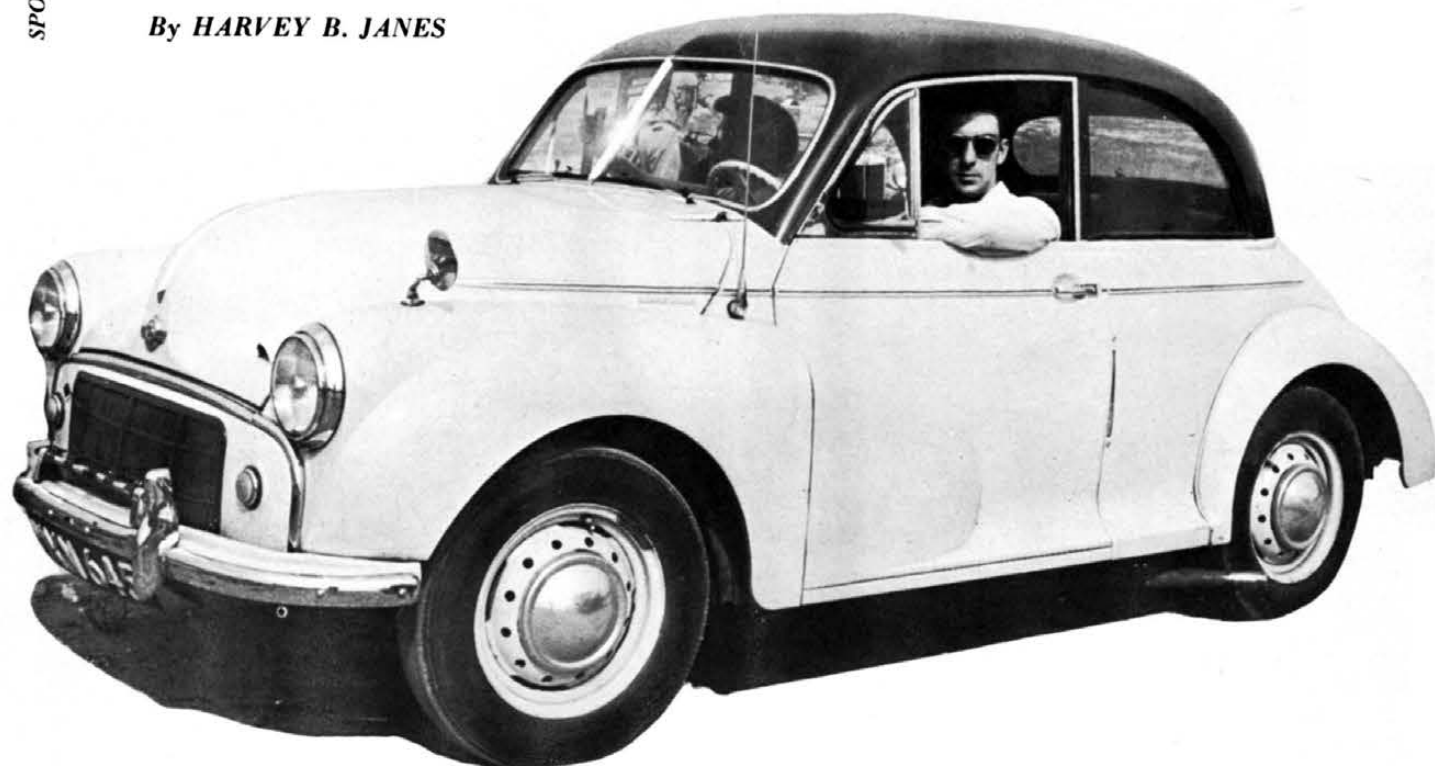


**A relatively simple piece of bolt-on equipment can add 100 percent more power to the Morris Minor, turning Nuffield's Delightful Dud from a lamb into a buzzing, MG-hunting tiger.**

By HARVEY B. JANES



# MINOR MODIFICATION

ONCE upon a time, in the days before 1953, there was a little British economy car that sold as well as the Volkswagen in the American market. This was the slow but sturdy Morris Minor flathead — an almost indestructible little buzz-bomb that looked like a squeezed-down Chevrolet and handled like a Ferrari.

Perhaps "buzz-bomb" is not the perfect term to describe the Morris flathead. It buzzes all right, but is anything but a bomb. Out of a displacement of 918 cc., the manufacturers managed to squeeze 39 lbs/ft. of torque and a rousing 27.5 horsepower at 4,400 rpm, a speed, incidentally, which the engine can attain only in the intermediate gears. As you know if you have ever driven one, all this leads to what can hardly be called performance at all, but rather a noble try.

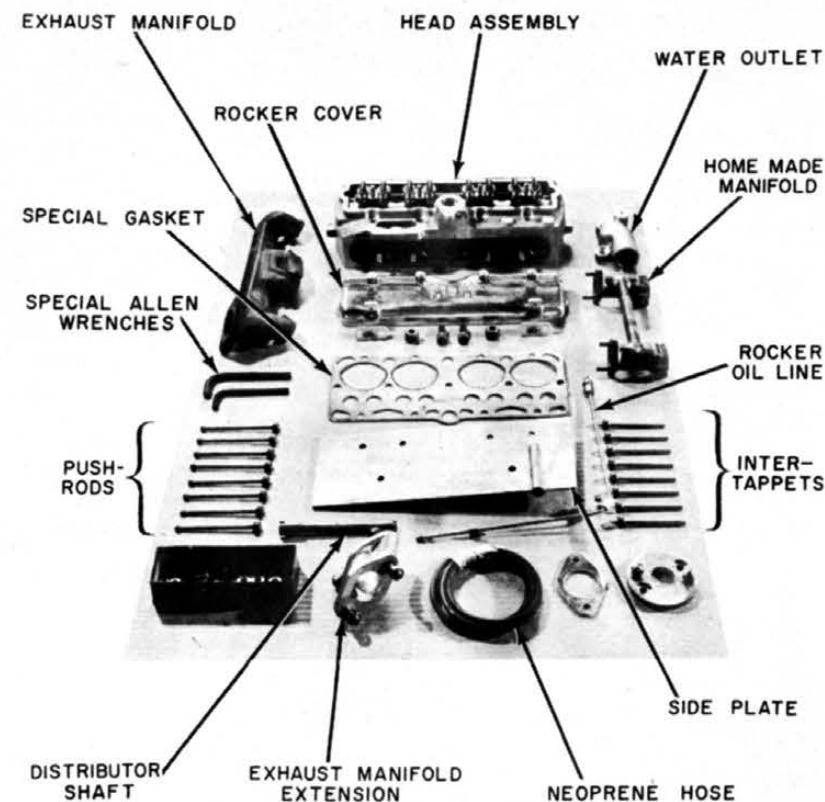
Such is the perfection of steering, suspension, gearbox and brakes, however, that thousands of Americans fell in love with the car, enthusiasts in particular. In garages and

back yards all over the land various modifications were tried, with some degree of success, but the handicap of side valves proved too great to make it all worthwhile, especially since the finished product still wouldn't go over 70 mph.

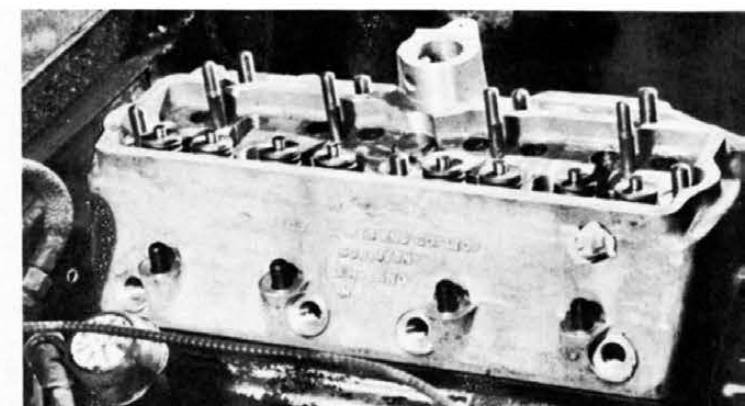
Meanwhile, back across the Atlantic, the British, too, had recognized the charm of the Delightful Dud and small parts manufacturers began to design speed equipment for the Minor. In various stages of tune the cars met with considerable success in British club racing meets, and drivers like Stirling Moss and Roy Salvadori stalked the highways in highly-modified examples of the marque. It was soon learned that the Morris was, in fact, crying to be souped, and that the crankshaft, gearbox, driveline and rear axle were fully up to the talk of withstanding the additional stresses of at least 6,000 rpm, if only there was a way to achieve such revolutions.

A famous British designer came to the rescue. Geoffrey Taylor, head of Alta Car and Engineering Company, pro-

*The Alta head kit as it looks taken from its wrappings. In this case the offset manifold extension and the single carburetor gasket were discarded for the home-made manifold which would accommodate the two SU carburetors already in possession of the owner.*



**1** The eight inter-tappets from the kit are oiled and inserted through the old valve guide holes. This is done only after block is cleaned and studs set in.



**2** After block is wiped clean, the gasket is set in place with the black side down. The valve faces are oiled and the head is positioned over the studs.

ducer of engines for HWM, Connaught and other British racing cars, engineered a nifty, high-performance, aluminum overhead-valve conversion head for the flathead Minor and soon went into limited production on the unit, supplying racing enthusiasts almost exclusively at first.

Performance of these Alta-Morris specials proved to be nothing short of amazing and more and more non-racing Morris fans began to get interested, so Taylor upped his production. Within a year he was shipping Alta heads all over the world.

As the deeds of Alta-Morris drifted into the United States, deponent was one of those who fell. We already had a '52 flathead that had been "tuned" to the point where its performance was just about equal to that of a good stock VW, perhaps a bit better on the lower end. But torque was still a problem and we still weren't satisfied, so off went our order to Mr. Taylor.

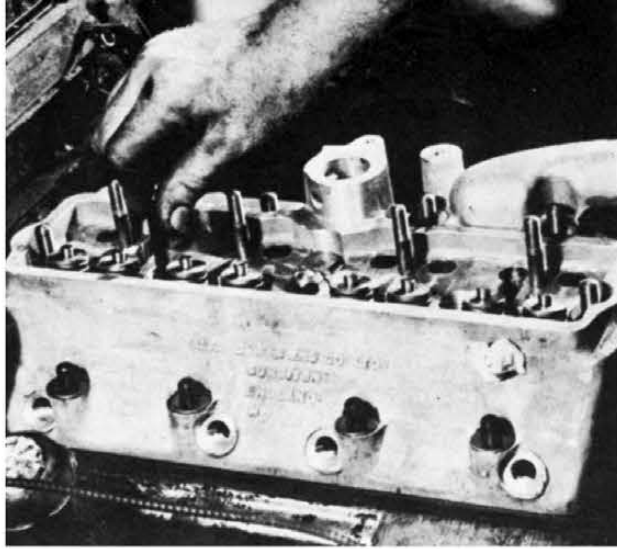
While we were waiting for the head to arrive we did

some research on the availability and performance of Minors, vintage '50-'52. We found that it is not at all difficult to find a very good specimen for under \$450 and that parts are no problem at all. As to performance on a strictly stock car, we borrowed one owned by a friend, put it through its paces, and got the following set of figures:

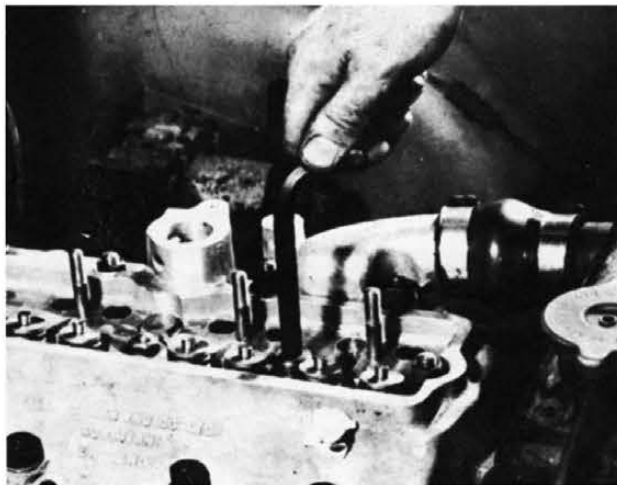
From a standing start to 30 mph we averaged 8.9 seconds. This run required a shift to second, but the synchromesh was working perfectly and we "wasted" only about a tenth of a second. Zero to 40 came to 14.1 seconds, to 50 took 21.7. Our run to 60 mph was more of a walk, consuming 38.6 seconds. Actually this figure wasn't too bad at all, considering the fact that the top speed came to just 62.7 mph.

All of the original modifications work on our car had been done by a red-headed Scotsman named Jock Murray, who was star mechanic for the MG team at Sebring this year. When our Alta head came we took it, and the car, up to Performance Motors, in Haverstraw, N. Y., where Murray

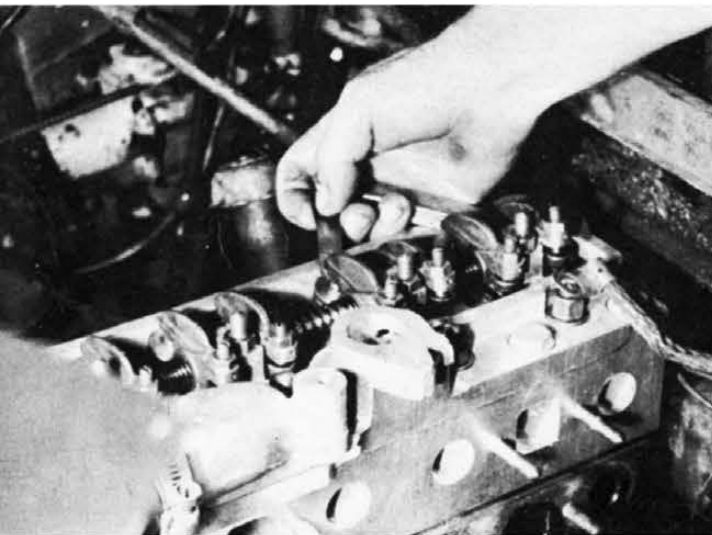




**3** With washers set on studs, the two Allen bolts through the intake ports were then tightened down with a special Allen wrench supplied with the kit.



**4** Following the procedure given with kit, the head bolts were next tightened down. To avoid warping or cracking head, uniform torque must be applied—28 ft/lbs.



**5** The short pushrods were set above the inter-tappets and the rocker assembly was set in place over them. Side valve tappets were then adjusted to .015-.020 inch.

is employed, to let the man complete his task.

First step was to wash the engine down completely. Kerosene and water did the trick nicely. While this was drying, Jock carefully polished the ports on the Alta head and smoothed out the valve throats, an operation that is not necessary but in this case beneficial.

Next the engine was completely dismantled, right down to the block. Cylinders were bored out to bring the total overbore to .060 inch and new, lightweight pistons, rods and bearings were installed. This step is not necessary, of course, if your car has had a recent overhaul, but keep in mind that rings and bearings must be in good shape to withstand the additional power and rpm. In fact, if you can afford it, the wisest thing is to have the engine completely balanced, statically and dynamically.

The grinding wheel should be used on the cylinder block as well as the head, matching all ports to assure maximum breathing. In our case, most of this work had been done before. The only additional work required on the block was to clean off the top face with a stiff wire brush, being careful not to get any dirt into the cylinder bores. Then the four short right hand head studs were screwed back in and we were ready to go.

The stud threads in the cylinder block and the top of the block itself were oiled and the studs supplied in the kit were screwed in place, two nuts being locked together on each stud. The two longest studs fit on the front of the block, opposite the four short original ones, and the shortest stud goes in the center of the head, being fastened in place with the short nut supplied. With all the studs inserted, the old distributor drive shaft was replaced with the new, longer one.

Next, the eight inter-tappets from the kit were oiled and inserted through the old valve guide holes. The original tappet screws were turned inward two turns at this point, but not locked up entirely. Once again the top of the cylinder block was cleaned and oiled, and a little oil was put into each cylinder. For this purpose light engine oil was used. This accomplished, the new head gasket was placed in position with the black side down and the Alta head fitted carefully in place over the studs.

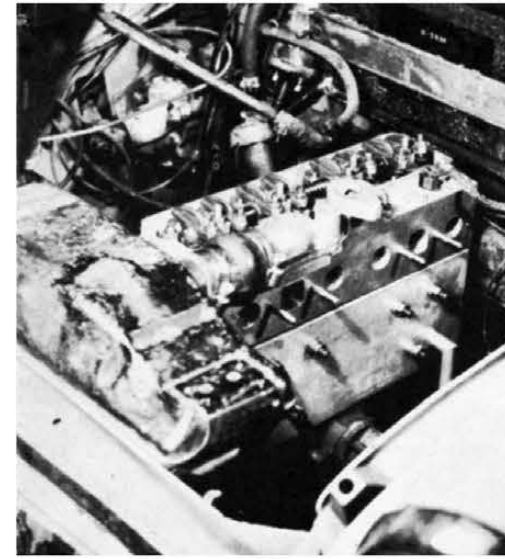
Now more oil was smeared on the nuts and with washers in place all the nuts were loosely tightened, starting with those in the center row. The two Allen bolts through the intake ports were then tightened securely with the special Allen wrench that comes with the kit. Keep this wrench! You will need it when the engine is overhauled.

Now for the delicate work. All the head nuts were tightened with a torque wrench, the correct torque being 28 ft/lbs. Do not be in a hurry here. If the head is not torqued down uniformly it will warp, or possibly even break, and all of your time and effort, not to mention money, will have been wasted. Go around the nuts several times to make sure.

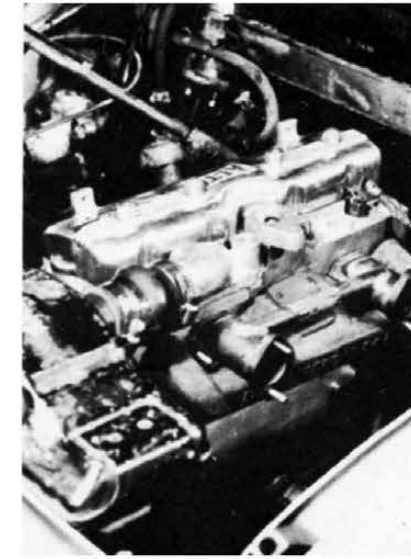
Sixteen short pushrods are supplied with the Alta kit. These were now placed in position through the valve guide holes, over the inter-tappets, and the new (and very neat) rocker assembly set in place above them. The original side-valve tappets were then adjusted to a clearance of .015-.020 inch. In this procedure, care must be taken to follow the sequence indicated in the original Morris instruction booklet. Valve number one is set with number eight fully open; three with six fully open; five with four fully open; two with seven fully open; eight with one fully open; six with three fully open; four with five fully open and number seven valve with number two fully open. Then the tappet screw nuts that were loosely tightened before are locked up, and for the last time. From this time on all valve adjustments are done from the top, making service that much easier.

But we were not yet ready to utilize the adjustment at

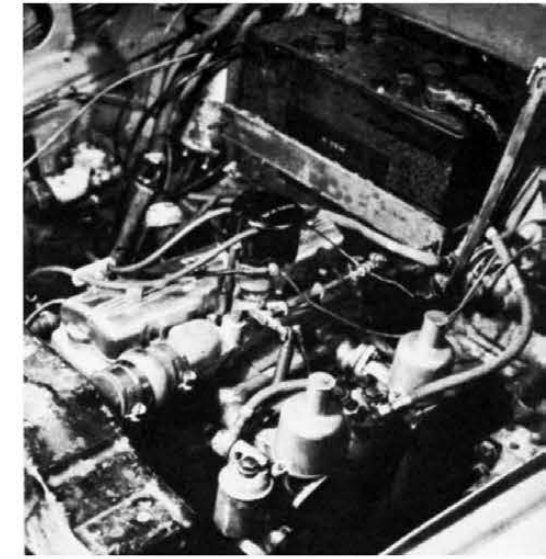
## MINOR MODIFICATION



**6** A new aluminum side plate replaces the old one, and seals off the old ports and the side tappets. Four spacers and fiber washers are supplied.



**7** Exhaust and new home-made intake pipes were mounted along with rocker cover. Note intakes are connected by a balance tube between.



**8** Completed, this is what the conversion looked like. Distributor now sits higher than before, and has an extension shaft, supplied with kit.

the valve rockers. First the old side plate at the tappets was replaced by the new aluminum one, using the four spacers and fiber washers supplied, and the breather pipe was connected to the short, bent pipe leading from the plate. Then, using two wrenches, one against the other, the two bolts at either end of the rocker shaft were thoroughly tightened.

At this point the intake-exhaust manifold would be fitted in place, if it were going to be left intact. We had decided to use two 1 1/8-inch S.U. carburetors instead of the one normally employed, however, and this meant that a new intake manifold would be needed. The problem was solved simply and efficiently. The intake branch of the old compound manifold was sawed off and discarded. At either end, where the cut was made, the exhaust manifold was sealed off, making this a separate unit. Then a new intake manifold was fabricated. This consisted of two short pipes, each with a flange for mounting one carburetor, connected by a balance pipe. Thus, the manifolds were now separate and yet they fit on the side of the head exactly as would be the combined stock head, matching the ports exactly. You may not want to go into the expense of such a conversion, especially since an S.U. carburetor alone costs about \$35, but the difference in power output is gratifying.

Once our manifolds were completed, they were immediately mounted and attention was turned to the valve gear. Some light oil was poured over the rocker assembly and a little more was used to coat the valve cover gasket. This was then set in place and the beautiful, finned aluminum cover itself was mounted on top and fastened with the four brass bolts supplied with the kit. We were in the home stretch.

The distributor was thoroughly cleaned and oiled, and new points were fitted, adjusted to a clearance of .012 inch.

After the new plug leads had been attached, the two small, plastic high tension wire holders were fastened to the brackets on the side of the valve cover, opposite the distributor drive shaft. The leads were then threaded through these holders and the distributor itself was mounted in place. Our original lead ends were fitted, as were four Champion NA-8 spark plugs, gapped to .020 inch. Other plugs that may be used with the Alta head are Lodge CLN-H and KLG FE-50.

Ignition timing was painstakingly adjusted with the use of a timing light. The correct timing is the same as with the stock Morris. Then the bolt on the front camshaft bearing (on the front, left side of the block) was replaced with one end of the thin, flexible oil line provided. This is the oil supply for the valve gear, and the line was carefully bent, to avoid kinking, until the other end would fit easily into the tapped hole on the front, right side of the cylinder head, passing in front of the head and above a small, centrally-placed lug. The oil line was attached to this lug by means of a clip and set screw.

There is an exhaust manifold extension included in the Alta kit. This was bolted to the manifold flange with an asbestos gasket in between. Instead of replacing the old muffler and pipes, which were shot and which created too much back-pressure anyway, we installed a replacement Huth muffler and pipes, made specifically for the flathead Minor.

Now we were ready for the carburetors. The existing one was dismantled and thoroughly cleaned and both were fitted with richer-than-stock M9 needles (one of these is supplied in the kit). In inserting the new needles, care must be taken to keep the shoulder of the needle level with the face of the sliding piston in the carburetor. Make sure to refill the carburetor dashpots with light engine oil.

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## Minor Modification

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The carburetors were mounted on the intake manifold and the fuel lines connected. We also changed the contact points in the S.U. electric fuel pump, just to be sure of getting an adequate supply of go-juice. A neat, ball-joint twin-carb linkage was now fabricated and attached to the head atop the mounting bracket originally intended to support the carburetor air cleaner. No air cleaners were fitted, though these may be found necessary eventually.

### FINAL TOUCHES

Since there are no provisions on the Alta head for either a heater or water temperature gauge attachment, the water outlet was tapped for a heater pipe and the radiator tank was drilled to accept the end of the cable leading to the temp gauge. We can understand that there is no need for a heater in a car intended primarily for racing, but the absence of a temperature gauge tap seems pretty foolish.

But all's well that ends well.

This ended fine. The car was now ready for a short test run. It started with a muffled but impressive roar and warmed up quickly. During the 10-mile test drive, it took great concentration and restraint on the part of the driver to hold the revs down below 3,000. Finally and reluctantly, the car was brought in and allowed to cool off. Then the head, tappet cover and exhaust flanges were carefully retightened, the carburetors properly tuned and the new rocker clearances set at .015 inch.

Except for a final check and additional tightening a week later, the job was completed. Total costs for parts and labor came to about \$350, including \$140 for the Alta head, a duplicate of which may be purchased from Alta Car and Engineering Co., Fuller's Way, Kingston Bypass, Surbiton, England.

### RESULTS

We found the expense to be well worth it. Fortunately we already had a heavy-duty clutch and Fren-Do brake linings in the car and didn't have to go into hock to put on these finishing touches. But we wouldn't even have minded the additional expense, at that, because the whole character of the automobile has changed. Corner-

ing is now even better than before, thanks to the new horsepower, now in the neighborhood of 60, believe it or not. Gear shifting has been cut in half in city and normal country driving, and hill climbing has become a pleasure instead of a terror. The engine will rev to 6,000 rpm and can pull better than 5,500 in high. Performance is so much improved that it is almost unbelievable, especially since the whole car is also smoother than ever before. Compression ratio is up from 6.6 to 8.25 to one.

Acceleration runs produced the following results: Zero to 30 in five seconds flat; zero to 40 in 7.2; zero to 50 in 10.4; from a standing start to 60 mph in just 14.7 seconds; zero to 70 in 24.9 and a standing quarter mile in 19.9 seconds. Top speed came to 84.3 mph, and we believe this figure might well be exceeded by one crueler than myself, especially with more miles on the rebuilt engine.

From any standpoint this is a lot of go per dollar. We have even found that in average driving the gas mileage has gone up, not down, by two or three miles per gallon. Starting from scratch you could buy a used Minor and build a machine equivalent to this for way under \$1,000. What are you waiting for? #



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