

# HOT ROD



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By Editors of HOT ROD and CAR CRAFT

**HOW TO HOT ROD  
YOUR CAR**

**Power Swapping the New V8's**

# Engine Swaps—

BY JOHN CHRISTY



*Dick Lyons of Lynwood, Calif., seen midwifing a Fordillac.* HOT ROD PHOTO



## The easiest way to get power is with big engines, light cars

**E**NGINE SWAPS ARE all kinds. It has been said, and quite truthfully so, that "you can put anything into *anything*—if you want to stuff it." Big Cadillacs have been crammed into the engine compartments of small Henry Js and even the Crosley has been literally stuffed with power through the mechanical taxidermist's art.

The job technically known as transplant of powerplants and more popularly as engine swapping, represents what is perhaps the cheapest and most satisfactory way to large horsepower increases, at least in the smaller car. As we said, anything can be stuffed into anything but let's be practical. There are some transplants that will work with a minimum amount of effort and a maximum amount of satisfaction. Similarly, there are those in which the effort expended

far overshadows the value of the results.

Different cars will take different engines well. One make or model will take one or two of the new V8 engines easily, one or two others with effort, and the rest only by sheer butchery. Another make will take an entirely different grouping. Only a few will accommodate virtually all of the big plants.

About the only real way to clear away the welter of false and incomplete information on this fascinating subject is to analyze each make of car carefully for its receptive capabilities or lack of same. However, before we proceed with the analysis, there are certain aspects of the situation applicable to *all* swaps that we should cover first.

To begin with, wishful thinking will do nothing for the power-to-weight ratio. Since we're being practical about this, the first

# What fits and why!

thing to find out is just how much room you have available for horses. This means measuring the stable carefully and accurately. It is far more practical and cheaper in the long run to find an engine with contours that will go around the built-in obstructions in the engine compartment than to have to move these about in order to get the engine in the hole. In other words, it's easier to match the engine to the car than to try to match the car to the engine.

The best way to begin is to strike a line or stretch a wire down the exact center of the compartment from front to rear, equal in all respects to an extension of the drive-line. Strike another line perpendicular to this at the firewall, running from frame rail to frame rail. These will be the base-lines from which all other measurements may be taken. The prime obstructions in the engine compartment will be the steering sector and shaft, the tie rods, the shift linkage, the battery box and any power accessories you might have. Measure the distance of these from the base-lines vertically, horizontally and diagonally from the closest point on the line. Now, compare these dimensions with the engine, complete with starter, generator and exhaust manifolds, that you wish to install. If the engine will fit without change or with only minor relocation of obstructions or modification to the engine, you're ready to begin. If the measurements indicate serious butchery is in order, pick another engine; you'll be much, much happier.

As work progresses keep measuring. Carefully check the placement of linkage, wiring changes, fuel lines and other points of attachment between the new engine and the original controls. Mounts, brackets, fuel lines, radiator mounting and fittings should all be inspected and changes carefully and accurately calculated *before* any work is attempted. Rehashing a botched job is one of the major extra expense items and the cause of more installation headaches than any other one item.

With the space problem out of the way, another problem rears its head: weight. Two engines can be almost exactly similar in all dimensions and *conversely* differ by a full hundred pounds. A good example of this is

the comparison of the Studebaker V8 and the Buick V8. The Stude weighs 685 pounds and the Buick, an internally larger and far more powerful engine, weighs 660 pounds. Similarly, the Cadillac weighs 710 pounds, while the dimensionally smaller Lincoln and similarly sized Packard weigh 760 and 800 pounds, respectively. Without even mentioning power-to-weight ratio, an extra hundred pounds can play havoc with the front end geometry, particularly if the lighter of the two choices is the usual extra hundred heavier than the original engine. An extra hundred pounds usually requires stiffer front springs or at least stiffer shocks; 200 pounds would be almost impossible to control through normal procedures.

There is one more major factor that may well influence your choice of engines: interchangeability. Among the Big Three in recent years there has been a definite move toward interchangeability of parts. But even though these manufacturers have made some startling engine changes, they have been loathe to retool transmissions any more than absolutely necessary. Consequently, there are some very inviting possibilities in using larger and later engines within the same manufacturer's line. In all cases where funds and availability allow, this will be the recommended practice except in certain rare cases where the interchangeability of the engine is over-balanced by the ease of installation of a much more powerful engine in another line.

It will be found advisable in all cases to use such original assemblies as temperature sending units, flexible oil and fuel lines, clutch and brake mounting assemblies and, by all means, the original throwout and pilot bearings. It is best *not* to attempt to use the original starter and generator (in fact in most cases it will be impossible to use the original starter). In the case of installing General Motors products in other makes of cars, the polarity of the generator must be switched so that the positive pole is grounded. This is done by "flashing" or *momentarily* connecting the armature and battery terminals of the regulator with a jumper wire.

In the following analysis of engines and cars, for swapping purposes, we have listed

engines under makes of cars into which they may be swapped. In all cases if an engine is *not listed* it may be presumed by the reader that the swap is considered impractical. This can either be due to the fact that there is no method of adaptation readily available or that space problems prevent the adaptation without considerable unwarranted expense. Unless you feel like being a pioneer and can stand the expense of such experimentation it is recommended that you do *not* use any engine which is unlisted for that particular make of car.

Let's go through a list of every car built since World War II in the United States and see just what engines are practical as swap material. In some cases we'll find that no actual swaps have been made; in others we'll have definite and specific information. In the former instance, we'll do our best to make an informed "guesstimate" as to problems and practical swaps. In each case we'll say when we are making these "guesstimates" to warn you of unforeseen problems.

### BUICK

About the only really feasible engine swap with this car, regardless of year or model is that of the latest model Buick Roadmaster V8 although late Cadillac engines

have been used on a very few occasions. The V8 we refer to is, of course, the big 322 cubic inch engine. This one offers only 10 fewer pounds-feet of torque than does the latest Cadillac and only 12 less horsepower. At the same time the weight of the engine is 660 versus a hefty 720 pounds for the Cadillac, the 60 pounds worth of difference largely making up for the minor power and torque differences. Price of the Buick is less than that of the Cadillac.

The '55 Century model indicates the possibilities here, since it is what amounts to a factory swap, the Roadmaster engine being used in the Special model body and chassis.

In the case of Dynaflo-equipped cars, it is recommended that the '55 variable pitch unit be used, if at all possible, due to its greatly improved efficiency over previous units, including the "Twin Turbine" transmission. In any case the parts for adaptation to any of the Buick transmissions are available from Buick dealers, making the use of special adaptors unnecessary.

The main problem in mounting will be the fabrication of front motor mounts and rearranging the engine compartment to use the engine to best advantage. Spacewise there is no problem, the original straight eight engine being the monster it is. Front mounts

*Steering linkage can be big problem in engine conversion. Note special linkage to clear pan.*





*Want a Fordillac? If so, you'll need a front mount like this to install Cadillac engine.*

can either be made up from one-quarter inch plate stock or can be made from 1937 Ford Sixty mounts suitably welded and gusseted in place. Since the V8 is slightly more than half the length of the old straight eight, the radiator must be moved back to a point at which the fan will be effective. To do this it will be necessary for special mounting brackets to be fabricated and either welded or bolted to the frame at the proper position. Although the radiator itself is more than capable of cooling the V8, a forward placement will completely negate the advantages of the fan. This, of course, would be no problem if the car were always in motion but in our modern day and age we have such things as stoplights and traffic jams. Another point worth mentioning regarding radiator placement is that of ducting. With some models this is unnecessary but in those models in which there is considerable space left around the radiator in its new position it is worth considering, since quite a bit of air will take the route of least resistance and go around instead of through the core.

### CADILLAC

At first blush, consideration of this one might be taken to be icing on the cake. Don't you believe it! Remember that it is only since 1949 that Cadillac has had the ohv engine and also that since that time some 125 brake horsepower has been added to the big brute.

Naturally there is only one logical or practical choice here: another Cadillac. We'll recommend swaps only up to the '49 models,

since the '49 and later engines can be modernized quite easily and simply through the use of '55 components, even unto the ultimate of "Eldorado-izing"! Once again there is no real adaptation problem; Cadillac engines will fit Cadillac transmissions without change practically back to the day of Al Capone-type "gangster wagons." The only problems involved will be those of adapting front mounts and the minor linkage headaches which are best left up to the individual installer. Have no fear on such items as the radiator, rear end or running gear or even front end alignment. The new engine will weigh less than the old one and will take less cooling; Cadillac running gear has for years been suitable for far more than it would get from the 250 horses of the '55. One thing we will advise in the way of transmissions, though. If the car is Hydra-Matic equipped and the unit is one of the earlier "Low and Drive" models, it would be definitely worthwhile to swap it off for the later Dual-Range unit. The flexibility of the later unit actually adds untapped horsepower to the road output of the car and allows even an elderly flathead V8 to outdo itself.

### CROSLLEY

That's right—Crosley. We said it and we're glad. Since we are for several reasons limiting this treatise to American-made engines as well as cars there is only one swap we can mention here. Like the Cadillac, the Crosley is suited only to another Crosley. From 1946 to 1949 this engine was made up in a highly unconventional and not too satisfactory manner. Briefly, it was stamped from sheet steel and the parts furnace-brazed together to produce a very light block. This method was used, though a bit differently, on the fantastically powerful Auto Union race cars in the thirties, but due to manufacturing difficulties was unsuccessful on the Crosley. On any Crosley, of pre-1949 vintage it would be wise to check to see what the block is made of. Many owners switched immediately to the 1949 and later cast iron block, but some did not. Since the two blocks are completely interchangeable the cast iron block may be substituted without further alteration.

### CHEVROLET

Now we begin to get complicated, at least as far as choice goes. Previous to 1955 the one swap preferred above all others was the big 270 and 302 GMC engines which fit with almost no alterations. The picture has changed with the advent of the Chevrolet V8.

PHOTOS BY ROLAND MILES

*This is an adaptor plate mounted on an Oldsmobile block for use with Ford transmission installation.*

ROLAND MILES PHOTO



We'll pass only lightly over the '55 models with the remark that the man who has been given a '55 Six and wants to switch may do so without further changes to the engine, transmission or even the chassis. According to the opinions, at least at present, of Chev V8 owners, anybody who'd change away from the V8 equipped Chev would be likely to run rabbits and bay at the moon. Soup it, yes; replace it, never!

In line with our stated policy on staying in the same manufacturer's line, we'll cover the preferred item first. Briefly stated, the '55 V8 can be said to be the least expensive, most satisfactory and most easily accomplished swap on any Chevrolet back to the early thirties. That's a pretty sweeping statement but it happens to be true. The '55 V8 lists at \$385 on the West Coast and slightly less in the East. Further, the engine weighs just a shade over 530 pounds, making it one of the lightest V8s available. Its small size practically eliminates, with one possible exception, any worries about engine compartment butchery. To top it all off, the transmission and '55 bell housing mate with but one minor piece of surgery well beyond our base limit of 1939.

On the pre-'55 transmission there is a small boss on the bell housing mating surface below the input shaft. Since this is hardened, a small socket must be ground or drilled into the '55 bell housing at that point. The job takes about 10 minutes and when completed the two fit together perfectly with no further alteration!

There's one point of warning in regard to transmissions. On the stick shifts there are two different model transmissions with no particular year pattern but mixed up from year to year. On one the upper and lower bolt holes are the same distance apart—about  $4\frac{1}{4}$  inches. On the other model the lower holes are five inches apart and the upper ones seven inches apart. This one is also on all pick-up trucks. *Only this latter transmission will fit the V8 bell housing.* Lift up the floorboards and check your transmission. Used Chev pickup gearboxes are cheap; buy one first if you need it for the installation!

As far as front mounts go, a straight piece of channel running from side rail to side rail will, with the proper pads, perform as a front mount platform admirably. There is only one further difficulty in this particular respect. The radiator must be moved back several inches to bring it in proximity with the fan. On some models there will be an added problem. The placement of the spark plugs on the Chevrolet V8 are such that they are a hard reach even on the '55 models. When used in the earlier models the left rear plug is covered by the steering column on some models, number three, left, is covered by some others. On still others there is no problem. Just which these are is at this time impossible to tell since only a very few swaps have been made. Generally it is the very early model with the steering sector mounted on top of the frame in which this occurs. The final switch-over is that of adapting the 12-volt system to the six-volt

car. Since the 12-volt system is a very desirable feature it is best to change the lights and other accessories to the higher voltage, and the vibrator in the radio as well. That, of course, means the added purchase of a battery but this is money well spent.

Other engines which can be used are the Cadillac and Olds V8s. Both of these can be adapted to the Chevrolet transmission through the use of special adaptor kits available from auto parts houses. With these engines, again, the only major problem lies in the front mounting which will have to be fabricated from suitable material and welded or bolted to the frame.

None of the other V8 engines are recommended nor are adaptors made for them. In the case of Chrysler products, the problem is one of lateral clearance, wide heads being the crux of the matter. As for Ford and Studebaker engines, the Chev V8 will provide everything that these will with less trouble and at less cost. The Buick could be adapted through the use of a Buick transmission and would make an excellent conversion. Unfortunately, transmission adaptation problems are beyond the scope of this section and so we will pass on.

### CHRYSLER

Back to '49 there is no problem with Chrysler products, at least in the V8 models. In fact there is really no need to swap to the latest engine since the earlier model can be modernized to '55 or even "300" specifications. In the case of the earlier straight eight and six engines, there have been almost no swaps. However, Chrysler service managers say that there are mating parts to adapt the later V8 engines to the earlier chassis and that these parts are available over the counter. Strangely enough, though the Chrysler V8 is a favorite powerplant for competition and for transplants into Fords and Mercs, there is almost no information on its use in the earlier models of the Chrysler car! Ray Brown, who is the country's acknowledged expert on the use of the Chrysler as swap material, refuses to go out on a limb on this one. According to Ray, there is no space problem nor is there any particular under-the-hood problem; the headaches seem to be in the welter of transmission changes made by Chrysler in the last five years. Bolt circles just don't seem to match up on many of the layouts. His suggestion in this case is to use the transmission for which the engine is equipped and install the entire power unit, making the adaptation, if such

is necessary, at the back of the transmission. This particular swap will have to come under the "guessing" classification and the individual pioneering headaches solved as they come up. The usual exhaust, linkage, fuel line and front mounting procedures apply here as does the rearward relocation of the radiator. We can only recommend that anyone planning a swap from the earlier flat-head engine to the V8 get into a close huddle with a sympathetic Chrysler service manager or parts man and check out the possibilities of matching the earlier gearboxes with the later bell housings.

### DE SOTO

Again, according to Ray Brown and several other swappers, the problem lies in the strange assortment of drive trains tried out by the DeSoto manufacturer. Nobody seems to have come across this particular swap and information is practically nil. The only logical engine choices are in the Chrysler line, as was pointed out; service managers say it can be accomplished but none have actually done the job or seen it done. There is plenty of room for the job. The chassis is of generous enough dimensions to allow the use of the latest transmissions. As in the Chrysler, it might be best to use the engine and transmission as a unit.

### DODGE

This one *has* been tried by Ray Brown. He finished the job but "never again," he says. The car that was used was the '52 Dodge; engine transplanted was the '54 Chrysler Fire-Power. Nothing matched up behind the flywheel! On first inspection it seemed that the job would be a simple one; everything under the hood from the firewall forward was perfect. Only the usual minor mounting and hookup problems seemed to present themselves. From the firewall back the problems started. Nothing would fit and nothing could even be adapted through the usual methods even in a shop where a Jaguar transmission was adapted to a new Dodge V8 powerplant.

"The Jag swap was easy compared to this one," Ray says. The final solution was to use one of the Ford-to-Chrysler adaptors and mount a '48 Ford transmission in the Dodge! The transmission was adapted through a Ford commercial rear universal joint to the Dodge drive shaft. It works fine, but it is the long way around. The inevitable conclusion is that the Dodge is just not good swap material.

## PLYMOUTH

Plymouth service managers say "no dice" on this one as far as using the new Plymouth V8 goes. In view of the information on the relatively similar Dodge chassis, it is doubtful if any of the other V8 engines in any line will be easy swaps.

Here is another educated guess, though. In the past, many Plymouths have been equipped with flathead Fords and Mercurys by using the Ford transmission, which is easily adapted to the Plymouth chassis. Since there are many adaptors to mate any of the new V8 engines to the Ford box, the way is clear. As was pointed out above, Ray Brown followed this route on the Dodge. Apparently the best method here is to proceed as if you were going to mount a Ford flathead in the Plymouth, then adapt any of the medium or small-sized V8 engines to the Ford box. Plymouth hood space is quite generous in both length and width. Consequently, if procedures outlined earlier in this section are followed carefully, almost any engine that doesn't have weird contours should fit.

We should, perhaps, pass on another tip to frustrated Plymouth owners. If you don't absolutely have your heart set on a V8, there is a way by which the vastly more powerful Chrysler Six can be stuffed in the Plymouth. Space does not permit us to detail the operation here.

## FORD AND MERCURY

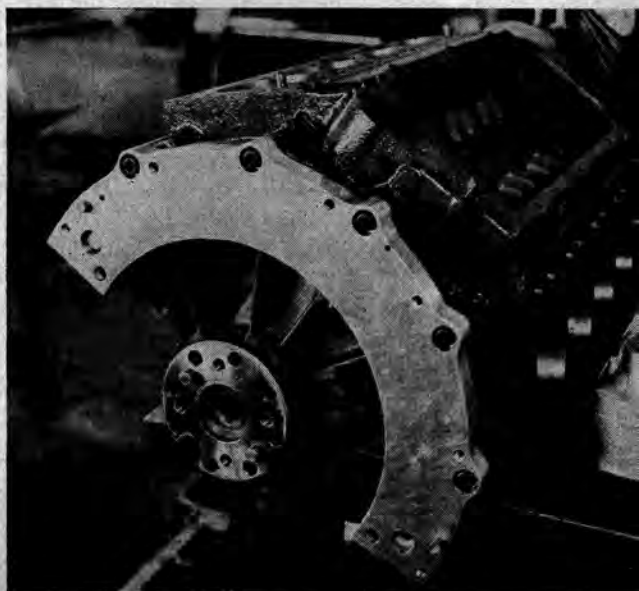
As one rather rotund colleague of ours is fond of saying: Pull up a chair! The owner

of any Ford back to 1932 and Mercury back to 1939 can stuff any V8 engine he desires into his engine room. Ford and Merc chassis have been equipped with every V8 engine from the small Studebaker to the big Chrysler and with little trouble except in certain rare instances. The best way to cover this perhaps is to take the grouping from 1939 to 1948 in the Ford and Merc as one bunch and the later models as another. The reason for this primarily being the placement of tie rods and other steering units in the later chassis.

The major problem from 1939 to 1948 is one of width with certain engines, primarily the *Chrysler products*. The Chrysler product engines have two protuberances which cause the space problem: the oil filter and the extraordinarily wide heads. The answer to the first in the past has been simply to remove the filter and by-pass it. *Don't do it!* Chrysler's engine needs this full flow system and many excellent powerplants have been wrecked by the simple act of by-passing this filter. It is a bit more tedious but far safer to cut a hole in either the hood side of the early model or the inside fender panel of the later model. In many cases this won't be necessary, but if it is, do it. As far as front mounts go, the problem is simple. A small diagonal bridge running from front crossmember to siderail on each side is sufficient if strongly gusseted. On the smaller model Dodge V8 engine, gusseted perches will have to be fabricated and welded or bolted to the frame at the proper point, which can be determined by setting the engine in the chassis and bolting it up to the

*Adaptor plate for Chrysler V8 for use with Ford flywheel, clutch and transmission. End of crankshaft has been drilled, tapped and doweled to accommodate the Ford flywheel to be used.*

ROLAND MILES PHOTOS





transmission. By blocking up the front of the engine so that everything is level and in line as noted in the first part of this chapter, the exact location of the new mounts can be found. This, of course, applies to any engine, not just the Dodge.

Cadillac and Olds engines have been the first choice since the introduction of these brutes in 1949, and the first adaptors were made for these engines. The only really big problem here is that the starters on these engines tend to conflict with the steering sectors on most models of both Ford and Mercury. There is currently a kit by Hildebrandt on the market that will allow the swapper to switch the starter to the right side of the engine. It would at first seem that this would interfere with the oil filter on the engine, but the kit also includes a remote mounting filter plate that gets that particular obstruction out of the way. This kit has nothing to do with the adaptor plate, fitting on the engine itself; in fact, it will even fit on a stock Olds. One of the kindest things done by GM with these engines is to design the flywheel so that it would take the 11-inch Ford clutch and pressure plate assembly. Most adaptor kits are complete with a pilot bearing adaptor built to take the Ford bearing. Never try to couple up the engine and transmission without this adaptor and bearing assembly. In some cases adaptor plates are merely drilled and standard bolts used. Here, the Ford bell housing must be notched to fit around these bolt heads. In others, countersunk Allen screws are used, making the process unnecessary.

It might be worth a word or two on purchasing an engine at this point, be it Cad, Olds or any other unit. One of the most common mistakes is to purchase an engine that is not quite complete and then to scrounge the necessary parts as the need arises. This can add greatly to the expense. The Ford-made starter, generator and voltage regulator are extremely reasonable in price, a factor which leads many swappers to believe the same holds true for other makes. Not so. Always be sure when you buy any of the later engines that the starter and generator come with them, since the over-the-counter dealer price on these can raise the cost of the installation considerably. Trying to adapt the original generator to the new installation is at best tedious and generally almost impossible. The starter is an impossibility from the beginning. Get a complete engine. The Buick can be an even

neater installation than the above two engines. For one thing, it's lighter; for another, it's less expensive if purchased new (more so if purchased used, though). The same general procedures apply except that the starter need not be moved. Due to the slightly narrower construction of the engine there is almost no necessity for juggling components. The Buick V8 is capable of startling performance in the Ford. Although Buick engineers say it's impossible, Max Balchowski, the top Buick swapper in the country, has turned a Buick-Ford combination past 8000 rpm in high gear with standard rear end gearing! This sort of thing is virtually impossible with the other two large GM engines, even on nitro fuel. Max did it on gasoline.

Ford Products, strangely enough, need adaptors to fit them to the earlier Ford and



*Cad engine fits well in 1950 Ford wagon.*

Mercury ohv engines so we'll not treat them separately. The main problem with these is the reversed pan with the sump in front instead of in the rear as in earlier models. Once again we'll go along with Ray Brown on this one. His solution is to use the Ford truck pan and, with a little minor surgery, rework it to provide the proper clearance for tie rods and other steering obstructions. This also applies to the later grouping as well as the pre-1949 cars. Mounting of the ohv engines presents a slightly different problem, too. The ohv jobs have what Ford calls centerpoint mounting; rather than rest the engine at the front they have placed the pads far back on the block. This will cause trouble in some of the earlier models,



*Adaptor plate has been welded in place on Chrysler V8. The clutch used is a Friction-Master and flywheel is from a Chrysler.*

ROLAND MILES PHOTO

particularly those which, like the '46-'47 Mercury, have a steering sector box that sticks out into the engine compartment at just about that point. In this case, the box must be moved, a factor that might make another engine seem a wiser choice, since changing steering components is very much against our better principles although it can be done if absolutely necessary. Check your own particular model, measuring from the adaptor line, to find out if the steering will interfere with mounting. With these major fitting problems worked out, the rest of the installation is a simple one in which the general rules apply. Since the late Fords use the same electrical system with the positive poles grounded, there is no need to change the polarity of the generator as is necessary when mounting GM products. In the case of the Lincoln engine, some attention will have to be paid to space limitations in a few of the models, but by use of headers the usual cause of trouble, jutting manifolding, can be eliminated. The other possible trouble point might lie in the full-flow oil filter which protrudes out from the side of the block even beyond the width of the head. Be sure that you not only have room for this but have space to remove it as well. We cannot recommend that this be by-passed, although it might be possible to manufacture some form of remote layout. Next to the Packard, this is the heaviest engine on the market today and one of the more expensive when purchased new. Its best use is probably in the late model Mercury station wagons rather than in the earlier models for the reasons outlined above and because there are other, easier swaps that offer just as much in the way of power.

Chevrolet V8 engines make for some of the most compact and satisfactory swaps of all.

Once upon a time it was a rare bird, one generally considered to have rocks in his head, who would sully his Ford with a Chevy powerplant. Things are different now; a stock power-pack Chev will give a Buick Century a very rough time, indeed, and will run off and hide from most stock Fords and Mercs. For about \$100 over the list price of the engine, a small enough figure even with the extra C-note, there is 195 horsepower in this mighty mite. That kind of suds was only available through the full house treatment with the flathead, and now it can be dumped into the flathead chassis with almost no strain at all. Even the adaptor is relatively cheap! There are absolutely no space problems—there couldn't be in a compartment that will handle the Cadillac or Chrysler. Either a tube cross member mounted from rail to rail or two step-type pads will take care of the front mounts, and one of the simplest adaptors going will take care of the rear. About the only piece of surgery required is the drilling of the flywheel to take the Ford pressure plate, a simple and inexpensive job for any machine shop. The main change will be in adapting the Ford to take the 12-volt system, changing the polarity of the generator and adding the Chev battery in the process. Linkage, fuel lines and wiring routing should be relatively simple since the engine is not much larger than the Ford Sixty, except in width. It's also 10 pounds lighter than the Ford flathead so no front end work will be needed, late models included.

The Pontiac V8, as we go to press, has no adaptor, although the engine is dimensionally similar on the outside to the Chev V8. Due to its larger internal dimensions, gained through a quarter-inch longer stroke, and its superior oiling system, there very likely will soon be adaptors for this engine. With the adaptor in hand, all procedures will follow the Chevrolet pattern in regard to the Ford.

Plymouth engines can be installed in the Ford and Mercury through a new adaptor just announced by Dean Moon Automotive, as we go to press. The engine is a good one though not quite as meaty as the other V8 engines in this class. As this is written no actual adaptations have been made *in a car* nor is any front mount information available at this time. According to Moon, there is no space problem nor is any cutting necessary to either the early or late model Fords. Due to the relatively low power output of the engine and the simplicity of other adaptations with higher power possibilities, this

one is a "second choice" deal. The over-the-counter price of the engine is not low, so the criterion of choice is whether or not a wreck with an undamaged engine can be found.

Packard, Hudson and Nash V8 engines all have the same rear bolt circle and are interchangeable insofar as dimensions permit. Although there are some 35 pounds difference between them, the large and small Packard engines are similar enough to treat as one engine. There is very little information on these brutes other than the fact that, at least as far as the big one goes, they pull more torque and horsepower than any other engine on the market. This is done primarily through sheer size, displacement being 352 cubic inches. This means weight, 800 pounds worth of it. There is an adaptor for it that will make it to the Ford and Merc transmissions up through '48 for the Ford and through '50 for the Merc. Even so, there have been no adaptations at this writing, partially because of a scarcity of supply and partially because this engine is *big*. If you are set on being really fearless enough to attempt this one, measure very carefully and be prepared to rearrange things. The pan is deep and the engine is wide; the crank-to-carburetor distance is not so very much greater than on others, but the crank-to-pan bottom distance is tremendous. Steering gear and tie rod clearances will be critical. In short, remember that this is an engine that can, at factory option and when the horsepower race requires, be boosted to 400 cubic inches, no strain!

Up to and including 1953, the Ford engine compartment changed hardly at all and the above mentioned specifics apply in all cases. Since this is the situation, there are only a few general problems to be taken up for the years 1949 through 1954. A good case in point is that of the Fordomatic equipped car. At no time should any swap be attempted using this transmission except for Ford and Mercury ohv engines; it is not amenable to swaps.

The major difference in these cars is in the transmission, which requires a different adaptor plate for all of the big engines. Further, the late Ford transmission ('49 through '53) is nowhere near as beefy as the earlier unit. Consequently, the larger ohv engines should either be forgotten or the transmission changed to a beefier unit to accommodate the higher torque. Properly handled, these boxes will take the torque of most of the medium sized engines. Anything beyond

this requires a transmission change.

Mention was made earlier regarding front end alignment. It is particularly applicable to the later family of Fords and Mercs. Except in the case of such engines as the Chev and Pontiac V8s and the Ford-Merc ohv plants, which are of nearly similar weight to the flathead, provision for stiff springing, stiffer shocks or both must be made. These stiffer units can be found by using the Ranch Wagon equipment of the same year as the car involved. Also heartily endorsed is the use of the Wagon stabilizer bar and the installation of some form of torque reactor, such as the "Traction Master," on the rear axle, which has a tendency to "walk" under large jolts of power.

Use of the independent front end on the Ford has brought about changes in steering equipment in the later models that require surgery in some swaps. Some of this chopping must be done on the tie rods, as in the case of the '52 and '53 Fords, and some must be done on the pan, as has been mentioned in regard to the '54-'55 engine installation. In some cases, particularly the Cad and Olds, the surgery is performed in the '52 and later Fords on both pan and tie rod. With the smaller engines that have the sump toward the rear, this will not be necessary, but always check the crank-to-pan distance at several places to make sure that the clearance is there.

## LINCOLN

From '46 to '49 the Lincoln presents *exactly* the same layout and problems as the Ford and Mercury of those years except for the fact that there's not as much space problem. There's enough room under the early Lincoln hood to satisfy anyone. The same adaptors that fit the Ford and Merc will work without change in the Lincoln.

The '49 through '51 Lincoln is a horse of another color, though. This one already has a huge engine in it but, unfortunately, one that is a real gas hog. A large percentage of these were equipped with Hydra-Matic and in these there is a remedy. The use of the Hydra-Matic dictates an engine equipped for this transmission, which leaves us with a logical choice between two of the larger mills: Lincoln ohv V8 and Cadillac. These two big brutes will fit into the space with room to spare, the original being the monster that it was. The electrical problem, if the GM unit is used, will be reversing the polarity of the generator. With the Lincoln nothing need be done. Designers being what

*Chrysler mounted in '51 Merc and with Cad Hydra-Matic is a hot combination.*

ROLAND MILES PHOTO



they are, front mounting will require changes, but in this case they will be minor. If you wish to be a pioneer and make your own adaptor plate, this might be the ideal vehicle in which to try out the new Packard. The weight of the Packard is similar to that of the flathead Lincoln V8 and dimensionally similar as well. It will be experimenting all the way but the end results might well be worth it. The car performed well with the flathead and, with the extra hundred horses of the Packard, it ought to really storm.

### KAISER

Here is another off-breed on which a few swaps have been made. These have all been with the Olds and Cadillac, since the car is equipped for Hydra-Matic and there are no adaptors for other engines. Naturally, with the Hydra-Matic being what it is, there are no mating problems, but it is recommended that the small, early model unit be traded in on one of the heavier transmissions designed for Cadillac. Space requirements are more than met in the engine room of the Kaiser and, due to the length of the original engine and its deep contouring, there will be little likelihood of interference with such things as tie rods. It would be well, however, to check centerline-to-steering sector dimensions carefully, particularly on the earlier breeds. The car was designed for an in-line engine and designers have a habit of taking up leftover room with no regard to the feelings of engine swappers. The real reason that there is so little information on this car is two-fold. First, the car itself has never been really popular except during its first few years, although it has been credited with being one

of the best styled pieces of transportation on the market. Secondly the swap is apparently one with few problems, at least insofar as the Hydra-Matic layout goes. The result is that the swap is done with little fanfare and less publicity.

### NASH

This one, with the possible exception of the '55, is a dead issue. We can find no one who has pulled a swap on this car, although a few shops are willing to try. The engine compartment is a fairly roomy affair. Like the Kaiser, there are intriguing possibilities in the Hydra-Matic-equipped Nash cars, and the problems should be quite similar except that absolutely no surgery should be attempted without serious contemplation. The Nash has for years been a unit body-frame piece of construction and butcher work might well end up wrecking the car. Any work on the Nash would again be sheer pioneering, although there may well have been someone tucked away in a back yard who has done this already. If he did, it was an experimental routine from beginning to end.

The '55 cars are another story. As we pointed out earlier, the bolt circle on the transmission mating surface is the same on all the Packard-built V8 engines. The cars are too new to have been given the swap treatment; consequently we can only guess, but since the externals of the engines are so similar it would definitely seem that the big one can be swapped for the little one. Providing the somewhat uninspiring Ultramatic transmission can be improved, the results in these light cars might well be nothing short of phenomenal.

As far as the Rambler goes, the answer is at present a flat, unhappy "no." It could quite possibly be stuffed with a Chev V8 but it would definitely have to be *stuffed*.

### OLDSMOBILE

Prior to 1949 the Olds was a reliable but hardly popular piece of family transportation. After that date it became the "poor man's Cadillac" and a family bomb. There's not much point in discussing swaps in the post-1949 series cars since, like the Cadillac, they can be brought up to date at relatively small expense. For a short time after 1949, Olds continued to build a Six that is interchangeable with the Rocket V8 in both stick shift and Hydra-Matic versions. The chassis are similar in layout and all that is required is the placement of stock mounting and linkage. Although we can find no instances of swapping into the pre-'49 chassis, the job should not be too hard, particularly in the Hydra-Matic versions and even more particularly if the recommended practice of using the later model transmission is followed. In all fairness to a would-be swapper in this category, it should be pointed out that it would be considerably cheaper to purchase a '49 or '50 Rocket-equipped Olds than to swap a V8 into the earlier model. By the time labor costs and the price of the engine with all its accessories are met, the total would come to the going price for a '49 with enough left over to bring the '49 to late model specifications.

Another possibility with the Olds, of course, is switching to the Cadillac engine. This depends largely on the price of the

Cad powerplant. The Olds can be bored out to four inches and stroked a quarter of an inch to give it the displacement of the Cadillac. However, if the cost of the Cad engine runs below \$250, as it will in some cases, it might be just as cheap to use that engine. The only change will be to the Olds front mount set-up and minor linkage alterations.

### PACKARD

As yet, this one is almost impossible to check out, since the Packard V8 engine is so new. In the past it has been the practice in rare instances to use the largest flathead available. Jean Trevoux has done this with his Mexican Road Race cars for several years. However, the use of the V8 and the interchangeability with the older flathead remains at this time to be seen. Service managers say there is no difference between the '54 and '55 transmissions and that the V8 engine should buckle up to the '54 set-up without trouble, although the usual front mount problems would be present. Prior to '54, Ultramatic transmission was considerably different in both case and bolt circle, consequently the switch in these models would require a transmission adaptation. Spacewise, there's not much of a problem; the V8 will go in the hole with little or no interference from such items as steering and tie rods.

As of this writing, although stick shifts are supposedly available, none have come through for inspection and comparison, dealers and service managers say. This leaves things hanging to some extent, particularly since Packard is prone to make changes in the gearbox cases as well as in the engines.

### PONTIAC

Olds and Cadillac are the logical choices here, particularly the Hydra-Matic versions. The swap is apparently an easy one, with little or no surgery involved. The Pontiac engine compartment is a long one and both V8 engines are fairly short, so there should be no interference underneath except perhaps in the latest of the short-nosed Sixes. Even here, there is little likelihood of trouble since Pontiac engines are quite deep from crank to pan. Due to similarity of GM fittings, wiring and linkage, there is little trouble in altering these items to fit the new installation, swappers say. As in all cases where a short engine replaces a long one, the radiator must be relocated rearward to bring it in close proximity to the fan. As for motormounts, a simple crossmember

ROLAND MILES PHOTO

*V8 Chrysler and Cad Hydra-Matic combination gives good bottom silhouette and leaves no worries about road clearance. Steering linkage problem was solved quite simply here by merely banging a few dents in pan.*



added to the Pontiac frame will handle the Olds; the Cadillac, due to its different mounting arrangement, will require step-type pads at each side.

Little is known at the present time as to how the '55 Pontiac engine will fit, except in the Hydra-Matic version. It is just possible (and here we're guessing again) that the Pontiac is like the Chevrolet in that the later standard transmissions will fit the new engine. Several Pontiac service managers report that standard shift is interchangeable by using a special adaptor made by Pontiac. Such is not the case with Hydra-Matic. Other than by switching to the new Hydra-Matic unit, there is no matching it up—bolt patterns are different. Unfortunately none of the service managers was able to say positively just which standard shifts would be interchangeable or whether all would. The engine is an excellent one and it would be worth while checking the bolt pattern of your present transmission against the pattern of the '55 standard shift bell housing.

### STUDEBAKER

From '53 to '55 the Studebaker is excellent swap material and has proved to be a top drawer boomer when equipped with either the Cadillac or Olds V8 engines. Adaptor plates are available for those models and the swap is generally considered an easy one. The Studebaker frame, already set up for the very similar Stude V8, presents only very minor problems, particularly where the Cadillac is concerned. Major problems encountered are those of fitting and cutting. Since there is only a difference of 25 pounds between the Studebaker engine and the Cadillac, front end work is generally unnecessary, though stiffer shocks from the Conestoga are recommended. Although Bill Frick, credited as originator of the Studillac, prefers to use one of the Cadillac transmissions, the Studebaker Commander transmissions, either the Borg-Warner automatic or the standard and overdrive transmissions, will stand up under the Cadillac, provided they're intelligently handled.

As was pointed out earlier in the chapter, there are certain things that should be saved. On the Stude they are: temperature sending unit, flexible oil line, clutch cross-bar release assembly, throwout bearing and rear motor mount. Unless you have purchased the special adaptor for the '55 Cadillac, you can use any Cadillac or Olds engine from '54 back to '49.

Several minor pieces of surgery must be

achieved before a perfect fit is accomplished. On the Cadillac, it is recommended that the '51 right exhaust manifold be used with the regular outlet plugged and the center or crossover outlet used for the right head pipe. This necessitates notching the right fenderwell over the A-arm and making a two-inch cut into the right body support at the firewall. Since the mounting of the GM engines is wider than that of the Stude, two steel plates, 4 by 7 by 1/4 inches must be made and welded over the original Stude mounts, and care should be taken to align and level the engine before final welding. One more small item on mounting is necessary. After attaching the clutch cross-bar assembly to the adaptor it will probably be found that the holes are just slightly to the rear of the holes in the rear motor mount when the mount is aligned on the center crossmember. Elongating the holes in mount by a mere 3/8 inch will set this right. The voltage regulator on the Stude should be "flashed," as described earlier, to bring the Cadillac generator into the proper polarity. From then on the whole thing is a breeze, no more difficult than replacing the Studebaker engine with another one.

Prior to '53 the news is not so good. The swap *can* be made but . . . Clem TeBow, of C-T Automotive just finished one of these swaps on a '51 Commander (use of the Champion is practically impossible) and his report is discouraging. Engine compartment butchery is the main problem, as is linkage. By using the Stude transmission the job would be a little simpler but side clearance is the bugaboo. Clem had to virtually remove both inside fender panels for proper clearance, and a good portion of the firewall was hacked. Clem feels that it would be far wiser to bore out the Studebaker V8 and use the latest equipment on it or install the similar but internally larger Studebaker President engine, which will fit without further change.

### WILLYS

Since space in the Willys Aero series sedans is such as to preclude the use of any of the V8 engines without serious butchery, we cannot recommend any swaps with this car. These very neat and good handling cars have unit construction, and the front suspension components ride quite high in the engine compartment. Any chopping of the sides of the compartment to make room for one of the new engines would very likely damage the suspension seriously or at least



*Buick's Century is factory swap, with Roadmaster engine in Special body.* MOTOR TREND PHOTO

the strength of its mounting.

The Jeepster and later Station Wagons with two-wheel drive are a different matter entirely. Cadillacs, Oldsmobiles and Studebaker V8s have been used with considerable success. These all require use of their own respective transmissions, which fit perfectly into the Willys frame tunnel, needing only very minor support modifications that can be made from scrap or quarter-inch plate. With the Cadillac, only minor front end mounts, almost exactly similar to those described in the Studebaker section, will be needed. The same applies to Studebaker. On the Olds, a slightly different method may be used. At about the level of the original Jeepster mounts, drill and tap holes into the Olds block on each side to take a  $\frac{3}{8}$  x  $1\frac{1}{2}$ -inch bolt by which means two Kaiser rear motor supports may be mounted. These will then fit into the original Willys frame mounts. Naturally, care must be taken when drilling for these mounts to make sure that no oil or water passages in the block are tapped in the process. Drill as close to the bottom of the block as possible where there are no passages and where the metal is quite thick. An alternative would be to make a

channel sling to take the stock Olds support. For cooling, the Willys radiator will probably not be sufficient. However, the front end of the Jeepster is wide enough to take the Olds radiator if the few obstructions on the inside of the Jeepster grille are pared away. The radiator can then be set the requisite three inches forward and mounted to new side brackets.

### CONCLUSION

All of the above installations are those that are considered practical for the average rebuilder. There are others which require transmission changes or frame surgery. These for the most part have been done by those who have had their hearts set on one particular engine and one particular chassis and hang the expensive. Usually the swappers in these instances were experts who were working with spare equipment and were not afraid of spoiling their personal transportation.

As we pointed out earlier, several cars considered by the top professionals in the country to be good swap material have adaptors to take those engines best suited to the car. ■

# Where to use 'em!

BY JOHN CHRISTY

## OHV V8 ENGINES

CARS	Buick	Cadillac	Chevrolet	Chrysler	De Soto	Dodge	Ford	Lincoln	Mercury	Oldsmobile	Packard	Plymouth	Pontiac	Studebaker
Buick 8	☆	O	NR	NR	NR	NR	NR	NR	NR	O	NR	NR	NR	NR
Buick V8	Engine swaps not recommended. See text Chapter V													
Cadillac	NR	☆	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chevrolet 6	O	X	☆	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chevrolet V8	Engine swaps not recommended. See text Chapter V													
Chrysler 6	NR	NR	NR	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chrysler V8	Engine swaps not recommended. See text Chapter V													
De Soto 6	NR	NR	NR	O	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
De Soto V8	Engine swaps not recommended. See text Chapter V													
Dodge 6	NR	NR	NR	O	O	O	NR	NR	NR	NR	NR	NR	NR	NR
Dodge V8	Engine swaps not recommended. See text Chapter V													
Ford (All)	X	X	X	X	X	X	☆	X	☆	X	X	X	X	X
Hudson ('55 V8)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR	NR
Kaiser (Hydra-Matic)	NR	☆	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR	NR	NR
Lincoln V12	X	X	X	X	X	X	☆	X	☆	X	X	X	NR	X
Lincoln ('49-'51 Hydra-Matic)	NR	☆	NR	NR	NR	NR	NR	☆	NR	☆	NR	NR	NR	NR
Lincoln ('52-'55)	Engine swaps not recommended. See text Chapter V													
Mercury (All)	X	X	X	X	X	X	☆	X	☆	X	X	X	NR	X
Nash ('55 V8)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR	NR
Oldsmobile	NR	☆	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR	NR	NR
Packard '50 Conventional and '54 Ultramatic)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR	NR
Plymouth Six	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR
Plymouth V8	Engine swaps not recommended. See text Chapter V													
Pontiac (Conventional)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	☆	NR
Pontiac V8 (Hydra-Matic)	NR	☆	NR	NR	NR	NR	NR	NR	NR	☆	NR	NR	NR	NR
Studebaker ('53-'55)	NR	X	NR	NR	NR	NR	NR	NR	NR	X	NR	NR	NR	☆
Willys	NR	O	NR	NR	NR	NR	NR	NR	NR	O	NR	NR	NR	O

☆ Naturals. Often possible without adaptor

X — Adaptor available

O — Transmission should be changed to match engine

NR — Not Recommended