Bill Scully Adds a '53 Cadillac Engine to His . . .

FORMULIZED FORD

By Joseph DeBlanco **Photos by Poole**

ONCE in a great while we run across an automobile that has been Hopped Up by an individual having no interest in racing or high speeds. Usually the owner is in that middle age bracket. He has improved the horsepower output or the handling characteristics of his car with the idea of obtaining higher performance in the low speed driving range.

In this particular case the objective was the same but the age of the owner would normally place him in the group that makes these conversions (large engines in small chassis) expressly to compete in all out competition.

Bill, age 21, is not interested in any type of speed competition. He wanted the added horsepower in his car to reduce the amount of effort needed by the driver while operating the vehicle in mountainous terrain or when passing other cars. He wanted to be able to pass other cars, when necessary, without having to shift to a lower gear race the engine and require a quarter mile of highway to overtake, pass, and return to the right side of the highway. The Vehicle Code of most states recommends passing as quickly as possible for obvious reasons. Slow passing can be dangerous.

Along with these features Bill also demanded a smooth idle at all times. This eliminated the possibility of a stock Ford engine *hopped up* to the point where it would deliver the same amount of torque and dependability as the stock '53 Cadillac engine. The problems of universal joints, slipping clutch, differential weakness and gas mileage arose. The car was to have no defect in its steering, other than prevailing stock conditions too numerous to mention and too expensive to correct, yet it must be converted in such manner that it would equal a factory installation.

With all these *problems, demands* and *musts* in hand Bill made a survey of all the shops in the area before deciding to place his car in the hands of the capable C. T. Automotive Co. Luckily the local Cadillac dealer had a new engine in stock so work was begun almost at once.

When the complete engine unit was delivered the 12 volt starter and generator had to be exchanged for 6 volt to eliminate the expense of replacing the battery and necessitating the use of resistors for lights and indicators.

Few engine modifications were necessary yet the ones mentioned here have shown a marked improvement in the operation of new Cad engines whether they be in the Cad chassis or converted for use in another make automobile. The hydraulic valve lifters were collapsed and the rocker arms were replaced with Studebaker arms. Previous experience with the stock distributor brought about the change-over to a dual point plate and timing correction of C. T. design. The fuel pump pressure was increased to give a constant 4½ lb. pressure when the engine is turning better than 2500 rpm. This modification necessitated changes in the float level and the amount of float travel. The fuel line pressures were changed primarily to eliminate the four-barrel carburetor's habit of running out of fuel when cornering or going around curves.

The next step was to adapt the Cadillac engine to the standard Ford transmission. The only adapter that had been manufactured to date (for this conversion) was too small in that it limited the size of the clutch assembly to that containing a facing disc no larger than ten inches in diameter. However, it was found that a Ford truck housing (of earlier vintage) could easily be used as one half while the regular adapter plate used between Cadillacs and earlier Fords completed the bell housing assembly. A Model A Ford main drive housing was cut and fitted over the original '52 housing and brazed in place. It was then possible to use the old style cross-shaft, fork and throwout bearing.

With these sturdier units in the assembly the use of the Cadillac pressure plate was again feasible. An early DeSoto clutch disc hub, which matches the Ford spline and is absent of webbing in the plate body, was used. This much modified and stronger assembly was needed to reduce the possibilities of clutch chatter or slippage due to the greater amount of torque now produced by the engine.

The truck housing was fitted to the '52 transmission, centered and installed on the transmission with 7/16 in. standard bolts, following the pattern of the bolt holes in the housing.

Next point on the agenda was the installation of the engine and transmission combined. The transmission rested in place right over the original rear motor mount in the frame X member.

The drive shaft was purposely installed at this time to determine the proper height of the front of the engine. In this manner the universal joints, drive line and differential were brought into close alignment and measurements could be made for the fabrication of front motor mounts. This correct alignment of the engine and drive line assembly allows the up and down whipping motion of the differential to be centralized.

The front motor mounts were made out of ¼ inch metal stock, approximately 3 in. wide and 2¼ in. high. They formed into a U shape, were bolted to the regular Cadillac front mounts and then welded to the frame crossmember.

The two upper inlets and the lower right outlet were cut from the radiator tanks and the openings closed. The lower right extension was then re-installed at the center of the upper tank. The radiator was replaced in the chassis in the stock position and measurements showed that the clearance between the fan and the radiator was identical to the stock Ford installation. Many conversions necessitate changing the radiator location.

The battery was transferred from the right to the left side of the engine compartment to make room for the generator. Moving the battery this far from the starter necessitated the fabrication of a new battery cable. The longest ready-

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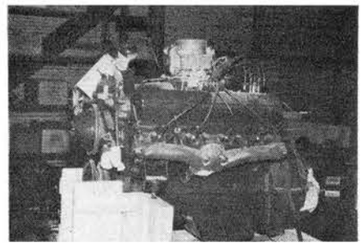
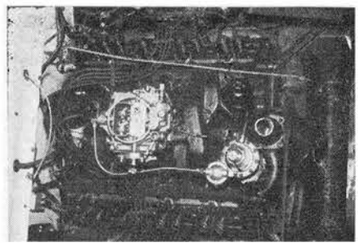
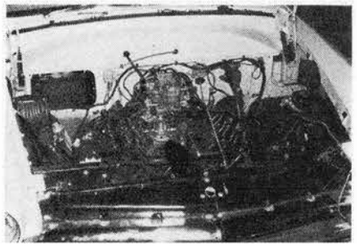


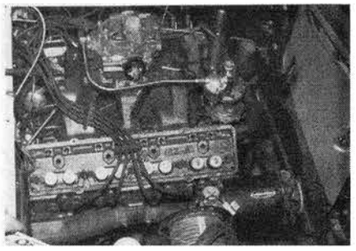
***CADILLAC** engine is uncrated and made ready for installation in the Ford*



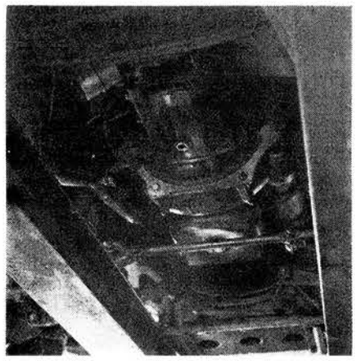
***BIRDSEYE** view shows plenty of room around oversized Cadillac power plant*



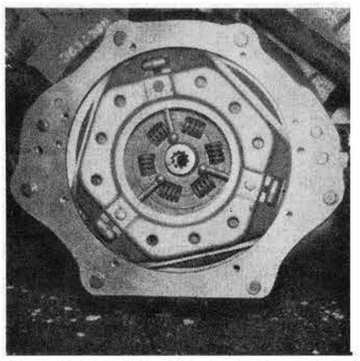
***BATTERY** has been moved to left side of the Ford engine compartment area*



***RELOCATION** of the battery allowed the generator to remain in stock position*



***UNDERCARRIAGE** showing how Ford transmission is connected to the engine*



***FORWARD** adapter mounted to Cad engine with clutch assembly completed*

***LEFT** front engine mount as seen through the left wheel panel opening*

***JOE DEBLANCO** makes adjustment to fuel line before completing road tests*

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made cable was 4 inches too short.

The engine block electrical units such as the water and oil pressure indicators were replaced with the regular Ford oil unit and a 6 volt Oldsmobile heat indicator unit. The voltage regulator was replaced with a '41 Cad regulator to handle the ground polarity of the Ford. The wiring from the generator to the regulator as well as the wire from the ignition to the starter was all replaced with the heavier gauge #10 wire.

The steering and clutch linkage presented no great problems. The drag link was lowered 1½" by heating and effecting two 90 degree bends; one down and one back. A plate welded to the crossmember as a new mount for the intermediate steering control arm changes the location of the arm 3½ inches to allow oil pan clearance for the drag link.

The new type clutch lever assembly as employed on the late model Fords effects only a minimum of pressure on the releasing action at the pressure plate. To modify the earlier type clutch release arm (used here) it had to be bent to the left (towards the driver's side) in a 90 degree angle. It was allowed to extend to the left 3½ in. and then bent down, sharply. An adjustment on the length from the fulcrum to the arm and the adaptation of a clevis to the end of the adjustment rod took care of the clutch operating problems *et al.*

Correct alignment of the engine and drive line components helped to reduce the amount of the up and down movement of the differential (twisting from torque) and left only the problem of eliminating the side to side motion. This was done with the use of two radius rods. They are composed of two '35 Ford complete drag link units. The rear spring plates, which support the U-bolts and shocks, were drilled 2½ in. to the rear of the shock absorbers. The drag link was fastened to this plate. The front end of this rod is attached to the frame with tie-rod ends mounted in the frame channel. Length adjustment was made through the use of the regular adjustable tie-rod ends.

The stock rear-end gear ratio was 4.10:1 and was changed to 3.73:1. The additional low rpm torque makes it possible to run a higher gear ratio in the rear end at all speeds.

The next step was the installation of the exhaust system. The flow of gases in the stock Cad manifolds is not deemed so far out of balance to call for a custom header exhaust unit as the car was not to be used in competition. Therefore the stock manifolds were used with a header pipe, 2" dia., leading into two 27" glaspack mufflers with 2" dia. cores.

The springs in the front-end assembly were left stock and alignment was checked only for *toe* and *caster*. The extra weight of the Cadillac engine definitely necessitated the need of stiffer springs in the front suspension assembly but it was decided to first road test the car and then make whatever changes were suggested by the three test drivers.

Until now we have covered only the installation and adjustment. Now we are all set to find out what improvements this big change may have accomplished. The moment that the engine was fired up it sounded as if there was plenty of power under the bonnet. We cruised around for a few minutes so as to get accustomed to the new feel—which was definitely prominent. The further we drove the more we opened up on the throttle. A few minutes was enough to make us call a halt to this fooling around and hit the open road.

The open road showed us exactly what we had hoped for: Such as—taking care of all the demands that were set upon us by the owner. Controlled horsepower—stability—no clutch chatter—no slippage. The power was felt prominently in all ranges, including overdrive. Taking off in low gear turned into a cautious operation. Second gear had us pinned to the back of the seat. High gear turned into a dream. Cruising in conventional at a low rate of speed—a slight pressure on the throttle—and we effortlessly passed another automobile. Passing other cars with ease was experienced many times. The surprise came upon looking through the rear view mirror and noticing two black streaks trailing the path of our car. Rubber from

the tires. At 50 mph in high gear it was necessary to ease the throttle down. A heavy foot on the throttle caused excessive rear wheel spin. Heading back to the shop, preparations were made for the full day road test.

A few mornings later the gas tanks and crankcases filled—we were on our way. Starting at Glendale we headed towards Apple Valley via Angelus Crest. The second car—which was used for a comparison test—was a '52 Ford Business coupe. Naturally, just as expected, the monstrous difference was surprising to all. The moment the uphill grades appeared—the conclusion seemed to be—that there were no more hills in California. A few cornering shots proved to us that the front springs definitely had to be replaced with sturdier ones and stiffer shocks added.

***SUSPENSION** weakness was noted immediately. Extra weight of Cad engine necessitates installation of stiffer springs*

As there were too many of us to fit in one car, the party was split up evenly. Halfway through the hills we decided to change cars. The initial feeling upon starting off in the business coupe gave you the impression that a few wires were off the spark plugs.

Leaving the hills we traveled through Palmdale and Victorville into Apple Valley. The temperature outside was well over 100—and it showed up in our pace car. The boiling point had been reached although the Fordillac was still traveling with heat indicator needle on normal.

The engine running cooler did not quite eliminate the problem of vapor-locking. This showed up in the Cad. The removal of the gasoline filter between the carburetor and the fuel pump was a great help. Making this correction—the acceleration tests were begun.

The regular test runs of the quarter mile were made—such as acceleration—standing—and flying times. Two way runs were made to arrive at an average. The first flying run showed us 117 mph—which with the 3:73-gear and tire size we were using gave a figure of approx. 5300 rpm. The return run was quite a bit slower, at 100 mph. Reasons for this slower run are multiple. The return was upgrade, into the wind, and vapor locks in the fuel line system all were contributing factors. As this test was to show the true merits of the car no additional runs were made with the idea of presenting only the *best operating characteristics.*

Inadequate fuel pressure slowed us down also yet we still had a two way average of 108 mph.

The standing quarter runs were made giving a result of 18 seconds flat for one way. The return trip was made in 18.10. The differential being the slight grade and headwind in one direction.

The stock business coupe was then put through its paces. The flying quarter showed it to be quite a bit slower—showing an elapsed time of 9.95 seconds in comparison to the Fordillac's 7.7. The return trip 11 seconds to the Cad's 9 seconds. The standing quarter comparisons showed 22.9 seconds for the stock Ford as to 18.10 seconds for the Fordillac.

Concluding our tests we headed for home. Upon reaching our destination we once more filled our tanks so as to get a comparison on mileage. This showed a variation of two tenths of a mile per gallon between the two cars.

The Fordillac showed only .2 mpg better mileage than the stock Ford at the

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completion of the day's running but the figure can hardly be used as much of the Fordillac testing was done while the stock Ford was parked by the side of the road.

The results of all the tests started us on various corrections. The Carter four barrel was taken off and a Rochester replaced it. The reason for this was that the Carter although modified could not flow the fuel through its chambers as readily as the Rochester. The increase in float level and float travel—of course—had to be made in the Rochester. The fuel line from fuel pump to carburetor was also increased to 5/16. The fuel pump was disassembled and one of the check valves was stuck—thus explaining the fuel pressure trouble in the straight-away runs.

The only thing we found lacking in the operation of the car was the amount of fuel pressure available. It was definitely inadequate for the type of test we had in mind. However, Bill does not plan on ever utilizing the full rpm range available in his conversion and he is more than happy with the car as it is today.

It answers his every need and when the heavier front springs are installed to improve the handling of the front end he will be in a most enviable position as the owner of this Formulized Ford.

BEATTY'S BLOWER

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was wrong only when the car began running a bit rough. An unblown engine with all these difficulties would never have made it down the course. So far, it has always been the engine which has broken down and not the supercharger.

At peak engine speed of 5000 rpm, he is able to realize 55 inches of mercury boost from the blower, which is to say that he has a gain of slightly over 12 pounds per square inch of pressure in the blower chamber above normal atmosphere, which is 14.7 psi at sea level. For safety's sake, he has machined the rotors for clearance greater than factory specifications, since he is both turning more rpm's and building greater pressures inside the chamber than it was originally designed for. According to Beatty's calculations, the rotors turn at approximately 1.25 times engine speed with his present drive pulley arrangement.

The total conversion job, in addition to requiring a large amount of time and labor, took more than a little bit of ingenuity and engineering. One problem led to another, and before Tom was through, he had fabricated at least eight major components for the unit.

Some of the parts involved casting, some milling and machining, others welding, and finally, as a topper for mechanical arrangements, we have the throttle linkages. The engine is currently running four Stromberg model 48 carburetors converted for alcohol. It was a touchy project to get them all synchronized and functioning simultaneously. Unfortunately, the photos fail to do this mechanism justice and it must be seen in action to be appreciated. Tom calls it his "monkey motion," and though it looks a bit strange to see all those linkage rods working when he pushes on the foot throttle, there is no perceptible lag anywhere in the system and it has proved most efficient. While not strictly a part of the supercharger, the fuel pressure set-up should be noted here. A hand pump has been installed which feeds the required seven to eight pounds pressure per square inch to a fuel log located on a plate just behind the oil filler pipe.

Beatty's only complaint about the carburetion is that he can't get enough of it. In other words, he would like to devise some way to get more fuel into the blower and consequently more speed. He feels that the limit has been reached at four in the number of carbs he can add and continue to gain in efficiency under the present arrangement. From here on in, it is a question of either designing his own carburetor or building some sort of fuel injection system on the blower.

As regards physical changes to the blower unit, the only internal change that could affect fuel flow was the previously mentioned tolerance increase to the rotor