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A proud father talks about the birth

by Tom Glatch

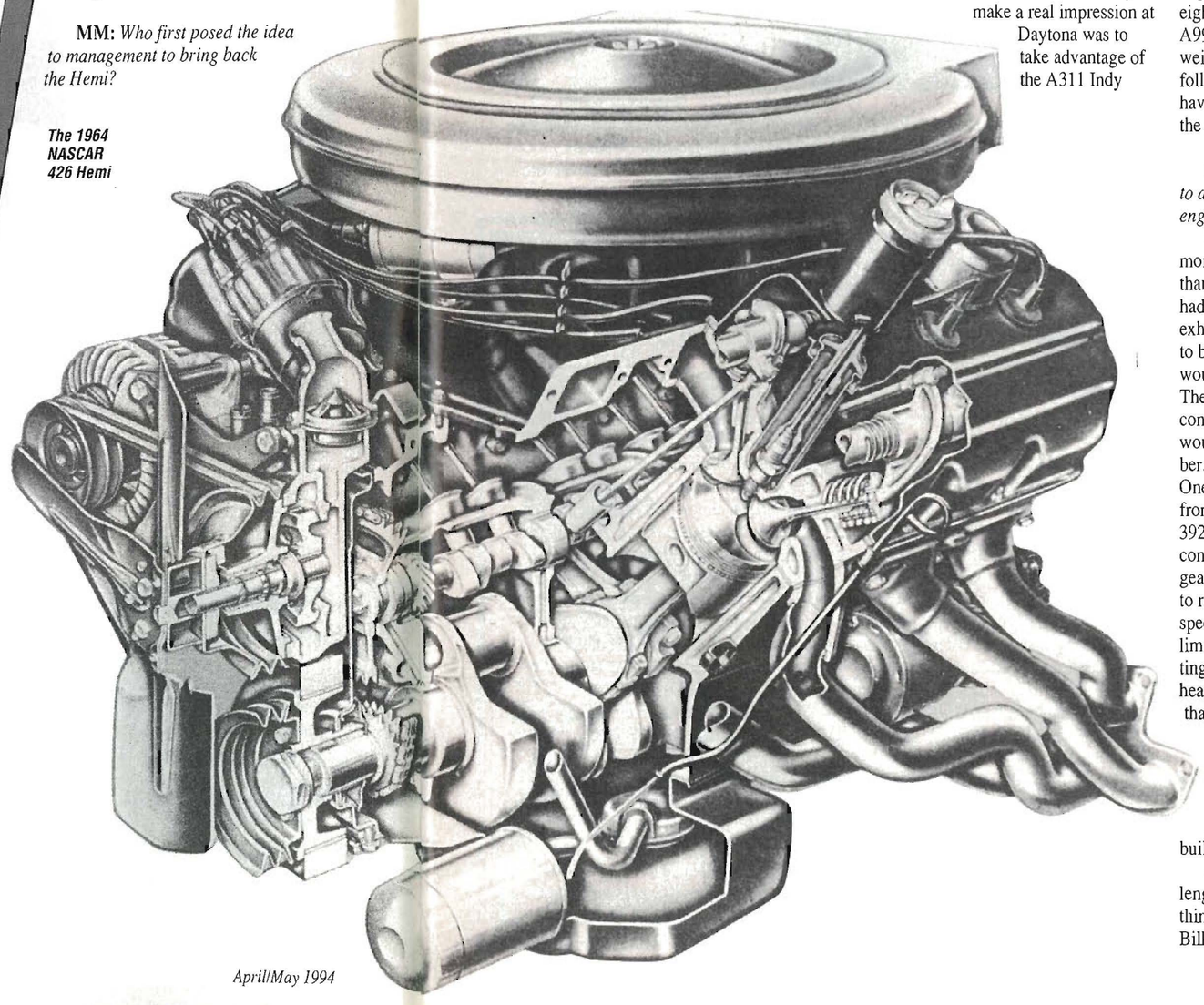
He's been called "Father of the Hemi," a title he strongly rejects. Nevertheless, Tom Hoover was at the conception of the 426 Hemi. With a Masters Degree in Physics, he joined Chrysler Engineering in 1955. Interested in racing, he ran a 1949 Plymouth Business Coupe, powered by a 354 early Hemi in B/Altered, using information gathered from the stillborn Project A311, Chrysler's attempt to bring Hemi power to the Indianapolis 500. With others at Engineering who held similar interests, the Ramchargers Racing Club was formed. By the end of 1963, Ramcharger Dodges (powered by Hoover-built Max-Wedges) dominated Super Stock racing. But there was something bigger developing inside Chrysler Engineering at this time – the Hemi.

Recently retired, Tom Hoover has been working with engine builder Ray Barton to extract even more power from the engine he helped design. On the eve of the 30th anniversary of the 1964 Daytona 500, we talked with Tom about the birth of the 426 Hemi.

MOPAR MUSCLE: *At what point did you first hear mention made of introducing a new performance-oriented Hemi engine?*

TOM HOOVER: Final approval was granted in April 1963. That hinged, as I recall, on a meeting of the executive committee made up of a number of vice-presidents and so forth. I think the committee was chaired by Lynn Townsend, president of the company. At that time I was Engineering Division Race Coordinator. Word came down (through our vice-president) that we should recommend a program that would allow our cars to win the 1964 Daytona 500. This was in late January, early February of '63. I remember being in a meeting, with not very many people, maybe 5 or 6; there was Don Moore, my boss before the race program started. He was sort of the manager of the Performance Group. As I remember the meeting was called by Bill Roger, who was high up in the Engineering division. Bill was Bob Roger's brother, one of the major forces in product planning. The meeting was in the hall by Bill's office. At that point we agreed to take advantage of all the work that had been done on the early Hemi, primarily the A311. All that background was available.

MM: *Who first posed the idea to management to bring back the Hemi?*



The 1964 NASCAR 426 Hemi

TH: Boy that's hard to say. I'd have to say it was a combination of Don Moore and myself. The question was: look, we have 10 months to win Daytona. We could pep-up the Wedge. They were pretty finely honed machines by that point. Maybe, if we got lucky ,we could end up essentially even with Ford, Pontiac, and Chevrolet. There was no guarantee that we could win the race with a Wedge. I'm not saying we were asked to guarantee a win, but if you're going to kick off a program, why not do it right. I'd say Don and I came to that consensus at the meeting by Bill Roger's office.

MM: *The Hemi was brought about by the lack of success of the Wedge in NASCAR racing. As a drag racer did you have any say in getting a drag version of the Hemi approved? Or was it slated for both applications from the start?*

TH: Once you got a NASCAR engine it was relatively simple to make a drag version out of it. In order to meet the production requirement that NASCAR had in those days, very often, the jobs that ran down the production line to meet the NASCAR minimum, were drag cars.

MM: *The early Hemi was taken out of production due to its high cost of manufacturing. What justification for cost effectiveness was applied to the new Hemi?*

TH: The way it was more cost effective was, that we knew with the power level we could expect, we could provide performance and win races for minimum expenditure. You could continue to hone and evolve the Wedge forward, but the results would be limited. The cost effective way to make a real impression at Daytona was to take advantage of the A311 Indy program background, and adapt it to the race "B" engine. And that's what we did.

MM: *Basing the Hemi on the Wedge "B" block saved money by sharing much of the tooling, castings, etc., right?*

TH: That's the only way we could do it. That was another stroke of good fortune in terms of how long the engine has been effective. In drag racing the bottom of the cylinder block structure is able, even today, to contain the enormous loads that are involved in Top Fuel and Funny Car engines. Who knows what power level they have.

MM: *Was there a Street Hemi planned from the beginning?*

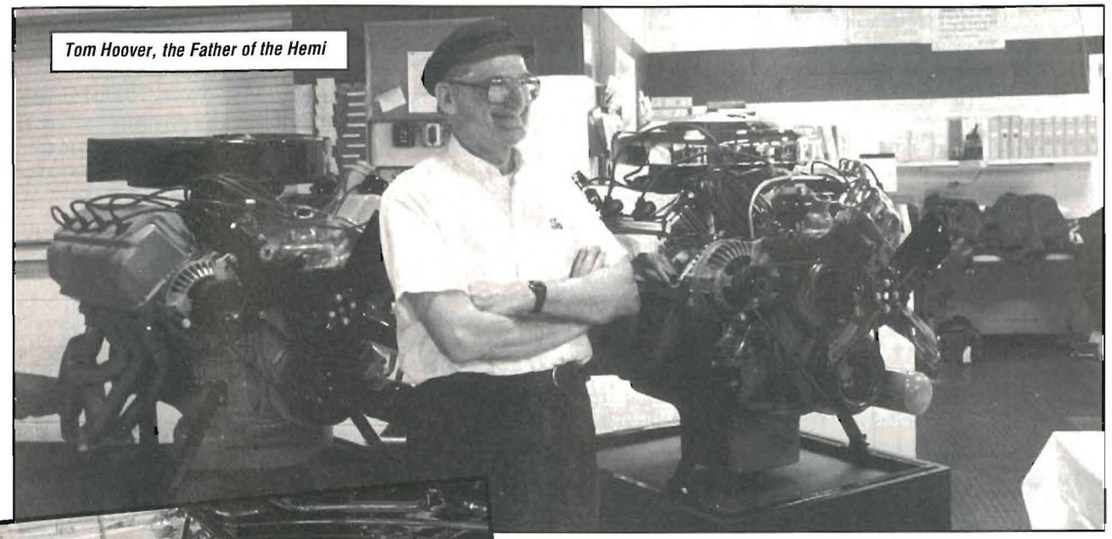
TH: No, not really. The A864 program was the 1964 NASCAR single four-barrel engine, and the A865 was the Cross-Ram eight-barrel version. Also, there was the A990 package, which was the 1965 lightweight production car. The Street Hemi followed later when it was necessary to have larger numbers of engines available to the public to meet NASCAR requirements.

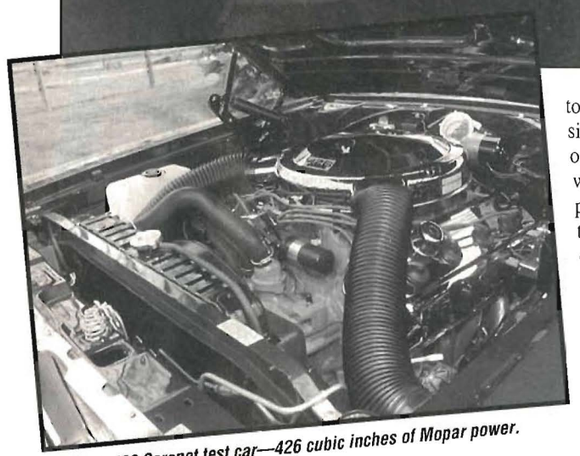
MM: *What compromises were needed to allow for volume production of the engine?*

TH: Well, really, the Street Hemi was more readily adapted to the production line than the Cross-Ram Wedges. The Wedges had to come down the line with their exhaust manifolds off. The manifolds had to be installed off-line. The Street Hemi would come down the line with everything. The idea that I happened to have (that I conversed with Frank Bilk) was that we would tilt the whole (combustion) chamber. This was done for two reasons, really. One was to prevent the exhaust rocker from becoming longer than the rocker on a 392. We really didn't know it, but we were concerned that if we got some of the valve gear out of proportion we wouldn't be able to run the engine fast enough, valve-gear-speed wise. We knew the 392 was OK. The limitation of the exhaust rocker length, getting the exhaust pushrod by the bead on the head gasket; one of the neat ways to make that all fit was to rotate the chamber about its inner edge, and lift out the outboard edge. That also made the engine narrower, which just allowed the B-body inner fenders to drop over it at Dodge Main where the cars were built.

Actually, we learned later that the length of the exhaust rocker isn't everything. There were even layouts made where Bilk had a two-piece exhaust pushrod.

Congratulations! It's A Hemi!


Tom Hoover, the Father of the Hemi


Hoover's '66 Coronet test car—426 cubic inches of Mopar power.

There was a little mini tappet that ran in the upper part of the block which then, at an angle, pushed the final pushrod which went up and pushed the exhaust rocker. We chickened out on that one.

MM: *Why did you go with 426 cubic inches when the RB block design could go much bigger?*

TH: Production Wedge engines at that point were 413s. The mind-set of the NASCAR rules-makers limited things to 7 liters (430 cu. in.). If you went bigger, there was a problem.

MM: *Were you involved with the double-overhead-cam Hemi?*

TH: The A925? Oh, sure. That was done by a special design group headed by Bob Dent. They had a little place at the old Chrysler Institute, a little alcove. There had to have been no more than six guys over there. One of their first assignments was to do the small pushrod Hemi (I think there was an overhead-cam version as well) for Indianapolis; it was called the A866. After the SOHC Ford Hemi came out, we wanted to go to the A925, which was a 4-valve. There were two versions of it; a four-cam version, and a pushrod version, which I though was really neat. We never got around to doing the pushrod version, but it just tickled my fancy. I thought it would be a slick piece. Harry Weslake (famed British engine designer) gave us most of the fundamental design parameters. After all, we had hardly any four-valve experience, none, really. Much of the fundamental criteria — chamber shape, piston crown shape, etc., were Weslake-derived. The thing that was really neat about the approach taken was that the cam ran in special pillow-blocks up in the tappet chamber. The centerline was considerably higher than the normal production crank-to-camshaft centerline.

MM: *Did the DOHC Hemi actually stand a chance of seeing production?*

TH: I doubt it. The whole approach to the way you make product was different in the United States in those days than from the way the offshore people have shown us — the new enlightened, continuous improvement approaches. When we were building cars back in those days, the idea was to take cost out to improve the profit margin; if you needed more power you just made it bigger.

MM: *Were you involved with the "ball-stud" Hemi.*

TH: Not much. That was done by the engine lab in the normal routine way. The ball-stud Hemi was the natural progression from your basic 440 GTX engine. I think everyone was surprised that the 440 GTX, really the A134 engine, ran so good. They weren't fussy, fragile and cantankerous and they still ran almost 100 (mph) at the drags. It was a really nice package. The ball-stud was a simple evolution forward from the A134. Given that there was no reason (in the minds of the product planners) to provide the regular A102 Hemi once it was ruled out of NASCAR, it just died. The same group of people did the 340 in 1968.

MM: *Was there ever any talk of a production aluminum block Hemi?*

TH: Not really. When a car weighed 3800 pounds, if you got it down another 150, on a percentage basis, you hadn't really done all that much.

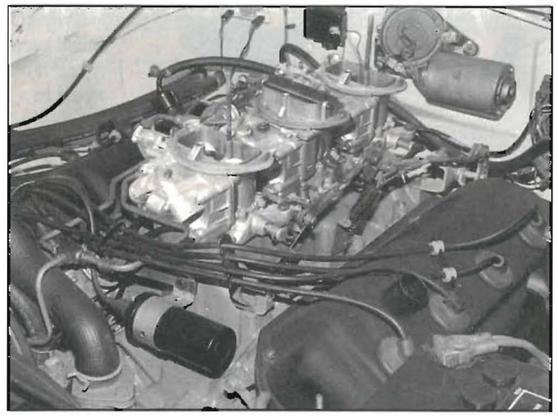
MM: *How long before Daytona in 1964 were you working on running, drivable engines?*

TH: Essentially, all the work was done on the dynomometer. The first time I remember one being in a car was at the Goodyear test track in San Angelo, Texas, which is a tire development and endurance track. I think there was a Plymouth and a Dodge. It snowed in Dallas on the way home, so it couldn't have been more than a month or two before Daytona. The purpose of all that was to sort out what the cooling requirements would be for the engine in cars at high speed, and what it would take to keep the oil cool.

MM: *How much of a secret was the Hemi around Chrysler?*

TH: I don't think it was much of a secret at all. Frank Bilk and Forbes Bunting laying the engine out, people like Bill Wertman going to the plants to get the fundamental castings made, and what have you. When it became secretive was when the first engine or two began running. We didn't want the power level to become well known, so the competition wouldn't know what to expect at Daytona.

MM: *Did the Hemi development program ever come into serious jeopardy of being canceled?*


Could the Six-Barrel set-up have been on the next generation Hemi?

TH: No, except for the specter of emission compliance. That is to say, the government looking down their nose on everything that could be construed as at odds with the emission compliance standards they had in mind.

MM: *Do you know if a single four-barrel version of the Hemi, outside of the NASCAR engine, was ever considered?*

TH: No. I had a lot to do with going with the dual four-barrels. In retrospect, I wish we hadn't. It was one more thing that made it difficult for the owners to manage the engine. Dual fours were a few more ways for them to get in trouble and screw up. I'd get so frustrated, I'd be out at the strip and kids would show up with cars that ought to run 106, and by the time the weekend was over they were running 92. I can't imagine how they could do that. The simpler you make it, I guess, the better. There was a slim possibility that the engine might have gone Six-Pack if it stayed in production longer. Generally, people ran pretty well with their 440 Six-Packs, a very pleasant package to drive. There was a car around Engineering, a blue '68 Hemi R/T hardtop, car number 540, that ran a Six-Pack. The car was much more drive-

able and flexible. I wish they would have put that in production.

MM: *Realistically, what would you say the true horsepower of a production Street Hemi was? A Drag Hemi?*

TH: Oh, boy, that'd be a wild guess. If everything was right, (properly tuned) I would guess 480, 485 or 490 would be typical. For the A990s, I suppose 675 would be a good number.

MM: *Aside from emissions and insurability, do you know of any other reasons to kill the Hemi after 1971?*

TH: No, not really. You've got to remember what the mind-set of the company was. It was exactly contrary to the Japanese approach. I think fundamental to it (the Japanese way), you want continuous improvement of the product, and more and more value to the customer. Although he may pay more for the product, the customer appreciates it, and comes back for more. That wasn't understood at all, anywhere in North America at that time, that I'm aware of.

MM: *If you could go back in time, knowing what you know now, how would you make the 426 Hemi better?*

TH: Well, certainly, I think it would be to lower the reciprocating weight. The other thing, I've learned an awful lot from the heavy duty vehicle business and the Orbital two-stroke program, to enhance "heat release," the ability to bring the cylinder pressure trace more nearly vertical near top-dead-center. A major contribution that Ray Barton has made today is to work on things to enhance the improved transients in the engine, the way it goes through the speed range instead of steady state-1 speed.

MM: *Finally, people have called you "The Father of the Hemi." How do you feel about that?*

TH: I think it's related to the number of people (there were only 30 or 40) that were heavily involved in making the engine successful at first — getting it designed, getting it procured, getting it functional, and getting it out there. I think probably the root of that moniker is that some of the solutions Frank Bilk considered in coming to the final configuration — I suppose I got lucky and made some of the critical guesses that helped Frank arrive at the configuration we ended up with. When you watch a Top Fueler run 300-plus mph today, what more can I say. That says it all!