PART IV*

Who put the EMI-SUL HEADS on the Ford V-8-60?

by Dave Cole

WHAT KIND of a headline is *that?* "Who put the Emi-Sul heads (*cylinder* heads, no doubt) on the Ford V-8-60?" it says. Who even knows what Emi-Sul heads are? And why would anybody worry about putting them on an old Ford V-8 60-horsepower engine that went out of production seventy years ago?

Well, those are all valid questions, but unless you've recently read Parts One, 2 and III (for indeed, they are so spelt in the three articles), you probably don't recall what all this would be about. And since Part One appeared in the *V-8 Times* for July-August, 1987, and Part 2 was in that year's November-December issue—which was 23 years ago, be it noted—there really isn't much reason to suppose you *have* read them recently. Even Part III, which takes up where Part 2 left off, and concludes with a description of the Emi-Sul heads, was printed in the *V-8 Times* over twenty-two years ago, in the July-August, 1988, issue. Indeed, it would be remarkable if you did remember reading about this matter—if you were even a member of the Early Ford V-8 Club that long ago. Many of you were, of course, but a lot of guys have joined us in the last quarter century, and they have not had much of a chance to read Parts One, 2 and III. Thus, it would not be amiss to review them here and bring everyone up to date. Then, the answer to the headline question will at least have some relevance, interest and meaning.

The three articles all appeared under the basic headline, "The 60 B.H.P., 22 H.P., 13 C.V. Ford V-8." In fact, Part One had no headline other than that. It described the smaller Ford V-8 engine that was introduced to the American public for 1937. It looked very much like the larger 221-cubic-inchV-8 that had been introduced in 1932, but had been updated for 1937, with its water pumps in the cylinder block instead of in the heads. This new V-8 had a cylinder bore of only 2.6 inches and a stroke of 3.2, so that its volume was a mere 136 cubic inches. Figured the conventional American way, this new little V-8 would crank out only some sixty horsepower, so it was known as the Ford V-8-60 to distinguish it from the 85-horsepower job that the motoring public knew and loved. Ford promoted the new engine as offering the maximum in economy with V-8 smoothness—22 to 27 miles per gallon of gasoline, which was 5 to 7 m.p.g. better than the 85 h.p. engine yielded—but since the car itself was the same size as the model with the big engine and nearly as heavy, its performance suffered. Those who liked Ford V-8's for their snappy performance, fast acceleration and high speed were disappointed with the V-8-60, and although V-8-60 sales were not too low in 1937, they declined as long as the engine remained in production, and thus it was quietly discontinued after the 1940 model year.

Part One also explained that the rationale for offering the smaller V-8 was not really to satisfy any demand for such an engine among Americans; it was intended as the powerplant for cars to be built in England and France, where cars were usually smaller and more economical because of the relatively high costs of buying, operating and licensing them in those countries. The V-8-60 had been designed and developed in Dearborn, so it was convenient to produce them here for the U.S. market, but it was intended that the British and French companies would make the most use of these small V-8's. Thus, Part One ended with a description of the smaller Model 62 saloons that Ford of England introduced in 1936 and produced until World War II ended production in 1939. Calculated the British way, the output of the little V-8 came to 22 horsepower, which explains the "22 H.P." part of the headline.

■ **Henry Ford (left) said the new little V-8 60-horsepower engine was introduced to give U.S. buyers the utmost in fuel economy, but the engine was really intended for use in smaller European cars, where it was quite adequate for the job. From *Ford News*, December, 1936.**

As for the "13 C.V." part of the title, that was the power output ascribed by the French to the small V-8. "C.V." stands for *cheval vapeur,* literally *horse vapor* in French, but it means *horsepower*, which they calculate in their own fashion. Part 2 discussed this and explained what the French did with the 13 C.V. V-8 engine. To meet government regulations, Ford had to become a partner with a French

*Or 4, or maybe "Four."

company, so they joined with Mathis, an old-line French auto maker, and produced Matford cars from 1936 to 1939, when WWII caused production to cease. But whereas V-8-60 production in the U.S. ended in 1940 and in England by 1939, the French resumed building the little V-8's after the war, using them first in updated cars based on the prewar Matfords, then in a new small car called the Ford Vedette, which they built until 1955, when the whole enterprise was sold to another French manufacturer, Simca, which built Vedettes until 1961. Thus, the French produced those smaller V-8's for a good 25 years (less the war years, of course), and while the Simca-built V-8's had received some performance upgrades so they would produce 84 horsepower from 2,351 cubic centimetres, they were still recognizable as having been derived from the Ford V-8-60, a.k.a. 13 C.V.

Nor was that the end of it! Part III of "The 60 B.H.P./22H.P./13 C.V. Ford V-8" story, subtitled "The Vedette V-8," related how Simca opened a factory in Brazil in 1958, about the same time the Chrysler Corporation acquired an interest in Simca. Apparently Chrysler paid little attention to what Simca do Brasil did, as they kept building V-8-powered Vedettes clear up to 1969, with ever-increasing power output. By 1965, one model they built had dual carburetors and 152.9 cubic inches, producing 112 horsepower! Note that 112 is almost double what Ford claimed when the V-8-60 was first built.

And still those Brazilians kept hopping up that little V-8! Having developed it as far as possible in its original "flat-head" configuration, the next step was to convert it to overhead valves with hemispherical combustion chambers! Well, why not? Simca do Brasil was part of Chrysler, and Chrysler had knocked the auto world on its ear back in 1951 when they introduced a V-8 engine—their first—with pushrod-operated overhead valves in hemispherical combustion chambers, the ideal shape for an internal combustion engine. This layout gives high thermal efficiency, a minimum of heating area, and with the spark plug centered right above the piston head, the shortest possible flame travel from the spark plug is achieved. In addition to all those benefits, intake and exhaust porting can usually be improved, without the sharp bends often found in flathead designs. On the other hand, if the engine does not have overhead camshafts to operate those valves (and Chrysler's engine did not), then it requires a lot of pushrods and rocker arms to work the valves. The heads of the valves have to fit in the dome-shaped combustion chambers as smoothly as possible to get the benefits of the design, which makes the intake valve stems stick out in one direction and the exhausts in another, so that all those pushrods and rocker arms are needed to work the valves with the camshaft in its usual location down near the crankshaft. Still, the benefits of the hemispherical chambers far outweigh the drawback of the valve train complexity, and Chrysler could boast of getting 180 horsepower from that 1951 V-8 with just 331 cubic inches and a 7.5-to-1 compression ratio. That still left plenty of margin for further development—and thus more power—in later years.

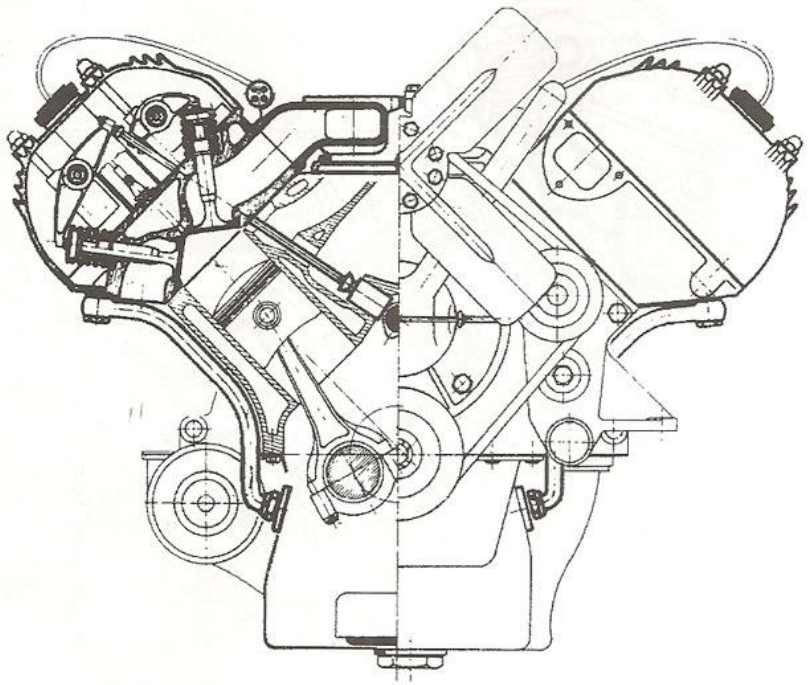
So it was that in 1966, Simca do Brasil made over their ancient V-8 with the same sort of hemispherical combustion chambers and OHV's as Chrysler had introduced in 1951. They called it their "Emi-Sul" V-8, "emi" being Portuguese for "hemi" and "sul" meaning "south." One version of the Emi-Sul V-8 had 2,414 c.c. with an 8.9-to-1 compression ratio giving 130 horsepower; the other, with 2,505 c.c. and a 9.3-to-1 c.r., cranked out 140! The last of these cars were produced in 1969, so the Emi-Sul was on the market for four years. But this development was the limit, so, almost 35 years after Ford first developed the little flathead V-8 for use in small European cars, Chrysler's Simca do Brasil ended production of what was still the same basic cylinder block, albeit with an OHV set-up and other tricks that had increased the power to more than twice the original figure.

No V-8'er read about the Emi-Sul heads on the last of the Simca V-8's with greater interest than Doug Clem,* of Sparks, Nevada. Even in 1988 when the article appeared in print, Doug was a long-time V-8 Club member, with a special passion for 1932 Ford V-8's and vintage speed equipment, especially things made by Eddie Meyer, of Hollywood, California. In fact, Doug had joined the club late in 1970, when he lived in Indiana, and the first issue of the *V-8 Times* he received was dated November-December, 1970—forty years ago now. Flipping through his first copy of the club magazine, Doug got no further than page 11, when he saw a headline that read, "1932 Ford Model 18 Notes," a sub-head that said, "Introduction," and text that reviewed some '32 Ford history and then commented on some factory photos of '32 driver's compartments. The guy† who wrote it implied that this was to be a regular column in the *V-8 Times* about 1932 Ford production details, and Doug could not have been more pleased about that. Wow! I sure joined the right club, he thought.

The cross-sectional view of the Brazilian-built V-8 engine,with hemispherical combustion chambers and overhead valves mounted on what was a Ford V-8-60 cylinder block to begin with, as seen in that article, kept gnawing at Doug's imagination. Do you suppose, he wondered, that a set of those heads would work on an original Ford V-8-60 engine? After all, he had a NOS 1940 cylinder block. Or would the inevitable minor alterations made in the design of the engine over the quarter century between 1940 and 1965 have so changed it that it could not be adapted to use the OHV heads? If it *did* all go together, the resultant engine could be about the most potent high-powered Ford V-8-60 the world had ever seen, right up there with the very few V-8-60's that

*And right there is the answer to the question in the headline.
†The same guy who wrote what you're now reading.

were fitted with Ardun OHV cylinder heads back in the early 1950's. What a challenge! And what a lot of fun it would be to make it all work!



■ **Ardun heads on the 24-stud 85-horsepower Ford V-8 looked like this in cross-section. The pushrod and rocker arm design is very much like the Chrysler Hemi V-8 that came out in 1951.**

Ardun OHV cylinder heads! The mere mention of Ardun heads will send a shiver of excitement down the back of anybody who knows anything at all about high performance Ford V-8 engines. Those heads are exceedingly rare, but back in the days before Chevrolet introduced its V-8 engine for 1955 and a hopped-up Ford V-8 propelled just about every hot rod in America, an Ardun-equipped Ford engine was the ideal, the very best you could have. James Zeder, Chrysler's director of engineering and research, said in an article in *Motor Trend* magazine for December, 1951, that just by putting Ardun heads on a flathead Ford V-8, you could increase its power from 100 horsepower to 175. Substitute high-compression pistons and a dual manifold for the original Ford parts, and that Ardun-Ford would crank out all *kinds* of power!

It was just such an engine that Doug Clem wanted to recreate by fitting Emi-Sul heads on a Ford V-8-60 block, and since that was the idea, we should say something about those Ardun heads at this point. There were two basic designs which differed considerably from one another, one set designed for use on the 24-stud 85 horsepower "big" Ford V-8 engine and made from 1947 to '49, and the other set made for the 17-stud 60-horsepower Ford V-8, which followed a couple of years later.

Both designs came from the fertile mind of Zora Arkus-Duntov, a Belgian-born engineer of Russian parentage who studied engineering in Germany prior to World War II, then came to the U.S. when conditions in Europe became intolerable. Most auto enthusiasts remember Arkus-Duntov as the chief engineer for Chevrolet's Corvette from 1968 to 1977, who took the Corvette from a sporty-looking little roadster to a full-fledged sports car during his tenure, but between his arrival in the U.S. and his joining the staff at General Motors in 1953, he did automotive engineering for other car makers, and among them was Ford.

Until 1947, Ford used what were basically passenger-car V-8 engines in their trucks, of which they built thousands. With only 100 horsepower and not a whole lot of torque, the Ford V-8 was not an outstanding truck engine, but so sturdy was the engine that it did a pretty good job anyway. But running under heavy loads and high RPM's hour after hour brought out one great flaw that caused a lot of trouble. Having the exhaust ports cored through the block, through the water jackets, led to overheating and the cracking of cylinder blocks. It's really a tribute to Ford's metallurgy and the design of the block that the stock V-8's would last as long as they did under such severe duty, but still, a cracked block necessitated an engine replacement, which was expensive and time-consuming for truckers.

When Arkus-Duntov learned about this problem, he thought that it could be solved by using cylinder heads with overhead valves so as to keep the infernally hot exhaust gases out of the block, and hemispherical combustion chambers would boost performance, so he designed heads that would provide both features. The rest of the engine would remain stock, but for the intake manifold, which would have to be of special design. The intent was thus to create a more reliable truck engine; it had nothing to do with hot rods, dragsters or other sporting endeavors.

But soon after Ardun Engineering Company (named after ARkus-DUNtov, obviously) got production on the new heads underway, Ford Motor Company came out with a new 337-cubic-inch truck engine that fairly well solved the problem. That was in January, 1948, so Ardun's OHV effort was short-lived. According to Doug King, of Castro Valley, California, who wrote a six-page treatise on Ardun heads for the *V-8 Times* of July-August, 1999, only 250 to 350 sets of Ardun heads were

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