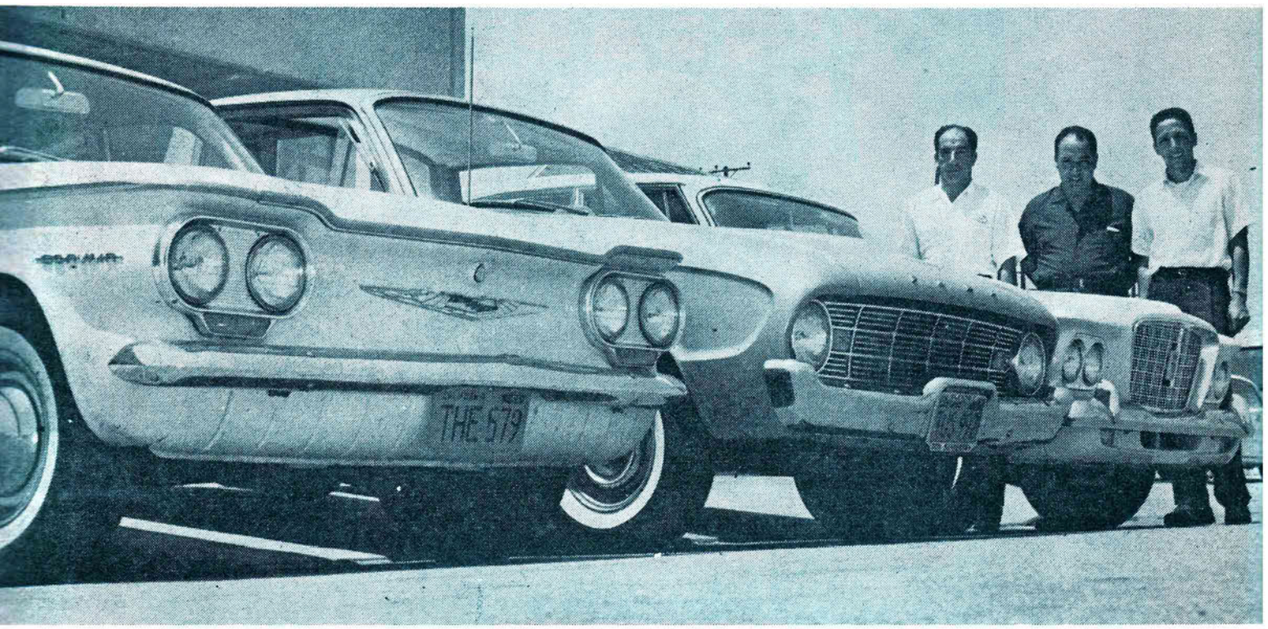
SUPERCHARGING THE: CORVAIR FALCON VALIANT



The Granatelli brothers, Joe, Andy and Vince, left to right, pose behind three docile-looking compacts which they have given the "treatment." All three responded when supercharged by almost halving acceleration times, adding many miles top speed.

By RAY BROCK

Heavy-footed performance tests of Paxton-blown compacts prove that these little bombs can hold their own with many of the larger super-stocks at the drag strip

One undeniable fact about small production engines such as those used in the Corvair, Falcon (also Comet) and Valiant, is that they just do not have much power. With small cubic inch displacement, low compression for use with regular grades of gasoline and camshaft timing designed for fuel economy, the horsepower/weight ratio is much lower than that of the average full-sized sedan produced today. With this sudden shift from driving cars with large engines, the one common complaint we have heard from acquaintances who have become recent owners of one of the new compacts is that they would prefer to have more power at their command. They like the size but not the power.

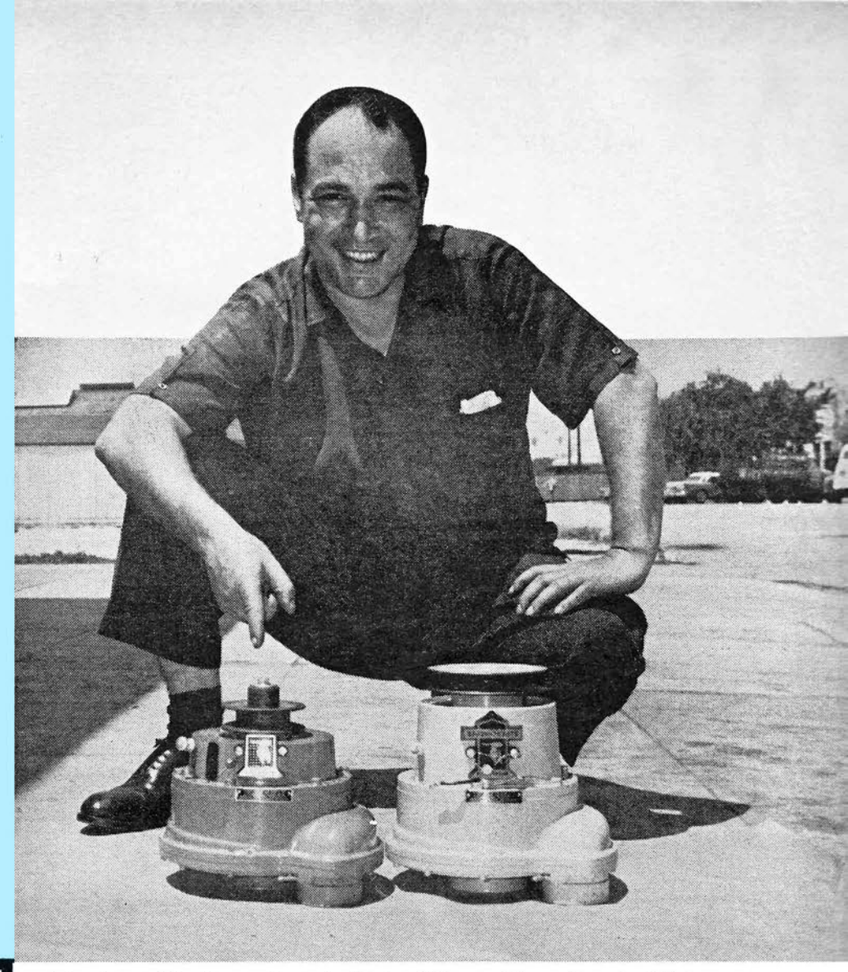
There are some solutions to this shortcoming; for instance a V8 engine will fit in the Falcon or Comet chassis (see page 38) and the Valiant engine compartment appears to be of large enough proportions to accept a V8. The Corvair, however, is completely impractical in layout for installation of an engine with larger dimensions. Installing a V8 in the Falcon, Comet or Valiant, while offering excellent results, is not necessarily the easiest or cheapest way to obtain the extra "oats" that you might desire. And since the compact engines are all of small displacement, the use of increased compression, wilder camshafts, extra carburetion, etc., will help only at the higher rpm's while making a serious dent in the already weak low speed torque.

We spent the first couple of weeks in May taking turns driving a Corvair, a Falcon and a Valiant furnished us by Paxton Products of Santa Monica, California, manufacturers of centrifugal superchargers. We really had our eyes opened on just what kind of performance could be wrung from small engines with some results that actually border on the fantastic. First, we drove the Falcon and Valiant in stock condition, just like the factory recommends they be tuned. The Corvair was stock too, but the term "stock" has to be stretched a little because the car was equipped with the optional 95 horsepower engine.

We drove the cars in everyday traffic and then took them to our usual test strip for acceleration checks against the stop watch. As everyone who owns one of these compacts knows, they lack the power needed to quickly pass another car at highway speeds or to climb a steep grade with any rapidity. To establish a set of stock performance figures against which we might later check the same cars after modifications, we ran 0 to 30, 0 to 60, 30 to 60 and 50 to 80 mph acceleration checks plus standing ¼-mile speed and elapsed times.

The purpose of the whole test series was to find out just how much the performance of the cars would be improved with the addition of Paxton's new SN-60 centrifugal supercharger and also to find out if the engines were further adaptable to modifications for a good horsepower per cubic inch ratio.

Paxton's SN-60 blower designation indicates that it is a "short-nosed" model designed in 1960. The "short-nose" title comes from the simple fact that it is 2.2 inches shorter than the standard VS



Andy Granatelli points to Paxton's latest addition to blower line, the SN-60 supercharger for compact engines. It is shorter than the VS-57 blower at the right, with fewer parts. The fixed ratio will deliver a minimum of 10 pounds boost at 6000 rpm.

(variable speed) Paxton blower. The VS blower has a piston-actuated pulley on the front which changes pulley diameter, therefore gives blower speed changes for a given crankshaft speed. The variable pulley has been eliminated from the SN-60 and it has a fixed ratio.

The blower internal ratio between input shaft and impeller is 4.4:1. This step-up is made by the input shaft driving a planetary carrier fitted with five large precision steel balls. These balls rotate inside a spring-loaded split outer ball race with the impeller shaft driven by the inner edges of the steel balls at an increased rate of speed. Recent developments by Paxton permit the SN blowers to be turned at engine speeds above 6000 rpm. With a 2:1 pulley ratio and 4.4:1 impeller ratio this gives impeller speeds well above 50,000 rpm.

Another new feature in the SN-60 blower is an oil pump of increased capacity which will pump oil at much higher rpm's than the blower will ever be turned. The principle cause of failure on the early McCulloch superchargers was the oil pump. It had an inadequate capacity plus a heavy pump plunger which would float at high rpm's and starve the balls and races when they needed lubrication most. DO (direct oil) model Paxton blowers solved this shortcoming by using oil directly from the engine main oil gallery but the success of these DO blowers depended upon the owner's habits of changing oil and filter in his car. If he let the oil get extremely dirty and full of grit, the blower would also get the same treatment and wear would be accelerated. Paxton included oil filters in the kits to solve this problem. The SN-60 combines the new pump design with its own supply of oil that cannot be contaminated so never needs changing.

The kit pieces used with the SN blower for the compacts vary somewhat depending upon the car but generally speaking, are pretty much the same. Tests were made with many types of carburetion and it was found that all three compacts had economy carburetors which were not of

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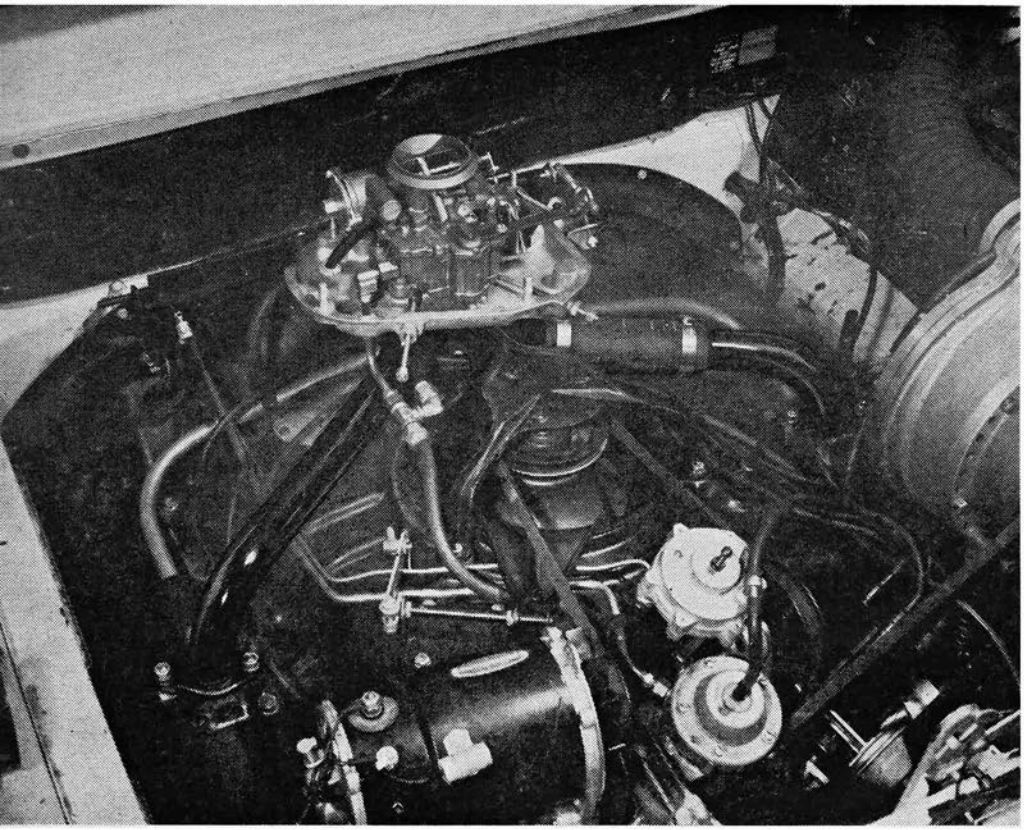
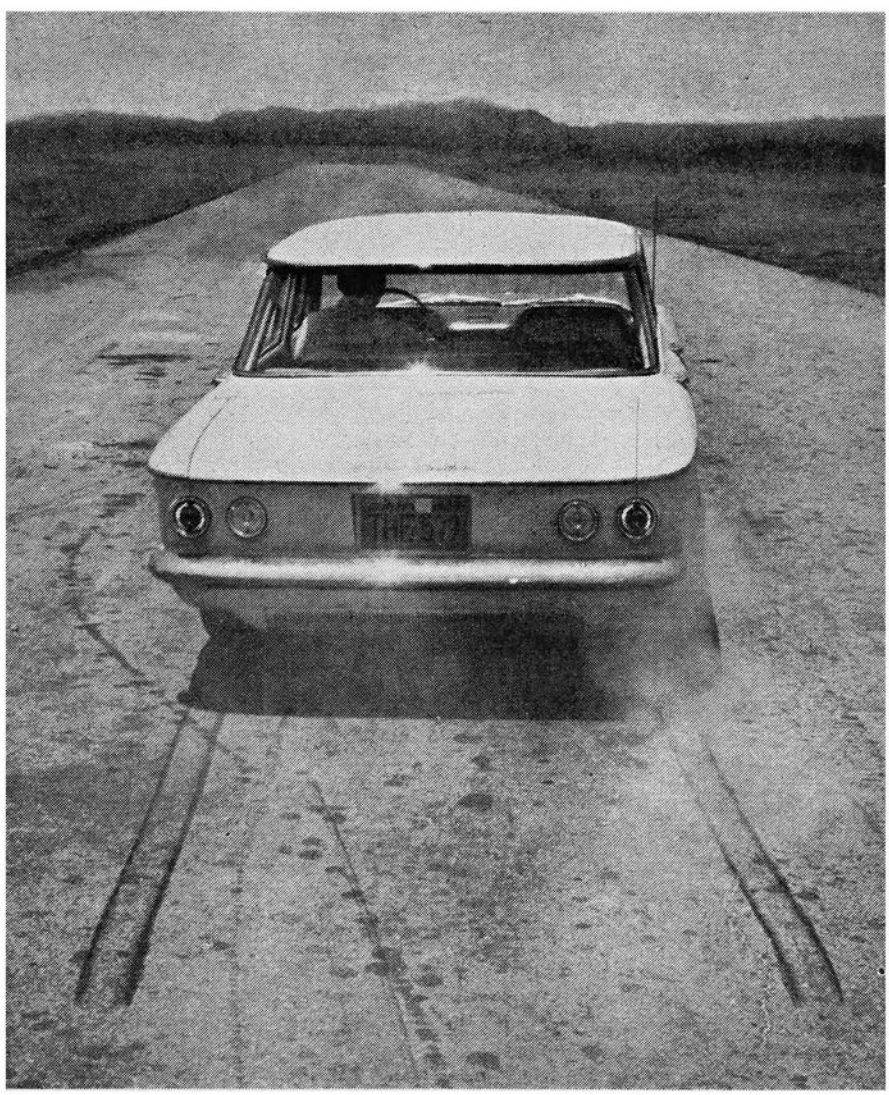




SUPERCHARGING THE: CORVAIR FALCON VALIANT continued

large enough capacity to supply the amount of air and fuel needed with the blowers. A Stromberg WW type carburetor, identical to those used on the supercharged Studebaker Hawks a couple of years ago has ample venturi area and is easy to rejet to suit various conditions so it was chosen for all three engines. A cast aluminum air box is also included in the kit so that the whole carburetor is pressurized and the possibility of leaks eliminated.

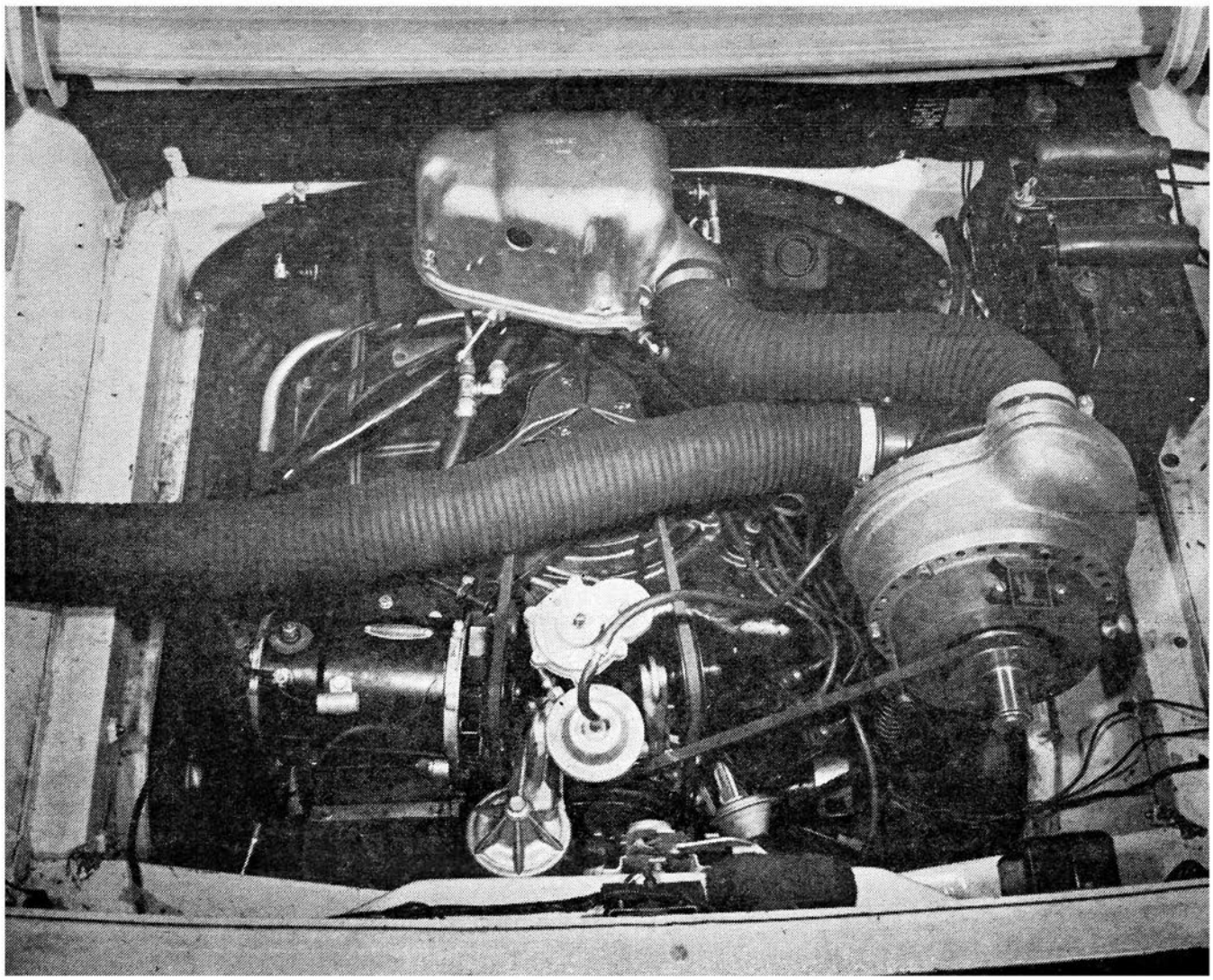
For the Falcon and Valiant, an adaptor is supplied to fit the two-barrel Stromberg to intake manifolds designed for a single-throat carburetor. For the Corvair, which uses a single-throat carburetor for each bank of cylinders, a manifold was made of steel tubing with the Stromberg two-barrel carburetor centrally mounted atop the engine. The rest of the kit pieces include the necessary pulleys, belts, linkage pieces, etc., to fit the blower to the engine plus a large capacity air cleaner. The price for the complete blower and kit for any of the compacts is a surprisingly low $299.50. Let's see what happened when these blower kits were installed on the Corvair, Falcon and Valiant!

Starting with the four-door stick-shift Valiant, the stock acceleration times were: 0-30 mph, 5.2 seconds; 0-60, 16.8 secs; 30-60, 11.8 secs; 50-80, 22.4 secs. The Valiant required 20.5 seconds for the ¼-mile with a top speed of 66.1 mph at the end of the quarter. Next, the SN-60 blower and kit were installed and the rest of the engine left untouched except for a colder range Lodge spark plug. Paxton recommends Lodge platinum point plugs because they are of multi-range design and will resist fouling in slow traffic plus they are suitable for high-speed use. The stock ignition was not altered in any way. The ratio between crankshaft and blower pulleys was 2-to-1 and combined with the 4.4 internal ratio in the blower, gave a

TOP—A single dual-throat Stromberg WW carburetor is furnished in Corvair SN blower kit to replace the two small stock Rochesters. Paxton also includes a steel tubing intake manifold with a hose joint in one leg to allow for engine expansion.

LEFT—A startling sight for the uninformed spectator at the drag strip is to see a Corvair sedan leave the line with a wild squeal of rubber for about a hundred feet. With the increased power supplied by the blower and terrific "bite," Corvair jumps.

PHOTOS BY ERIC RICKMAN



ABOVE—The prototype blower installation on the Corvair was made using a SN unit with reversed rotation. Production kits will use standard rotation blower with idler shaft. Cast aluminum air box completely pressurizes the carburetor to prevent leaks. Air cleaners are furnished in kits; in this case, it's in the fender.

8.8:1 ratio between engine speed and blower impeller speed.

At 2000 engine rpm, full throttle, the gauge installed for the test recorded 1 pound manifold pressure. Compared to ½-pound vacuum recorded on the same engine normally aspirated, this represents a 1½-pound pressurization of the manifold which indicates the cylinders would get a

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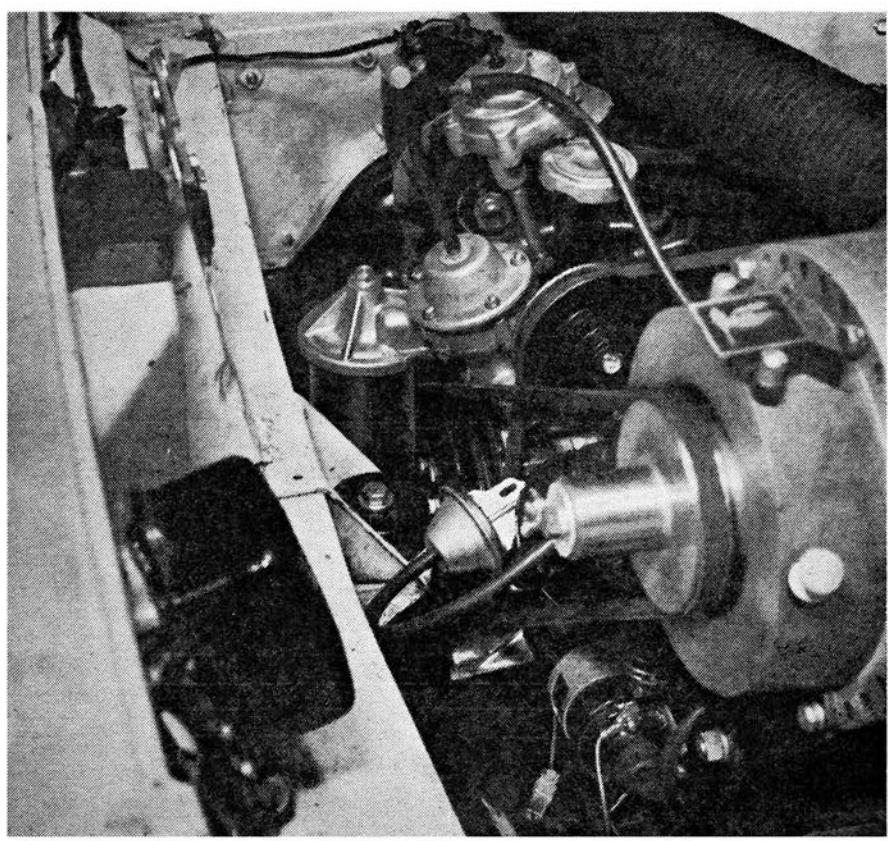
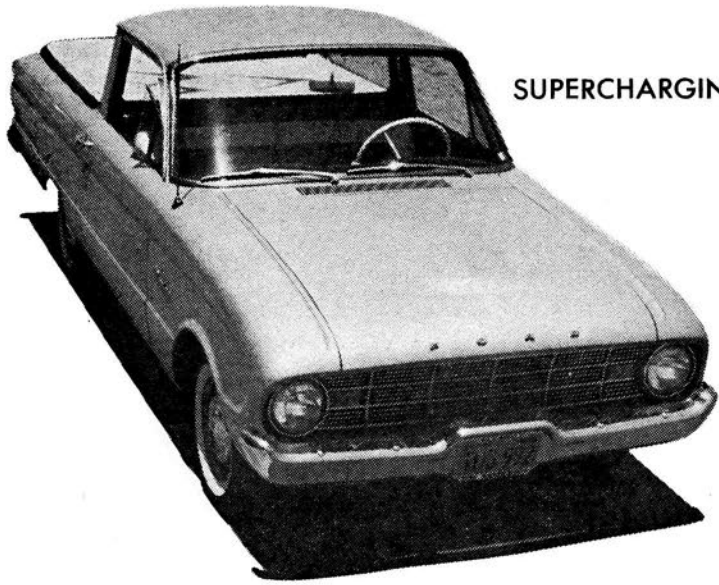


RIGHT — There is very little room to install a blower drive belt on the Corvair engine so for the prototype installation, a second crank pulley was bolted directly to the original pulley. The oil filter can was also flattened slightly on the back side to give a little extra clearance.



SUPERCHARGING THE: CORVAIR FALCON VALIANT

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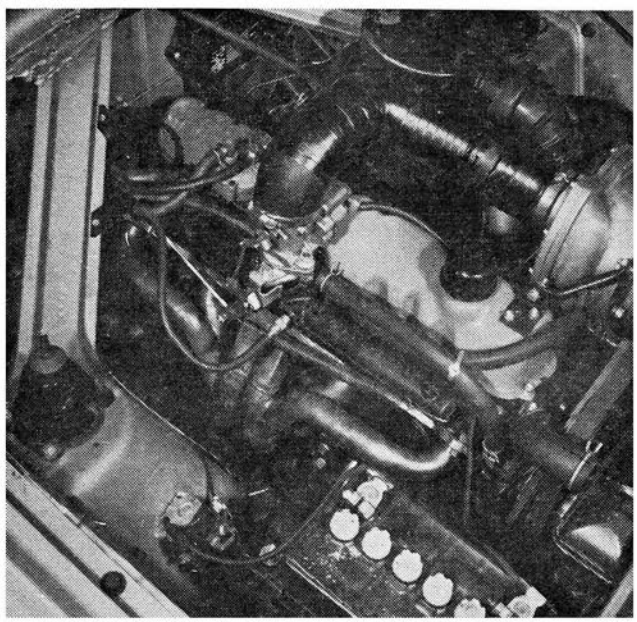
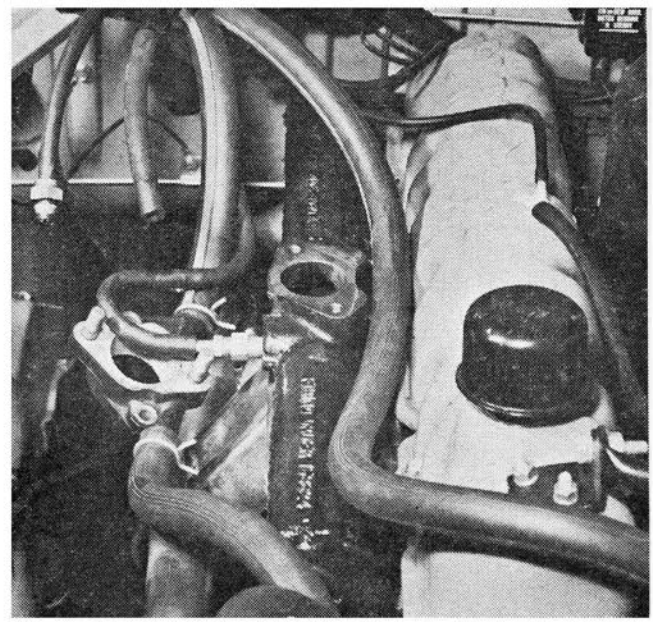
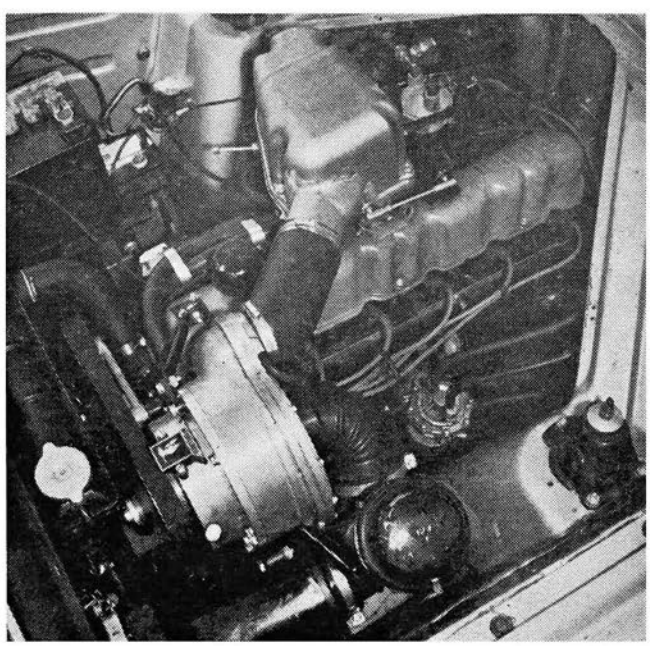
Completely stock in appearance except for a tarp over the bed, Paxton Products' '60 Falcon Ranchero is equipped with a modified and supercharged 144-inch engine which gave it a top speed of 125.698 mph.







ABOVE—Falcon intake manifold is cast integrally with the cylinder head so prevents extensive port modifications. The intake riser hole has 1 3/16-inch stock diameter with a straight bore and sharp edges. Paxton opened riser to 1½ inches and also flared the opening fore and aft for better mixture flow.

ABOVE LEFT—Custom exhaust headers were designed and built by Hedman with a single large diameter exhaust pipe to the rear of the car. Carburetor pictured here is a Fish and ran quite well but was discarded in favor of a Stromberg dual so that all compact kits could use common parts supply.

LEFT—Production kit for the Falcon engine will include the SN-60 blower with a single wide drive belt. There is plenty of room around the Falcon engine so the regular inch-wide Paxton V-belt is used. The air cleaner brackets below the blower to pick up a fresh air supply from behind the Falcon grille.

10% heavier air/fuel charge, therefore theoretically deliver 10% more power than it did at 2000 rpm without the blower. The pressure increased as the engine rpm went up with readings of 2 pounds at 3000 rpm, 4 pounds at 4000, 6 pounds at 5000 and 10 pounds of manifold pressure recorded at 6000 rpm. The stock camshaft, lifter and valve spring arrangement floated at 6200 rpm. The 10 pound boost at 6000, if applied according to supercharging theory whereby an extra atmosphere of pressure (15 pounds) doubles the horsepower output, would indicate that the Valiant's 101 horsepower had been increased 66% at 6000 rpm, or the power was somewhere in the neighborhood of 165 hp. The car felt noticeably better at even the lower rpm's but really started to run as the engine speed increased and manifold pressure went up.

Back at the ¼-mile strip for another set of acceleration figures, we came up with these times: 0-30, 4.0 seconds; 0-60, 9.6 secs; 30-60, 5.8 secs; 50-80, 10.6; and the ¼-mile in 17.5 seconds with a speed of 81 mph at the end of the quarter. The proof of improved performance is in the 30-60 and 50-80 mph acceleration tests where the times with the supercharger were half of the time needed with the stock engine. Also, the 15 mph increase in speed for the ¼-mile is quite conclusive. The car was not timed for top speed but by speedometer indications was estimated close to 115 mph.

The next car we tested was a Corvair four-door sedan with standard three-speed transmission and 95 hp engine. The reason for choosing the 95 hp engine over the standard 80 hp version is that Corvairs use hydraulic valve lifters and early tests by Paxton proved that these hydraulic lifters would pump up and cause valve float at about 4800 rpm. Small engines need rpm's to produce horsepower so the optional engine was ordered to get stronger valve springs and different lifters (although still hydraulic) that would permit engine speeds to 6000 rpm. A different cam grind, larger ports and carburetor changes are also included in the 95 hp engine. The 95 hp Corvair is much quicker than the 80 hp version even in stock form but does not idle as smoothly nor provide

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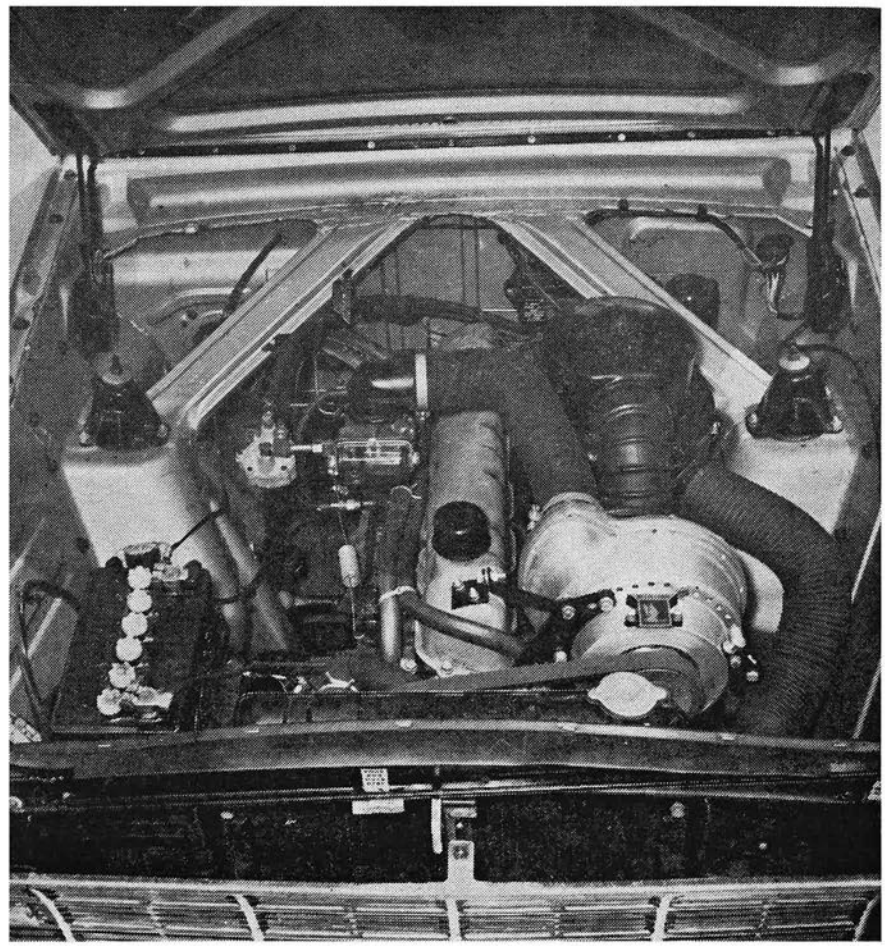
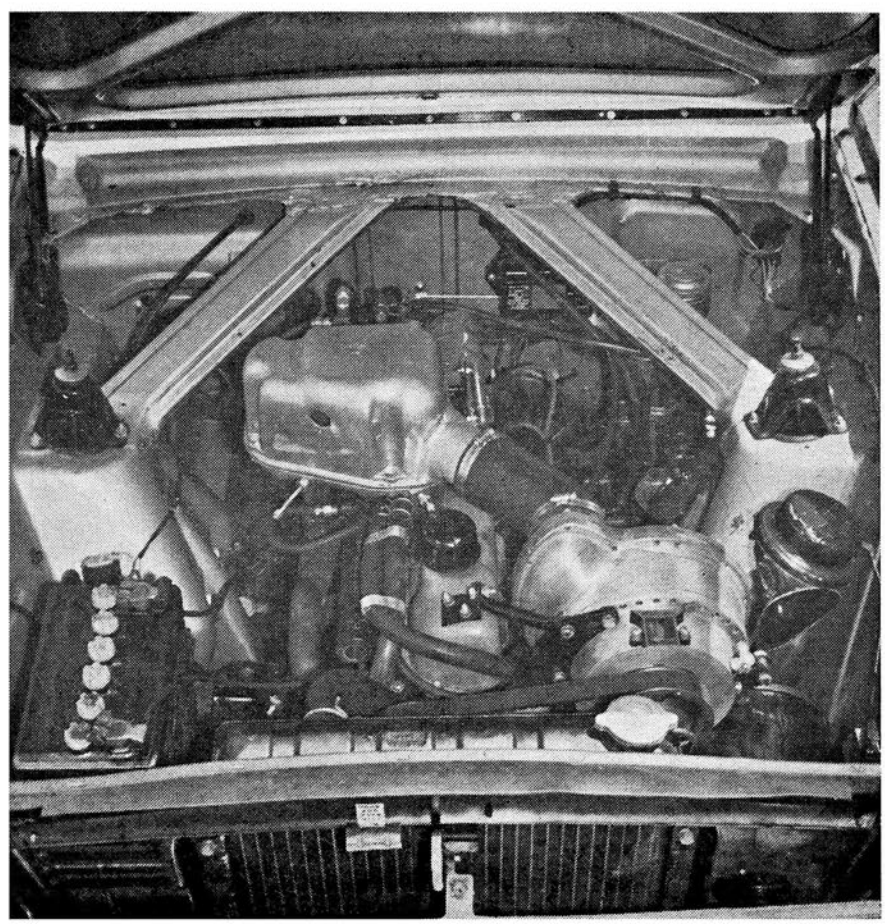




TOP—Original blower tests on the Falcon were made by Paxton with a single-throat carburetor from 223-inch Ford six. Chart on next page shows results were good but Stromberg dual has less air restriction.

RIGHT—This is the Paxton installation for Falcons and Comets. The air cleaner is below the blower and a cast aluminum air box completely encloses the Stromberg carburetor. Engine accessibility is good.

SUPERCHARGING THE: CORVAIR FALCON VALIANT continued

good low-speed operation as does the 80 hp Corvair engine. Our "before" tests showed the Corvair needed 4.4 seconds, 0-30 mph; 0-60 in 14 secs; 30-60, 9.0 secs; 50-80, 17.4 secs; and 69.2 mph for the ¼-mile in 19.8 secs.

The blower was fitted for our next tests along with the kit pieces such as the steel tubing intake manifold and Stromberg carburetor with cast aluminum air box. The Corvair engine, when viewed from the crank pulley (rear) end of the car, rotates in a counter-clockwise direction, opposite the standard engine rotation, so presented a few problems in mounting the blower. For these initial tests, Paxton used a special blower with the impeller and air scroll made up for counter-clockwise rotation. Production units will probably use an idler shaft between the crank pulley and the blower so that standard clockwise rotation blowers can be used, requiring less parts manufacturing. Tight fits between crank pulley, the oil filter and rear mount also presented some problem but they were solved by using a second stock crankshaft pulley next to the regular pulley, flattening the back side of the filter can slightly and using a ⅜-inch V-belt to drive the blower. For production kits, a cast dual-sheave pulley will be furnished to replace the stock crank pulley. Blower pressure in the head was 10 pounds at 5700 rpm, about 11 pounds at 6000.

There were many amazing things about the supercharged Corvair. First of all, the very fact that a ⅜-inch V-belt is all that is needed to drive the blower indicates that the horsepower requirement of the blower is slight. We abused the Corvair for several days with the tach reading 6000 rpm literally hundreds of times in first and second gears and the belt never showed signs of slipping. The tension is controlled by a spring-loaded idler arm pulley. The next amazing thing about the Corvair is the way the car ran: 0-30 mph in 2.5 seconds; 0-60 in 7.4 secs; 30-60, 4.6 secs; 50-80, 9.0 secs; and the ¼-mile in 16.5 secs with a speed of 82.6 mph. Compare these times to the hottest '60 stocker we tested, a Ram-Inducted Plymouth Fury, and you will see why we were amazed. The Fury needed 3.1 seconds to accelerate from 0 to 30 mph; 0-60 in 7.5 secs; 30-60, 5.6 secs; 50-80, 7.2 secs; and the ¼-mile in 15.6 seconds at 90 mph.

The Fury gets the upper hand only above 65 mph when the Corvair must be shifted into third gear and the rpm's (and blower pressure) drop. At about 85 mph, the pressure output is once more enough to make the car really storm. Don't get us wrong, the acceleration between 65 and 85 mph is still good but not as good as the Fury. We actually believe that if both cars would start a drag race with an 85 mph rolling start, the Corvair would beat the Fury to 125 mph, its estimated top speed with the 3.54 axle at about 6200 rpm when the valves start to dance.

We are pessimistic on the stop watch, making sure that it is started before the car is in motion, not afterwards, and stopping the watch only after we are sure it has reached the proper speed. Our tests were made when the car was equipped with the standard 3.54 axle ratio; Paxton changed to a 3.89 ratio a few days later and set a new G/Sports record at the San Fernando, California, drag strip with an elapsed time of 15.76 seconds and a speed of 84.50 mph. It beat a Carrera Porsche by several car lengths in setting the record. At LADS drag strip in Long Beach, the car reached a top speed of 85.71 mph.

The Corvair actually ran against and beat 100-110 mph Gas class cars for the first one-eighth mile. The rear engine location gives superb traction and the car is very light so gets off the line in rapid fashion. Proper dragging procedure is to rev the engine up to about 5500 rpm, slip your foot off the clutch and hang on. The Corvair will peel rubber with both wheels for about 100 feet and make spectators' eyes pop and mouths hang open. With this kind of performance, Corvair owners shouldn't worry about the fact that a V8 won't fit.

Another amazing thing about the Corvair is that the suspension was strictly stock with no heavy-duty shocks, springs, etc. The original equipment tires were inflated to recommended 25 pounds pressure. As we go to press, the transmission, rear end and engine have been abused unmercifully but haven't shown any signs of weakness. A top speed of 114.942 mph was registered at a Russetta Timing Association meet May 15, on California's El Mirage dry lake. The course was 1½-miles long but the Corvair needed less than half that distance to reach 6200 rpm where the valves floated. It could have used the 3.54 ratio to great advantage.

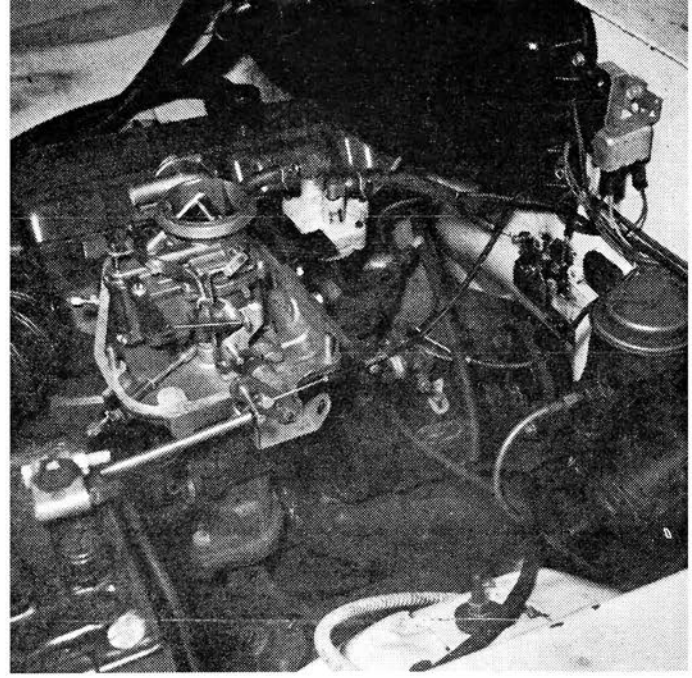
The stock Falcon Ranchero we tested had a standard three-speed transmission with 3.89 rear axle ratio. Its stock performance times were: 0-30, 5.6 seconds; 0-60, 20.5 secs; 30-60, 15.0 secs; 50-80, 28 secs; and the ¼-mile in 21.5 seconds at 63 mph. It was fitted with a SN blower and kit using a Holley single-throat carburetor from a 223-inch Ford six engine. With just this change and the rest of the engine left stock, the Falcon performance

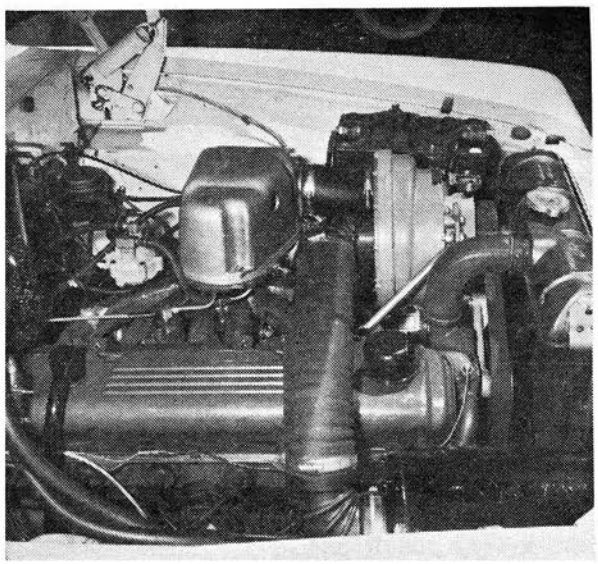
(*Continued on page 102*)

STOCK VS. SUPERCHARGED COMPACTS

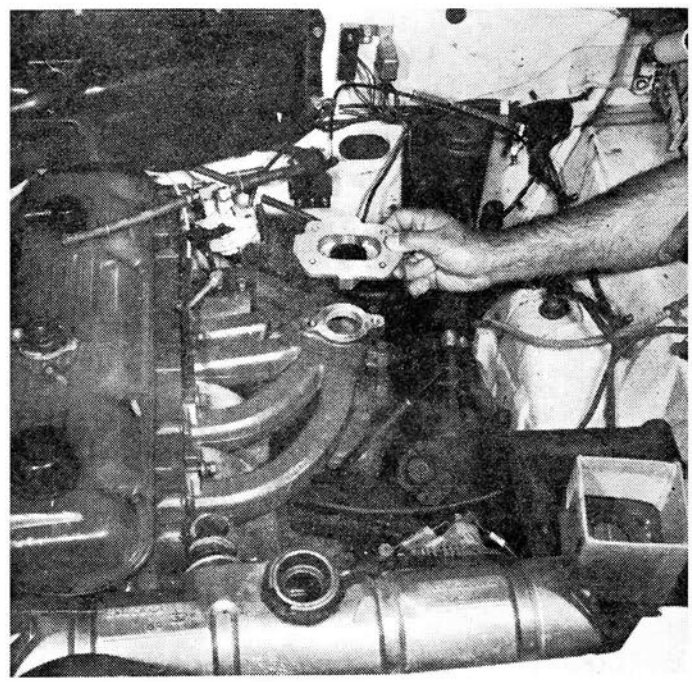
	Axle Ratio	0-30	0-60	30-60	50-80	¼ ET	¼ Speed	Top Speed
VALIANT								
Stock	3.56	5.2	16.8	11.8	22.4	20.5	66.1	100 (est.)
Blown	3.56	4.0	9.6	5.8	10.6	17.5	81.0	115 (est.)
CORVAIR 95 HP								
Stock	3.56	4.4	14.0	9.0	17.4	19.8	69.2	100 (est.)
Blown	3.56	2.5	7.4	4.6	9.0	16.5	82.6	125 (est.)
Blown	3.89					15.76	85.71	114.942
FALCON								
Stock	3.89	5.6	20.5	15.0	28.0	21.5	63.0	85 (est.)
Blown	3.89	4.1	12.6	8.6	12.2	18.3	76.0	110 (est.)
Modified & Blown	3.89	2.7	7.9	5.1	10.9	15.99	86.10	125.698

RIGHT—The Valiant throttle shaft through the firewall is in a fore and aft position while the Stromberg carburetor throttle shaft is crossways. To make the changeover, a shaft support and bell crank are fastened to the stock shaft and a piece of motorcycle throttle cable looped over to the shaft lever on the air box.

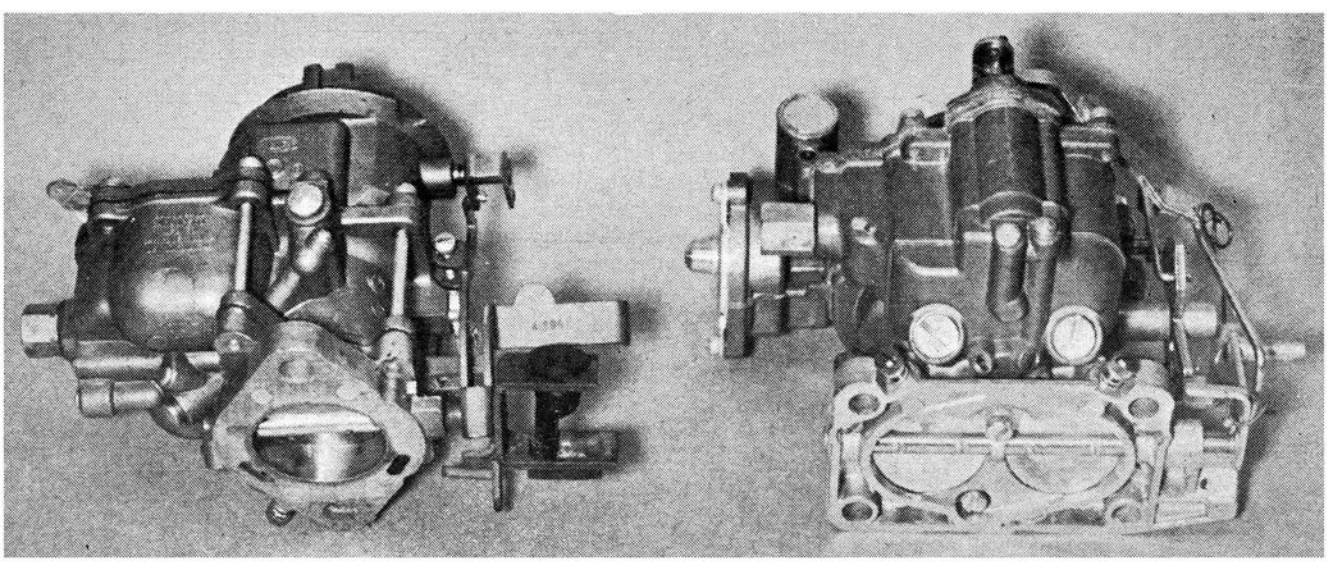




ABOVE—Completed blower installation on the Valiant engine is uncomplicated thanks to the tilted engine which gives ample room to the left side of the engine. Cool air is picked up behind grille, filtered. Cast aluminum air box encloses carburetor.



RIGHT—To permit the use of a larger capacity two-barrel carburetor, an aluminum adaptor plate screws to the Valiant intake manifold. Exceptional results should be gained using Valiant's optional four-barrel, long-passage intake manifold.



Stock Valiant carburetor, left, is a single-throat Ball and Ball model which is both small in venturi size and not easily rejetted for use with a blower. The Stromberg two-barrel is type used on supercharged Stude Hawks, has more area, is easy to jet

HOT COMPACTS

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was improved as follows: 0-30, 4.1 secs; 0-60, 12.6 secs; 30-60, 8.6 secs; 50-80, 12.2 secs; and the ¼-mile in 18.3 seconds at a speed of 76.0 mph. Like the tests with the Valiant, just adding the blower made a great difference in the acceleration of the Falcon, especially at the speeds needed on the open road when passing.

Next, the Granatelli brothers, Andy, Joe, and Vince, who together with John Thompson, own Paxton Products, decided that they would like to see just how much horsepower they could produce with a compact engine. The Falcon engine was left at stock displacement but otherwise modified to a pretty good degree. The head was ported as much as it was possible, which isn't too much since the integral intake manifold arrangement defies any intake port enlargement except through the valve pocket. The chamber was also opened out around the valves for better flow and polished, operations which lowered the 8.7:1 compression ratio to 8:1. Stock valves were retained but undercut, polished and lightened.

The carburetor riser passage into the intake manifold was enlarged from 1 3/16- to 1½-inch diameter and the cast aluminum adaptor to fit between the carburetor and the manifold matched to the 1½-inch hole. This riser was also flared both fore and aft inside the manifold log to eliminate sharp corners. An Iskenderian E-2 camshaft was installed for increased valve timing and a Mallory fully centrifugal distributor used in place of the all-vacuum stock ignition. Bob Hedman designed a beautiful set of custom headers for the Falcon engine with a large diameter single exhaust pipe to carry the gases to a single large muffler at the rear of the car.

The rest of the engine was left stock except for slightly increased clearances on the pistons and pins. One of the Stromberg WW carburetors enclosed in an air box was bolted on top of the enlarged manifold opening and adaptor flange. The crankshaft to blower ratio was 2:1 for a final 8.8:1 ratio between engine speed and impeller and a boost of 10 pounds was recorded in the intake manifold at 5700 rpm.

With these modifications, the Falcon performance was absolutely unbelieveable once it was underway. The Ranchero could not stay with the Corvair on a standing start since it does not have the terrific "bite" of the rear-engined Corvair and would just burn rubber, but once underway the story was different. Acceleration figures for the Falcon were: 0-30, 2.7 secs; 0-60, 7.9 secs; 30-60, 5.1 secs; 50-80, 10.9 secs; and the ¼-mile in 15.99 secs at 86.10 mph. The ¼-mile times were

(*Continued on page 104*)

HOT COMPACTS continued

recorded at the San Fernando drag strip.

Top speed of the Falcon prompts us to estimate horsepower of at least 200. At the Russetta Timing Association meet on El Mirage dry lake on May 15, with 1½-miles of loose dirt to reach top speed, Andy Granatelli scorched the Falcon to a top speed of 125.698 mph. Needless to say, the little compact was the sensation of the meet. The unbelieving officials promptly checked the fuel to make sure it was pump gasoline. It was. Andy reported that valve float at 6800 was all that kept him from going faster. He plans to install a 3.54 or 3.10 ratio for the next meet. Any guesses of top speed?

All three of the cars we tested were fitted with prototype blower installations and there will probably be some changes in kit pieces, especially for the Corvair, but the amount of blower pressure will be the same, 10 pounds minimum in the manifold at 6000 rpm. All three of the little engines proved that they could hold their own with almost anything on the road today with just a little breathing assistance. With a few modifications, look out! An interesting note is that despite dozens of abusive wheel-spinning starts on each car, there were no signs of weak spots anywhere between the engine and the rear wheels. The small engines reap the benefits of the Paxton blowers at the higher engine rpm's so do not torture drive-line components like a large displacement engine with brute torque at low engine rpm's would.

The results of the supercharged compacts were far more than the Granatelli brothers dared hope when they first started on their plans to build blowers for the cars. Now that they have seen what can be done, they are not satisfied to settle back and rest on their laurels; they believe that they can perhaps get a compact to run 150 mph or more with a stock displacement engine. We wouldn't care to bet against the 150 speed, especially with the larger 170-inch Valiant. With a hot cam and perhaps the four-barrel competition intake system, it should really produce horsepower. Also, they have ordered a Corvair coupe with a four-speed transmission which should eliminate the "slow" stretch between 65 and 85 mph with the conventional three-speed transmission. Andy, Joe and Vince think that they can better 90 mph in the quarter in about 14 seconds with the Corvair coupe and after driving the sedan, we wouldn't be surprised.

We expected some interesting story material when we joined with Paxton to do these tests but we didn't imagine that we would be driving compacts that could dust off a good share of the hot superstocks. We did! Anybody for compacts?