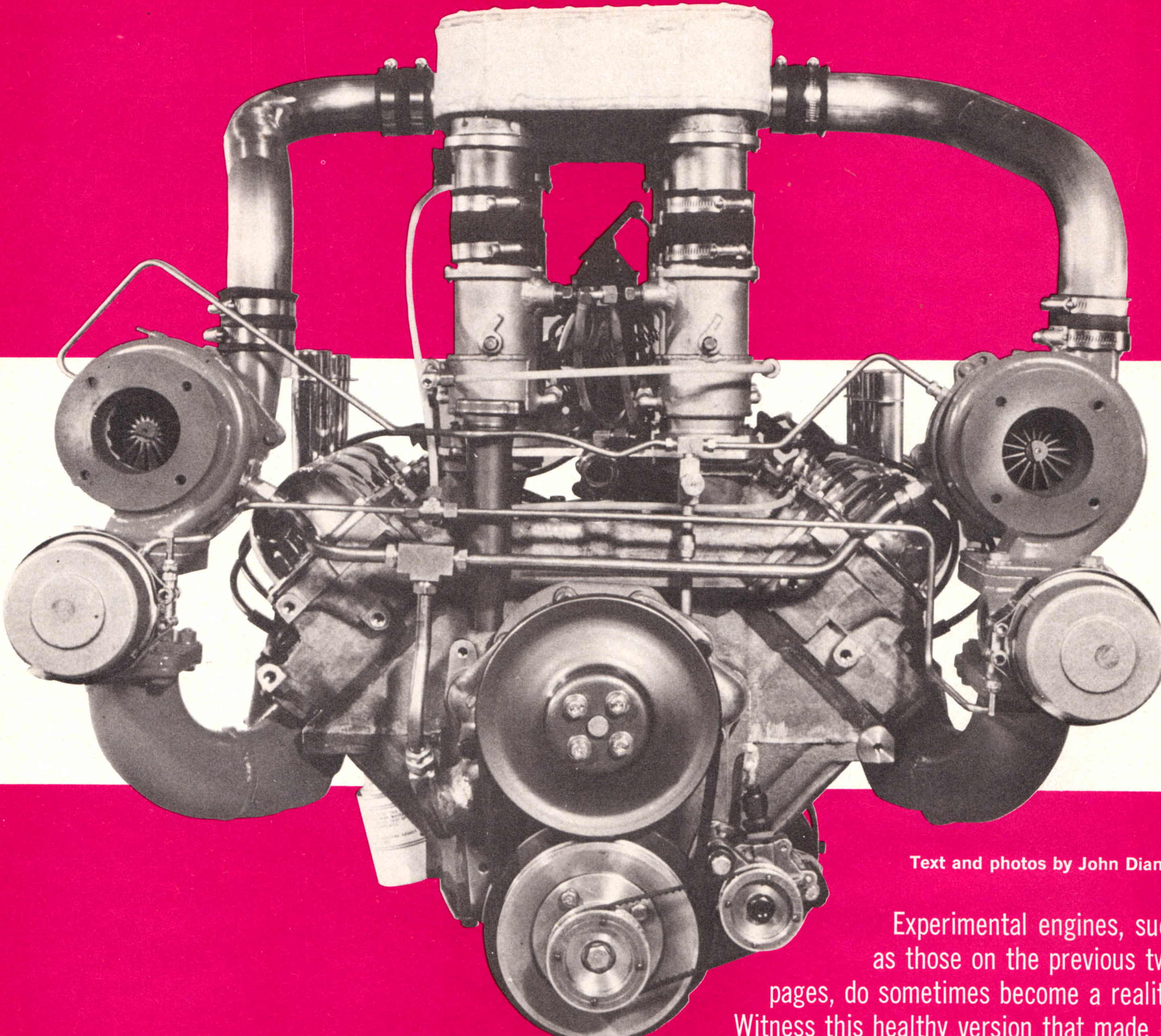
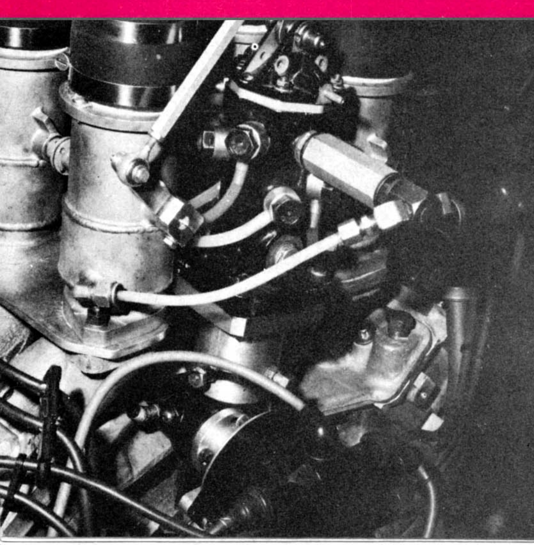
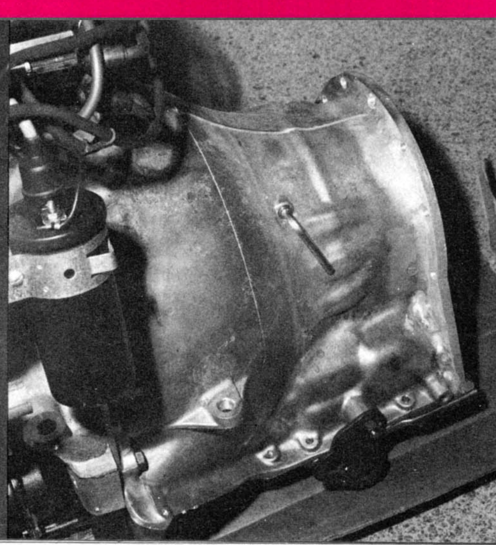


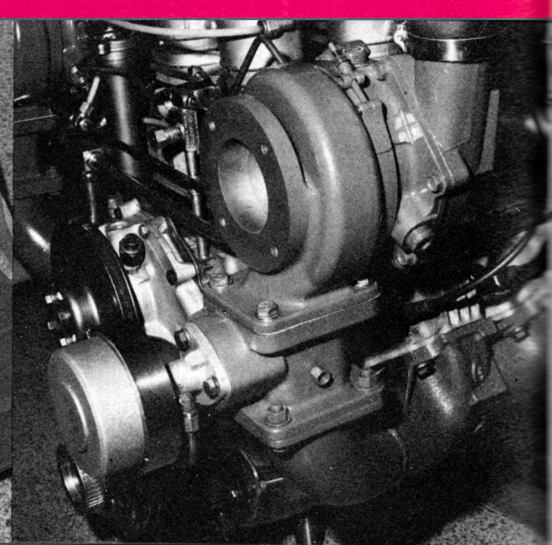
Text and photos by John Dianna

Experimental engines, such as those on the previous two pages, do sometimes become a reality. Witness this healthy version that made it!

OLDS CAN-AM 455







On the two preceding pages we have taken a brief look at some of Oldsmobile's experimental engines, and now we are about to learn a little more on one of the more current projects involving Olds engineers. Admittedly, this newly developed race engine was basically designed to power a totally new concept in Can-Am cars. The engineers at Oldsmobile, Armco Steel, McKee Engineering, and Cro-Sal (Gene Crowe and Ralph Salyer) are all directly responsible for this endeavor.

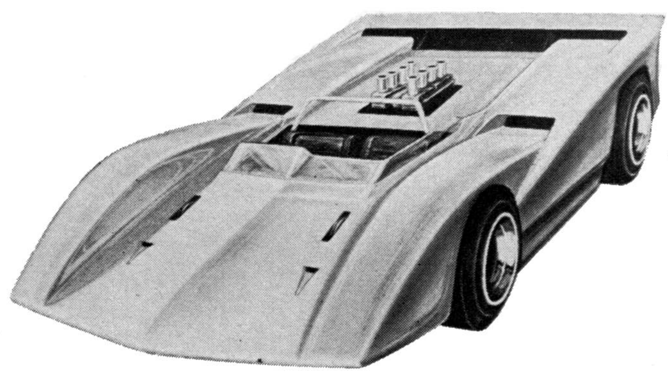
The car itself is of monocoque design, incorporating mainly stainless steel components. In addition to this unique design, an automatic two-speed transmission (and we don't mean Powerglide), coupled to a Ferguson four-wheel-drive unit, will also be employed. This basic idea is relatively new, but if it works as well as expected, you may see many other Can-Am competitors following suit.

Now that we know what the new engine was basically designed for, let's take a closer look at this powerplant. Obviously, the twin turbochargers are the most unique components on this particular engine. The basic turbos are relatively small in size (but not in output), and are the TRW 375E10 units. Waste gates are located just under the turbocharger assemblies and are needed to maintain the correct amount of boost during acceleration through the rpm range. A maximum boost presure of 10½ psi was found to be the right ticket for needed performance requirements. Countless dyno hours were spent in developing the correct waste gate configurations needed for the tremendous response demanded for this particular type of racing. However, turbo and waste gate locations shown in the accompanying photos will differ slightly when the engine finally rests snugly in the car (actual location will be more toward the center of the valve covers). Stainless steel exhaust headers (not shown in photos) will pass the exhaust gases through the turbo's housing, thereby causing the turbine blades to rotate. This turbine builds the needed boost in the air box located above the Lucas injectors. When this boost reaches the desired maximum pressure, a spring-loaded diaphragm opens the waste gate to discharge enough exhaust pressure to keep the boost at the predetermined 10½ psi.

FAR LEFT — The Lucas timed fuel distributor received modifications which enabled the correct fuel load to be distributed to the intake valves under changing boost conditions. Note the adapter which locates the electrical distributor at 90 degrees. CENTER — This two-speed automatic trans is quite an engineering feat, and was designed by the Olds engineers. You'll hear more on this particular trans at a later date. LEFT — The turbo's waste gates took up many hours in development.

Speaking of dyno time (we were, remember), countless hours were spent just matching the Lucas timed injectors to the TRW turbochargers. A positive displacement fuel pump operates off the front crank pulley, by means of a Gilmer belt drive. The all-important fuel distributor mounts in place of the stock ignition, and a 90-degree adapter is utilized for driving the electrical distributor (see photo). The fuel distributor is the "brain" behind the fuel supply, and operates eight barrel valves feeding the intake valves in a timed sequence. Of course, with the addition of the turbos, obtaining the correct fuel mixture at boost and no boost created a problem. A throttle richening device was designed to work in conjunction with the existing fuel distributor cam, thus eliminating possible mixture problems. The gas cooling deficiency was also eliminated by routing the bypass (excess) fuel through Teflon fuel lines, around the individual injector stacks, and on back to the fuel tank reservoir. The injector manifold was designed by the Oldsmobile engineers after extensive flow-bench development.

Working on down into the engine's interior, we find many nonproduction parts being employed. And recalling this engine's intended use, that's to be expected. The basic block is of aluminum alloy and will house 455 inches of turbocharged muscle. To contain all the pieces, special four-bolt main caps were machined from high-quality forgings. To arrive at the preordained 455 cubic inches, a combination 4.125-inch bore and 4.250-inch stroke is used. The crank in this engine will be an Oldsmobile forged steel unit with 3-inch-diameter main bearing journals and 2.499-inch-diameter rod bearing journals. Bearing selection is Clevite 77's for both rod and main bearings. Because of the duration of Can-Am-type races, connecting rod failure became an important factor. So, with this thought in mind, the engineers went with the race-proven rods of "Spade" Carillo. In keeping with the tried and proven performance items, Forgedtrue pistons were also selected. The forged aluminum pistons will give an overall compression ratio of approximately 8.5:1. The piston ring combination will be the new .017 Dykes top ring and a 1/16-inch cast iron second compression ring.



This artist's rendering of Cro-Sal's new 4-wheel-drive Can-Am car shows ultra-sleek lines — a very interesting approach.

The oil ring selected is a 3/16-inch rail-type (3-piece) circumferential ring. Steel sleeve cylinder inserts finished with a 300-grit Sunnen stone will ensure the piston assembly good sealing characteristics.

As you might expect, the heads are also of aluminum alloy and use cast iron valve seat inserts. After extensive testing in Oldsmobile's airflow research room, the basic intake runner designs were employed. It was found that newly designed heads weren't needed; reworked intake runners would do. Altering length, shape, and overall width was all that was necessary to produce the needed air/fuel flow. Exhaust passages were relieved to aid in scavenging increased gases. By correlating the intake valve diameter of 2 inches and exhaust valve diameter of 1.625 inches, the total working combination proved very promising. Again, thinking in terms of reliability, the TRW engineers designed the valves for specific use with the twin turbochargers. Valve springs and camshaft are products of Bruce Crower, and are his roller tappet design. A 320-RD came with 320-degree intake and exhaust duration and .555-inch lift, and is used in conjunction with aluminum roller tappets. Crower #100 aircraft-quality dual valve springs, bronze valve guides, and PC Teflon valve seals complete the heads.

Dyno readings for the final (well, almost) engine combination were quite impressive. More impressive, however, was the torque output of this engine in relation to the horsepower curve. Try these figures on for size:

RPM	TORQUE	HP
3000	571	325
4500	626	537
5500	619	647
6250	554	659

And that figure of 659 hp isn't the end. This engine has more development in store. A few of the engineers and fellow co-workers involved with this project feel that horsepower readings well over 700 (might just call this the leader of the "rat" pack) will be forthcoming with additional research and development, engineering exercises, or just plain diversification. ■ ■