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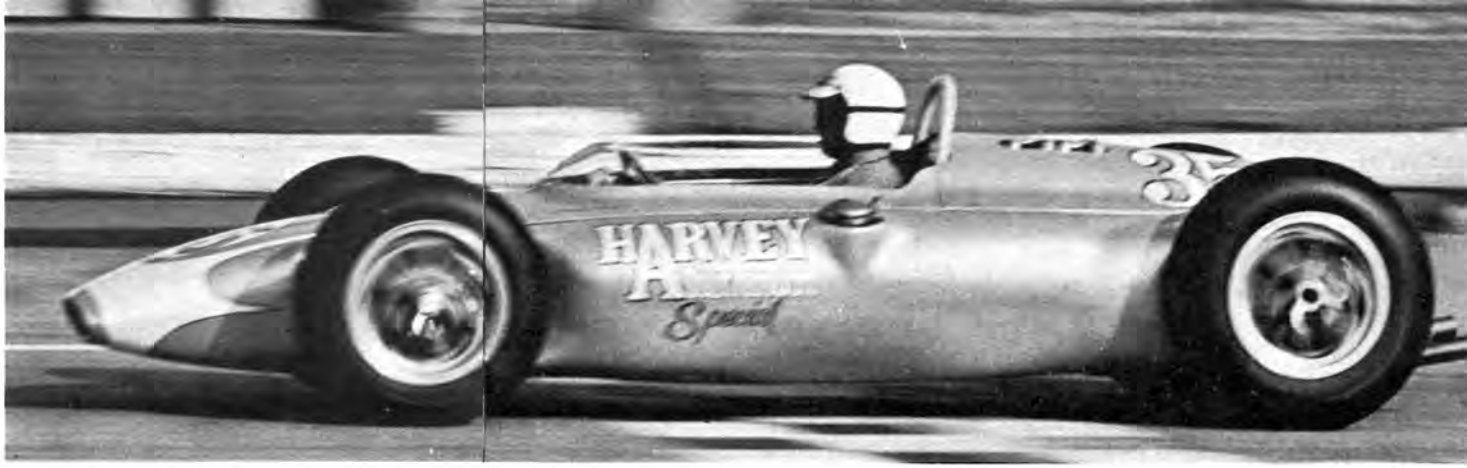

SOUPING THE SPECIAL

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Since it was first introduced in 1961, the aluminum V8 has been used successfully in a variety of competitive events, including the 500-mile race at Indianapolis as mentioned earlier, for boat drags, in the latest version of the Scarab racing sports car by Lance Reventlow, in midgets, dragsters, gas coupes and sedans and, as one of the latest ventures, as the muscle for Jerry Grant's new Lotus sports car which was scheduled to make its debut in the 1963 Pikes Peak Hill Climb.

The in-roads to improving the already lively performance of this little bear are many and varied, and can range anywhere from simple and inexpensive minor changes to the full treatment. Let's take a look at some of the possibilities.

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Allowing the engine to cool, at least to the point where the hand can be placed on the engine without fear of getting burned, is highly recommended before tightening down any bolts. This is especially important with spark plugs. Since aluminum is softer, there is more chance of stripping threads, so extreme care should be taken here. You will find that the aluminum also dissipates heat more rapidly than conventional cast iron blocks, so the engine will cool faster. In fact, this rapid dissipation of heat seems to lengthen the time of breaking in an engine. One V8 that we looked at, after 15,000 miles, still had the hash marks on the cylinder walls.

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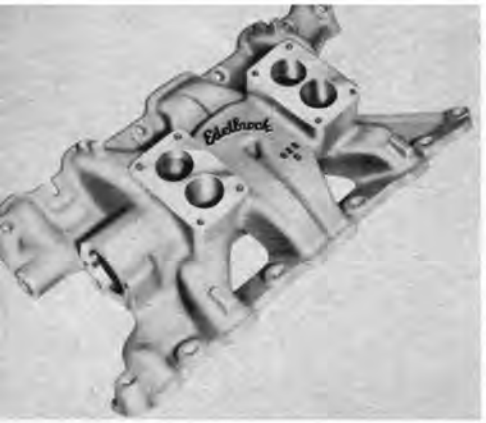
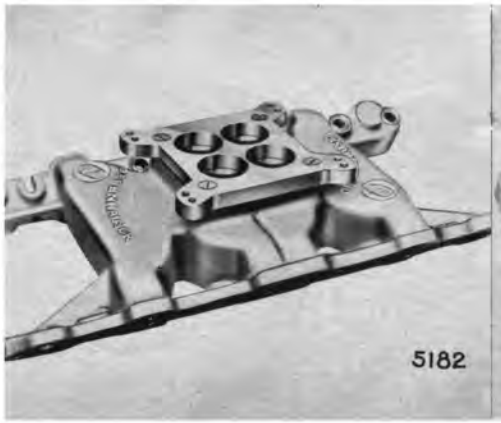
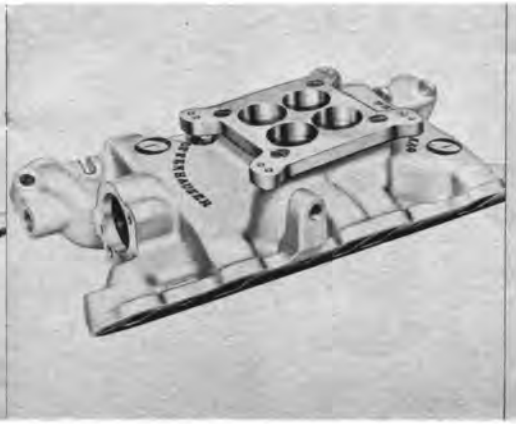
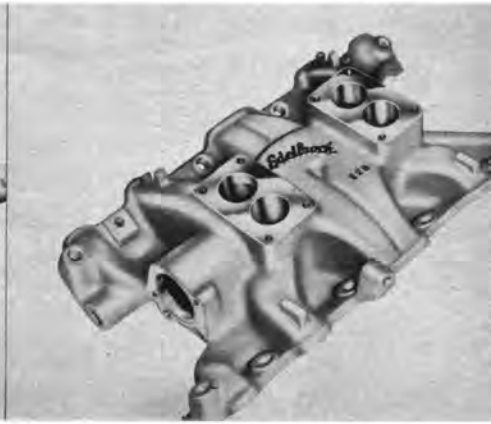
Edelbrock racing manifold (left) for Special V8 costs $92.95; Offenhauser is $86.50.

For street use, similar manifolds can be obtained with normal water-heated passages.









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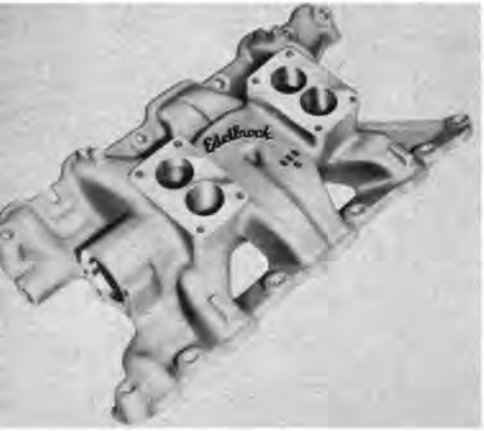

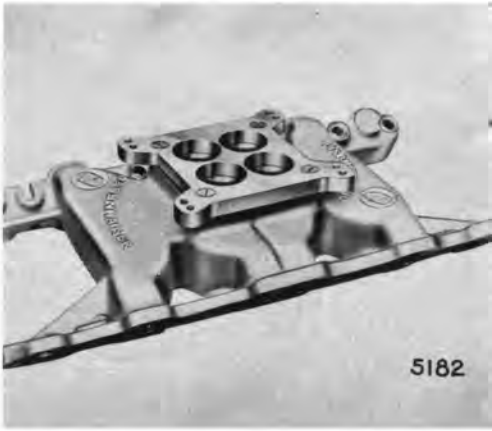

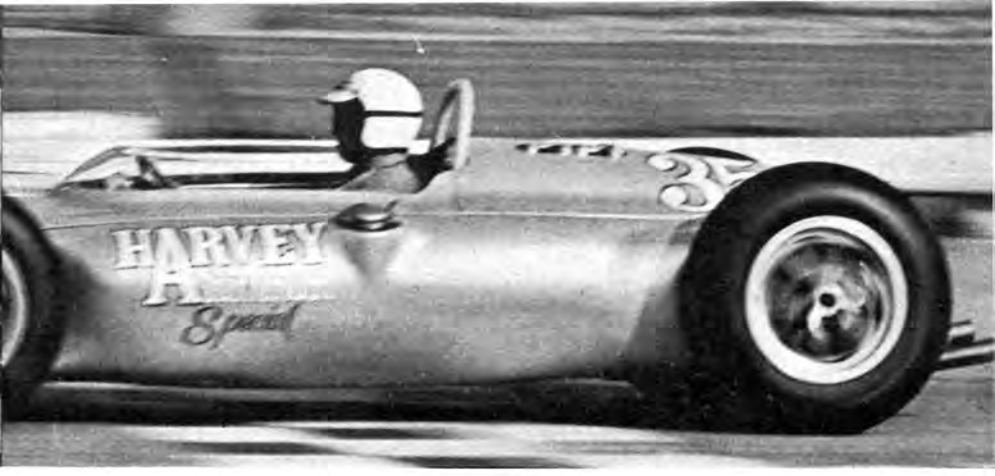

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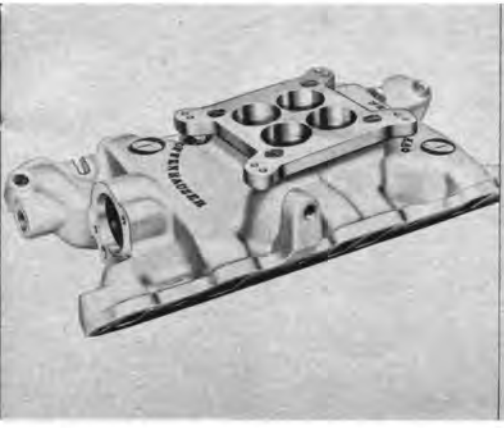
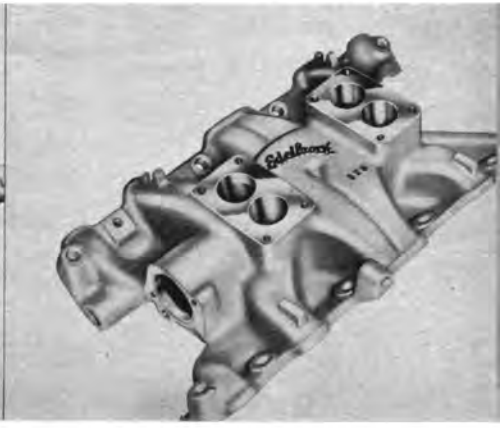




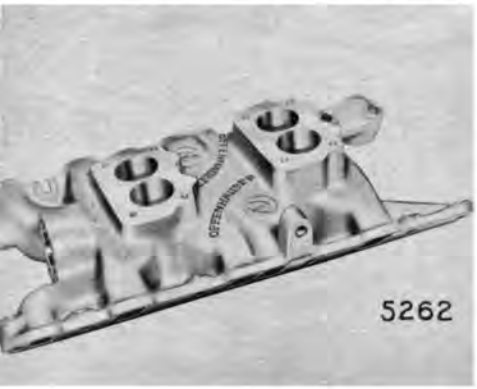
Olds F-85 turbocharger can be fitted to Buick Special engine but amount of power gained is hardly worth trouble, cost.

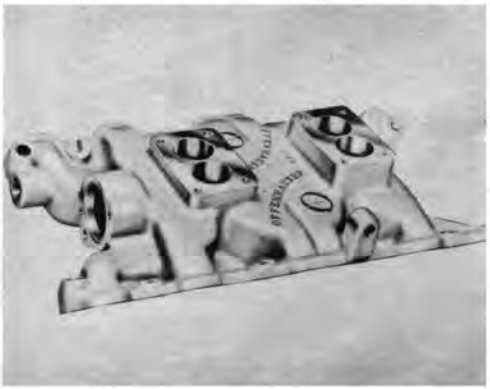
not get on the underside of the bolt where it will cause pressure to build up when the bolt is torqued down. A light coating is sufficient.

A lightweight oil also is recommended for coating spark plug threads (do not dip the plug in oil, just coat the threads) for easier installation and removal and for less chance of stripping. For those planning any number of teardowns or plug changes for competition or what have you, its a good idea to keep a Heli-Coil kit around. The steel inserts are the perfect answer to stripped threads.

One further word of caution: Block and head surfaces of aluminum will scratch or score more easily than cast iron so be sure your work bench is clean and free of any abrasives. Scratch-

Offenhauser makes dual 2-barrel manifolds in heated, non-heated versions for Buick.





Subbing flat-top Olds F-85 piston (right) for dished Buick unit (left) is slick way to boost aluminum V8's compression.

ing or scoring can cause leakage and loss of compression.

Simple modifications can be very effective with the Buick V8, and one of the most logical places to start is with improved breathing. While breathing is fairly good on the stock engine, it is one of the weaker points and there is much to be gained here.

Considerable advantage can be gained with the V8, and especially with the V6, through modification of the exhaust system. A good set of headers such as Hedman or other top name products will pretty well take care of the small restriction which is evident in the exhaust manifold.

Another method involves a Y-type system whereby a supercharging effect is applied to the exhaust gasses as they leave the exhaust pipe. This can be accomplished with two pipes of 1¾-inch diameter running from the exhaust manifold on each cylinder bank, back to a single two-inch pipe and joined in the area of the flywheel. The single pipe should then be extended a minimum of 30 inches for best effect.

Actually, the Y acts as a venturi, and you actually have a suction applied to each bank. When one bank exhausts, it applies suction to the opposite bank. This particular system works best on the V6, although it is effective on the V8 also, and the improvement it brings can be noticed in acceleration runs of

Buick V8 in Lance Reventlow's last Scarab was enlarged to 239 cu. in. Carburetors are Webers, set on cross-fed manifolding.

Flow bench was used as guide to breathing improvement in Reventlow motor. Porting of stock Buick (top), Scarab are compared.

a quarter-mile or more.

Carburetion can also bring some marked increases in horsepower without getting too involved. Replacing the standard two-barrel carb on the V6 and standard V8 with a four-barrel from the Skylark is, of course, a logical choice or, if cost is a determining factor, the Buick LeSabre two-barrel will bolt right on either engine and add as much as 17 hp, according to dyno tests.

The beauty of this modification is that it is reasonably cheap and simple, and everything fits, including the linkage. Actually, the two-barrel LeSabre carb has a venturi area approximately half-way between the standard Special two-barrel and the Skylark four-barrel. It will give almost the same effect as the Skylark carb and, with the right

Intake and exhaust pockets were trimmed in Scarab to allow for 1/8-in. larger valves.

tuning, etc., even offers a bit more lively acceleration at the start.

If the LeSabre carburetor is used, however, it is best also to include the LeSabre air cleaner, trimming the intake snorkle tube so that it does not interfere with the fan.

If other than stock Buick carburetors are desired, manifolds are available from some speed equipment manufacturers. Buick speed equipment is not as plentiful as, say Chevrolet or Ford, but since the introduction of the aluminum V8, more and more manufacturers are coming out with accessories and we'll probably be seeing a greater selection in the very near future.

Edelbrock produces a dual two-barrel manifold that will permit the use of stock Buick carbs. It is available with either a three- or four-bolt pattern so that other make carburetors may also be used. It also comes equipped for heating for street use or cold for use in competition. They sell for $92.95 and offer a 10 percent boost in horsepower. In any case, carburetion changes are pretty effective and fairly simple to do on the Buick V8, and they can be complimented by modifications to the valve train which we'll discuss a bit further on.

In addition to carburetion, changes in compression ratio on the aluminum V8 can be effectively accomplished rather simply and inexpensively. There is a difference in compression (9-to-1 versus 11-to-1) between the standard Buick V8 and the Skylark, one offering 155 hp while the other is rated at 200

Reworked Pontiac Six valve, roller tappet, stock Buick rocker are used in Scarab-Buick.

ENGINE	V6	Special V8	Skylark	401	425
Bore	3.625	3.50	3.50	4.1875	4.3125
Stroke	3.20	2.80	2.80	3.64	3.64
Compression Ratio	8.8:1	9.0:1	11.0:1	10.25:1	10.25:1
Bore Spacing	4.240	Same	Same	4.750	Same
Cylinder Numbering					
Left Bank	1 - 3 - 5	1 - 3 - 5 - 7	1 - 3 - 5 - 7	2 - 4 - 6 - 8	2 - 4 - 6 - 8
Right Bank	2 - 4 - 6	2 - 4 - 6 - 8	2 - 4 - 6 - 8	1 - 3 - 5 - 7	1 - 3 - 5 - 7
Firing Order	1 - 6 - 5 - 4 - 3 - 2	1 - 8 - 4 - 3 - 6 - 5 - 7 - 2	Same	1 - 2 - 7 - 8 - 4 - 5 - 6 - 3	Same
PISTONS					
Type	Cast Aluminum Alloy - Transverse Slot With Divorced Skirt				
Weight	15.6 oz.	13.81 oz.	14.0 oz.	23.68 oz.	25.31 oz.
Number Rings	Three				
Skirt Clearance, Top Land	.0215 - 0304	.0255 - .0355	Same	.029 - .037	.034 - .042
Pin Bore Offset	.040 Hi-Thrust side		Same	None	None
PISTON PINS					
Length	2.960	2.870	Same	3.520	Same
Diameter	.8747 - .8750	Same	Same	.9994 - .9997	Same
Locking Method	Pressed In Rod				
Clearance in Piston	.0003 - .0022	Same	Same	.00005 - .00001	Same
CONNECTING RODS					
Material	Cast Iron	Forged Steel	Forged Steel	Forged Steel	Forged Steel
Weight	19.616 oz.	17.552 oz.	17.552 oz.	24.384 oz.	24.384 oz.
Length, Center-Center	5.860	5.660	5.660	6.220	6.220
Bearing Material	Steel-Backed Durex			Steel-Backed M/400 Aluminum	
Bearing Length	.737			.820	
Clearance	.0002 - .0022			.0002 - .0023	
Endplay	.006 - .014			.005 - .012	
CRANKSHAFT					
Material	Pearlitic Malleable Cast Iron			SAE 1145	
Endplay	.004 - .002				
Main Bearing Journal Diameter	2.2992			2.4985	
Crankpin Diameter	2.000			2.2495	
Bearing Material	Steel-Backed Durex 100A			Steel-Backed M/400 for First Four Durex 100 A - Rear Four	
Clearance	.0005 - .0021			.004 - .008	
CAMSHAFT					
Material	Cast Alloy Iron				
No. Bearings	Four	Five	Five	Five	Five
Type Bearings	Steel-Backed Babbitt				
Type Drive	Chain				
Crankshaft Gear	Sintered Iron				
Camshaft Gear	Nylon Coated Aluminum				
Chain Width	.875			.864	
INTAKE VALVES					
Material	SAE 1041 Steel				
Head Diameter	1.500			1.875	
Face Angle	45 Degrees				
Stem Diameter & Taper	.3412 to .3407 Plus .0005			.3730 - .3720 Plus .0005	
Clearance in Guides	.001 to .003 Top				
Seat Inserts in Head?	Yes, Sintered Steel			None	
EXHAUST VALVES					
Material	High Alloy Steel				
Head Diameter	1.3125			1.500	
Face Angle	45 Degrees				
Stem Diameter & Taper	.3407 to .3402			.3725 to .3715	
Clearance in Guide	.0015 to .0035, Top - .002 to .004, Bottom				
Overall Length	4.605			4.785	
Seat Inserts in Head?	Yes, Sintered Steel			None	
VALVE SPRINGS					
Single or Dual	Single			Dual	
Pressure, Closed	64 pounds @ 1.640 inches			46 pounds @ 1.60 inches	
Pressure, Open	168 pounds @ 1.260 inches			101 pounds @ 1.60 inches	
LUBRICATION SYSTEM					
Type	Pressure				
Normal Oil Pressure	33 pounds @ 2400 rpm			40 pounds @ 2400 rpm	
Filter	Full Flow				
Crankcase Capacity	Four Quarts, Less Filter				
IGNITION SYSTEM					
Type	Delco Remy Single Coil				
Distributor Make	Delco-Remy				
Distributor Number	1115179	1115136	1115161	1115182	
Dist. Auto Advance Starts at	450 - 800 rpm			550 - 900 rpm	
Intermediate Points	13 to 17 degrees @ 2100 rpm			0 - 4-degrees @ 900 rpm	
Maximum Degrees	26 @ 4200	28 @ 3700	26 @ 3800	22 @ 3800	
Vacuum Advance Starts	6 to 8 inches			8 to 10 inches	
Intermediate Points	14 degrees @ 14 inches			5.5 degrees @ 12 inches	
Maximum	17.5 degrees @ 16 inches			17.5 degrees @ 18 inches	
Initial Spark Lead	7.5 @ 1050 rpm			12 degrees BTC @ 400 rpm	
Spark Plugs	AC - 44S	AC - 45FFS	AC - 44FFS	AC - 44S	
Plug Gap	.030 - .035				
Point Gap	.013 - .019				

SPECIFICATION CHART FOR BASIC BUICK ENGINES

Aluminum-bronze alloy guides were fitted to accommodate Scarab's special valves.

Existing tappet holes were bored to take bronze guides for roller tappet assembly.

hp, and this is due to a difference in pistons. However, the difference is too slight to warrant consideration of changing from one to the other, especially when you look at the Olds F-85 slug which fits the Buick perfectly.

As mentioned, the difference between the two Buick pistons is slight. Both are dish-type, but the Skylark slug has a much shallower dish, hence the higher compression. The F-85 piston on the other hand is of the flat-type. Slipped into the Buick V8 it raises compression to an even 12-to-1, and accurate dyno tests show that they are worth an increase of 17 hp, with everything else stock!

So what happens when you go the piston route and then add carburetion like, say, Edelbrock's dual manifold and stock carbs? Well, the effect of more efficient breathing provided with this setup will jump horsepower even further, especially in speed ranges from 3500 rpm and up. You can look for an increase of 20 hp and possibly a bit more with the right tuning. Adding it up, you come up with an increase of nearly 40 hp, just with pistons and carburetion.

The piston swap, while somewhat involved, is not too expensive and well worth the trouble. Olds F-85 pistons retail for about $8.00 apiece, not bad at all considering the job they do. Of course it's always a good idea to rebalance the crank assembly after installing these pistons since they are about ¾ ounce heavier than the stock Buick slugs.

Unfortunately, the Olds pistons are not interchangeable with the Buick V6, because of the difference in bore. However, speed equipment specialists such as Forgedtrue or JE can machine up just about any size or type piston desired.

Changes in camshaft and valve train will, of course, provide effective increases in the V8's horsepower output. However, when you start to get more involved with this type of modification, it is wise to take another look at carburetion and ignition.

Stock ignition on the Buick is pretty efficient up to 5000 rpm. Beyond that, it can still be effective providing it is given some attention to compensate for the increased rpm and performance brought on by a hotter cam, porting and improved carburetion. Set up right, with at least 28 ounces of spring tension on the points, and with proper point alignment, stock ignition can be efficient as high as 6000 rpm. Beyond that, one of the better brands of dual-point, dual-coil ignition such as Spalding, Mallory or, perhaps the Vertex magneto from Joe Hunt should be considered. Resistant secondary wire is

Copper rings in grooves around cylinders insure sealing of combustion pressures.

Rear-engined Scarab has proven Buick aluminum V8's potential for sports car use.

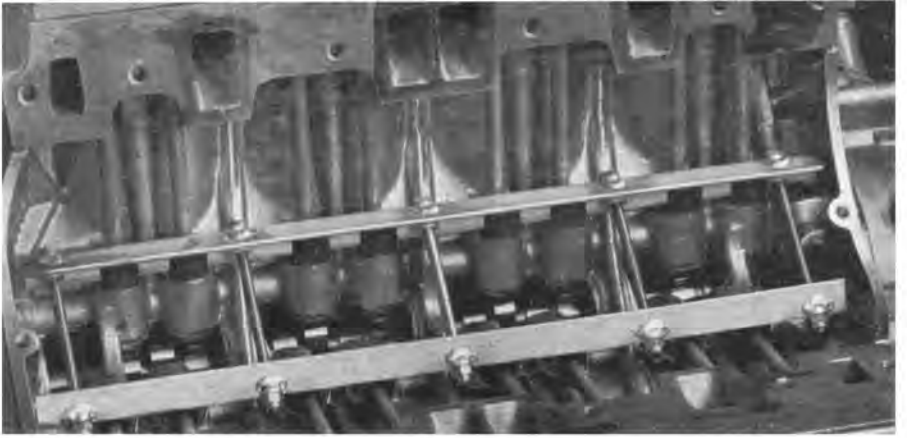
still the recommended thing for high speed performance, with the exception of the coil which should have a standard conductor wire.

There has been one cam change by the factory since the Buick V8 was first produced, and that was put into effect for 1963. The '63 cam has a little higher lift and more duration than the '61 and '62 and is, of course, interchangeable with both models. Consequently, it is possible for the owner of a '61 or '62 to add some muscle to his engine with the '63 cam.

Speed equipment manufacturers are now making special cams and kits for the V8. Iskenderian for example, puts out what is known as the E-2 cam with solid lifters included in the kit. This is a very effective cam and is being used by quite a few Buick owners. Not too long ago, *Hot Rod Magazine* technical editor Ray Brock made some dyno tests with this cam and reported a maximum hp reading of 226 at 6000 rpm. The Isky E-2 was used in conjunction with Olds pistons and dual ignition for the test.

With this type of power increase, precautionary measures should be taken to insure proper oil pressure. Shimming the oil pump relief valve 1/16 inch will raise oil pressure to a satisfactory 60 psi at 6000 rpm.

Wilder cams such as the E-2 can also be complemented by more car-



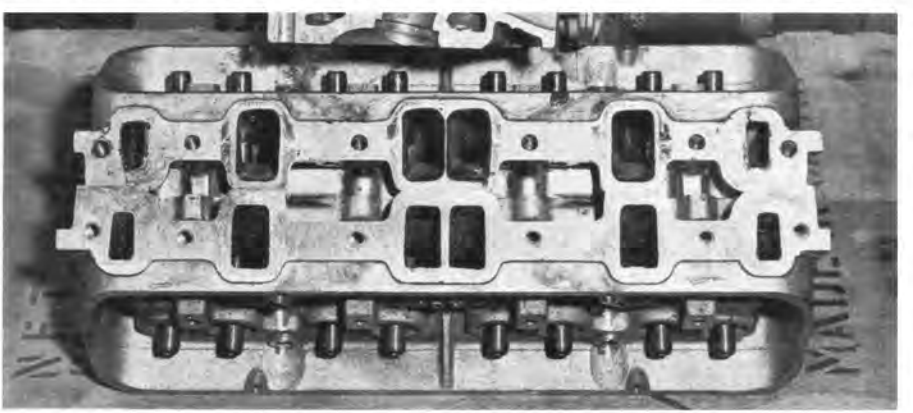
Scarab's roller tappet assemblies are kept securely in place by longitudinal carriage.

buretion. For example, the Edelbrock dual manifold mentioned earlier will permit the use of Chevy carbs which are bigger than the stock Buick. Jetting them at .062 (according to conditions) seems to work out pretty well, although some experimentation probably will be necessary here to find the right combination. The same goes for spark plugs, since various heat ranges will effect performance considerably.

Very little gain if any can be accomplished by changing from stock hydraulic lifters to solid if the stock cam is retained. The heavy duty hydraulic lifters which have been used in all Buick engines since 1957 seem to work out well, even with the engines turning as high as 6000 rpm. When running them in competition such as the drags, however, it is recommended that 20 weight oil be used to lessen the chances of the lifters pumping up. Solid lifters are recommended, of course, for wilder cams such as the E-2.

Naturally, reworking the heads is important when you get into major modifications. Porting needs to be done carefully, however, since there isn't too much material around the ports, and anything more than 1/16 inch could lead to trouble. If you do go too far into one of the ports, the thin walls make it virtually impossible to mend the damage by heli-arcing and you probably will wind up buying a new head.

Porting of Thompson engine, stock Buick (below). Compare with Scarab on page 30.



Tests by Reventlow engineers showed shape, not size, of ports is most critical factor.

Cleaning up the combustion chamber, however, and eliminating all sharp edges is well worth while. It's the knife edge type of surfaces, where the machined surface of the head meets the contour inside the combustion chamber that tends to cause spark knock and pre-ignition problems.

Except where really way-out modifications, such as the Mickey Thompson Indianapolis car are concerned, the Buick V8 has a good bottom end. With some of the modifications mentioned in the preceding paragraphs, some owners are getting as high as 235 hp with rpm as high as 6500, without experiencing any bottom end trouble, so there doesn't seem to be any present need for more beefing of rod and crank assemblies.

Boring .020 is recommended if and when it is necessary but is not too practical just for the sake of increasing displacement. The increase wouldn't be that great and many experts feel that there is more to be gained elsewhere. Of course if the engine is to be used for all-out competition in a dragster or for track racing or sports car courses, then a bigger bore has advantages. In this case though, it's more than .020 and modifications usually include replacing the cast iron sleeves.

Since Oldsmobile brought out its turbocharger for the F-85 there has been some speculation as to its value

Scarab exhaust headers are tuned in both length and shape for efficient operation.

Like Reventlow, Mickey Thompson modified Buick heads for enlarged valves.

on the Buick Special. It is adaptable, of course, since the manifolds basically are the same and all the bolt holes line up. With just some minor changes it can be adapted to the Buick. However, this is a costly operation. The turbochargers don't come cheap and it is doubtful if the performance increase is worth it. As it stands at this writing, the turbo-equipped F-85 is running well behind the Special at the drags in most cases. This probably can be attributed to the initial acceleration lag which is typical of turbochargers. It takes a few seconds for the added boost to come in, and those extra few seconds spell the difference between winning and losing at the drags.

In addition to the modifications covered in the preceding paragraphs, weight saving advantages can also improve performance of the V8 and V6. Both engines are extremely light to begin with, and additional weight can be saved by trimming the flywheel, running without the starter, etc.

As mentioned earlier, both the V8 and V6 will fit almost anywhere and they bolt right up to a variety of gearboxes such as the Warner T-10 four-speed or the Warner T-85 heavy-duty three-speed. It is a good idea here to consider a heavy-duty Chevy clutch also, especially if drag racing is to be part of the picture. Quite a few Buick owners running the drags have gone this route, since the Chevy clutch offers more surface and less trouble under these strenuous conditions.

We've talked about some of the way-out modifications such as the Reventlow Scarab and Mickey Thompson's Indianapolis Buick, and we've mentioned engine swapping. Let's take a look at some of these in more detail.

One of the neatest swap jobs we've seen since the V8 was made available was an installation to a Mercury Comet. *Hot Rod Magazine* photographer Eric Rickman went all out on this modification, dressing up the completed job with breather-equipped chrome valve covers produced by Edelbrock at $54.45 a pair; Stellings-Hellings chrome air cleaner; and cad plating of all hardware.

The aluminum Skylark V8 was chosen for this installation, and it is coupled to the aluminum Olds F-85 Hydra-Matic gear box with an Ansen Posi-Shift stick. The basic engine has been stepped up with oversize pistons, Mickey Thompson manifold and four-barrel carburetor and DuCoil ignition. Rick also used a pair of hardened steel ignition drive gears from Clay Smith Engineering, since the stock gears have shown appreciable wear with high speed running. For exhaust improvement, he went to headers.

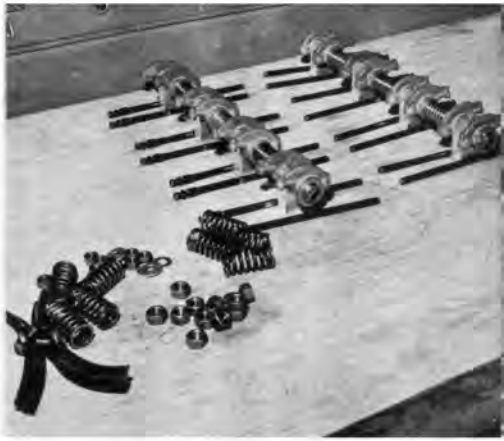
The all-out competition engines that went into both the Thompson Indianapolis car and Reventlow's Scarab were the result of many hours of experimenting, planning and fabricating. Although the Thompson engine is bigger than the sports car version (255 cubic inches against 239), they share some of the same engineering modifications and are comparatively close in horsepower output . . . around 300 hp.

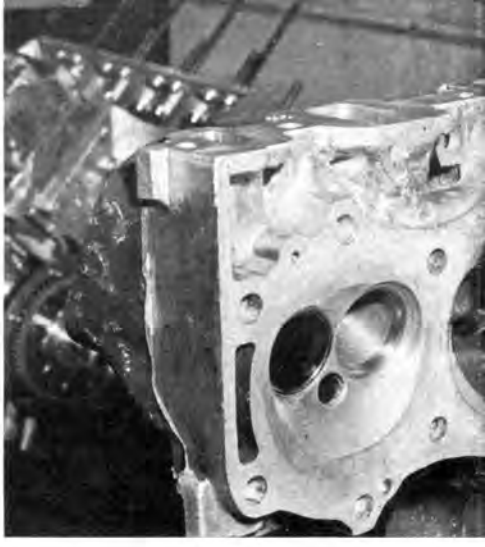
All of the work was based upon proven fact rather than theory to achieve the best possible results. As brought out previously, one of the weaker points of the aluminum V8 is its breathing capacity and this is where the bulk of major modification work was done.

Two variations were tried with the Scarab engine, one retaining stock bore and stroke and the 215 cubic inch displacement while the other was bored .060 over and had 0.20 inch added to

Compare Thompson's exhaust porting (l) with Reventlow's at top of previous page.

Thompson used stock rockers, shaft, with special lightweight springs, retainers.



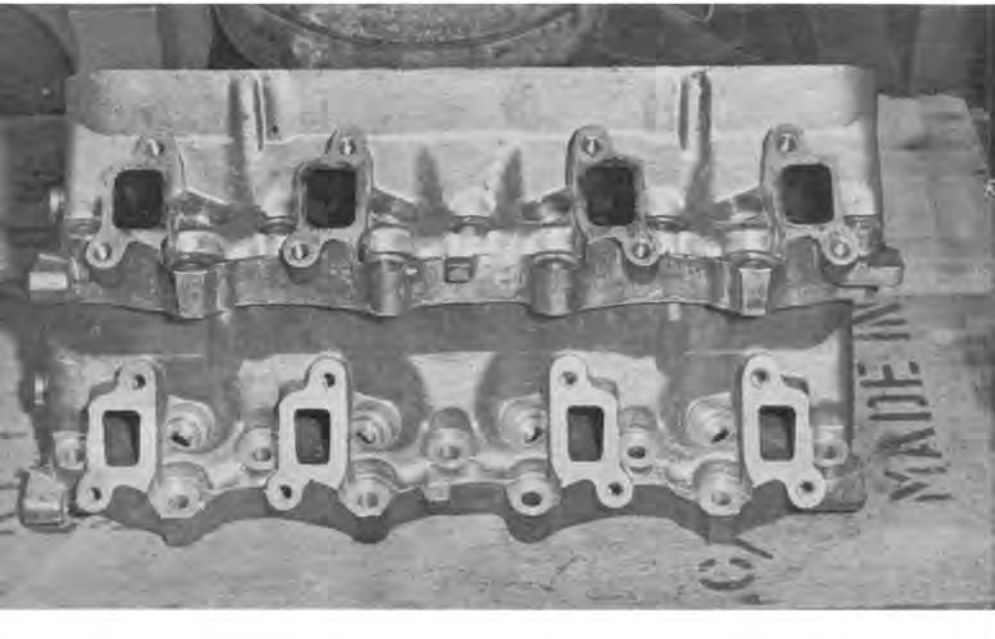


Like Reventlow, Mickey Thompson modified Buick heads for enlarged valves.

on the Buick Special. It is adaptable, of course, since the manifolds basically are the same and all the bolt holes line up. With just some minor changes it can be adapted to the Buick. However, this is a costly operation. The turbochargers don't come cheap and it is doubtful if the performance increase is worth it. As it stands at this writing, the turbo-equipped F-85 is running well behind the Special at the drags in most cases. This probably can be attributed to the initial acceleration lag which is typical of turbochargers. It takes a few seconds for the added boost to come in, and those extra few seconds spell the difference between winning and losing at the drags.

In addition to the modifications covered in the preceding paragraphs, weight saving advantages can also improve performance of the V8 and V6. Both engines are extremely light to begin with, and additional weight can be saved by trimming the flywheel, running without the starter, etc.

As mentioned earlier, both the V8 and V6 will fit almost anywhere and they bolt right up to a variety of gearboxes such as the Warner T-10 four-speed or the Warner T-85 heavy-duty three-speed. It is a good idea here to consider a heavy-duty Chevy clutch also, especially if drag racing is to be part of the picture. Quite a few Buick



owners running the drags have gone this route, since the Chevy clutch offers more surface and less trouble under these strenuous conditions.

We've talked about some of the way-out modifications such as the Reventlow Scarab and Mickey Thompson's Indianapolis Buick, and we've mentioned engine swapping. Let's take a look at some of these in more detail.

One of the neatest swap jobs we've seen since the V8 was made available was an installation to a Mercury Comet. *Hot Rod Magazine* photographer Eric Rickman went all out on this modification, dressing up the completed job with breather-equipped chrome valve covers produced by Edelbrock at $54.45 a pair; Stellings-Hellings chrome air cleaner; and cad plating of all hardware.

The aluminum Skylark V8 was chosen for this installation, and it is coupled to the aluminum Olds F-85 Hydra-Matic gear box with an Ansen Posi-Shift stick. The basic engine has been stepped up with oversize pistons, Mickey Thompson manifold and four-barrel carburetor and DuCoil ignition. Rick also used a pair of hardened steel ignition drive gears from Clay Smith Engineering, since the stock gears have shown appreciable wear with high speed running. For exhaust improvement, he went to headers.

The all-out competition engines that went into both the Thompson Indianapolis car and Reventlow's Scarab were the result of many hours of experimenting, planning and fabricating. Although the Thompson engine is bigger than the sports car version (255 cubic inches against 239), they share some of the same engineering modifications and are comparatively close in horsepower output . . . around 300 hp.

All of the work was based upon proven fact rather than theory to achieve the best possible results. As brought out previously, one of the weaker points of the aluminum V8 is its breathing capacity and this is where the bulk of major modification work was done.

Two variations were tried with the Scarab engine, one retaining stock bore and stroke and the 215 cubic inch displacement while the other was bored .060 over and had 0.20 inch added to

Thompson used stock rockers, shaft, with special lightweight springs, retainers.

Compare Thompson's exhaust porting (I) with Reventlow's at top of previous page.

the stock 2.80 stroke. On the dyno, with pump gasoline, the big-bore job produced close to 300 horses as compared to 242 for the 215-cubic-incher. Thompson's engine, which runs on methanol, was right around the 300 hp mark.

As mentioned, most of the gain in horsepower was the result of improved breathing. To achieve this, Scarab engineers approached the problem with methodical efficiency. Stock heads were checked on a flow bench, a device for accurately measuring the volume of air passing through intake manifold, valves, exhaust manifold and exhaust pipe. It also can accurately measure the rate of flow. Needless to say, this is important in determining modifications necessary for the best advantages.

Valve seats were given 0.125 inch more diameter for bigger valves which came from the six-cylinder Pontiac engine. They were not left stock, however. The stems underwent machining which trimmed and lightened them and the heads were refaced to 45 degrees. Valve guides made from an aluminum-bronze alloy were machined and bored to accommodate the new valves, and were installed by press fitting them into the block.

The entire combustion chamber was reworked, eliminating sharp edges and making room for the ⅛-inch larger valves. Exhaust ports also were cleaned up and enlarged slightly while intakes were increased ¼ inch in height and ⅛ inch in width.

Both the Scarab and Thompson Buicks were fitted with specially fabricated intake manifolds, and Thompson also experimented with fuel injection. The Scarab uses four two-barrel Weber carbs, working through a cross-feed manifold. This means that the passages are crossed so that the two left carbs feed the right bank of cylinders while those on the right feed the left bank.

Exhaust is not unlike the modification described earlier in this chapter. Tuned length tubes of 1½ inches in diameter and 34 inches in length carry exhaust gases into a three-inch OD tailpipe which is 23 inches in length.

It is interesting to note that hydraulic lifters were retained in the 215 cubic inch version of the Scarab-Buick which bears out the fact that these are fairly efficient. The lifters used in this particular case were from the '53 big Buick engine, and despite the fact that they are generally not compatible with either the Engle or Racer Brown camshaft used, some modification work permitted rpm's as high as 7500. The modification consisted of setting leakdown to maximum and then partially compressing the lifter in the adjustment process. Camshafts themselves have a duration of from 280 degrees to 290 with a .375-inch lift.

With the .060 overbore, it was necessary to fit special pistons, and these came from JE. They are cast aluminum, with a compression ratio of 11.5-to-1. Piston pins are the full-floating type.

Some beefing was added to the bottom end. Although the stock aluminum V8 has extra long bolts for main bearing webs, the block was drilled and tapped so that ⅜-inch longer bolts could be used for additional strength and sup-

Special gear assembly provides accessory drive in Thompson's Indianapolis Buicks.

port. Main bearing inserts were grooved and a 10-quart oil sump was fabricated into the block. Overheating problems were solved through the use of a vertical flow radiator and an oil cooler, and it was necessary to drill additional water passages between the head and block. Oil pump flow capacity also was increased.

The ignition and water pump drive gears, mentioned earlier as a possible trouble spot at sustained high speeds, were replaced with hardened steel gears. And Reventlow's engineers even went one step further by fabricating an external oil line which connects to an aircraft fitting in the housing and keeps a continual flow of lubricant on the gears.

Like most racing engines, the Scarab Buick employs magneto ignition, this one, a Vertex mag supplied by Joe Hunt magnetos of Los Angeles. Electric fuel pumps also are used.

Final carburetion for the 239-cubic-inch engine is by four 58 DCOE Webers with 1.85-inch venturis, which gave considerably more horsepower than the 45 DCOE's with 1.57-inch venturis tried earlier.

Rear-mounted Thompson Buick displaces 255 cu. in. to meet Indy regulations.

Performance of the Scarab and Thompson Buicks has been impressive to say the least. Still, it's far from the end of the line. The engine still is comparatively new and there is no telling how much more performance can be gleaned as more and more enthusiasts adopt this little power plant for their ventures over the nation's drag strips and oval tracks. ■

Buick aluminum V8 has also been tried in dirt track cars but with inconclusive results.