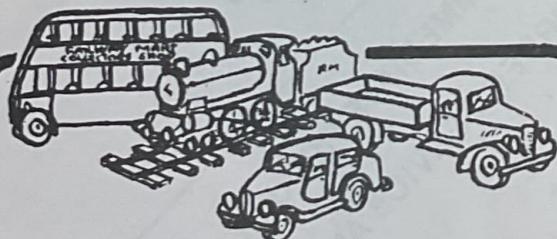
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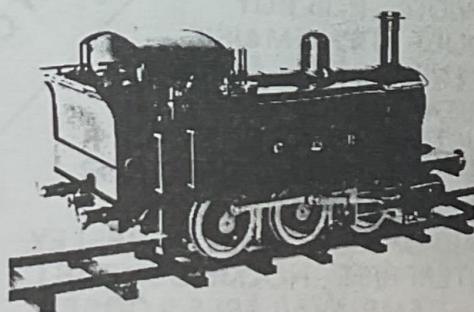
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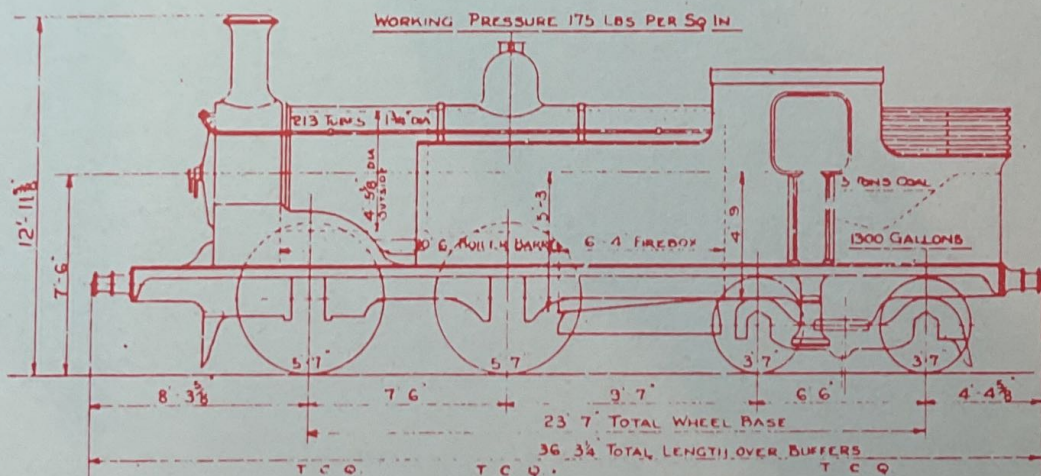
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