

a car is born

For a quarter of a century the Rootes brothers wanted to build a small car. Now, with the Hillman Imp, which made its first appearance last Friday, they have done it. It is the first British mass-produced car to have a rear-mounted engine; it seats four, will do 45 miles to the gallon and can reach 80 m.p.h.

Can it succeed in the highly competitive small-car market? The answer will affect the lives of nearly all the people of a new town 12 miles from Glasgow. For without the Hillman Imp, Linwood would never have been. The Government loaned £23 million for the project—should it fail Rootes could be merged out of existence. Our motoring correspondent MAXWELL BOYD reports



Scotland's Hillman has its engine at the back, neatly angled for ease of access. With Britain out of the Common Market, selling the Imp abroad will be an even tougher business

A SMALL CAR these days is really a glorified shopping basket on wheels. It must be big enough to take the large parcels—the passengers and their luggage—but small enough and nippy enough to be 'portable' in our kind of traffic. It must also be easy to pack and unpack and, as the woman in the family carries the shopping basket, so she must be able to drive the car easily and without getting tired.

This is Craig Miller, Chief Engineer of the Rootes Group, summing up his idea of the Hillman Imp. Craig Miller has lived with the idea of a Rootes small car for 25 years; he has nursed the project through countless experimental, mock-up and prototype stages; last week the Imp was launched.

The brothers, William and Reginald Rootes, introduced their first Hillman Minx in 1933, the year Craig Miller joined the firm / continued on next page



as a young engineer. Following the success in the late thirties of Italy's Fiat 500, the first mass-produced baby car, the brothers started to 'think small.' They produced the prototype of a car based on the famous 'Topolino.' It had a 580 c.c. side-valve engine mounted at the front, but the war put an end to all ideas of production development.

In 1946, the small car idea was taken down from the shelf. Another prototype was built, this one on the lines of the Volkswagen, whose bomb-blasted factory at Wolfsburg was, at that time, being handed back to the Germans on the advice of the British motor industry, who declared that neither it, nor the product it was designed to make would be of any particular value to this country. The 1946 Rootes 'baby' had a 'flat' twin-cylinder air-cooled engine of 750 c.c., mounted at the rear. But this car, too, was shelved long before it reached production. The time, the brothers decided, was not yet ripe for motoring in miniature.

The project lay gathering dust for about eight more years. Meanwhile, no one in the British motor industry seemed to think seriously of trying to counter the rising tide of world-wide Volkswagen sales by producing a similar car. Then, in the middle fifties, Rootes built another flat-twin, rear-engined car—the first prototype of what is now the Imp. In December 1958, the Rootes brothers gave Miller the green light to go ahead and develop the vehicle—known by the factory code-name, 'Apex'—for production. At the same time, the 'flat' engine was dropped, though its rear position remained.

"We decided the machinery had to be grouped together, in the form of a 'power pack' consisting of the engine, gearbox and transmission combined, either at the front, or as Alec Issigonis planned it for the 'minis,' or at the back," Peter Ware, Director of Engineering, told me. "We settled for the back for various reasons. Traction is better and the weight distribution is better for smooth, even braking. As any car carries only two people for 90 per cent. of the time, the engine is as far from them as possible, making it quieter. Compactness means that the space over the engine can be used and the passengers are left with nothing in front to come back at them in an accident."

Engine came from Coventry Climax: "Everybody copies something, sooner or later"

A few prototypes were built with air-cooling, but "we decided against this because we had no tradition of air-cooled engines. We thought we would be better off making use of our previous experience. Besides, they were all far too noisy."

With 'Apex' development going ahead as quickly as possible, Miller found himself without a suitable design for a four-cylinder 'in-line' engine. So he went to Coventry-Climax and bought a 741 c.c. overhead camshaft fire pump engine, similar to the first Climax sports-racing car power unit.

While retaining its principal features, Rootes took the engine apart and redesigned it for mass-production, first to a capacity of 800 c.c., then, to its present capacity of 875 c.c. "Everybody copies something, sooner or later," said Miller. "We had to do the redesigning because, in the meticulous way Climax work, they'd make, say, one camshaft in the same time that we would have to make sixteen."

To save weight at the back, where it can cause trouble in a rear-engined car, it was decided to cast the engine, gearbox and transmission housing in aluminium, though this meant that Rootes production engineers had to learn from scratch a whole new, difficult technique of aluminium casting. The engine is now a hundredweight lighter than it would be in cast iron.

Helped by a team of 50 to 60 engineers, designers and stylists, Ware and Miller set about the task of making the Imp attractive, yet practical and easy to drive. "We wanted it to be a car that people only had to try once before wanting to buy. We have aimed it at the average family motorist, and we particularly want the ladies to drive it."

For the latter reason, the controls have been made as light and precise as possible. Experts in ergonomics were called in to advise on the planning and layout, so that hands need to move as little as possible. In this disc brake age the Imp has drums on all four wheels. Public demand may insist on discs later, but the engineers are loath to fit them to a small, light car. They believe 20 per cent. of the present braking efficiency will be lost.

For months, Imp production prototypes have been driven to destruction all over Europe, from the Arctic Circle, to the 'heel' of Italy. They have been cold-tested in Canada, and thrashed over thousands of miles of primitive roads in Kenya. In non-stop endurance tests, drivers working in shifts have clocked-up weeks of continuous motoring at average speeds near the car's maximum. Much of the high-speed testing has been in the hands of one of the project's co-ordinating engineers, Michael Parkes, a racing driver who has now left Rootes to join the Ferrari Grand Prix team in Italy.

Each of the major European countries has a thriving motor industry of its own and, although import restrictions have been removed, Britain's failure to join the E.E.C. means that tariffs remain. As a result, British cars selling in E.E.C. countries carry a burden of import duty about twice as heavy as that on vehicles built within the Community.

For example, in the small family car range in France, in which the Imp will sell, the basic pre-tax price of the French-built Simca 1000 is about £467, and that of the Renault R8, £507. The equivalent price of the Common Market Volkswagen from Germany is £511, and that of Italy's Fiat 600 only £405. By comparison, the price of Britain's Ford Anglia is competitive at about £495, but the Morris 1100 and Triumph 1200 are around the £755 mark. The French price of the Imp has yet to be fixed, but it will have to be nearer that of the Anglia than the other cars if it is to sell in any quantity.

A price handicap of this nature can be overcome only by our building cars which will sell on their intrinsic appeal, by the trouble-free service they give and by the speed and ease with which they can be maintained. If the foreign motorist must pay more for a British car, he will need a good reason for doing so. Is the Hillman Imp good enough to become Europe's car from Britain?

Recently, I road-tested the Imp over 1000 miles of the widest variety of roads in England and Scotland, from wide, straight motorways to the roughest and most twisting highland mountain tracks. At the end I believed it to be a most roadworthy, easily driven and very safe car. It shows many improvements in detail design over competitive models, and it can hold its head high against foreign opposition in its class, whether it be rear-engined or otherwise.

Despite its engine size of only 875 c.c. (only 27 c.c. more than the B.M.C. 'twins'), the Imp is not a 'mini' car. It is, rather, a small version of medium-size saloon, yet little or nothing has been sacrificed in interior space to achieve the reduction. The inside dimensions are almost identical with those of the Hillman Minx, and the majority of drivers will find plenty of room to relax behind the steering wheel. There is no feeling of driving a bus, sitting almost on top of a steeply-angled wheel, one's right elbow has room to move between one's side and the door and, because the floor is flat, there is somewhere to put one's clutch foot.

Lines by Renault and Simca out of Chevrolet Corvair, with touches of Austin A40

The front seats, separated by the handbrake, are not 'showroom seats.' At first glance they do not look particularly comfortable, but they support the body in the right places and, after a run of 460 miles in a day, I felt neither cramped nor overtired.

With four up, the space for luggage—beneath the bonnet and behind the back seat—is no more than adequate. But folding the back seat forward turns the Imp into a miniature estate car, while the opening (and lockable) rear window greatly simplifies the loading of a two-door vehicle. The petrol tank is towards the front of the bonnet, rather than directly over one's legs, a position which always makes me feel a little uncomfortable, and the vertically-mounted spare wheel takes up relatively little space. What cannot be avoided is the intrusion of the wheel arches into the forward carrying space.

Opinions may differ over the Imp's exterior lines. Personally, I find them attractive and well-balanced. Though they are new for a British car, no one, least of all Rootes, would claim them as original. In the current rear-engined fashion, they are by Renault and Simca out of Chevrolet Corvair with touches of Austin A40 about the roof-line. They are square and angular, and look rather as though they had been styled with a pair of butter paters.

The most serious vice of a rear-engined car can be its 'tail happiness,' and the impairing of its handling and, in extreme cases, safety, by the uneven distribution of its weight and the concentration of the weight in the tail. No such charge can be laid against the Hillman Imp, though I fear that the mere fact of the car having the engine at the back may well leave it wide open to taking the unjustified blame in certain cases of 'driver error.'

On both wet and dry surfaces, the Imp's handling is exceptionally surefooted and precise, and I would have no hesitation in putting the car into the hands of a relatively inexperienced driver. It would not let him down. When the tail finally does 'go,' the whole car slides sideways—better than having the tail suddenly whip round uncontrollably.

Getting a rear-engined car to hold the road properly is a matter of balancing the weight distribution and getting the suspension right. After all, a modern racing car has no trouble in this respect. In the Imp, weight has been saved by casting the transmission casing and the engine (an integral unit) in aluminium, a 'first' for a British mass-production unit. And the weight factor is minimised by canting the engine at an angle of 45 degrees, to achieve an unusually low centre of gravity and to save space.

The rack and pinion steering is certainly as light and precise as you could wish, and proves the case for fitting it to more Rootes Group models. The transmission of road shocks through the steering wheel can be a disadvantage of this system, but not in this instance, while with the correct tyre pressures, the steering itself is, to all intents and purposes, neutral. There is certainly no acute oversteer, as might be expected with a rear engine.

The Girling drum brakes fitted all round are more efficient and require less effort than some disc systems I have encountered on small cars. The pneumatic throttle control, new from Dunlop, is more sensitive than the majority of cable controls.

Because of the length of the cable linkage involved, the gearchange of a rear-engined car is frequently spongy, like a spoon in porridge, but the Imp's linkage is principally of rods, and each of the four gears (all synchromesh) engage smoothly and positively. One can flick through the gears extremely quickly and the ratios exactly match the engine characteristics. There is 40 m.p.h. in second gear, and 60 m.p.h. in third.

The Imp has no exceptionally-high maximum speed (about 80 m.p.h., in fact), but because of the

liveliness of its engine and its nimble acceleration, plus the vehicle's roadworthiness, high averages can be maintained over long distances. The overall fuel consumption on my test worked out at 38.5 m.p.g., but most owners, driving the car moderately, should regularly record anything from 40 to 45 m.p.g.

The four-cylinder 42 b.h.p. (gross) water-cooled engine has an overhead camshaft which does away with many moving parts in the valve gear, resulting in greater efficiency and less noise. The Imp's 0 to 30 m.p.h. figure of 6 sec. demonstrates the car's agility from a standstill. 50 m.p.h. is reached in 15 sec., and 60 m.p.h. in 22 sec., times which are virtually identical with those recorded by the much larger Hillman Super Minx. One omission which may become evident in certain export markets, rather than at home, is the lack of protection beneath the engine. The low-slung sump and transmission housing are very vulnerable to damage on the rough roads and tracks over which the car is quite agile enough to travel.

One of the major practical advantages of a rear-mounted engine is the ease with which it can be serviced and repaired. The Imp scores heavily in this direction. For instance, one mechanic can re-

move the engine in 30 minutes. As garage time means money, this will help to keep down repair costs. Imp servicing costs, too, have been pared to the bone. There are no chassis greasing points at all, the engine oil is changed at 5000-mile intervals and the gearbox oil every 15,000 miles, or once in 18 months to two years for many motorists. The price, including tax, of the standard version is £508; the de luxe model is £532. Servicing costs for the first 30,000 miles work out at 17s. 6d. per 1000.

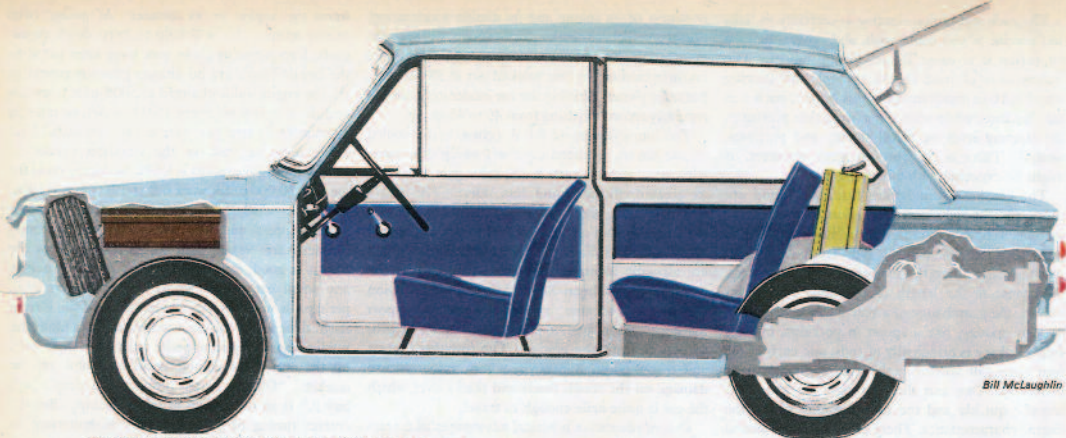
Rootes, smallest of the Big Five British motor manufacturers and the last to remain a family business, are certain that, on its introduction, the Imp is as good, as roadworthy and as well-tested as any small car in the world. A very great deal, perhaps as much as the whole future of the Group itself, depends on the car's acceptance by a motoring public whose buying appetite must be almost sated by the variety of similar small cars now on the market. "Offer a better product and people will buy it," is an old maxim of salesmanship. But the correct timing of public taste is all-important in selling motor cars. Even if the Imp is a better product, has it been shelved and dusted-off too often? Is it too late?



The men who made the Imp

This is the Rootes team which conceived and built the Hillman Imp at Linwood. In front are Chief Engineer, Craig Miller (left) and Director of Engineering, Peter Ware (right). Crouching in the centre with parts of the suspension unit in front of them are Harry White, Chief Designer, and Tim Fry, Co-ordinating Engineer. On the extreme left, behind the gearbox is Bill West, Transmission Engineer; behind him is Ken Sharpe, Chief Development Engineer. Holding the mock-up model is Bob Saward, Body Styling, to his right is Bob Croft, Bodywork Engineer. On the far right is Leo Kuzmicki, Deputy Chief Engineer, with the engine he largely designed

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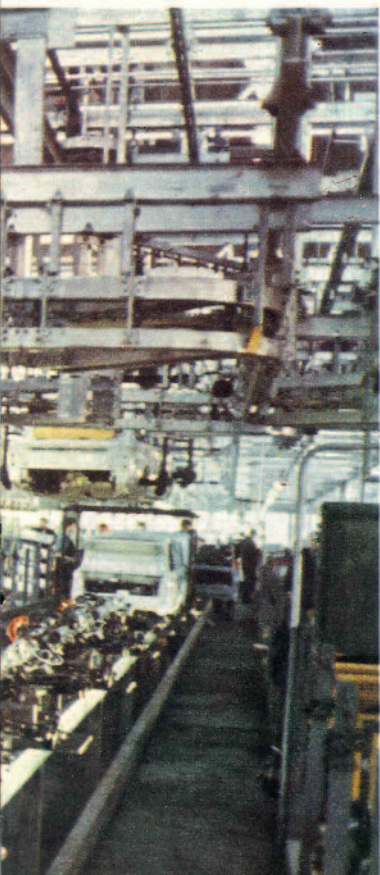


Bill McLaughlin

The rear-mounted engine of the Imp, tilted to save space, develops 42 h.p. at 5000 r.p.m., has an 875 c.c. capacity and a 10 to 1 compression ratio. The clutch, gearbox and final drive gears are in a unit assembly. It's the first British car with an aluminium-alloy cylinder block. The rear seat squab folds forward, and the rear window opens high—like a miniature estate car. Overall length is 11 ft. 7 in., width 5 ft., height 4 ft. 6 in.

Right: on the sands of Skye, the Imp, on full left lock, shows off its 30 ft. turning circle





From all angles, including the underside, each Imp is spray-tested for body leaks by powerful waterjets as it comes off the assembly line

Hillman Imps on the assembly line at the new Rootes Group factory at Linwood, near Glasgow. By the autumn, Imp production will have risen to 150,000 a year. This, the first really small Hillman car to go into full production, and the first mass-produced British car with a rear engine, is designed to compete with similar European vehicles