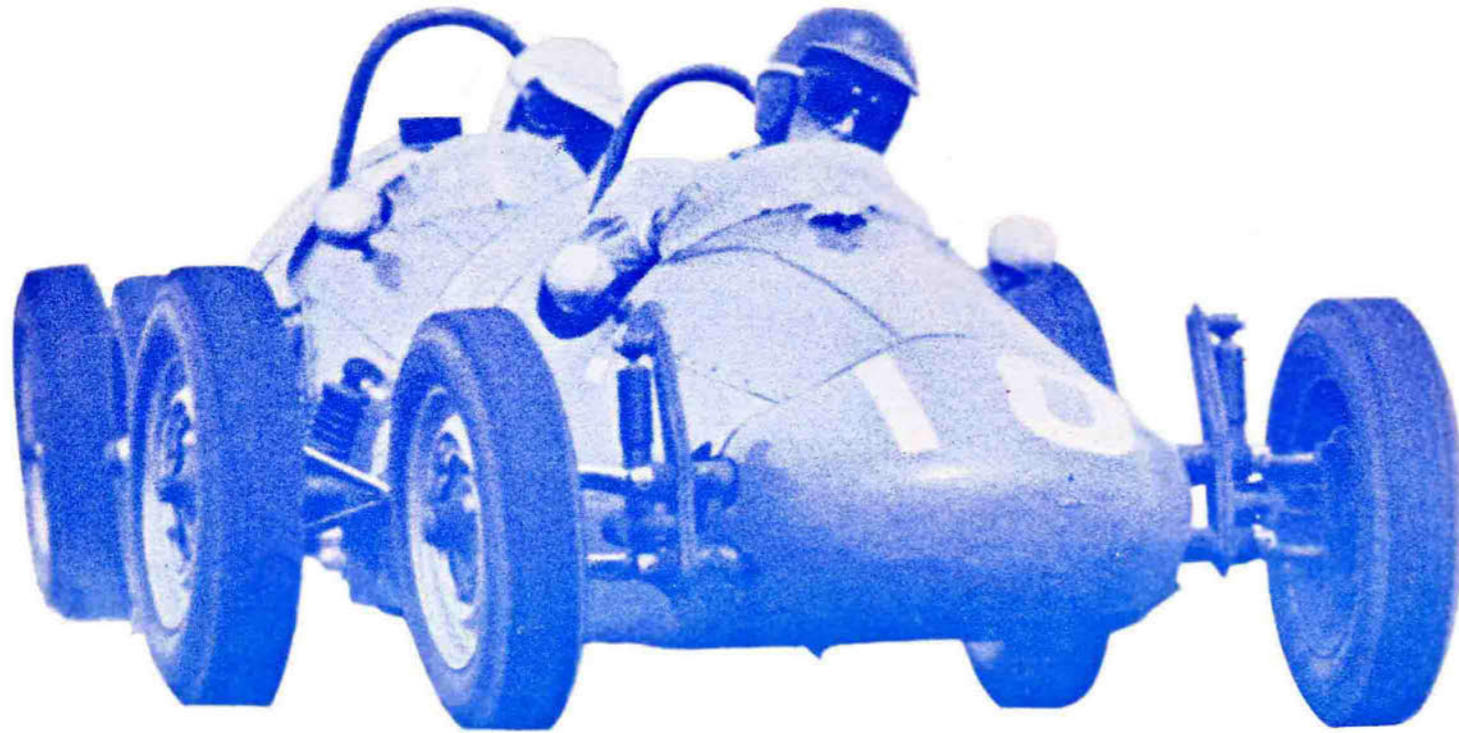


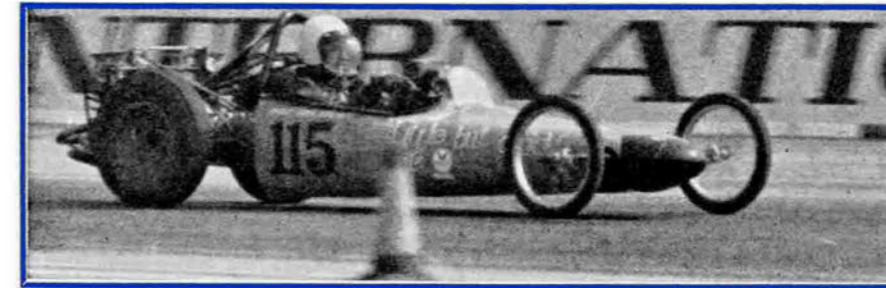
A FORMULA V race car can be built from a kit for \$995 or purchased ready to race for \$2495. VWs now are in anything-goes Formula B competition.



TEASING & TUNING THE VW

A CAR LIFE Guide to Better Leaving

BY JIM WRIGHT



DESPITE ITS popularity and sound basic engineering, the Volkswagen leaves much to be desired. As any car designed for functional, no-nonsense transportation with high reliability and economy factors, the VW has a number of drawbacks. Chief among these is sameness—mainly its sameness in looks and its sameness in performance.

People may be hooked on the low initial cost, low overall operating costs and high resale value, but they also want just a little bit more. People, being people, traditionally want to have their cake and eat it, too. Luckily there are enough accessory manufacturers specializing in VW equipment of all kinds (Pages 34-37) so that the individual owner can eat all the cake he wants. A few well-chosen modifications, an accessory or two, and any owner can make his Volkswagen look just a little bit different and go just a little bit better than his neighbor's.

The engine is as good a place to start as anywhere. As any other engine designed for long life and high economy, the VW has quite a few horses lurking in it that the factory hasn't deemed necessary to unstable; at least not more than a few at a time. A close look at the basic engine shows that it has plenty of potential that can be developed through the use of simple bolt-on equipment, and additionally exploited through more exotic means. ▶

IN TRIM for sedan racing, this 1956 VW is fitted with an EMPI anti-roll bar, a de-cambered rear end, Koni rear and Boge front shock absorbers, a high-performance camshaft and special carburetion.

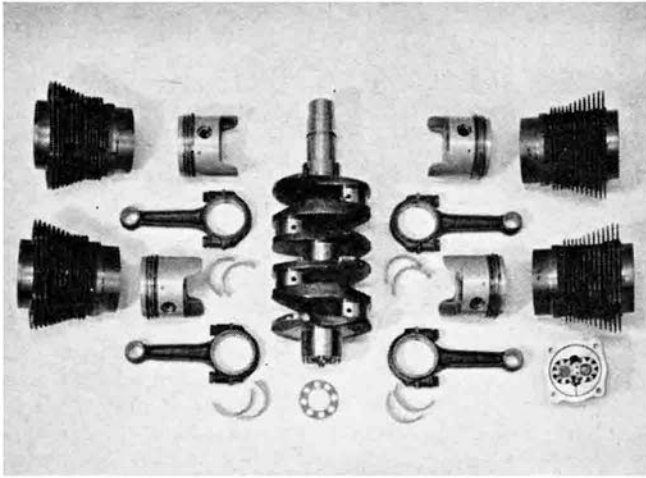


WITH A stroker kit installed to produce almost 1900 cc piston displacement, the VW below set the NHRA H/Gas record at 108.8.

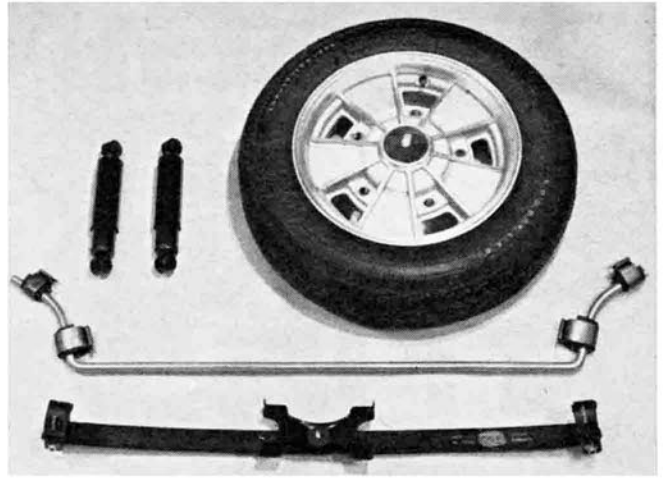


OFF-THE-road vehicles are favorite projects of modifiers. Conversion kits are supplied by several manufacturers.

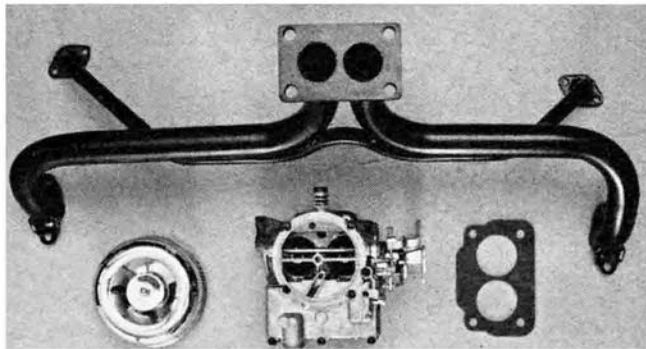




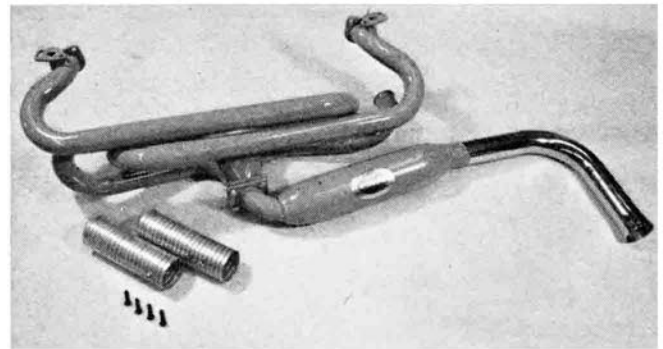
STROKER KITS, which include barrels, pistons, rods, crank, bearings and heavy-duty oil pump, sell for \$200 to \$400.



HANDLING PACKAGE includes camber compensator, heavy duty shock absorbers, anti-roll bar, special wheels and tires.



RAM MANIFOLD by IECO seats an American made Stromberg 2-barrel carburetor. This kit sells for less than \$90.



EXTRACTOR EXHAUST systems for VWs are manufactured by Cyclone, Bursch and EMPI (above). Prices are near \$50.

VW TUNING

There is very little difference in outward appearance between current engines and earlier versions. The basic design, surprisingly enough, can be traced back to a small aircraft engine that was developed and patented by Dr. Ferdinand Porsche in 1912. But while the engines may look alike, the years have produced several important design changes, mainly internal. These differences should be noted because in some cases they will limit the type and amount of modification and output that can be accomplished.

Basically, the engines are air-cooled, horizontally opposed, 4-cyl. units with pushrod-operated overhead valves. Features include an extremely light magnesium alloy crankcase, cast-iron cylinder barrels and aluminum heads. Heads and barrels have cast-in fins for cooling.

The crankcase is vertically split in two halves, which are machined as a matched pair and therefore are not interchangeable with other case halves. The case provides internal webbing for four main bearings for the forged steel crankshaft. Four light alloy bearing

shells carry the crank. Numbers 1, 3, and 4 main bearings are sleeve type while number 2 is a split type. Thrust is taken by number 1 at the front (fly-wheel end) of the engine. The flat, opposed design has good inherent balance characteristics and, while the short, stiff crankshaft is balanced to a close tolerance at the factory (0.11 oz.-in.), counterweights aren't provided.

Fiber timing gears drive the gray cast-iron camshaft, which is located directly below the crankshaft. Prior to 1966 the cam ran directly in the case, but now split inserts are used. The camshaft is provided with four lobes with each lobe operating two valves. The internal case webbing which carries the cam followers also seals off the crankshaft from the oil sump which prevents the pistons and cylinder walls from receiving too much splash. Rod and main bearings, camshaft and rocker arms are pressure lubricated by a gear-type oil pump. The lubrication system also includes an oil cooler to provide a temperature drop of 70°F. The short, rather sturdy

connecting rods are of forged steel.

The solid lifters are attached to hollow pushrods and actuate conventional rocker arms pivoting on a central shaft mounted on each head. The pushrods carry oil to the rocker arms. Engines through 1960 used a slightly radiused lifter and from 1961 on use a mushroom-type lifter.

Each pair of cylinders shares a lightweight, cast aluminum head. Combustion chambers are of modified wedge design and are partially machined. Engines of 1961 and later vintage have inclined valves, while early engines locate the valves vertically. Valve seats are sintered steel, shrunk into place. The bronze valve guides also are shrunk fit. Spark plug threads are cut directly into the aluminum head. The cylinder heads are mounted on the cylinder barrels without gaskets, but copper-asbestos rings are placed between the flanges of the cylinder and head. Heads are secured by the cylinder's long bolts, which pass through notches in the barrels down into the crankcase. The barrels are spigoted into the case and held in place by the head tie-down bolts.

Barrels and the aluminum alloy 3-ring pistons are matched for size during production and are color-coded accordingly. Dabs of pink, blue, or green paint identify the corresponding

sizes. This is because of the tolerance spread allowed at the factory. The 77-mm bore size is nominal, meaning that it will vary as much as 0.03 mm from cylinder to cylinder. This spread is divided into three grades 0.01 mm apart. Replacing a bad piston or barrel means replacing both as a matched set. The pistons ride on full-floating pins secured by circlips. They are internally reinforced with steel struts, both for strength and to control expansion. Rocking is held to a minimum by rather long, cast-in skirts.

In 1953 and earlier engines, the bore and stroke were 75 mm (2.953 in.) and 64 mm (2.520 in.), displacing 1131 cc (69.014 cu.in.). Compression ratio was 5.8:1 and the rated output was 25 bhp at 3300 rpm.

In 1954, the bore was increased to 77 mm (3.031 in.), while the stroke remained at 64 mm, upping the displacement to 1192 cc (72.74 cu.in.). This engine had 6.1:1 compression and was rated at 30 bhp at 3400 rpm. The 6.1:1 c.r. was utilized from January to August 1954, but from September on the c.r. was 6.6:1 and the rating was 36 bhp at 3700 rpm. Very few of the 25 and 30 bhp versions were imported (the Bug hadn't caught on yet) to the U.S.

THE 1961 MODEL featured an all-new engine, even though you couldn't tell it by looking. Bore, stroke and displacement were still the same but the case, barrels, heads and all other internal parts were completely different and not interchangeable with any of the corresponding earlier parts. Compression ratio was increased to 7.0:1 and the output to 40 bhp at 3900 rpm.

In 1963 another new engine was introduced. This was known as the 1500 because its displacement closely approximated this at 1493 cc (91.1 cu.in.).

This engine has a bore and stroke of 83 mm (3.27 in.) and 69 mm (2.72 in.), a 7.8:1 c.r. and produces 53 bhp at 4000 rpm. However, this engine wasn't slated for export to this country—except in various versions of the VW bus. But, many did enter the U.S. through other channels, mainly through Canada and private individuals' imports.

Late in 1965 VW introduced a new car model for export to the U.S. and also still another version of the engine. This engine is similar to the 1500, but an increase in bore size to 86 mm (3.36 in.) brings the displacement up to 1584 cc (96.6 cu.in.). It is called the 1600 in single carburetor form and the 1600S (for Super) with twin carburetors. Compression ratio is 7.7:1 and output is 65 bhp at 4600 rpm.

Starting with 1966 models, all regular VWs arrived equipped with a smaller version of the 1500-1600 engine. This one is known as the 1300. It uses the 69-mm crank of the bigger engines, but the smaller, 77-mm bore of the 40-bhp engine. Compression ratio is 7.3:1 and it is rated 50 bhp at 4600 rpm.

OTHER DIFFERENCES of note are in cam timing, carburetion, and valve sizes. The 40-bhp, 1300, 1500, and 1600 all use the same camshaft grind, but the effective timing on the latest three engines is increased due to the use of a 1.05 ratio rocker arm, as compared with the 0.95:1 rocker arm used in the 40-bhp engine. Timing for the 40-bhp is 6-35.30/42.30-3. For the 1300, 1500 and 1600 engines timing is 7.30-37/44.30-4. The earlier 36-bhp engine uses the 0.95 rocker with a symmetrical 2.5-37.5/37.5-2.5 grind.

Both the 1500 and 1600 engines use the same size valves with head porting to match. Intakes are 35.5 mm and exhausts are 31 mm in diameter.

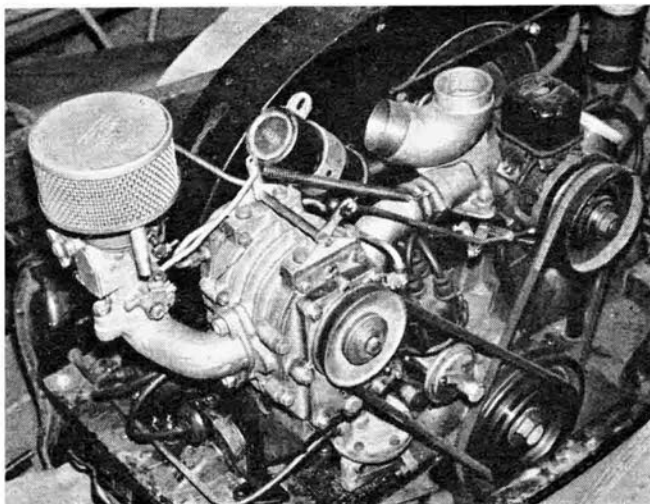
The 1300 engine uses valves with head diameters of 32 mm (intake) and 30 mm (exhaust). Diameters for the 40-bhp engine are 31.5 mm intakes and 30 mm exhausts. In the 36-bhp engine these are 30 and 28.5, respectively.

Carburetion for the 36-bhp is by a single-throat Solex, model 28 PIC, having a 21.5-mm venturi. The venturi on this model is replaceable. A single-throat Solex, model 28 PICT is used on 40-bhp engines. The T in the model number designates a fixed venturi. It has a diameter of 22.5 mm. The 1300 uses a single 30 PICT (fixed venturi) Solex with a 24-mm diameter venturi. Single carburetor 1500 engines use a Solex 32 PHN, fixed venturi, 23.5 mm. The single carburetor 1600 uses the same size Solex, but the model number is 32 PHN-1. No difference. Both 1500 and 1600 dual carburetor engines use Solex 32 PDSIT units having replaceable venturis of 21.5-mm diameter.

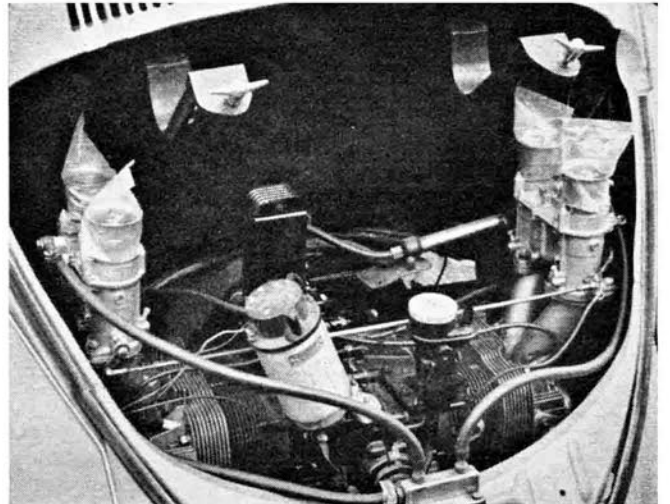
THE DISTRIBUTORS used with all engines are of Bosch manufacture and model numbers have been changed quite frequently, which makes them almost impossible to list here. However, it will suffice to say that they are either vacuum or mechanical advance, with the mechanical versions being the best-suited for any modified engine.

The best place to start any discussion on modifications is with those that are easiest and least expensive—namely those that entail simple tuning procedures and the addition of external bolt-ons. Anyone who has had any experience at all working on VWs will agree that the very first place to start is with the exhaust system. This holds true on all versions of the engine. The stock system, while using dual outlets, is still very restrictive. Just by replacing the stock system with a good extractor-type system, ▶

SHORROCK ROTARY vane positive displacement supercharger kit includes carburetor and fuel pump. Price is \$395.

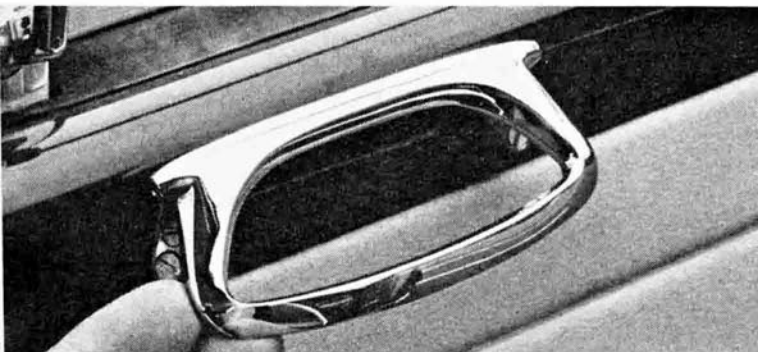


TWIN 2-THROAT Weber carburetion is still another way to tweak some additional performance out of that flat Four.

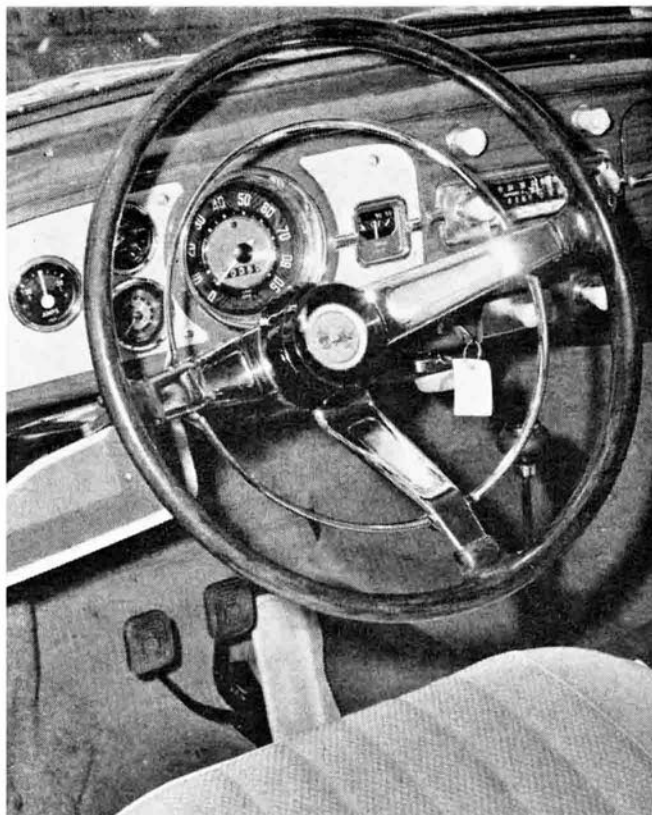




EMPI'S GTV is a sleek show car bearing almost a complete catalog of accessories, interior and exterior, for VWs.



CHROMIUM-PLATED door closing handles are convenience items among accessory equipment on the EMPI GTV.



JIM WRIGHT PHOTOS

SPECIAL STEERING wheel, instrument cluster, pedal cover, shift knob and paneling are a few GTV add-ons.

VW TUNING

power output at the rear wheels can be increased 7 to 10%. The extractor systems which feature large diameter, tuned-length, individual collector pipes feeding into one, low restriction muffler, have proved to be superior to other systems, such as duals, because they not only lower back pressure, but they also (due to the "tuned" length) actually help pull exhaust gases out of the cylinder to promote better scavenging. Several firms make them—EMPI, Cyclone, Bursch—and they all are priced at approximately \$50.

Right after the exhaust system is installed, the modifier should take a long, hard look at the induction system—from the carburetor air cleaner right on down to the intake valve. Looks a bit restricted, doesn't it? It is, but that's the reason an owner can run his VW, foot to the floor, all day long. By restricting the top-end breathing, the factory has in effect installed a governor which keeps the engine from being over-revved. There really isn't much the modifier can do to the stock system. One thing that does help is to throw away the stock air cleaner and replace it with a low restriction, paper element, accessory cleaner. As mentioned previously, the carburetor on the 36-bhp engine has a replaceable venturi. This unit will also fit the

40-bhp engine. Several replacement venturis are available, ranging from 22.5 to 24 mm. If a low restriction air cleaner has been installed, and/or the venturi size increased, the carburetor jetting also must be changed. This means either changing the air correction, or the main jet, or both, to obtain a richer mixture. Because breathing ability varies from engine to engine, it would be a good idea to check out jet changes on a chassis dynamometer in conjunction with an exhaust analyzer. In most instances the installation of an extractor exhaust also will allow use of a slightly richer mixture.

The best thing to do with a stock induction system is to replace it with one of the several accessory setups available. Most of these use a 2-throat carburetor and larger diameter induction tubes. One of the most popular is the "Ram Induction Power Kit" offered by EMPI (Engineered Motor Products Inc.). They make it for 36- and 40-bhp engines as well as the 1500 transporter engine. The kit includes a larger-than-stock diameter ram induction manifold, Zenith 32-NDIX 2-throat carburetor, Bosch centrifugal advance distributor, free-flow air filter and necessary hardware. The carburetor has 2.5 times the venturi

area of a stock carburetor and, properly tuned, can deliver a solid 10 to 15% increase in output. It sells for approximately \$150. EMPI also markets a dual carburetor adapter kit for 36-bhp engines. This has separate, cast aluminum intake manifolds designed to accept a pair of stock 28 PCI carburetors. Included are all the necessary linkage and mounting hardware, but the builder must supply the extra carburetor and air cleaners.

Speedwell Equipment of England has recently developed another dual carburetor installation that utilizes two English side-draft Strombergs. This kit also uses two individual, cast aluminum intake manifolds. It will fit the 1200 and 1300 versions of the engine. Called the "Speedwell Sprint Kit," it will be marketed by EMPI and will cost less than \$175.

Still another manifold kit worth consideration recently was introduced by IECO (Induction Engineering Co.). This also is a ram design, but uses a single, dual throat, American Stromberg (1.0625-in. venturis). This kit sells for under \$90.

Also of interest are several "tuning kits" that have been developed for the 36- and 40-bhp engines. The first is an offering by John Fitch (of Corvair fame). This kit includes a free-flow, paper element air cleaner, larger power jet, timing adjustment instructions, and free-flow, low-tone, resonator tailpipes. The 36-bhp kit includes

a larger carburetor venturi. It sells for \$31.25; Fitch claims a 10% bhp increase.

The second kit is offered by IECO. This is called a "Dyno Pak" and is similar to the highly successful kit of the same name that IECO has been selling for Corvairs. It consists of new spark plug wiring (Packard 440), plugs, points, condenser, chrome-plated air cleaner with paper element, larger power jet and timing instructions. This kit was developed on the chassis dynamometer to offer the quickest, most economical way to produce extra horses. It sells for \$19.95 and is available for 36- and 40-bhp engines.

Once a ram intake manifold and an extractor exhaust system have been installed, and the engine has been tuned, the builder has gone as far as he can with bolt-ons. From here on out the equipment and labor involved becomes much more complicated—and expensive. But then, the results also are increased proportionately. Internal changes or modifications mean the engine must be removed from the car.

If a 36- or 40-bhp has been driven to the point at which it requires a complete rebuild (new pistons, new barrels, etc.) it might be well to consider one of the available big bore or stroker kits (or both). Nothing will increase the output and resulting performance more than adding a few cubic inches. EMPI offers several kits for accomplishing this. The first is the big-bore kit for 40-bhp engines. This includes new barrels with a 5-mm overbore which increase the stock displacement from 1192 cc to 1352 cc. The pistons are select-fitted, aluminum alloy and come complete with hand-gapped rings and fitted pins. The barrels and the pistons are made for EMPI by the German firm of Mahle, which also is supplier for Mercedes, Porsche and VW. An increase of 15% is claimed and the kit is reasonably priced at \$98.50. It requires no special installation tools, procedures or machining.

NEXT IS THE "1300" stroker crank kit for the 36-bhp engine. This kit includes a matched set of Mahle barrels (stock bore), hand fitted pistons (rings and pins), a counterbalanced, 69.5-mm stroker crank and a heavy-duty oil pump. Compression is increased from 6.6 to 7.5:1. These parts slip right in without any machining, but the stock flywheel must be re-drilled because the stroker crank uses eight dowel drive pins instead of four. The heavy-duty oil pump increases oil pressure from 32 to 42 psi. The cost of the complete kit is \$219.50 and the changes increase output to 44 bhp.

The stroker crank is offered by itself at \$129.25.

Two stroker kits are offered for the 40-bhp engine. One uses a 69.5-mm crank, and 82-mm barrels to increase displacement from 1192 cc to 1468 cc. This is called the "1500" kit. Also available is a "1600" kit (actually 1586 cc) which utilizes a 74-mm stroker crank with 82-mm barrels. The crankshafts in both kits are manufactured by the German firm of Okrasa. They are drop-forged steel and fully counterweighted and balanced. The barrels and pistons are Mahle, precision fitted, complete with rings and pins. Both kits include a heavy-duty oil pump. Here again the stock flywheel (if used) must be re-drilled as the stroker cranks have eight drive dowels. The 1500 kit has a compression ratio of 7.5:1. A total of 48 bhp is claimed with this kit installed. The 1600 kit has 8.0:1 c.r. and increases horsepower to 52. Prices are: \$289.50 for the 1500, and \$399.50 for the 1600.

If the modifier doesn't desire to go to that expense he can obtain more displacement by interchanging parts from the later 1300, 1500, or 1600 engines. The 69-mm stroke cranks from these engines will fit the 40-bhp engine without machining, but it should be remembered that pistons also must be changed to compensate for the increased stroke. Cylinder barrels from the 1500 engine will fit the 40-bhp case, but machining is necessary for the 1600 barrels. In the long run, the exchanger is better off with the engineered kits.

IF DISPLACEMENT is increased, the intake ports must be opened up if the full potential of the extra inches is to be realized. Stock head intake and exhaust passages can be enlarged by porting and larger valves can be installed. This is a good idea even if only ram induction and extractor exhaust systems have been installed. The later 1300, 1500, and 1600 heads also will fit the 40-bhp engine and they all have larger ports and valves. The ultimate solution is a set of Okrasa heads from EMPI. These special heads are offered for either the 36-bhp or 40-bhp engines. Features include bigger ports, larger valves, increased compression and, best of all, individual intake passages. The redesigned combustion chamber increases compression to 7.5:1 on both engines. The complete kit also includes separate intake manifolds, two single-throat, Solex 32-PICB carburetors, linkage and mounting hardware. On the stock 36-bhp engine, the heads raise the output to 44 bhp (48 bhp if the 1300 stroker kit also is installed). On a stock 40-bhp engine, the kit adds

6 bhp. With the big bore kit, the rating jumps to 54 bhp. Used with the 1500 stroker kit, 66 bhp; and 72 bhp with the 1600 kit. The Okrasa kit for 36-bhp engines is \$309.50; \$365.00 for 40-bhp engines.

If the modifier goes as far as changing bore or stroke he might as well install a different camshaft as long as the engine is opened up. Several different companies (Iskenderian, Weber, etc.) offer a variety of grinds to match whatever use or degree of performance is desired. The stock grind durations are on the short side and could stand lengthening out—especially if displacement is increased or the heads are replaced or opened up. What grind is chosen depends on the extent of other modifications and for what purpose the engine is being built. For general street use, good low-end and mid-range torque characteristics are desirable, while for racing, more on the top end is best. Or, perhaps, more of a compromise between the two would best suit some needs. The important thing is not to overcam the engine. The grinder should be told what has been done to the engine and what is expected of it. His recommendations for the proper grind should be followed.

If an all-out effort in the engine department is planned, supercharging shouldn't be overlooked, either as a substitute for, or in addition to, boring and stroking. This is the ultimate in bolt-on equipment, and properly installed, can offer a larger increase in performance for a comparatively lower cost than anything else. There are currently two supercharger kits being offered for VWs. The less expensive of the two is manufactured by the Judson Co., Conshohocken, Pa. This kit utilizes a rotary vane, positive displacement pump to deliver 6 psi boost pressure. The stock carburetor, rejetted, is retained. The Judson is driven by V-belt and also includes an oil injection unit (through the blower) for vane lubrication. It is claimed that horsepower is increased from 36 to 57, and from 40 to 59 on the two 1192-cc engines (no other changes). The kit sells for \$144.

THE OTHER UNIT is made in England and is marketed by EMPI. It is a Shorrock rotary vane, constant displacement blower, also driven by single V-belt. This kit features a special English-built Stromberg, constant vacuum carburetor, cast aluminum, large diameter induction tubes, SU electric fuel pump and several other miscellaneous parts not included in the Judson kit. This helps explain its greater price \$395. Increases of up to 80% are claimed on stock engines (65 bhp for 36-bhp and 72 bhp for 40-bhp

VW TUNING

engines). If used in conjunction with big bore or stroker kits, or special camshafts, either supercharger will increase the power to a proportionate degree.

Once the engine is up to the desired level, attention can be focused on the chassis. The stock VW, with its 4-wheel, independent suspension, handles fairly well as compared with the average American sedan. But, as with any car which displays a rearward weight bias and swing axles, there seems to be room for improvement. When cornering, the outside rear wheel of the VW tends to tuck under slightly, and there is a corresponding reduction in cornering power when this happens. There are several ways to rectify this condition. The least expensive and simplest method is to install a "Camber Compensator." This device, developed and sold by EMPI, consists of a single-leaf, transverse spring that attaches to the rear axle. It has the effect of weight transfer from the outside wheel to the inside wheel in a corner and limits the degree of tuck under (or positive camber) on the outside wheel. It can be installed with simple tools in about 15 min. and costs \$19.95 for VW sedan models. The compensator also slightly increases rear end roll resistance, but doesn't add appreciably to the existing spring rate. Front end roll resistance can be increased by addition of an anti-roll bar. These also are sold by EMPI and cost \$17.95.

ANOTHER METHOD of increasing rear end cornering power is by changing the camber setting of the rear wheels from positive to negative camber (positive camber is when the top of the wheel leans outward, negative is the opposite). This is accomplished by an adjustment of the rear springs. About 1.5-2° negative camber with the car static and carrying its normal average load is sufficient. Offset accessory wheels also help. They give a wider track for increased chassis stability and their wider rims give the tires themselves better stability. Offset of any accessory wheel chosen (steel or alloy) shouldn't exceed 1-1.5 in. total (two wheels).

Tires also are very important to the way the VW handles. First off, the owner should not buy tires, no matter how good they are, unless they have been recommended for VW use. Some of the square-shouldered tires designed for American cars just won't do the job.

Stock VW shock absorbers offer

good performance up to a point, but if other chassis and suspension changes are made the job'll only be half done if good, heavy duty shock absorbers aren't installed. There are several makes which should be considered; Armstrongs, made in England, are good, as are the Boge units from Germany. The best choice is Koni. These are made in Holland and are fully adjustable to meet changing conditions.

Stock VW brakes aren't bad. Under normal conditions they are adequate, offering good stopping ability with a fair degree of fade resistance. For other than normal highway usage it is advisable to fit metallic linings. These provide even more stopping power, have more fade resistance (the hotter they get the better they work) and aren't adversely affected by water. Several companies offer these, among them IECO, which sells them either outright or on an exchange basis.

Now that the VW is running and handling just a little bit better than the other guy's, the owner may want it to appear just a little bit different, too. Nothing fancy, but just that extra added something is needed to set it off. Or maybe that's all the modifier wanted all along (some people are completely satisfied with the performance of the stock VW). In any event conscience and pocketbook must be the enthusiast's guide, because there probably are more goodies being offered for the VW than for any other single car.

THE STOCK VW probably is just about one of the most basic transportation cars there is. But once a little money has been spent on it to individualize it, other possibilities can be seen. There are a lot of clubs around the country composed of people who have become aware of the possibilities. They're just not satisfied with using their Bugs for basic transportation. They enter them in rallies and in trials or gymkhanas where they (depending on individual driving skill, as well as car preparation) usually do pretty well in their classes. They even enter them in road races in Sports Car Club of America's increasingly popular sedan class. Some of them don't do half bad there, either. More and more are turning out for the drag races in which they compete in special classes. EMPI has a VW sedan it uses as a test vehicle for new equipment that goes really well. Currently running an experimental stroker kit, giving almost 1900 cc, and Weber carburetors, it holds NHRA's H/Gas record at 101.80 mph.

Other competition areas include Formula Vee and Formula B road racing. These formulas are for single-seat race cars and offer a high level of competition on a less expensive scale. Formula Vee was set up to utilize strictly stock VW components, including the front suspension, transaxle and rear suspension, and engine. There are currently several manufacturers offering body and chassis kits for this class. The prices range from \$995 for a basic kit (you supply the VW parts) to \$2495 for a ready-to-race car. Recently Formula Vee owners have turned to Formula B, in which the only limitations are an engine size of 1600 cc.

Those seriously interested in any form of competition had best check with the governing association(s) to find out exactly what is allowed in the way of preparation before any money or labor is invested in the project.

Another popular use of basic VW components is in the construction of off-the-road vehicles. Enthusiasts either build their own or purchase kits to get the job done. Currently there are two companies offering both kits or completed cars for this increasingly popular pastime. The EMPI Sportster is one, the Meyers Manx is the other. Both utilize VW front suspension, chassis platform (modified), engine, transaxle and rear suspension, along with miscellaneous items such as steering, seats and instruments. The EMPI version uses welded-up steel construction throughout and sells for anywhere from \$295 for a basic kit (chassis only and very bare at that) on up to the Deluxe kit for \$1045 (you supply the VW components.) The Meyers Manx features mainly fiberglass construction, with prices starting at \$535. Both the Manx and the Sportster will do just about anything a 4-wheel-drive vehicle will do, and maybe a little more. And, they can still be driven comfortably on the streets because they use stock springing and gearing.

IF SOMETHING really different is desired the special bodies that are beginning to appear on the market should be considered. These are downright exotic, with lines that closely resemble the latest Ford GT-40. Here again the builder buys the basic body and add VW components. Kellison and Aztec are the two big names in this field. The bodies are molded from fiberglass and keep weight to a minimum. They are designed to bolt to the VW platform chassis, but they do require quite a bit of finishing work. The results are most likely worth the effort. This type of body, along with a few engine and chassis modifications, adds up to just about the ultimate in having VW cake and eating up the competition, too. ■