GET 'EM GO CORVAIR

Increased popularity of the Corvair among today's young auto enthusiasts has prompted racing specialists to devote more time to giving the rear-engine compact increased vigor for strip and track. Here's Bill Thomas' offering, a

text and photos by Don Francisco

With the exception of a couple of makes, U.S. automobile manufacturers have caused the importation of economy cars into this country to dwindle somewhat. They did this by building the small cars we refer to as compacts.

One of the more popular such cars is the Chevy Corvair, differing from other compacts by having an air-cooled, horizontally-opposed engine mounted in the rear. It also differs by having been accepted by most of the younger drivers who prefer a compact rather than a full-size car as being "the car." Perhaps only a psychologist would be able to give the true reason for the Corvair's acceptance by this group but to venture a guess, appearance may be the answer. Acceleration, top speed, fuel mileage, and other performance factors don't vary enough from those of other compacts to affect a prospective purchaser's choice, but its squatty silhouette and overall appearance give the impression that it was built to enjoy rather than for just transportation.

Several of the fellows and companies that specialize in reworking engines and cars for different types of competition believe the Corvair possesses some of the spirit of a sports car. One of these companies is Bill Thomas Race Cars, in Anaheim, Calif. Bill and his crew build all kinds of cars for competition events that range from drag racing to the Pikes Peak Hill Climb. One of their latest is a Corvair coupe that is destined for both drag racing and sports car track racing. Because it was only recently finished, the car has competed in only two drag meets and as yet hasn't been on a closed track. The first crack out of the box the car won its class, which was D/Sports, and turned a top speed of 97.64 mph and an e.t. of 13.88 seconds. This performance was on gasoline, without the aid of a blower. Shortly afterward, runing another strip under E/Gas, it turned 99.38 mph in 13.45 seconds.

All engine and chassis work on the car was done in Bill's shop. Mike Jones was given the responsibility of modifying the body and running gear and coordinating the entire project. This was all right with Mike because he was to be the car's driver for both drag and track racing.

What Bill wanted to do was modify the car with the special Corvair equipment he advertises in his catalog. His company designs and manufactures many of these parts. Basic aims were to lighten the car as much as practicable, improve its drive-wheel traction and handling abilities, and boost the horsepower output of the engine as much as possible without sacrificing the reliability needed for long races. The results are a moderately-modified body and running gear and a much-modified engine. However, more modications are planned for both the body and the engine in the near future.

The car is a 1960 coupe. It was one of the first coupes to be produced in the Corvair line. Stock weight was approximately 2350 pounds but in its present form it weighs 1975 pounds. The weight reduction was effected by removing the front and rear bench-type seats and installing two Naugahyde and foam rubber upholstered bucket-type fiberglass seats in the front, replacing the steel luggage compartment hood with a duplicate made of fiberglass, removing the glass windows and their actuating mechanisms from the doors and installing ¼-inch thick Plexiglas windows that are raised and lowered by sliding them up and down by hand, replacing the rear quarter windows with Plexiglas, replacing the standard steel inner door and body panels with aluminum panels, removing all floor mats and sound-deadening material, replacing the standard steel wheels with magnesium wheels, cutting excess material out of the front sunspension system's crossmember, spring towers, and upper and lower control arms, etc. Further weight reductions will be made in the future by replacing the doors and engine compartment cover with fiberglass parts, which are now in the development stage, and replacing the rear window with one made of Plexiglas.

Modifications to the front suspension system, in addition to removing excess weight, included replacing the rubber bushing in the inner ends of the lower control arms with a Heim bearing to eliminate all play at this point. The Heim bearing is supported by the original 7/16-inch bolt on which the rubber bushing pivoted. The joint is located in the fore and aft directions with steel spacers that slip over the bolt.

Front springs are factory Corvair Spyder springs. These are stiffer than

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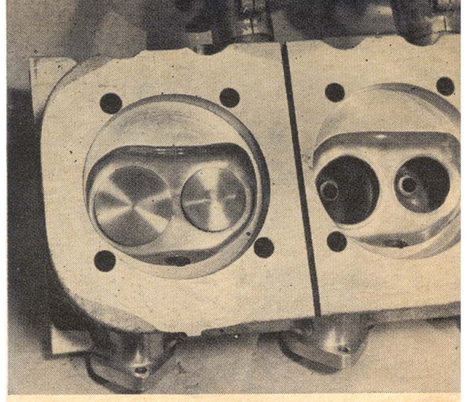
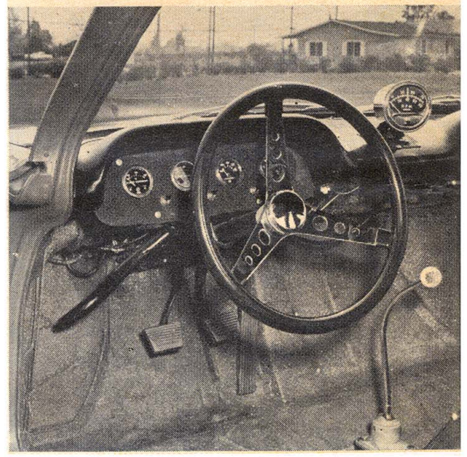
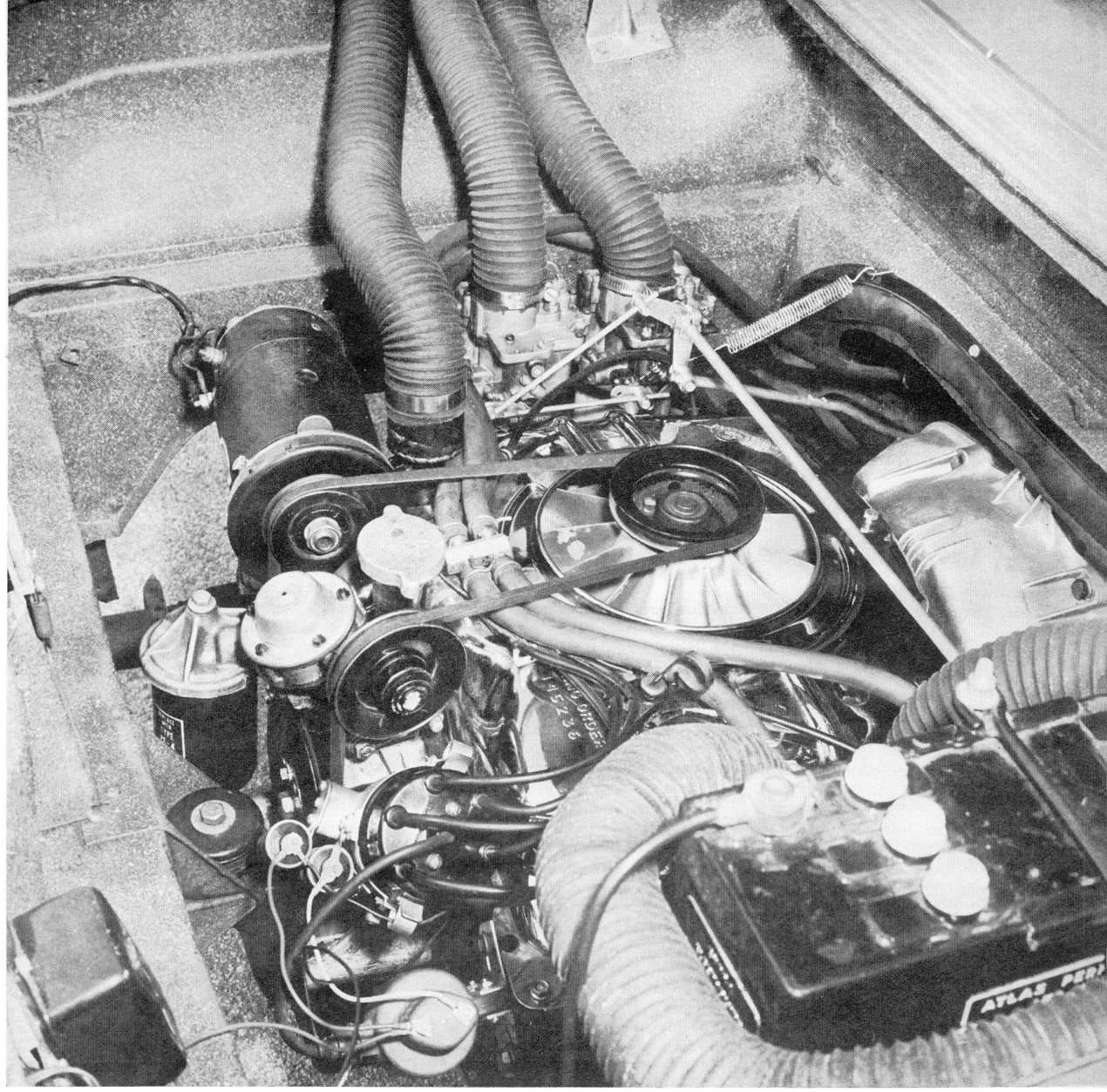


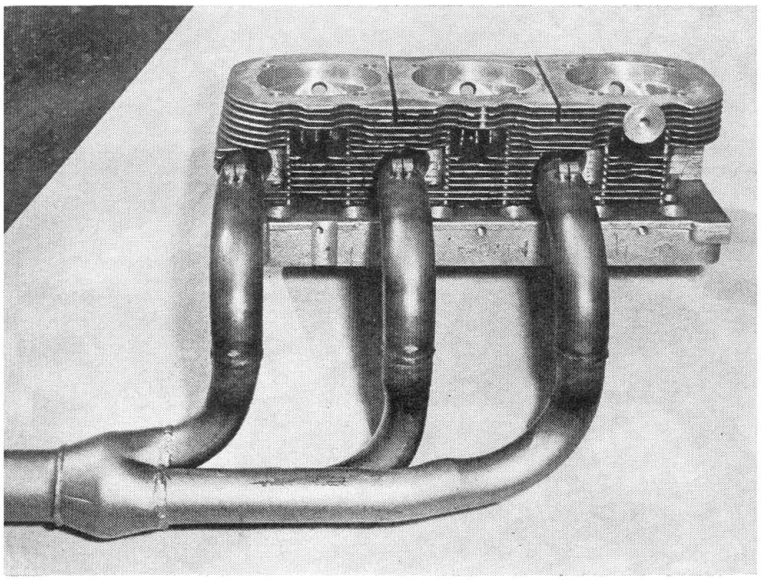
ABOVE – Combustion chambers in heads reworked by Thomas have lowered gasket seat for higher compression, big valves, polished surfaces.

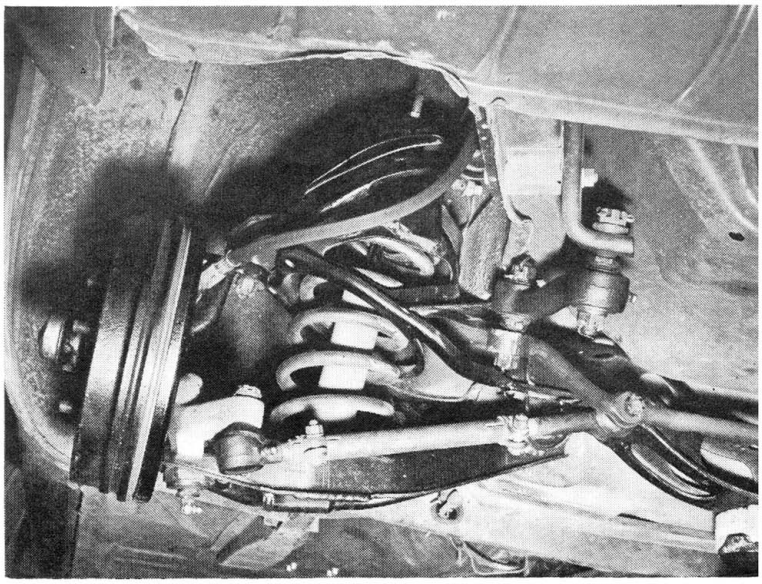
RIGHT – Engine in Bill Thomas' Corvair was bored, stroked to 164 inches and has four carburetors that induct cool air through flexible hoses.

BELOW – Four gages in Going Corvair's instrument panel include two for cylinder head temperature and one each for oil temp and pressure.









Special headers for stock heads were reworked to fit the larger exhaust tubes installed in reworked heads. Openings of different shapes were cut in front suspension crossmember and upper control arms to reduce car's weight. Steering arms bolted to spindles are special ones Thomas makes, are stronger than stock and make steering faster. Springs are Corvair Spyder.

GO GET 'EM CORVAIR *continued*

the originals. Shock absorbers are the ones that came on the car. Front wheel alignment for drag racing is stock. For road racing the camber will be changed to ¾-degree negative.

The number of turns of steering wheel rotation from lock to lock was reduced from five to two-and-one-half by replacing the standard steering arms that bolt to the spindles with special Thomas arms that are shorter and stronger. A rubber-rimmed, steel-spoke steering wheel was installed in place of the standard wheel.

Essentially, the rear suspension system is stock. Springs were replaced with special Thomas springs and Spyder shocks were installed. Thomas springs are wound from larger-diameter stock than that in factory springs and their coils have a flatter angle. Using heavier stock gives the springs the required pressure to prevent the suspension system from bottoming except under severe conditions. Making the coils flatter allows the spring rate to remain more nearly constant as the springs are compressed than it does with a standard spring.

Combination of length and pressure of the rear springs is such that they support the rear end of the car in the position that gives the rear wheels 2 to 2¼ degrees of negative camber. Factory heavy-duty springs are supposed to provide 1½ degrees of negative camber but usually the measurement is found to be closer to 1 degree.

Negative camber causes wheels to tilt in at the top. This gives a Corvair a strange appearance from the rear but this wheel attitude is essential in good cornering. Bill and Mike have found that at least 2 degrees are required to prevent the outside wheel from assuming an angle that gives it positive camber and trying to roll under the car in fast turns. For drag racing, the wheels should be maintained as close to straight up and down as possible so the tire and treads will remain flat on the strip. This requires stiff rear springs to minimize the amount the car's rear end drops on acceleration. When the rear end drops, wheel camber changes toward the negative angle.

Spyder rear shock absorbers are a little stiffer than the standard type but they have the same 60-40 action. Resistance is 40 per cent to downward body movement and 60 per cent upward. This easy-down, harder-up action is exactly what the Thomas springs need. Special shocks that have fifty-fifty action make a Corvair's ride more severe without a relative gain in handling characteristics.

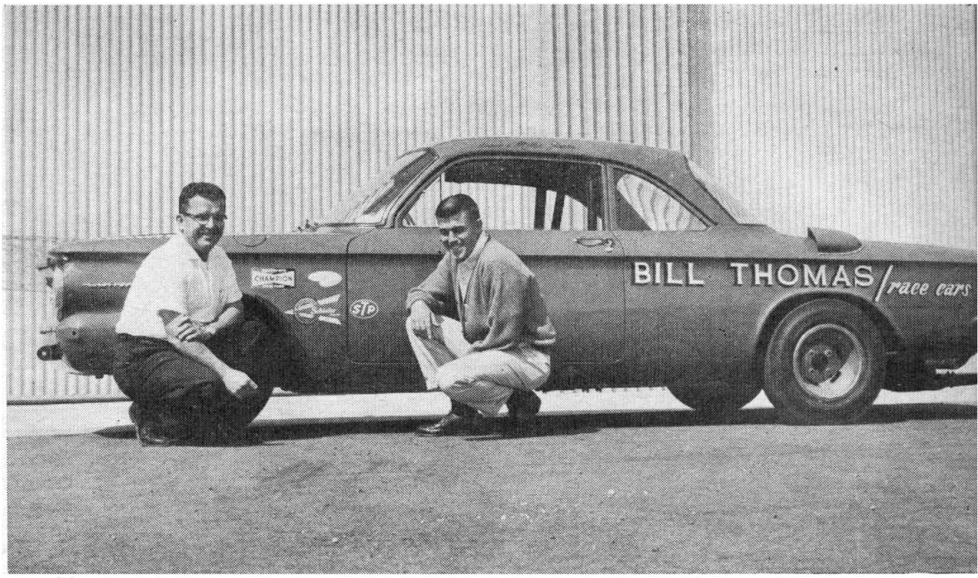
Ring and pinion gears that have a ratio of 3.89 to 1 rotate a limited-slip ring gear carrier in the differential assembly. These are the numerically highest gears available for a Corvair. To get the numerically high final ratio required for drag racing, tires with an o.d. smaller than standard are used on smaller than standard rear wheels. Larger and longer lug bolts (½-inch diameter compared to the stock 7/16-inch diameter) were installed in the flanges on the stock rear axle shafts for the mag wheels.

Brakes for all four wheels have the sintered-metal linings available with the factory heavy-duty suspension kit. The extra cost for these is $35.50. They are well worth this as standard brakes lack enough resistance to fade when they are subjected to severe use. Metallic linings can be used for either street or competition driving.

Thirteen-inch wheels will be used both front and rear for road racing and 13-inch fronts and 12-inch rears are used for drag racing. The front wheels are made by Hands Engineering Company. These were the last mag wheels Hands made before they switched to permanent-mold aluminum castings. Rims are 5½ inches wide, the same as those on standard Corvair wheels. Rear wheels, for both drag racing and road racing, are Halibrands. The 13 inchers have 5½-inch rims and the 12 inchers have 7-inch rims.

Regular Corvair passenger car tires are used on the front wheels for drag racing. They have an outside diameter of more than 24 inches and are inflated to a pressure of 50 psi. Rear tires for drag racing are Inglewood Tire Company recaps for midget race cars. Originally they had an outside diameter of almost 23 inches but were trimmed down to 22 7/16 inches. They had the feathered tread profile used for track racing but now this profile isn't as pronounced. They have a tread width of 6⅛ inches and are inflated to 35 psi. For road racing, both front and rear wheels will be fitted with Goodyear road racing tires; front, 5.20, and rears, 6.50.

A peculiarity of magnesium wheels is that they are so porous that tubeless tires can't be used on them unless the rims are sealed in some way. Air seeps through the magnesium, causing the pressure in the tires to drop. Halibrand



Standard front seat was replaced with a pair of upholstered fiberglass bucket seats that were mounted on tubular supports. Rear seat was removed completely. These changes alone reduced car's weight a little more than 100 pounds. Posed with their Riverside Red beauty are Bill Thomas, left, who owns it, and Mike Jones, who did most of the work on it and does all driving.

has a method of sealing his wheels now so tubeless tires can be used but all the tires on the Corvair have tubes.

To keep the car off the driver's head should it get upside down, a sturdy roll bar was added. The bar, which is one of the items in Thomas' catalog, is made of 1¾-inch o.d., ⅛-inch wall mild steel tubing. It is triangular in shape. Mike felt this shape would provide maximum rigidity. On the driver's side of the car it rises almost vertically, then curves over the top of the driver's head, and then goes down to the floor on the other side of the passenger compartment. Welded to the lower end of each of the bar's ends is a flat plate ¼-inch thick and 3½ inches square that rests on the body's floor. Under the floor is a matching plate. The top plate, the floor and the lower plate are bolted together to sandwich the floor between the plates.

The roll bar is bolted to the floor because the car doesn't have a frame. How much the floor would hold before the bar punched through it is a question Mike hopes will never be answered. Another tubular member connects to the top of the bar, over the driver's head, and goes down to the floor behind where the rear seat would normally be. Its lower end has a shoe that fits over a bend in the floor. This area of the floor is stronger than the flat area that supports the bar's main member.

At the base of the roll bar are brackets for the driver's Ray Brown competition seat belt. A Ray Brown shoulder harness connects to an eye bolt attached to the floor behind the seat.

Modifications to the engine started with the crankshaft. The shaft's standard 2.600-inch stroke was lengthened ¼-inch to 2.850 inches by the conventional welding method. Thomas buys stroked shafts from both Weber Tool Company in Santa Ana, Calif., and Delta Parts and Machine Company in Long Beach.

Connecting rods are standard Spyder rods. They are a little heavier and a little stronger than standard Corvair rods. Center to center length, piston pin bore, and crankpin bearing bore diameters are the same as those on the lighter rods. Moraine 500 heavy-duty inserts were used for both main and connecting rod bearings. Clearances are .003-inch for main bearings and .002-inch for the rods.

Pistons are Forgedtrue forged aluminum. They are 1/16-inch larger than stock pistons because the cylinders were bored 1/16-inch oversize to 3.500 inches and have .007-inch skirt clearance. Three rings are used and compression height is the same as that on stock pistons. Piston pins are full-floating. Pin movement is limited by wire-type lock rings that fit in grooves in the ends of the bores in the pistons.

Stroking the crankshaft and boring the cylinders boosted the engine's displacement from its standard 145 cubic inches to 164 inches. Boosting the displacement of the individual cylinders and machining the raised surface in the cylinder-head combustion chambers, on which the head gaskets seat to make it flush with the quench-area surface, raised the compression ratio from its standard 8.0 to 1 to 10.5 to 1.

Cylinder heads were reworked by installing oversize valves and a complete porting job. This is Thomas' standard $314.00 head reworking job. Installing the valves involved removing the stock guides and machining new guide bores at a different angle. Angles of the new bores are such that the rocker arm ends of valve stems in guides pressed into them are the same distance apart as they were originally but the valve heads are closer together. Changing the guide angles in this manner maintains correct alignment of the valve stems with the rocker arms but moves the valve heads away from the combustion chamber walls so the heads won't be "shrouded." When a valve is shrouded by being too close to the chamber wall, fresh mixture or exhaust gases, depending on whether the valve is an intake or an exhaust, can't flow freely past its full circumference. New cast-iron seats to match the oversize valves are installed in recesses machined in the heads.

To provide a solid base for the new guide bores, the original bores are threaded with a 9/16-inch coarse-thread tap and filled with a plastic metal that hardens to approximately the same consistency as the aluminum of which the heads are made. Purpose of the thread is to give the plastic something to grip. New guides that are installed are for a six-cylinder Continental aircraft engine, used because they have a smaller outside diameter than standard Corvair guides. The smaller guides simplify machining the bores.

Valves installed in the reworked heads are for Corvette high-performance engines. Heads of the intakes are reduced to 1.700 inches and heads of

(Continued on page 100)

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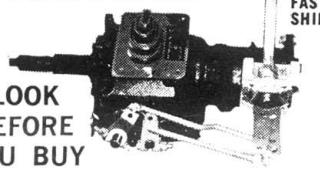

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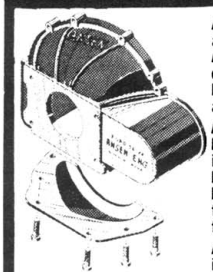

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GO GET 'EM CORVAIR

continued from page 35

the exhausts are reduced to 1.400 inches. Standard intakes have 1.340-inch heads and the exhausts have 1.240-inch heads. All valves are lightened a little by removing material from their heads; face angle is 45 degrees.

Enlarging the intake passages in the heads is a problem because of the integral intake manifolds. All enlarging must be done through the valve ports as reaching the manifold ends is impossible. In the near future Thomas plans to change his head reworking procedures by cutting the standard manifolds away and providing individual carburetor flanges for each cylinder. This will allow the intake passages to be enlarged in the conventional manner.

Exhaust ports and passages are enlarged enough to remove the tubes to which the exhaust manifolds connect. Oversize tubes that have an outside diameter of 1½-inch are installed by boring the outer ends of the passages to a different angle and the correct diameter and then the porting is finished by blending the head passages with the tubes. Flow capacity of the reworked passages and new tubes is about twice that of those in a stock head.

An extra single-throat Corvair carb is installed on each manifold, giving the engine four carburetors instead of the original two, by adding a special flange to each manifold. These flanges and the other equipment required for the four-carburetor setup are sold by Thomas in kit form. All four carburetors were rejetted to richen the air-fuel mixture they deliver. Some fuel passages, such as the float needle seat, were enlarged to increase fuel-flow capacity. The rest of the fuel system, including the engine-driven pump, is stock.

Valve rocker arms and pushrods are stock but the hydraulic valve lifters are special ones that have a high leakdown rate. They are said to function up to 7500 crankshaft rpms without pumping-up. This particular engine has been turned as high as 7200 rpm's without lifter pump-up or noticeable valve float. So far, hydraulic lifters have been a necessity in these engines because of the engine's expansion characteristics. Solid lifters have been tried but the inability to maintain valve lash within a suitable range has resulted in far too much noise from the valve action under certain running conditions.

An Iskenderian CV 300 camshaft, which sells for $85.00, opens the valves and Isky dual springs close them. The springs are retained on their valves with aluminum washers made by Thomas and stock split locks.

Several changes were made in the engine lubrication system. All oil passages in the crankcase were enlarged to ¼-inch to increase their flow capacity. Oil pump capacity was boosted by adding a ⅜-inch thick spacer to it and replacing its standard gears with ⅜-inch longer 409 gears. With SAE 30 Mobil oil, maximum pressure in the lubrication system is approximately 60 psi, with the oil hot. Oil is carried in an Eelco six-quart finned pan that replaces the stock 4½-quart steel pan.

At the present time the engine has a stock full-flow oil filter but this filter isn't considered to be large enough for a competition engine. The plan is to replace it with a larger one that will be mounted to some point in the engine compartment and connected to the engine with suitable hoses. Another modification for the future is an oil cooler that will be mounted at the front of the car.

Bill and Mike have found that crankcase pressure can become something of a problem in Corvair engines because of the small size crankcase. This one has a breather setup that consists of a short length of 2¼-inch o.d. steel tubing fitted with baffles that slips onto the oil filter tube. A length of flexible hose connected to the tubing is routed out of the engine compartment to a location behind the left rear wheel. Also, each rocker arm cover has a long cast-aluminum Cragar breather bolted to it. Communication between each cover and its breather is through a long narrow slot cut in the cover.

The purpose of the breathers on the rocker arm covers is to provide additional area through which pressure, built up in the crankcase by blowby and other causes, can escape from the engine. If this pressure cannot escape easily it will force its way through the front and rear crankshaft seals and similar openings and take with it whatever lubricating oil that may happen to be in its way. Purpose of the baffles in the breathers is to trap oil that might be in the gases that flow through them and allow it to drain back into the crankcase. Mike indicated that the Cragar breathers do an excellent job.

A Mallory Rev-pol ignition distributor and coil create secondary current that flows through Packard 440 wires to Champion spark plugs. For drag racing, plugs are L81 or L7, and for road racing, L63R's will probably be used. The automatic advance mechanism in the distributor provides 24 crankshaft degrees of advance and this is boosted to a total of 40 by giving the distribu-

tor 16 degrees of initial advance. The distributor doesn't have a vacuum advance unit. Primary current for the ignition system is provided by a standard Corvair battery.

Each cylinder bank has its own exhaust header, made by Hollywood Deeptone, that was modified to enable its 1½-inch o.d. branches to be slipped over the oversize exhaust port tubes in the heads. The headers point to the rear of the car rather than in the standard forward direction and each empties into a 2-inch o.d. pipe that extends to the car's extreme rear.

Corvair engines are cooled by a fan that circulates air through the fins on their cylinders and heads. Standard fans are made of metal but the one on this engine is nylon. The nylon fan was designed for Spyder engines but the factory didn't use it after they found the nylon could be damaged by battery acid. Mike decided to use it because it is lighter than the steel one it replaced and would, therefore, effect some reduction in the car's weight. Because its blades have a slightly different shape than those on a steel fan, Mike was hoping it would deliver less air and, therefore, be less of a drag on the engine. However, the factory says it delivers as much air as a steel fan.

For drag racing, Mike removes the fan belt while the car is in the pit area and then runs the engine as little as possible to get to the starting line. After making his run he reinstalls the belt before driving the car back to the pits. So far this system has been satisfactory.

Corvair has only one four-speed synchromesh transmission and that's the one Mike is using. Gear ratios aren't at all suitable for drag racing but nothing can be done about this at present. A Schiefer aluminum flywheel, a Hays driven clutch disc, and a Schiefer clutch pressure plate assembly drive the transmission. The driven disc is a standard Corvair, which has a solid hub, with Hays special facings. The pressure plate assembly has a diaphragm spring, similar to that in standard assemblies, but the spring is made of thicker material so it can exert a greater pressure on the pressure plate.

Corvair owners who would like to give Mike a bit of a go on strip or track can have their engines reworked exactly like the one in his car by taking it and $1100 to Thomas' shop. Don't push, there's room for all. ■■

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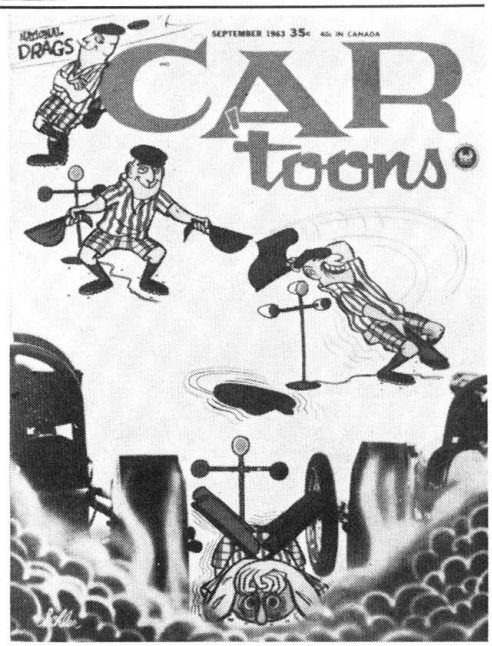

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