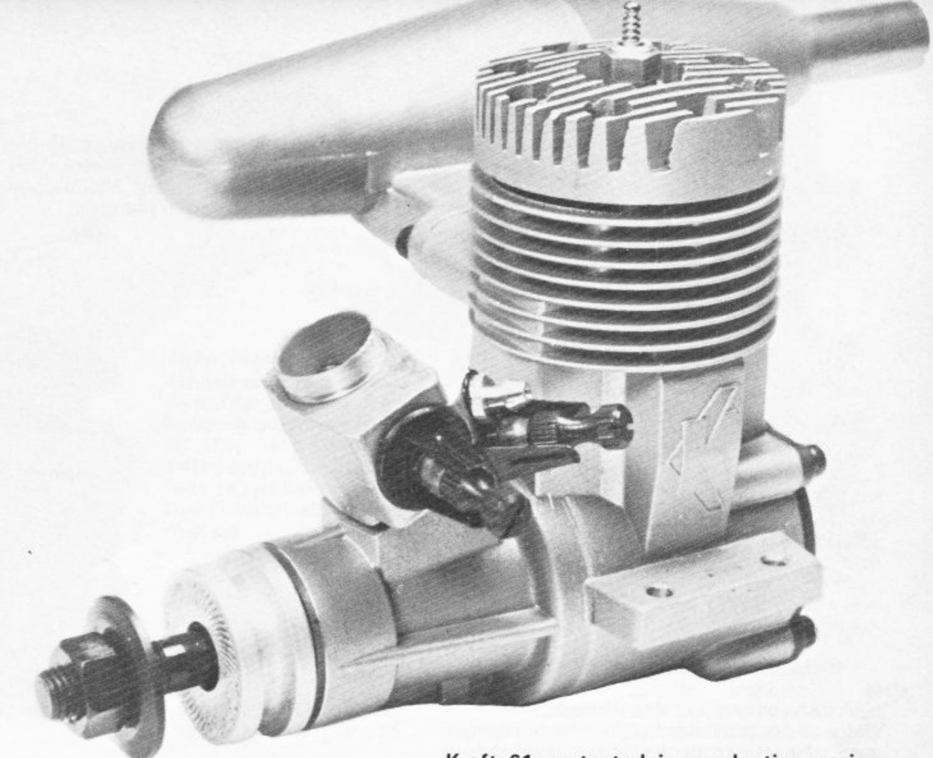
Peter Chinn's

RADIO MOTOR COMMENTARY



Kraft 61, re-tested in production series model, proved to have better top-end performance than pre-production version reported upon in these columns last year.

Kraft 61 again

A detailed description of the then-new Kraft 61 was published in these columns just over a year ago and test findings appeared one month later in the September 1975 'Commentary'.

The actual engine dealt with at that time was one from the very first, relatively small, production batch and, although the engine developed high maximum torque on test and, as a result, showed excellent performance on big props, torque fell off a little more rapidly under lighter loads than one might expect, as a result of which the actual peak horsepower developed was, as we stated at the time, not quite so high as had been anticipated.

Our findings were passed on to designer Roger Theobald, at the Kraft factory in California, who, a few months later, confirmed that their own tests had also indicated a need for one or two modifications. A new, revised, production model was subsequently received and a second series of tests was undertaken.

It is with this improved version that our present report deals and the manner in which it differs from the earlier model is as follows.

First, several modifications to ports and port timing have been made. The centrally bridged exhaust port is now deeper, extending the exhaust period by about 5 degrees to approximately 147 deg. of crank rotation. The fore and aft transfer ports are unchanged in area, but are also timed for longer opening: approximately 122 deg. instead of 116 deg. The third port period is slightly modified from approximately 108 deg. to 110 deg. The rotary-valve period has been extended by about 9 degrees, the measured valve timing on our motor being 31 deg. after bottom dead centre to 54 deg. after top dead centre. The gas passage through the crankshaft is slightly smaller at 11.5mm, compared with 11.8mm for the original model. This is still larger than most other front induction .60s using 15mm shafts, but the reduction may have been a precautionary measure to preserve crankcase strength in view of the wider port now used to extend the intake period.

The first production model Kraft 61 engine had a white polyfluorocarbon coating on the piston crown. The purpose of this was, presumably, to form a heat shield that would reduce the amount of heat conducted to the piston bosses and thereby prolong piston life by reducing the rate of wear in the gudgeon-pin holes. Our tests on the original indicated that this shielding did work and the piston interior remained remarkably bright and free from discoloration.

From the manufacturing standpoint, however, the polyfluorocarbon shield proved to have certain snags, the coating thickness being critical yet difficult to control and the process has been abandoned for the present. There is no suggestion in this that gudgeon-pin bearing life will necessarily suffer. The Kraft uses a ¼ in. (nominal) o.d. hardened tubular gudgeon-pin that is extremely closely fitted (virtually a press fit) to the piston and, although circlips are used to limit any axial movement of the gudgeon-pin that might occur when the piston is hot, the fit of the gudgeon-pin remained firm in the piston at the end of testing.

Slight modifications have been made to the bowl-and-squishband type cylinder head. The bowl had a 0.5mm smaller diameter (now 16.5mm) and a fractionally wider squishband. No gasket is used and the measured nominal geometric compression ratio of our motor was 11.5:1.

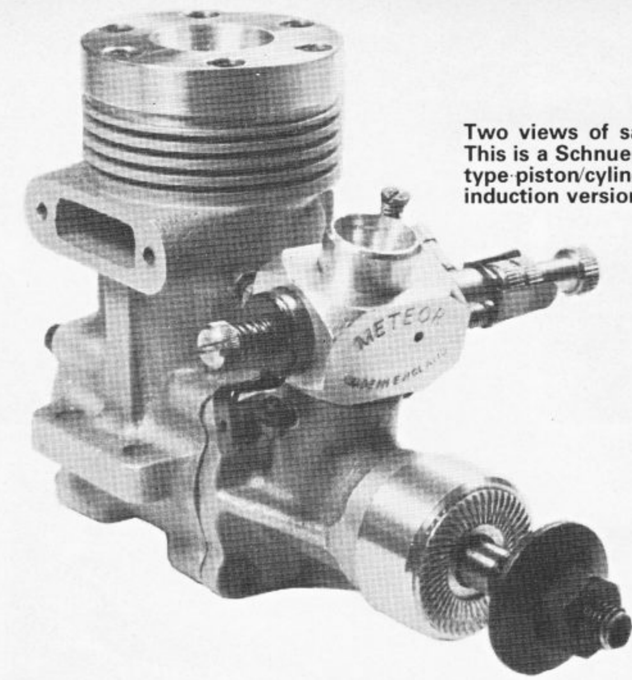
The Kraft uses a non-metallic crankcase-backplate, moulded in glass-filled nylon with an O-ring seal instead of a gasket. In our description of the original engine, it was remarked that this was rather too loose a fit in the backplate groove, and this has been corrected in the current version.

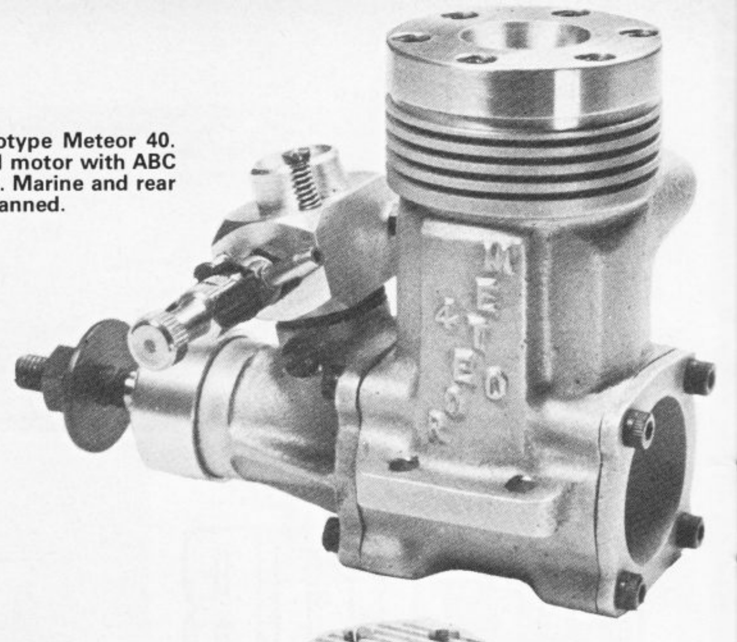
After running-in, in accordance with the manufacturer's recommended procedure, the Kraft was first checked out on our standard 5 per cent nitromethane R/C test fuel. Prop revolutions recorded at this point, *without* silencer, included:

9,600 rpm on a	14×6	Top Flite maple
11,800 rpm on a	12×6	Top Flite maple
11,800 rpm on an	11×7¾	Power Prop maple
12,950 rpm on an	11×7½	Power Prop maple
13,400 rpm on an	11×8	Robbe glassfibre-nylon
13,800 rpm on an	11×6	Top Flite maple
14,400 rpm on an	11×6	Power Prop maple
15,800 rpm on a	10×6	Top Flite maple

Adding the silencer had little effect on power output when the engine was loaded for relatively low speeds, but torque fell off more rapidly as load was reduced. This lowered the peak power output from approximately 1.52 bhp at 15,500 rpm to 1.32 bhp at 13,500 rpm. In terms of prop revolution this meant reductions in static rpm ranging from 200 on, for example, a 12×6, to 600 rpm on an 11×6.

Below: two new U/J marine couplings. Left is Toyoda type supplied for use with OS Max-80 Marine. Irvine ball-and-pin type is available in a variety of sizes and threads.





Two views of sandcast prototype Meteor 40. This is a Schnuerle scavenged motor with ABC type piston/cylinder assembly. Marine and rear induction versions are also planned.

A gross output (i.e. less silencer) of over 1.5 bhp on 5 per cent nitro fuel may be considered very competitive in the 10 c.c. R/C engine class. It puts the Kraft among the established leaders of this group, all of them Schnuerle scavenged units, such as the Webra Speed-61, OS Max 60F-SR, OPS Ursus and HP 61-FS.

The Kraft ran well on our standard 5 per cent nitro R/C test fuel, but we also checked it out on a 15 per cent nitro fuel, as a 15 per cent blend is suggested (after adequately running-in) by the manufacturer. On test, this was found to add 200-250 rpm to the full throttle performance on the most commonly used prop sizes. The engine ran steadily over the whole usable load-speed range and with a relatively low level of vibration.

Starting qualities were good. The engine had good piston seal from new, giving sufficient compression for a quick start both hot and cold. The Kraft carburettor has no throttle stops, which is rather inconvenient for bench running but is no disadvantage normally when the engine is installed in a model and servo movement is used to determine the throttle position. The throttle worked satisfactorily on test, giving a safe idling speed, on normal props, of approximately 2,500 with instant recovery and good mid-range control.

The only real criticism we have to make concerns the silencer supplied with the engine. This is fairly light (2.6 oz) but offers very limited noise suppression, at the cost of about 13 per cent in peak power output. A silencer of larger volume but with a smaller area outlet could be expected to be more effective without causing significantly greater power loss.

For the benefit of readers who did not see our earlier report, the Kraft 61 has a bore and stroke of 0.940 × 0.875 in. giving a swept volume of 0.6072 cu. in. or 9.951 cc. It weighs 481 grammes (17.0 oz.) bare, or 556 grammes (19.6 oz.) with Kraft silencer.

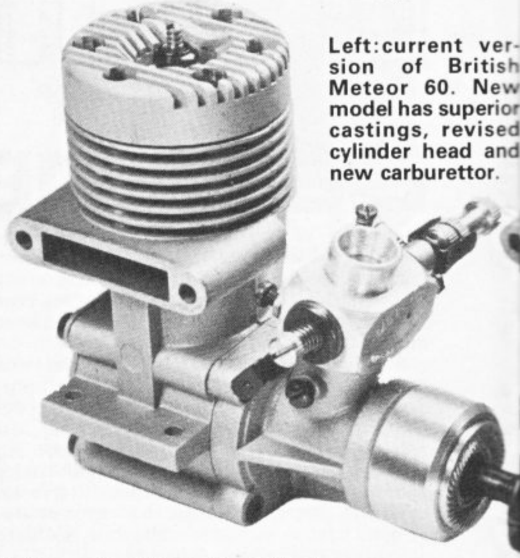
Meteor 40

As regular readers of these columns will know, the Meteor 60 engine, formerly produced and distributed by Jim Herbert and Keith Jones, was taken over in 1973 by the Wisemore Engineering Company Ltd. of Erdington, Birmingham, under the direction of D. J. D. Rowe and J. R. Follis, who subsequently formed a new company, Meteor Model Engines Erdington Ltd. to manufacture and market this and other planned Meteor products.

The Meteor 60 is, of course, a strictly conventional crossflow scavenged motor but, for some time, the manufacturer has been working on a 40 of rather more up-to-date design. We have recently been loaned a 40 prototype for appraisal and Mr. Rowe was kind enough to grant permission for this to be photographed and described in R.C.M.&E.

The Meteor 40, in accordance with currently accepted practice in the high performance .40 R/C class, is a Schnuerle scavenged unit. It also features an ABC type piston/cylinder set-up. The first pre-production batch of engines will, like the prototype described here, have a sand cast crankcase/cylinder casing unit and a sand cast front housing, but regular production units will use die castings.

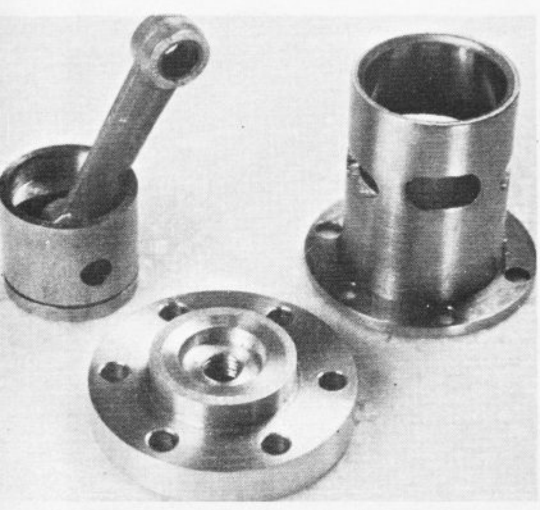
Below left: Meteor 40 uses ringless aluminium piston running in chromed brass cylinder liner having very wide top flanges. Below and below right: other parts of Meteor 40. Pre-production units will have sand castings, like prototypes, but standard production units will be die-cast.

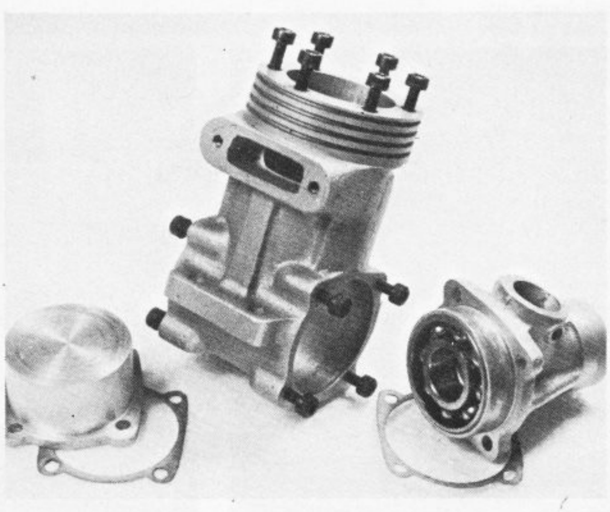


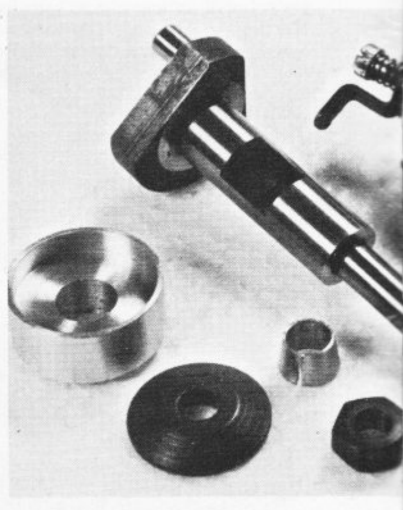
Left: current version of British Meteor 60. New model has superior castings, revised cylinder head and new carburettor.

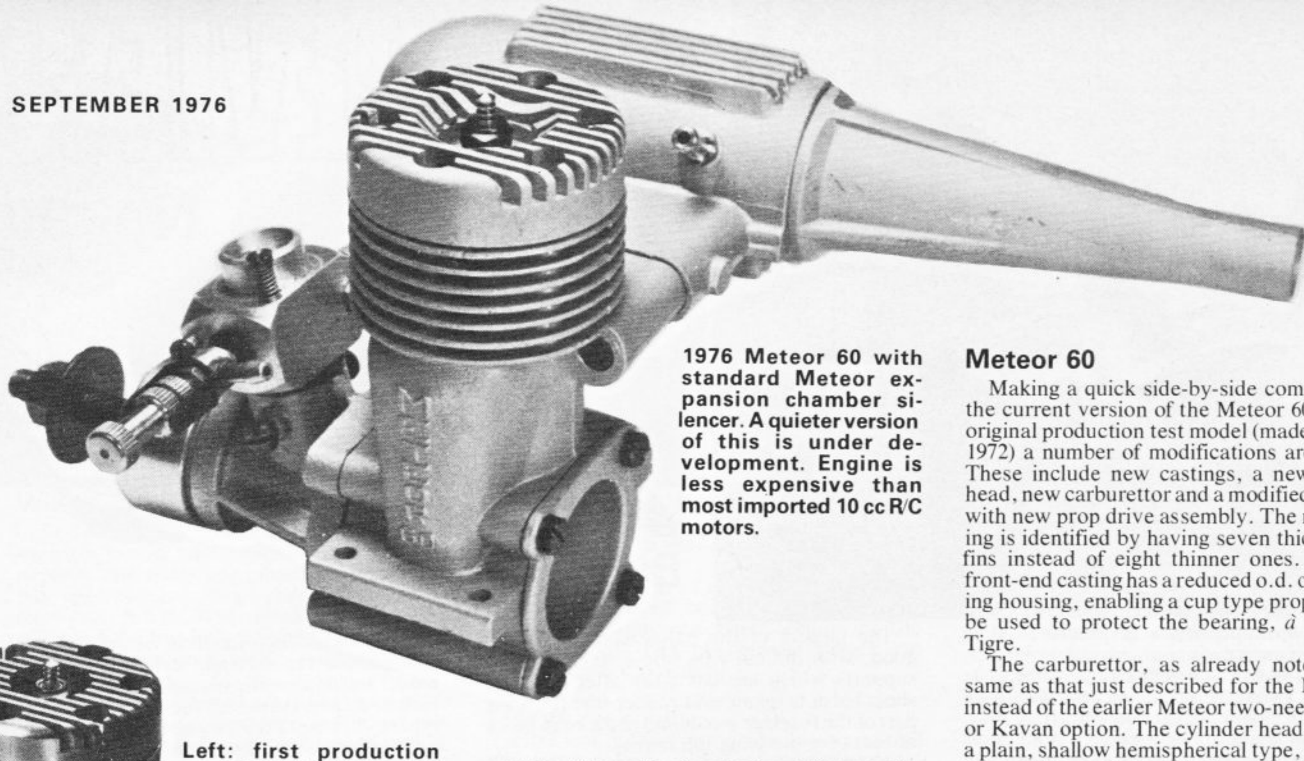
The Meteor 40 is, of course, a twin ball bearing motor. The crankshaft is made from high-tensile steel, hardened, with a 12mm o.d. main journal, 7mm dia. front journal and a 6mm dia. solid pressed-in crankpin. Although a 12mm o.d. shaft journal is relatively small by current high performance front-intake .40 cu. in. engine standards, the shaft has a fairly generous gas passage (9.2mm i.d.) that is fed from a rectangular valve port. The shaft runs in a 7-ball 7 × 19mm shielded ball journal bearing at the front and an 8-ball 12 × 28mm steel-caged ball journal bearing at the rear.

The chromium plated brass cylinder liner has a generous wall thickness (2.2mm) and a very wide top flange that is drilled to take the head screws. It has an unbridged exhaust port

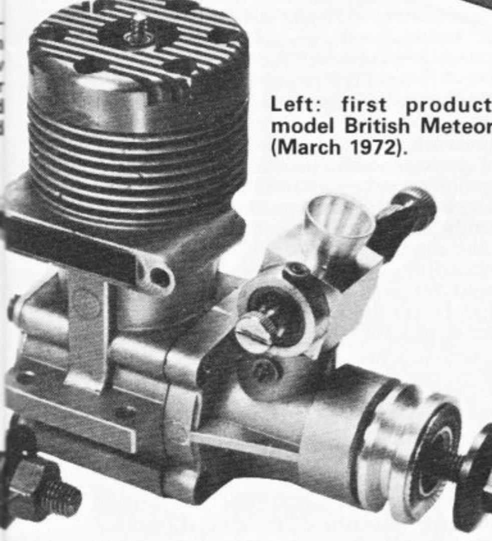








1976 Meteor 60 with standard Meteor expansion chamber silencer. A quieter version of this is under development. Engine is less expensive than most imported 10 cc R/C motors.



Left: first production model British Meteor 60 (March 1972).

on the right side, flanked by the two main transfers, angled to direct gas to the opposite side of the cylinder, and the usual upwardly inclined third port diametrically opposite the exhaust port. These three ports are fed from vertical channels in the main casting.

The ringless aluminium piston is machined from high silicon content aluminium and, in the prototype, is of quite hefty construction. It has a flat crown, an oil retention groove 3mm below the crown and is coupled to the connecting-rod with a 5mm dia. solid gudgeon-pin located by wire circlips. The conrod is forged from RR.56 high-duty aluminium alloy – an old and well-proved conrod material – and is fitted with phosphor-bronze bushes at both ends.

The plain, unfinned cylinder head is machined from alloy bar stock and features the now widely used bowl and squishband type combustion chamber. The squishband is 4.3mm wide, the inner 2.5mm of this width being angled upward while the outer edge remains flat. It surrounds a shallow, almost flat, bowl with central glowplug. Six 3mm Allen cap screws are used to secure the cylinder head. No gasket is fitted.

The carburettor is Meteor's own and is similar to that currently fitted to the Meteor 60 but with a slightly reduced choke size and a 12mm spigot diameter (instead of ½in.) to fit the 40's smaller intake boss. The carb is a two-needle automatic mixture control type similar to the Webra TN, but with an airbleed and with the idle needle controlling a radial slit type jet in the jet tube which extends about 70 per cent across the width of the 8mm i.d. choke.

The Meteor 40 is rather more 'over-square' than most of its contemporaries. Cylinder bore is 0.850 in. and piston stroke is 0.700 in., giving a stroke bore ratio of 0.824:1 and a swept volume of 0.3972 cu. in. or 6.5092 cc.

The heftily built sandcast prototype checked out at 399 grammes (14.07 oz) but the production model should be somewhat lighter in weight. Details of the actual production engine and, we hope, its performance, will be given in this column as soon as these motors become available.

Below and below right: 1976 Meteor 60 parts. New castings are produced by gravity die casting process. Cylinder-head now has squish-band. Carburettor is of two-needle type with airbleed.

Meteor 60

Making a quick side-by-side comparison of the current version of the Meteor 60 with our original production test model (made in March 1972) a number of modifications are evident. These include new castings, a new cylinder head, new carburettor and a modified front end with new prop drive assembly. The main casting is identified by having seven thick cooling fins instead of eight thinner ones. The new front-end casting has a reduced o.d. outer bearing housing, enabling a cup type prop driver to be used to protect the bearing, *à la* Super-Tigre.

The carburettor, as already noted, is the same as that just described for the Meteor 40 instead of the earlier Meteor two-needle design or Kavan option. The cylinder head, formerly a plain, shallow hemispherical type, now has a 3mm wide, angled squishband and is rather deeper with, externally, a shallow depression surrounding the plug recess. It now has a plain matt grey finish instead of the red anodised finish of the older model.

The weight of this latest model Meteor 60 checked out at 465 grammes (16.4 oz) or just 3g. more than the earlier model. Adding the Meteor expansion chamber silencer pushes this figure up to 578 g. or 20.4 oz.

One area where the Meteor scores, in comparison with some of the more exotic 10 cc R/C motors now on the market, is price. With many of the imported high performance Schnuerle scavenged 60s now costing between £50 and £60, the Meteor, at £31.50, is frequently a more saleable proposition to the ordinary club flyer. In fact, when talking recently to Jim Bowden and Nigel Ashwood of Langleys, one of East Anglia's largest model dealers, we learned that the Meteor is now their current best seller to local modellers, in the 10 c.c. class. Obviously, there is a continuing market for a moderately priced 60 (the Merco 61 and Fox Eagle are other examples) and with the recent falls in the value of sterling, British manufacturers are obviously in a very favourable position to compete in this market.

Meteor engines are now being distributed through three wholesale outlets in the U.K., namely, Irvine Engines, Keith Jones and Micro-Mold. The manufacturers state that spare parts are moderately priced and that the factory can execute repairs within 48 hours. Their address is: Meteor Model Engines Erdington Ltd., 9-11 Station Road, Erdington, Birmingham B23 6UB, telephone no. 021-373 6386.