

# SECOND GENERATION

A FIRST GENERATION MANUFACTURER TACKLES THE NEW WATER-COOLED ENGINE

BY JOHN G. RETTIE

The new generation water-cooled VW engines have been around for about four years and are just beginning to receive development work for use in competition vehicles. The air-cooled engines were around for over 20 years before development work started on them in the mid-Sixties, and then it took a further five years or so before they were "fully" developed. So far, little more than six months work has been done on the water-cooled engines, so it will be a while before their full potential is realized.

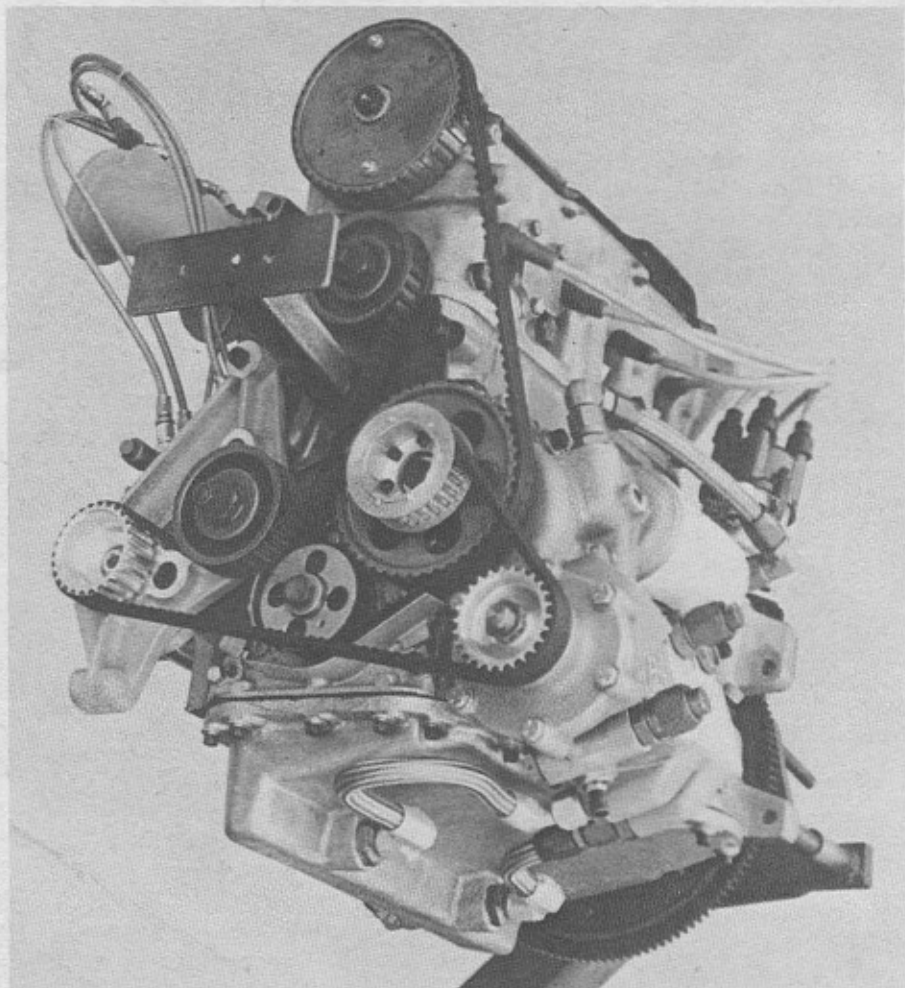
When we were reviewing the Super Vee scene earlier this year we noted that there were many companies entering the field of tuning VW engines for the first time. Likewise, we found that many of the established VW engine builders appeared not too interested in the new engine.

However, one well established company that will definitely be developing the new engine is Scat, which has been in the VW engine business longer than almost everyone else. The Scat folks have been working with Richard Lyndhurst of Automotive Design Consultants, designing various components that are required for adapting a stock Rabbit or Scirocco engine for use in a FSV race car.

Regulations are fairly strict on what may be done to the engines for Super Vee. Basically, the block has to remain much the same, while the cylinder head and cam can be modified quite extensively.

One very necessary modification that is carried out on Super Vees is dry sumping of the oil system. This is necessary to make the engine live with all the high G forces exerted when cornering hard. While each engine builder has his own ideas on how the cylinder head should be modified, he has to use commercially available oil pumps for scavenging the dry sump pan, unless he can manufacture his own. This is the area receiving the most attention from manufacturers. There are several companies making the components needed for converting the engine to dry sumping and each one of them seems to have come up with different designs.

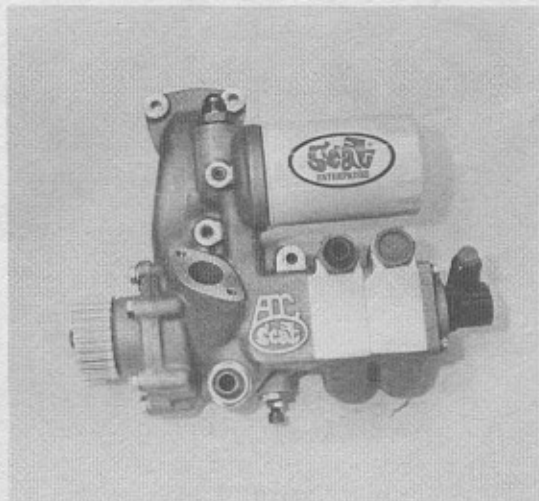
On a stock Rabbit engine the water pump is driven by the same belt that



turns the alternator, while the oil pump is in the sump and is driven off the distributor drive. When the VW factory commissioned the University of Brunswick in Germany to develop a water-cooled Super Vee engine last year, they came up with a system where the oil pump was located under the engine and driven by a separate belt from the one used to drive the water pump. This meant that three Gilmer belts were required to drive the camshaft, the fuel injection pump, the oil pumps and the water pump. But since that first engine was built, builders have been combining the water pump drive with the drive for the oil pumps so that only one additional belt is required. This obviously saves valuable horsepower.

Last month we talked about the Drake Engineering components for building a Super Vee engine. They produce a combined water pump and three oil pump unit that is attached to a spec-

ABOVE, it's hard to believe this is a Rabbit engine. With the addition of the Scat dry sump system and fuel injection, the engine looks ready for any race car. BELOW, the Scat combo pump system for Super Vee is one of the neatest units available.



DUNE BUGGIES & HOT VWs

ial plate that bolts to the front of the engine.

Scat's unit is a lot more complicated at first sight but it is actually a lot simpler. Not only are the water pump and oil pumps driven off the same shaft, but the oil filter and the mechanical tach drive are also incorporated in the unit. Furthermore, the unit bolts right onto the stock engine block using the same mounting points as the stock water pump. The end result is, therefore, much simpler and more compact.

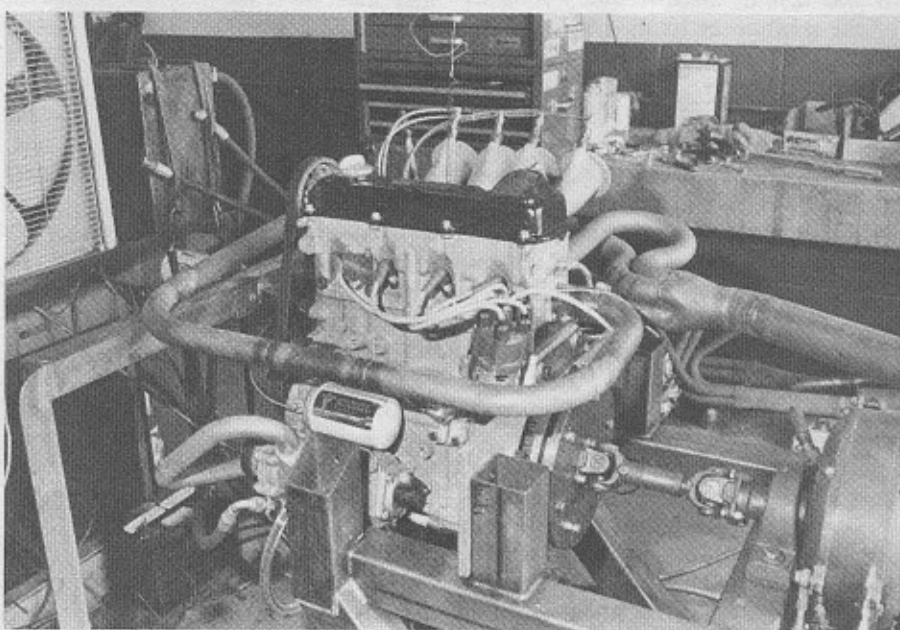
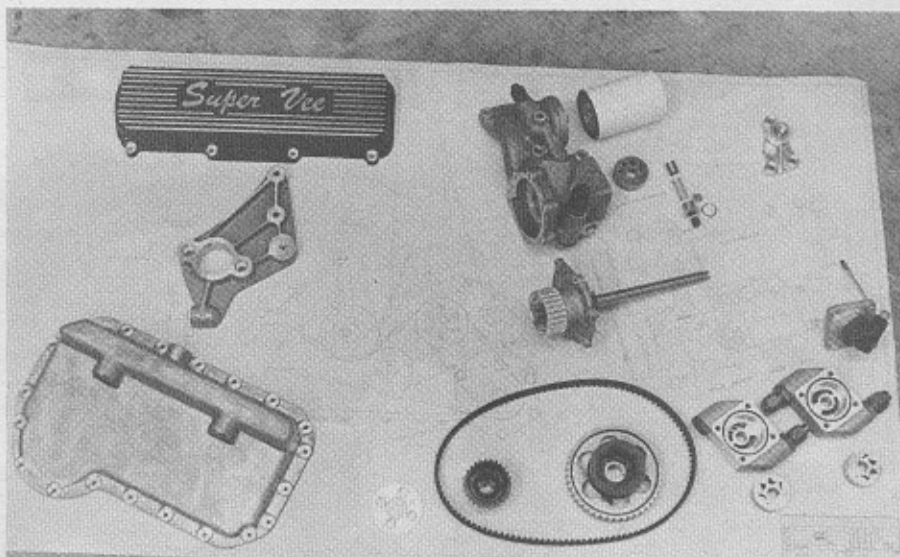
Scat has only incorporated two scavange oil pumps in its unit, which connect directly to its aluminum dry sump pan. Two pans are available, one for engines mounted upright and the other for engines mounted at a 15° angle.

The other components Scat is manufacturing for Super Vee engines are a finned aluminum valve cover with no breather tube or filler cap and the words "Super Vee" written on it; an adaptor plate to cover the hole left in the block after the oil filter is removed that enables a pressure line from the oil pump to feed into the block; a plate for mounting the Bosch injection pump, to be driven by the same Gilmer belt that drives the combo pump unit, and a block-off plate for covering the fuel pump hole in the block. Scat sells Uniroyal Gilmer belts which have rounded teeth and take 30% less power, according to Scat, than similar belts.

At this time Scat has not built any complete engines, but Jules Williams of Automotive Development, Dept. HVW, 501 W. Maple, Unit V, Orange, CA 92668, has built the first engine using the Scat components and reports that they work fine. He has had no problem, thanks to effective sealing rings, of oil getting from the high pressure pump into the water pump.

Scat has already sold its first production run of components and is starting a second run. Scat hopes the components will soon find their way onto engines for use in other forms of motorsports. An off-road car will need dry sumping as much if not more than a circuit Super Vee car.

Scat Super Vee components are available from Scat Enterprises, Dept. HVW, 1400 Kingsdale Ave., Redondo Beach, CA 90278. If you don't want to build your own trick water-cooled engine, you might contact Jules Williams at Automotive Development. They have had many years experience building successful Formula Ford engines and are now building Super Vee engines as well. ●



TOP, this is the kit that Scat is producing for converting a stock Rabbit engine into a race engine. CENTER, Jules Williams winds Automotive Development's first Super Vee engine up on the dyno. ABOVE, at 8000 rpm this little four-banger should be capable of over 160hp.