EXOTIC ROCKETS

OLDSMOBILE'S EXPERIMENTAL V8s

By Al Kirschenbaum

Picture a state-of-the-art automotive lab staffed by topnotch scientists who operate with the latest tools and the most advanced techniques. Add an atmosphere of pure enthusiasm and competitive brand loyalty, and practically anything "engineerable" becomes possible. The mechanical-marvel potential of such a research and development environment would be like the ultimate hot rod garage running at wide-open throttle all the time! In an enthusiast's fertile mind, the output potential of such a stimulating atmosphere would be virtually unlimited.

In practical terms, we can look back at the products of the circumstances that prevailed in and around Detroit during the sizzling, supercar Sixties. A decade or so ago, those very real conditions combined to inspire the evolutionary peak of Oldsmobile's Rocket V8. Visually, at least back then, there appeared to be a fine line between "factory fantasy" and actually going fast.

During that period, when GM's Lansing division was cranking out musclecars by the tens of thousands, this series of non-production Rocket powerplants was developed to demonstrate the ultimate potential of the division's largest-ever V8. With a deep-breathing approach to durable big-inch horsepower, Olds engineering teams (led by the late John Beltz and Frank Ball) uncovered elevated levels of both torque and engine speed in the division's main-line powerplant. Based on production designs, each of these exotic engineering exercises was taken toward its outer mechanical limits. These are the products of Olds engineering on a very fast roll—the equivalent of once-top-secret weapons in Olds' Rocket motor arsenal.

As exciting as all this experimental engineering hardware appears in print, it can be even more stimulating when viewed in person. You can see these very engines (and other interesting ones) on display at the R.E. Olds Museum in Lansing, Michigan. They're on long-term loan from the Oldsmobile Division's engineering department.

Although both cast and forged pistons were made for these engines, dynamometer evaluations were conducted using these 10.2:1 forged-aluminum units. Designed to allow maximum practical squeeze with minimal flame-front obstruction, these forged-alloy slugs incorporated carefully contoured tops.

Cut-away cylinder head section illustrates the shallow valve angle and the extensive coolant jackets surrounding the valves. Unique chamber design called for a maximum ignition timing of 29-30 degrees, while production Rockets called for a more conventional 37-38 degrees of spark lead.

Consistent with contemporary engine science, all of these experimental Olds engines incorporated four valves per cylinder. Each intake measured 1.75 inches, while the stainless-steel exhausts were 1.375 inches in diameter. As with Cosworth/Ford Formula One V8 practice, the angle between the valves is held at 37 degrees. Despite having almost twice as many components, efficient design and production parameters maintained these heads' relatively compact size. With many other automakers now employing this multi-valve plan in their present production line, a similar mini-Rocket may yet make it off the Lansing launching pad.

Designated W-43, this engine's mile-wide valve covers hint at the Chrysler-style science that resides within. Cast in iron, like its 455-cubic-inch production counterparts, this prototype Rocket spewed out 550 hp at 6500 rpm with the help of hemispherical combustion chambers, four valves per cylinder, a high-capacity four-throat Quadrajet carb, special-cast crankshaft, forged-steel connecting rods and 10.2:1 high-squeeze pistons. According to Oldsmobile engineering sources, the W-43 engine was the one powerplant in this experimental series that came closest to actual production.

The special iron and aluminum cylinder blocks cast for these experimental engines were the first factory Rockets fitted with four-bolt main bearing caps. Produced entirely in iron, the pushrod W-43 engine weighed 86 pounds more than a stock 455. With an aluminum block and cylinder heads, the same assembly weighed 75 pounds less than a stock 455. Produced solely as an all-alloy combination, the OW-43 cammer weighed 50 pounds less than the same stock 455.

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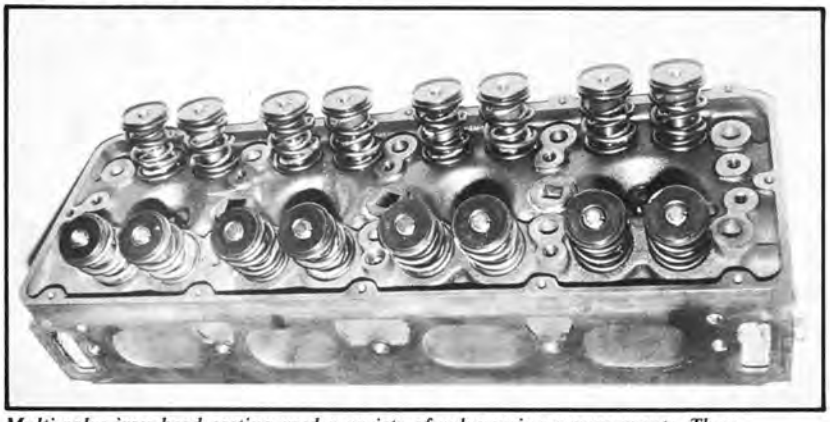
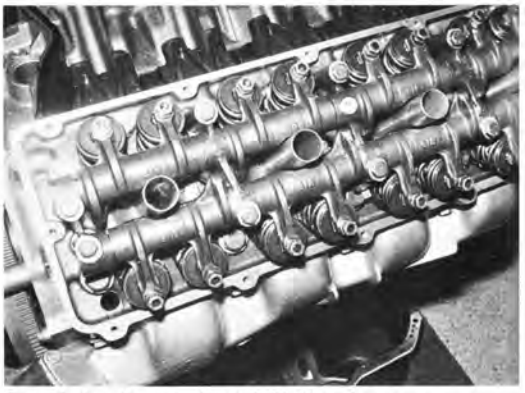
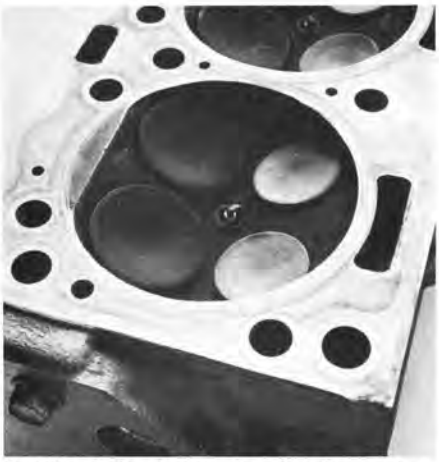


Multi-valve iron head casting used a variety of valve spring arrangements. These plans included an outer spring with an inner damper, interfering inner and outer springs, and even an inner spring with an outer damper. Note the machined flats for each row of valves' rocker shaft stands, and the huge oval-shaped inlet ports.



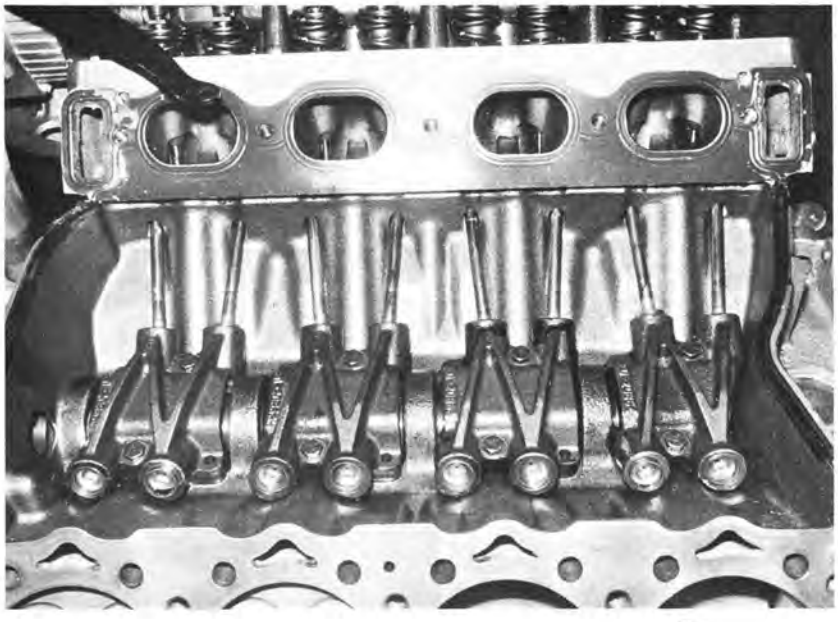
Considering the complicated W-43 rocker arm design, the assembled rockertrain was remarkably compact. This head illustrates an early layout with iron rockers on dual shafts and Swedish chrome-silicon steel valve springs. Vertical tubes between the shafts held a single spark plug for each cylinder.



Locating both exhaust valves directly opposite the intake valves allowed this central spark plug location. Taken individually, each valve is considerably smaller and lighter than the units that would be needed to equal the airflow potential of a conventional two-valves-per-cylinder arrangement.

Original rocker arms for the W-43 engine were cast iron (right). Prompted by the necessary location of the pushrod arms at the extreme outboard end of each rocker body, excessive friction at the shaft pivots caused a switch to aluminum units. The later forged-alloy pieces pivoted on dual-needle bearings; they also had a steel insert in each pushrod socket to resist wear. Valve adjustment arrangements were also unusual.

The W-43's exhaust manifolding was flow-tested and streamlined for both chassis clearance and efficient waste-gas handling. Castings were made with 2¼- and 2½-inch outlets. Tubing risers plumbed exhaust heat to the intake manifold for cold-weather operation; they were easily closed to cool the intake charge for maximum power. Street features such as these indicated the powerplant's production potential. Unfortunately for Rocket fans, the assembly line was not to be Oldsmobile's target.



This view of W-43's valley illustrates how the intake ports were pinched together to clear the path of pushrod travel. These intrusions at the sides of the ports, just upstream of the critical valve pockets, appeared particularly restrictive. But with 3.1 square-inches of port cross section remaining at the tightest points, intake flow was down just 20 percent in comparison with the non-pushrod OW-43 DOHC engine.