EARLIER this year, letters in the correspondence columns of Flight, from Lt.-Col. C. E. Bowden, Mr. J. M. West of Associated Motor Cycles, Ltd., and others, served to remind us how badly off we are in this country for light aero-engines. No doubt the lack of interest shown by manufacturers is attributable to such factors as the large number of regulations which hedge-in private flying, its high cost and the manufacturing difficulties which have beset industry of recent years.

The second item suggests the existence of a vicious circle because, surely, the absence of suitable low-cost economical engines contributes considerably to the expense of such flying as is possible.

Col. Bowden suggested that the modern vertical-twin motorcycle engine might well prove a suitable power unit for a light aircraft in view of its relatively low price and weight and its high power-output. This theme merits consideration; and the results of a study of the possibilities are given in the notes which follow.

Modified motor-cycle and even car engines have, of course, been employed for aircraft-propulsion in the past, and many readers will no doubt recall such small motors as the Douglas, Anzani, J.A.P., Scott and Carden-Ford. The majority of them suffered from rather poor power/weight ratio and fuel economy. Since the 1930s, however, developments in design, production methods and metallurgy have effected considerable improvements.

The U.S.A. and certain of the European countries produce quite a number of engines in the 60-80 h.p. range, whilst the smallest British engine in current production is the Cirrus Minor, with a take-off output of 90 h.p. The only other small engine available here is the horizontally-opposed twin of 36 h.p., of several of which are still extant. This motor has recently achieved publicity in connection with the Dart Kitten "Make it Yourself" kit. It seems to be agreed that about 40 h.p. for take-off is the minimum desirable to give reasonable performance and power in reserve for normal still-air cruising at about 60 m.p.h. An engine installed-weight in the region of 150 lb should not be excessive. The engine should run on 72 octane (minimum) fuel and should give a cruising duration of, say, 3½ hr.

Table I lists the salient details of motor-cycle engines which could be considered for this type of work, while Table II gives comparable figures for the leading U.S.A. and Continental aircraft engines of 2-3 litres capacity.

Figures of weight, power output, etc., quoted in Table I should be regarded as approximate, because the conditions are not standardized (i.e., it is not known which of the power figures were taken with exhaust silencers and/or air filters; nor have all the makers stated whether the weight includes magneto, carburettor, dynamo, etc.). Official figures for the Matchless engines are not available, but it is understood that the standard G.9 unit gives about 29 h.p. at 7,000 r.p.m.; the same engine with "racing kit" incorporated gives about 38 h.p. at 7,200 r.p.m.; and the G.45 racing engine produces in the region of 50 h.p. at 7,500 r.p.m. All three have a bore and stroke of 66 mm and 72.8 mm, giving 498 c.c. capacity, and the respective weights are 98 lb, 99 lb (twin carburettors are included in the racing kit) and 101 lb complete.

Before we delve more deeply into figures, some design-details may be of interest. All the units listed are parallel (or 360 deg) twins with the exception of the Vincent, which is a 50 deg vee-twin, and of the Square Four Ariel, which has two 180 deg geared (modified) twins. Of the parallel twins, only the Matchless engine has a centre bearing for the crankshaft; the others appear to function perfectly well without one, due to the comparative shortness and stiffness of the shaft.

Crankshafts of these twins are usually steel forgings with a central flywheel, the balance-weights being shared between the crankshaft. Of the parallel twins, only the Matchless engine has a centre bearing for the crankshaft; the others appear to function perfectly well without one, due to the comparative shortness and stiffness of the shaft.

B.S.A. A.7 Star Twin (497 c.c., 31 b.h.p. at 6,200 r.p.m.).

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Crankshafts of these twins are usually steel forgings with a central flywheel, the balance-weights being shared between the crankshaft and the wheel. These crankshafts may be in one piece with the flywheel bolted to a flange; or they may be divided, each half being attached to the flywheel. An alternative layout is that favoured by Royal Enfield and Matchless, who employ a one-piece alloy-iron cast crankshaft which appears to be equally satisfactory.

Connecting rods are generally of R.R. 56 or similar light alloy, with split plain big-