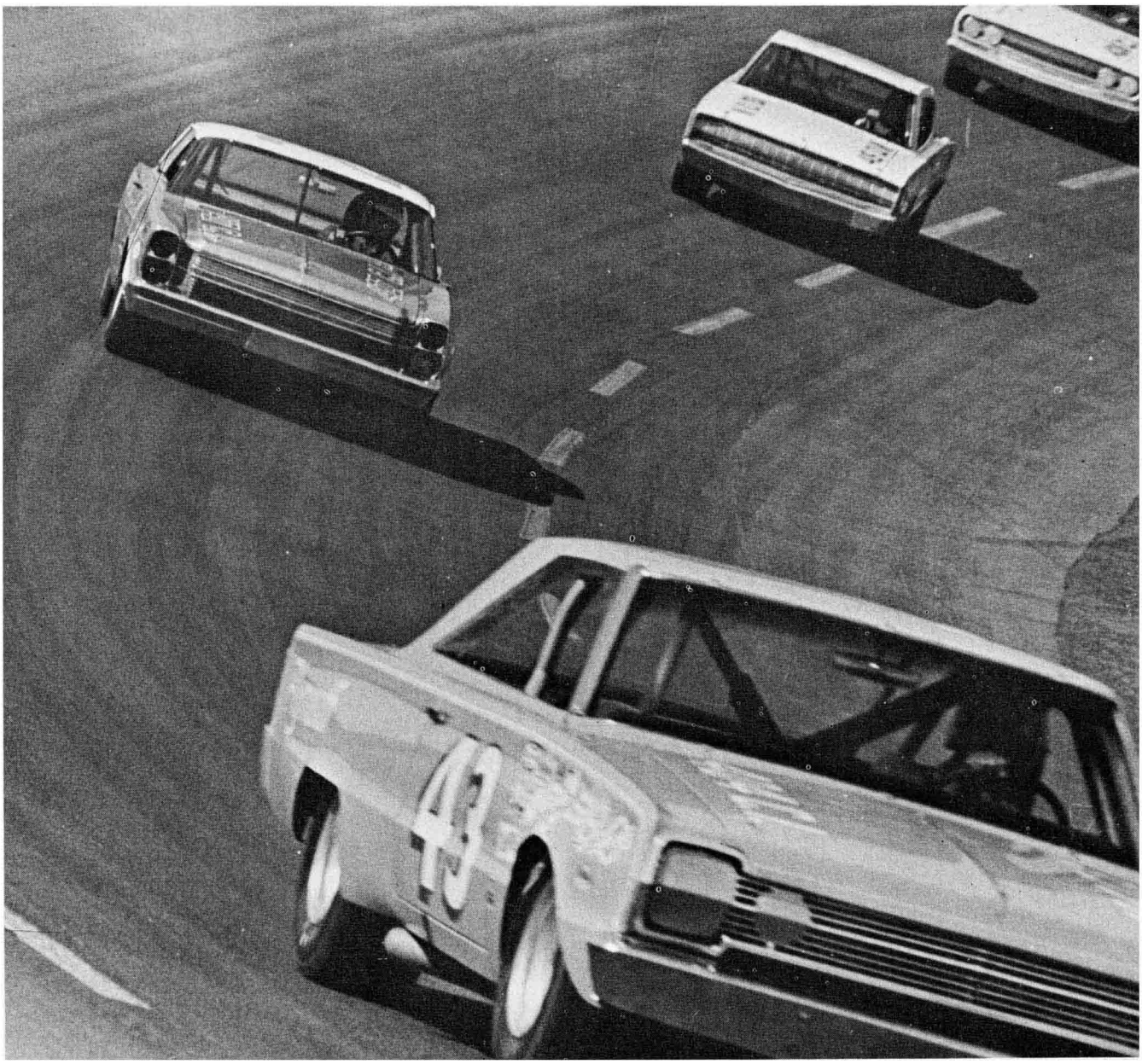


WHAT'S NEW IN NASCAR FOR 1967?

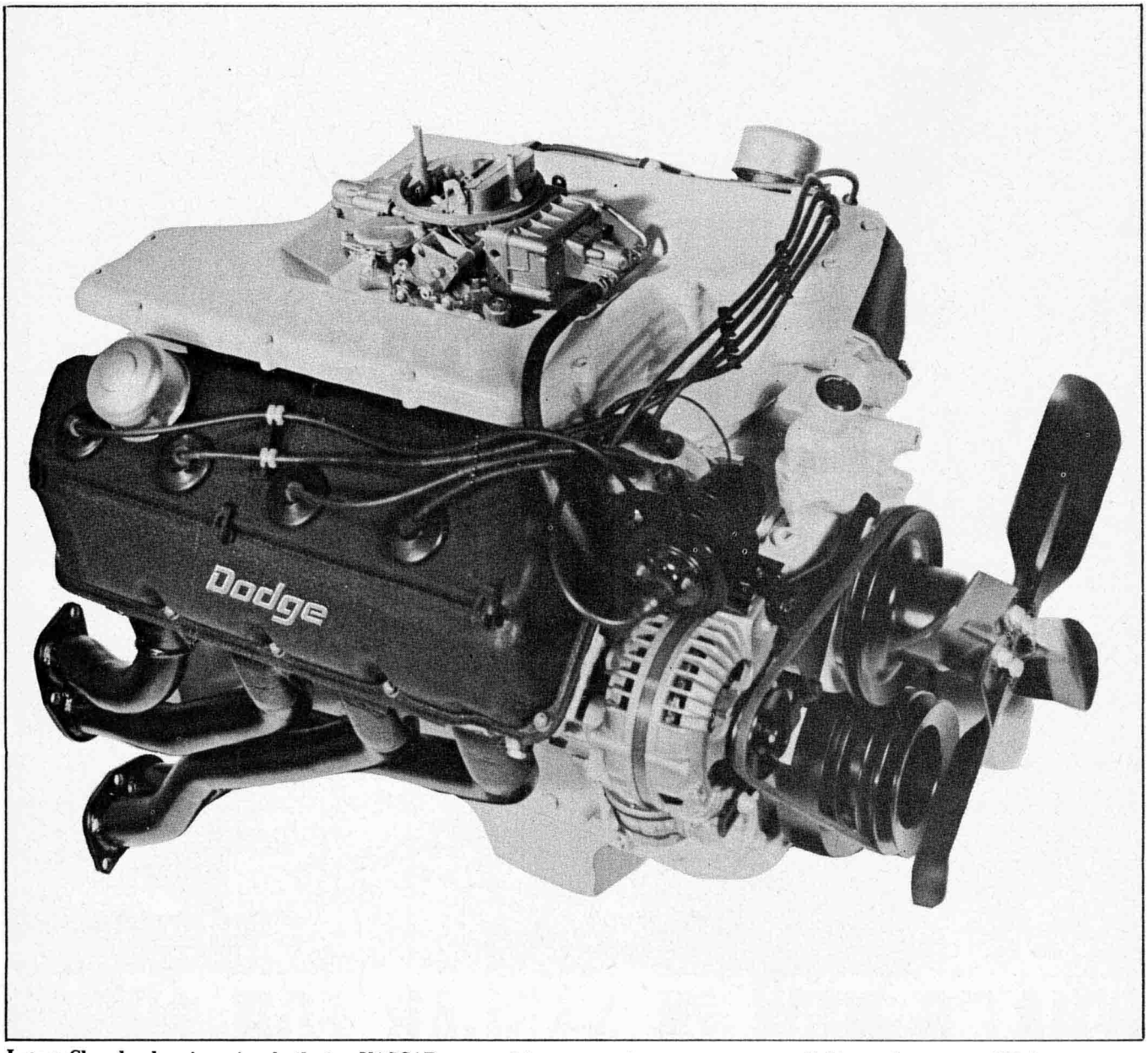
Just about everything. Chrysler's out. Ford's in. Hemi's in. Cammer's out. Hot damn! We might just be seein' some real ol' fashioned oval honkin'

BY ROGER HUNTINGTON

STOCK CAR FANS have been waiting for more than a year to see the big showdown between the overhead-cam Ford and the Chrysler hemi engine on the NASCAR tracks. It looked for a while like we would see it last summer. Ford officials were anxious to stick the OHC 427 engine in their Category I Galaxies and go racing against the 426 hemi Plymouths and Dodge Chargers.

But the NASCAR boys said no. Only a handful of the OHC Ford engines had been built at that time, at costs ranging up to $12,000 each, and the officials felt it could not be considered a "stock" engine in any sense of the word. Chrysler officials agreed, of course. They seconded the motion by tooling up their 426 hemi engine for a production volume of up to 6000 units a year, and offered to sell a street version to the public for an optional cost of less than $1000. Several thousand are on the streets today.

As we face the 1967 season, the situation is changing. Ford has definitely gone into at least limited production of the OHC 427 engine, after several false starts. Their production rate is not yet even near that of the Chrysler hemi, but right now they're putting out over 100 units a month. They have set a price of $1995 for the complete engine, *in the crate.* Anybody can order one at his friendly Ford dealer, and expect delivery in six weeks or less. But you can't order one installed in a car. A few of them are running around in Ford engineer-



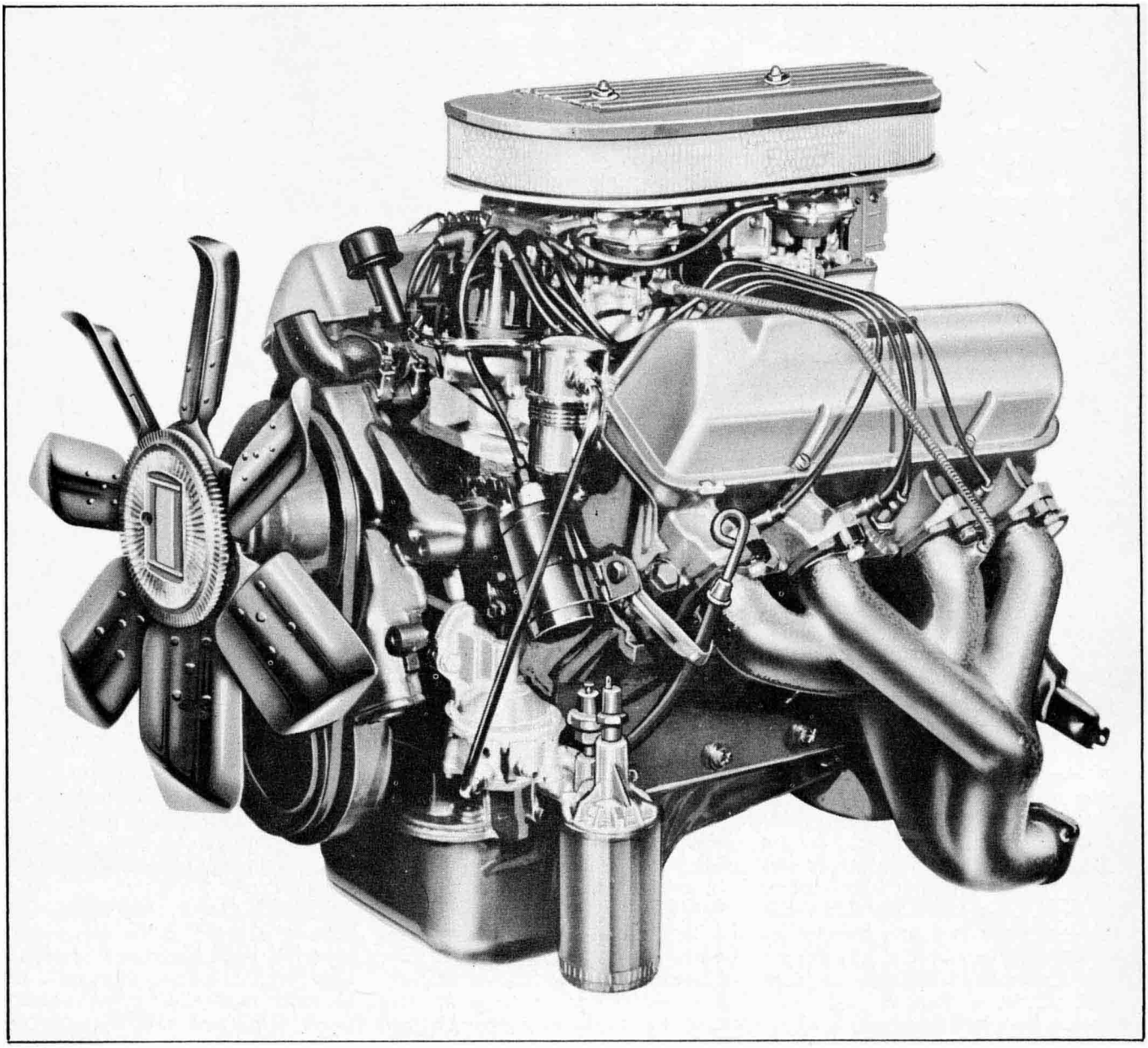
Latest Chrysler hemi engine built for NASCAR competition uses unique cross-ram manifold, produces over 600 horsepower.

ing prototype models, but no specific street version of the engine has been developed as yet, and no decision has been made to release the option for assembly-line installation.

This is where the possible rub could come in for the 1967 racing season. The new NASCAR-USAC stock car rules call for a minimum production of 500 units to be eligible as a "stock" model. This is in line with international FIA rules for Grand Touring (GT) cars, which are considered "production" models under worldwide racing rules. But the specific wording of the NASCAR-USAC rules doesn't make it clear whether the "production model" refers to an engine and a car as a complete assembly. In other words, does Ford have to install 500 OHC engines in 500 Fairlanes or Galaxies on factory assembly lines? Or can they just build 500 engines and sell them in kit form for installation in standard chassis by dealers or private buyers?

Ford would rather have it the latter way. They would rather not fuss with installing OHC engines on crowded factory assembly lines. Even trying to do 500 engine swaps in factory engineering garages would take up too much space and manpower. Farming the work out to Shelby-American or Holman and Moody might be possible, but 500 units are a lot of cars to convert in a few weeks. It might take more space and manpower than Ford can spare. So they'd rather go the kit route, build 500 engines, and sell them to all takers in the crate.

As this is written, NASCAR officials haven't made a ruling on this. Ford hasn't actually asked them to. Everybody is playing it cool. Ford would rather build the 500 engines first, before coming to NASCAR for a decision. They will have built this number by the first of the year, which theoretically should qualify the equipment for the full 1967 season. NASCAR officials will eventually be faced with the big decision, possibly by the time you read this. Or it may go right down to



The 427 wedge mill will be Ford's official NASCAR oval-track powerplant this year if overhead-cam version is not approved.

the wire. That is, Ford may come to Daytona in February with several OHC-powered Fairlanes or Galaxies and ask for a decision on the spot. This might put additional pressure on NASCAR officials, partly from the race spectators that would like to see the OHC engine run—and they might be more apt to let it go through. Nobody knows right now.

So this is where we stand as this is written. A lot of expert race observers feel that NASCAR and USAC officials will let the OHC Ford run this summer. I think so, too.

But it must be admitted that there are a couple of strong factors *against* the OHC engine running this summer. One, the Chrysler people aren't going to like it. They've said as much. They threatened to pull out of NASCAR racing last year if the OHC Ford engine were certified as stock, since there were only a few of them in existence at that time. I'm sure they won't feel quite as strongly after 500 units have been built this winter. But they still won't be happy—especially after they have tooled the 426 hemi engine for volume production on the assembly line.

Of course, Chrysler officials announced weeks ago that they would not sponsor any factory cars in NASCAR racing next season. We don't know exactly what this means. I'm sure the top boys like Richard Petty and David Pearson will still get plenty of under-the-table help from the factory. But by going on record publicly that they would not be sponsoring regular factory teams, this would take some of the sting off if Ford is allowed to run the OHC engine. Chrysler wouldn't be compelled to pull out in a huff. They could still compete with the Fords, more or less under the table. And if they got beat, it would be "independent" teams, not factory cars!

But there is another factor weighing against the OHC engine which is right inside the Ford racing department. In a word, Fairlanes and Comets with

427 wedge engines have been doing much better than expected against the Mopar hemis this last season. They've won a number of big races on the shorter tracks, and even a couple on the faster banked speedways, when the leading Mopars dropped out with mechanical or tire trouble. The wedges have been extremely competitive for the last few months—more so than most of the Ford people expected.

The major reason, of course, was the new ruling made in the middle of the 1966 season that permitted dual four-barrel carburetors on wedge engines, while still limiting the hemis to a single four-barrel. This extra breathing gave another 20 or 30 horses to the Ford 427 wedge engines, and made them that much more competitive with the Mopar hemis. Also, it appears that the intermediate-size Fairlanes and Comets have a little better aerodynamics than the Plymouth Belvederes and Dodge Chargers. They seem to go a little faster with an equal amount of horsepower. (Weight is not a factor here, as all cars are limited to a minimum of around 4000 pounds under the new rules.)

Anyway, the good showing made by the wedge Fairlanes and Comets this season has taken some of the steam out of Ford's drive to get the OHC engine accepted for next year. They feel that they can stay in the ball park without it. They would still like to run the OHC, but I don't think they would ever knuckle under to the extent of installing OHC engines as an assembly-line option just to get NASCAR officials to let them run it. In other words, if NASCAR and USAC won't let the OHC engine run on a basis of 500 engines sold in the crate, I don't think you'll see it next season. Ford will run 427 wedge engines in Fairlanes and Comets, and do the best they can.

So now let's consider what might happen in both cases: Suppose the OHC 427 Ford engine is permitted to run. In this case I don't think there's any question that Ford would have somewhat more top-end horsepower available than the Mopar hemi. The Ford engine has huge round intake ports with a minimum of flow restriction. The Mopar ports are a rectangular section, of slightly less cross-sectional area, due to the space required by the pushrods going up through the head casting. The OHC, of course, doesn't have any pushrods, so the ports can be made as big and streamlined as desired. Both engines have similar valve sizes, but the Ford ports are definitely bigger and better shaped.

This apparently makes a difference of somewhere around 20 or 30 hp in the speed range around 7000 rpm. Factory dynamometer curves show that a standard OHC Ford engine with single four-barrel carburetion will peak at around 600 hp at 7200 rpm. A 426 Mopar hemi with the latest cross-ram four-barrel racing manifold is good for about 575 hp at around 6500 rpm. (Certain clever mechanics might be able to super-tune these engines to give them maybe 20 hp more than this with these carburetion systems, but these figures give a fair comparison of the relative breathing potential of the two engines.) The Ford seems to be 20 to 30 horses stronger at the very top of the speed range.

But there's a hooker in all this theory—that is, the OHC Ford engine has to wind in the speed range between 7000 and 8000 rpm to show its breathing superiority over the Mopar hemi. This is important in drag racing. Ford engines, with their light reciprocating weight in the valve gear (no pushrods and lifters), can run up as high as 8800 rpm before shifting. The Mopar hemis, with their pushrods and long, heavy rocker arms, are limited to around 7600 rpm. That difference of 1000 rpm or so in the shift point gives the OHC Ford a considerable advantage in drag racing.

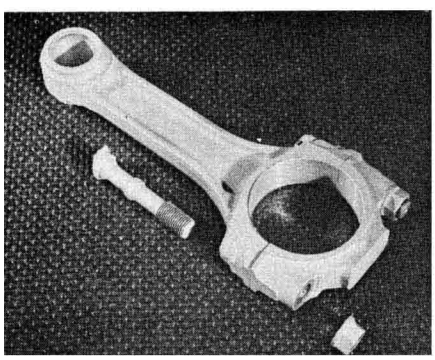
But where is the advantage of this on oval tracks? Nowhere, really. Here the usable rpm is not limited by valve gear reciprocating mass, but by the durability of the lower end — the crankshaft, bearings, rods and pistons. These stresses go up as the *square* of rpm, so they would be roughly *one-third* higher at 7500 rpm than at 6500. It's these stresses in the rods and crankshaft, bearing loads, thermal stresses in pistons, etc., that kill an engine in these long-distance races. After all, racing all-out for 200 to 500 miles is a little different than a short burst for 1320 feet down the drag strip. Engine speed must be closely controlled in the long races to keep the lower end together. With these big-liter NASCAR engines, the boys don't like to flash over 7000 rpm for even short bursts in traffic. They try to limit sustained engine operation to the 6500-6700 rpm range. And for the long 400- and 500-mile speedway races, where the engine speed doesn't drop much in the turns and there is no chance to "breathe" the engine, most teams like to stay down around 6200 if they can.

So where does this leave the advantage of the OHC Ford engine? Its optimum range between 7000 and 8000 rpm is not even *used* in NASCAR racing.

And the Mopar hemi engine looks better and better as the rpm range is lowered. With their new cross-ram four-barrel manifold, they get a nice acoustic "ram" effect in the range between 6000 and 6500 rpm, so they have a very broad, flat peak on the power curve—where the OHC Ford has a fairly sharp peak around 7000. Right around 6500 rpm both engines are quite close in horsepower output —within 10 hp. And down in the range between 5500 and 6000 rpm, where the exotic Chrysler ram manifold is really working, the Mopar hemi puts out at least 10 hp *more* than the Ford! At 5000 the difference is more than 20 horses.

So on this basis, in the present state of development using current equipment, the OHC Ford would have absolutely no advantage over the Chrysler hemi under NASCAR track racing conditions.

Ford engineers would have to do a lot of development work on the OHC engine to get a big margin of superiority over (*Continued on page* 79)



Hemi engine is installed in Charger. It dominated oval tracks in 1966.

Chrysler hemi has specially-designed con rods for long-track endurance.

the highly-developed Mopar hemi. They would need to develop an improved ram-type four-barrel manifold to broaden the torque curve in the upper speed range. I'm sure the OHC Ford engine would respond as readily to this refinement as the Mopar hemi. The brutal fact is that Ford engineers have been behind Chrysler on intake manifold development for several years.

Another possibility would be for Ford to beef up the bottom end of the OHC engine to stand sustained crankshaft speeds up to 7500 or 7700 rpm, so the engine could work in its superior breathing range like it does on the drag strip. Right now this engine is a big question mark in the durability department. The 427 wedge engine is well proved for sustained speeds up to 6600 or 6800 rpm—and this engine has essentially the same block and lower end as the OHC version. But the free-breathing OHC heads are putting another 60 or 70 hp through the same lower end. Nobody knows how this combination is going to prove out in the long races. Ford engineers may have to start all over even to make the OHC engine safe at 7000. And to extend this effective range another 500 to 700 rpm might double the problems.

You can see from all this that the OHC Ford engine is anything but a sure bet to sweep the Mopar hemis off the NASCAR tracks next season—even if they do let it run.

And what will happen if NASCAR officials decide *not* to let the OHC engine run, unless it is installed in 500 cars on factory assembly lines—and assuming Ford declines to do this? What will the Ford teams do then? Like we said earlier, they won't be out in the cold. The 427 wedge engine in intermediate-size Fairlanes and Comets should still be reasonably competitive, especially in view of the fact that Chrysler engineers aren't doing any extensive performance development work on the hemi engine for the 1967 season. The situation should be very similar to what we saw late in the 1966 season, when the wedge Fairlanes were definitely in the game.

On the short tracks, where handling is more important than brute horsepower, it was nip and tuck. And on the fast speedways where power does the job, they were close enough to keep the Mopars humping.

And things could be just a little bit better for the wedges this season. The new NASCAR-USAC rules now allow triple two-barrel carburetion systems on wedge engines as well as dual four-barrels, while still limiting hemis to one four-barrel. I don't know that this is much additional advantage for the wedges. But it's possible that an exotic high-riser triple manifold might be developed that would give better breathing and mixture distribution than Ford's current dual-quad racing manifold. Or Ford engineers might take another path and concentrate on a cross-ram dual four-barrel manifold setup similar to that which Chrysler uses for their hemi drag racing engines. They should take advantage of the ram principle in some way. The new manifolding rules allow them a lot of elbow room.

And there is no doubt that these rules give wedge engines at least another 20 or 30 hp than they could expect with a single four-barrel setup. Ford 427 wedge engines with single-four-barrel carburetion have been pulling 520 or 530 hp at around 6200 rpm for the last two years. This was with the latest big-port heads (2.19-inch intake valves) and lightweight 7000-rpm valve gear. This seemed to be some kind of "breathing barrier" for this engine. But apparently much of the limitation was in carburetion capacity, because a number of Ford teams were getting dyno figures between 550 and 570 horses with dual four-barrel carbs toward the end of the last season. This is within 20 or 30 hp of the Mopar hemis with a single four-barrel. And another good point is that this power is developed below 6500 rpm on the 427 wedge, so there is no need to turn 7000 to realize the full potential of the engine. The safe red-line of 6800 should be adequate through next season. The bulk of the development work can be concentrated on manifolding.

(*Continued on page* 81)

So that's how things stack up between Ford and Chrysler for the upcoming NASCAR-USAC racing season. I don't see how we, the spectators, can lose. If the racing officials let Ford run the OHC engines, we're bound to see some wild racing and a flock of new records. If Ford engineers get busy on manifold and lower end development, this engine should be dominating the tracks by the end of this season. On the other hand, if the OHC Ford engine is *not* permitted to run, we'll still see good racing between the Mopar hemis and wedge Fairlanes and Comets. The Mopars will probably win most of them, especially on the fast speedways, but things will be close enough to be interesting.

RUND OLDS continued

these pivots are die cast in pairs at a fixed height from the cylinder head, precluding any conventional adjustments. Brady uses a pair of .070 flat washers to space up the rocker arm pivot. This brings the lash to .002 inches, which is just what the doctor ordered. The correct washer thickness will vary from car to car depending on how much the head is cut.

Last year, the cam gear was bored out to accept offset bushings for advancing or retarding the cam. This year Brady accurately bored eight holes in the cam gear to provide half-degree increments for advancing the cam to a maximum of 4 degrees. The same eight holes can be used for retarding as well as advancing the cam by simply flopping the gear.

To keep tabs on what the engine is doing, Brady and Molnar installed a set of gauges in a snappy looking walnut panel fitted under the dashboard. However, Brady is not one to call a warning light an idiot light. He feels, and right so, that a warning light can be seen more easily than a gauge and when it flashes on it draws immediate attention, while a gauge is likely not to be spotted. Thus, the oil pressure and coolant temperature warning lights have been retained. A set of T-fittings are used to mount the sending units for the gauges and the warning lights.

Plans for the future? Molnar and Brady polished off the last race of the season before the advent of the cold weather and promptly set to the winter task of rebuilding the car from top to bottom. To win more races, that's the plan. . . .

EDITORIAL continued

Chevrolet has its Chevelle SS 396 available in 325-hp trim. For the first time you can get a two-barrel economy GTO and an automatic-equipped top engine option.

Chrysler, on the other hand, has reversed its performance merchandising program. They are actually offering an image muscle-mobile for the first time and the only way it can be had is with hot and hotter powerplants. Prior to the Plymouth GTX and Dodge R/T Mopar middleweights were available with engine choices from Slant Six to Street Hemi. There were no image models for the youth market. Now that Chrysler has some image machines, they have restricted their sale to ultimate performance buffs. The standard 375-hp 440 cube engine is a dynamo and the only optional engine, the 426 Street Hemi, is unreal. It looks like GM and Chrysler are trading positions in 1967.

LOYAL CHEVY FANS are eagerly awaiting delivery of the first 396 Camaros. The factory has the option listed, but as of this writing none have been delivered. Nickey Chevrolet in Chicago is offering custom-built semi-hemi Camaros and is in the process of finishing up a drag racing version for competition in the "funny car" ranks. Nickey's Camaro will most likely feature new rods, forged high, high compression .060-inch-over slugs and aluminum heads. All carry factory parts numbers and can be ordered from hip dealers such as Nickey or Bill Thomas in Anaheim, California. You can rest assured that Chevrolet will be well represented in quarter-mile competition this year.

HUNTINGTON continued

All of this has got the Chevrolet people a little bugged about the Camaro. They would like to offer the 325-hp version of the 396 engine as an option. The word now is that this combination will be a dealer-installed kit at first, possibly available by the time you read this. Of course engine swapping on this basis is no real answer in the mass market because it's so expensive and inconvenient. But the dealer kit will tide Chevrolet over and help to maintain the "image," until arrangements can be made for assembly-line installation. I look for this by next spring, now that Pontiac has gotten permission to use the 400-cube engine in their Firebird.

And who knows where it might go from there? I notice that the well-known Nickey Chevrolet agency in Chicago is already taking orders for