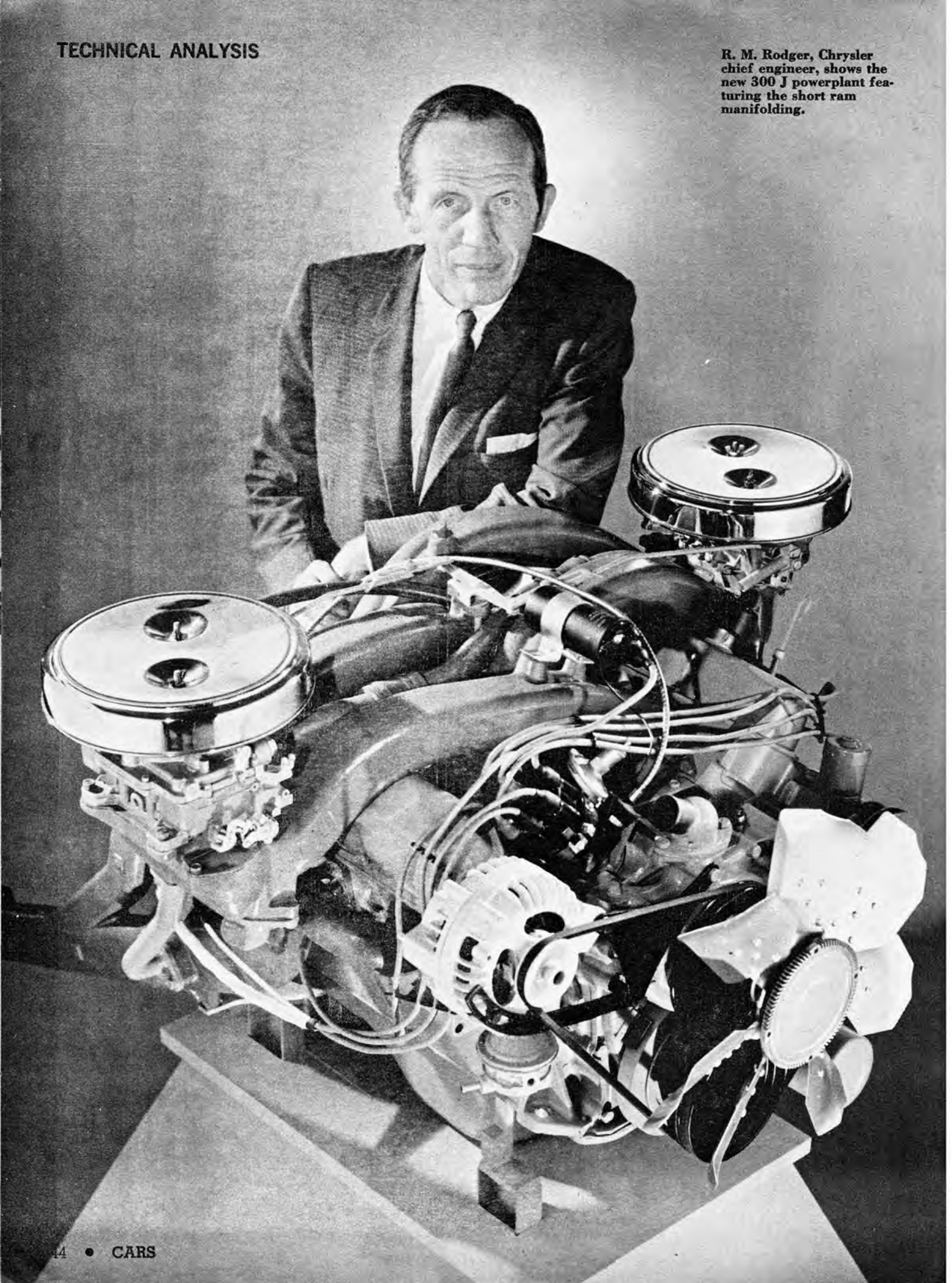
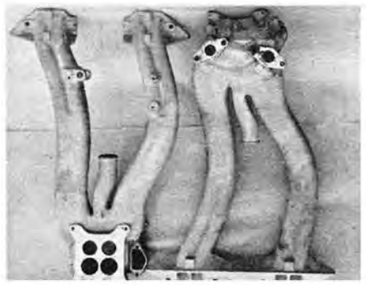
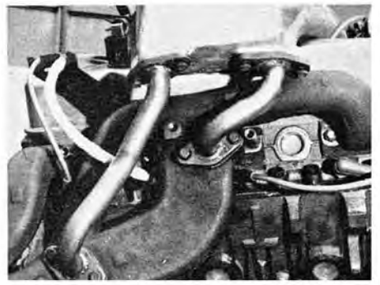


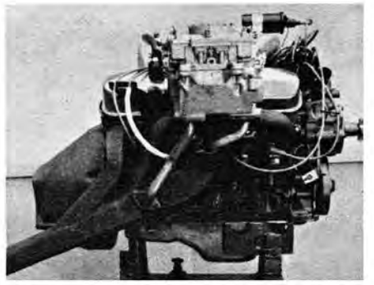
R. M. Rodger, Chrysler chief engineer, shows the new 300 J powerplant featuring the short ram manifolding.



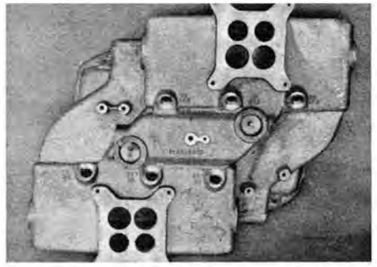
Divider wall between intake ports extends part way up manifold passages. Balance pipe dimensions are critical for performance.



Exhaust heat comes to underside of plenum chamber for good cold start operation, but may be blocked off for competition purposes.



Long exhaust manifold branches help separate individual pulses, prevent exhaust overheat interference between adjacent cylinders.



Top of 426 Short Ram intake is shown for comparison. It was designed for power in the top rpm range.

Manifolds look like previous 300 series units, but have added exhaust takeoffs for plenum heat.

Manifold underside shows ram passages tied into plenum chambers under carbs. Floors drain into ports.

CHRYSLER'S 300 J ENGINE, MOST POWERFUL STANDARD V8 YET!

By HAL KEMPER

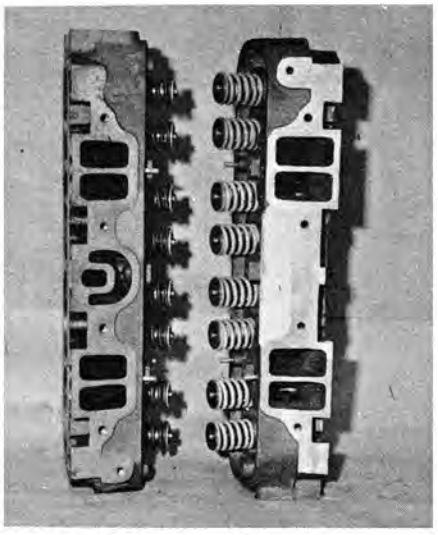
A RIDE in the new Chrysler 300J will convince you that it is one of the best street machines ever built. With 390 horses on tap at 4,800 rpm, there is always extra passing power. Yet the engine does not show the least sign of being temperamental. In other words, if you feel like driving conservatively you can. But if you want to leave someone standing at the light, just push your foot into the gas tank and "go!"

Open the hood and you'll spot a change from last year. Instead of the dual log manifold, the ram manifold with a four-barrel on each side of the engine is back with us. While reminiscent of the Long Rams used in 60, these are the new Short Rams. As you can guess from looking at the manifold casting, each of the four large manifold branches feeds two cylinders. In the '60 version, full length dividers separated each branch to achieve individual ram passages for each cylinder. The 300J manfold has much shorter dividers, hence shorter rams.

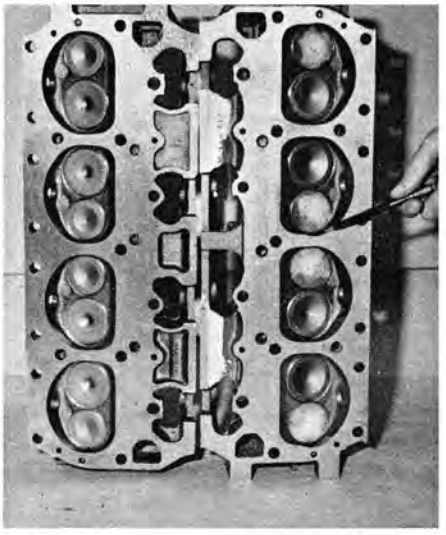
The effect of the short ram length is to increase the rpm point at which peak torque occurs. Specs bear this out, since maximum torque is now 485 pound/feet at 3,600 rpm as opposed to last year's 450 at 2,800 rpm. The '63 TorqueFlyte automatic is now fitted with a 5,400 rpm governor, 600 revs higher than in the 300 G, to accommodate the change in engine torque curve.

Chyrsler Corporation has done more with ram manifolds than any other manufacturer, showing the way to obtain more horsepower without resorting to wild cams which make a car non-tractable for street use. They do it by tuning the effects of the ram manifold, valve timing and exhaust manifold to inject a bigger air/fuel charge into the cylinder. When the intake valve opens, the column of gases in the ram pipe begins to move at considerable speed. This column of gases wants to keep right on moving, even when the valve begins to close and more mixture is packed in (just like getting more people on a bus in one last heave before the doors slam shut).

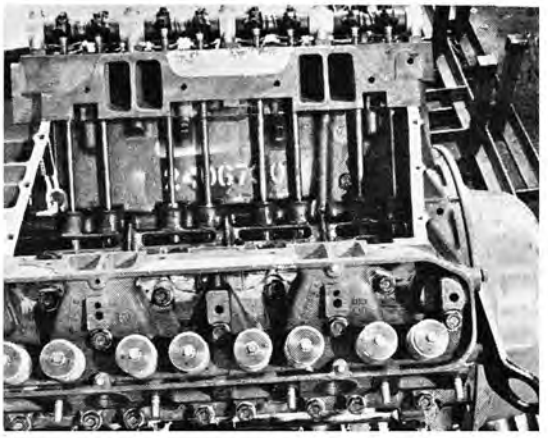
In addition to the inertia of a moving column of gases, there is a resonance effect that helps the ram action. A good example of a system in resonance is to bounce a car up and down in unison with its natural spring action. A swimmer can get considerable action on a diving board by bouncing on it with the right timing. By the same token, opening and closing the intake valve results in a series of pressure pulses traveling up and down the ram pipes. By tuning the length and size of the manifold pipes and the intake timing, pressure pulses can be generated which arrive



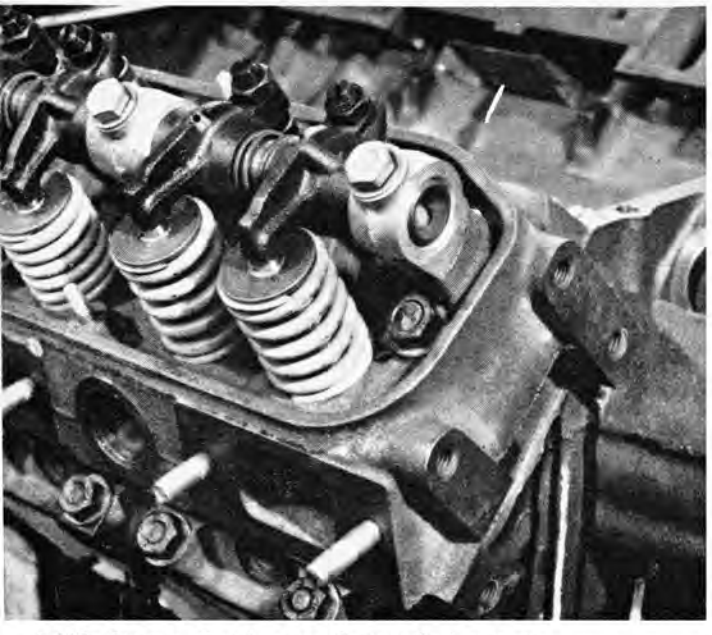
300 J head, left, has exhaust crossover blocked with intake manifold gasket, as heat comes from manifolds. Performance head lacks crossover.



Maximum performance heads on hot 426's have larger exhaust valves of 1.88-in. diameter. Cutout shown with pencil provides added room for valve.



J has 9.6-1 compression. Max. heads use 11 or 13.5-1 compression requiring super premium fuels. Lifters, valve train parts are same for both.



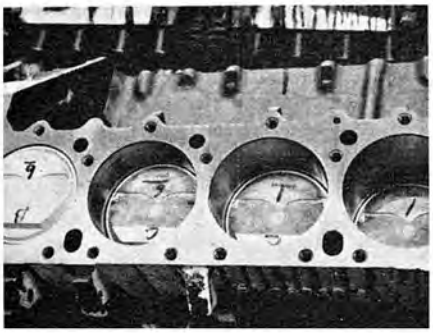
Self-locking pushrod screws feature lock nuts to prevent loss of valve setting from high rpm vibration. Valve springs use dampers.

13.5 pop-up piston, left, is shown with J's flat piston. The 9.6 J piston has been given eyebrows in order to gain extra valve clearance.

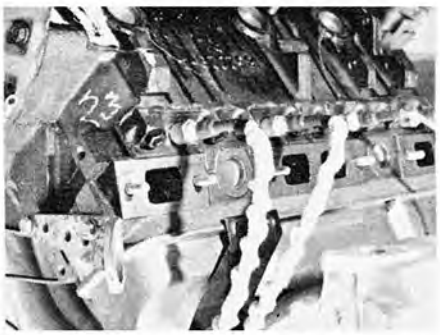
CHRYSLER'S 300 J ENGINE, MOST POWERFUL STANDARD V8 YET!

in time to fill the cylinder more completely as the valve is closing. When the ram pipes are shortened, the pulses travel that much faster from one end to the other, and peak charge —which also means peak torque—occurs at a higher speed.

The volume of a plenum chamber has a substantial effect on overall performance. If it is too small, the system will become unstable and the mixture will pass back and forth, creating a standing fog over the carburetors. Some of the fuel is bound to impinge on the flat floor under the plenum chamber and form a wet fluid sheet. A good portion of ram manifold development time was spent on positioning the carburetor so that fuel distribution would be correct from cylinder to cylinder. Some manufacturers use ribs and dams built into the manifold floor to direct this fluid sheet away from cylinders that are running rich. Chrysler Engineering, on the other hand, believes that these dams are too readily defeated either at the foundry stage or through carbon buildup. Plenum chamber floors on all ram induction systems are completely flat. What's more, they drain into the individual branches to avoid fuel (*Continued on page* 82)

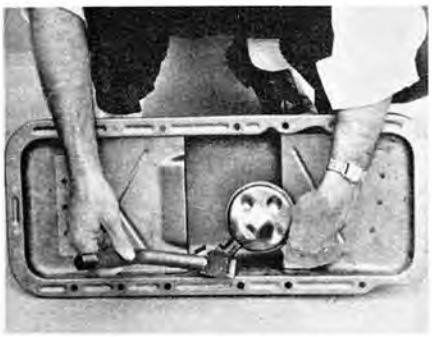


Maximum performance block has higher oil level, larger main grooves, stronger rods, added bearing clearance.

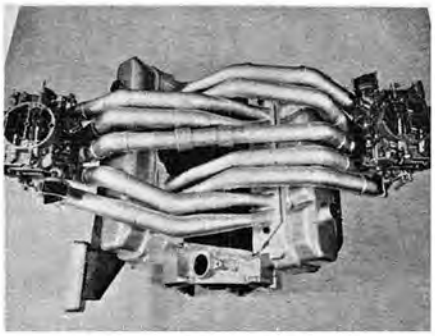


Special asbestos sleeves protect high tension wires from exhaust heat. Notice the very large port areas.

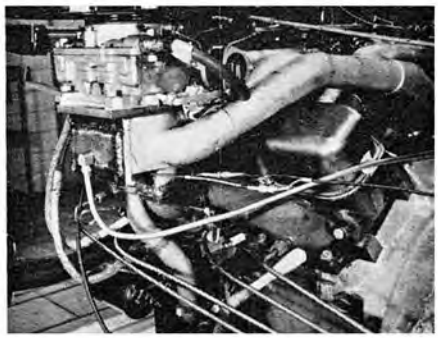
Oil pickup line was increased to 9/16-in. inside diameter. Swivel is bigger. Float swings sideways.



The pan is thoroughly baffled against acceleration and hard braking. Oil pick-up swings accordingly to compensate.

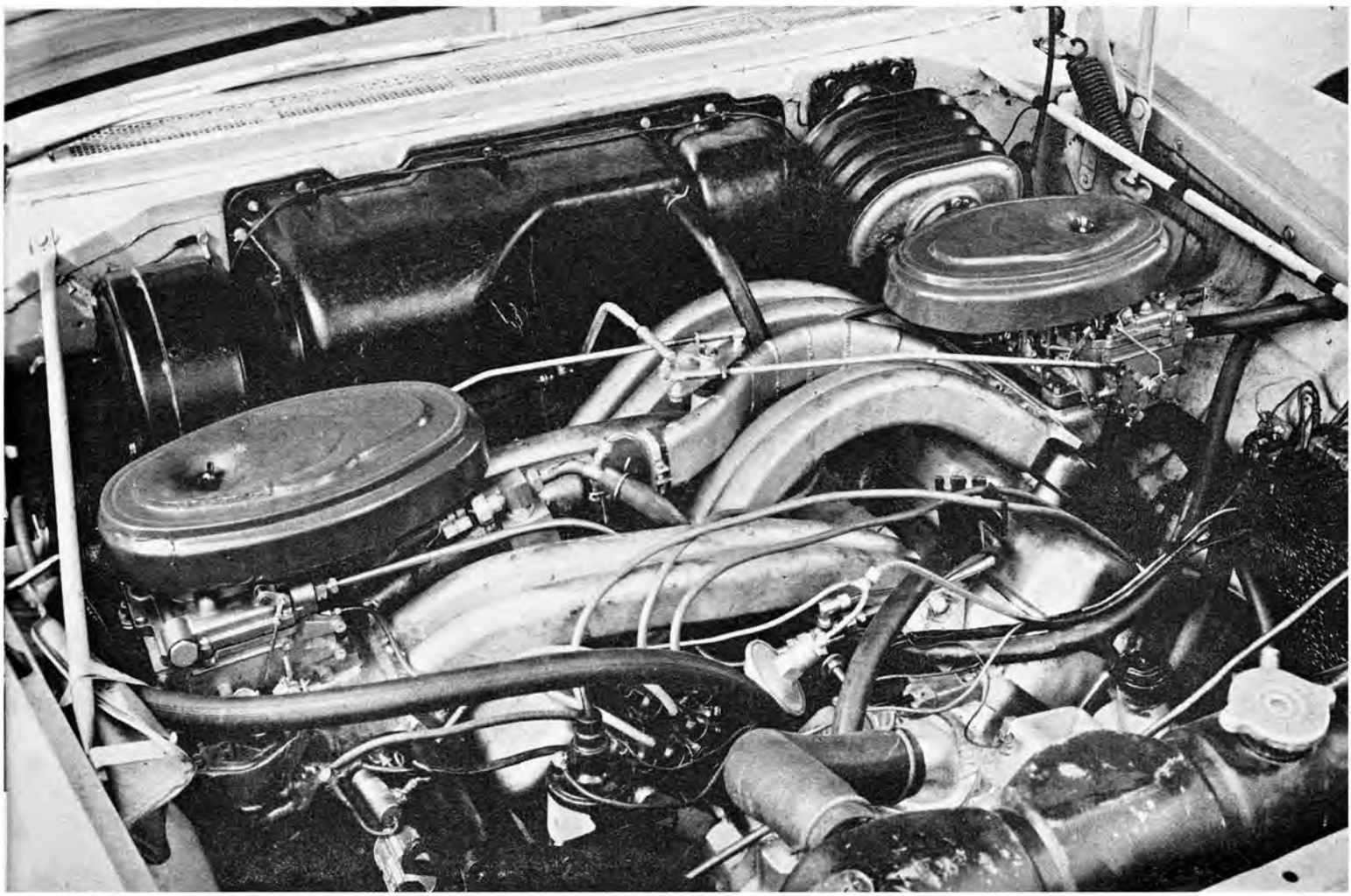


Manifold pipe lengths, plenum chamber sizes, carb locations were among engine points put to dyno tests.



This prototype plenum chamber was rigged to accept exhaust heat, and instruments checked wall temperatures.

Below is direct descendent of 300 J manifold. Chrysler Corp., having been ram manifold pioneer, can just about tailor system for any torque curve requirement by working on intake, cam, exhaust manifold combination.



help. On the other hand, polishing has not shown any measurable improvement over a competently done porting job. If anything it has sometimes resulted in a loss, especially at part throttle. Since H and M operate two engine dynos full time and carry out all of their initial new project testing on the dynos, they ought to know. In other words, the time and effort spent polishing ports can be better spent experimenting with an advance curve or providing any of the thousand-and-one details that make an engine last longer and perform better.

300 J ENGINE CONTINUED

puddles. Under full throttle, running a fuel puddle means little. But when the throttle is closed abruptly, high vacuum causes this fuel to flash (boil up suddenly) flood and stall the engine.

Design of the intake manifold, valve timing and the tuning of the exhaust system all exert effects on ram charging . . . in approximately that order. For peak effect they must be matched to each other. Pipes placed at the inlet side of a carburetor can produce a ram action. However, the restriction offered by the carburetor is deemed to have a damping effect on the pulses, and Chrysler favors placing the carburetor at the outer end of the manifold.

In the past, Short Ram manifolds

were strictly maximum performance items and did not offer such niceties as manifold heat (which accounted for poor cold start performance) or short warmup time. On the 300J, which is a street machine, two small pipes lead from each exhaust manifold to the underside of the plenum chamber (where the four-barrel delivers the mixture). There is no heat riser valve, but flow is obtained through a pressure differential in the pickup connections. A 300J cylinder head casting is basically the same as that of the stock passenger car engine, which is simply blocked off by a gasket.

The exhaust headers are designed for maximum flow and have long branches to separate the exhaust pulses of adjacent cylinders and prevent them from interfering with each other. These headers are similar to last year's 405 hp versions. Exhaust piping is now of 2¼-inch diameter, a ¼-inch gain over last year. Just in case this doesn't sound like much, consider that the cross section area goes up from 3.14 to 3.98 square inches, a 27 per cent gain!

Some interesting comparisons can be made between the 300J engine, which is designed essentially for street use, and the maximum performance 426 Dodge and Plymouth engines that are primarily drag strip material. Compression ratio of the 300J is 9.6-to-1, down from the 10-to-1 of last year. This makes the engine less octane-sensitive (it will run quite readily on premium fuels rather than thirst for super premium). The 426, on the other hand, uses forged pop-up pistons to achieve either 11-to-1 or a 13.5-to-1 compression. The cylinder head of the 300J is essentially the same as that of the less powerful engine versions with one important exception; exhaust valve size was increased from 1.64 to 1.74 inches. The 426's run 1.88-inch exhaust valves which require small scallops machined in the sides of the combustion chambers. On a 426 engine, the heat riser passage is omitted entirely since cold start performance is of little import. The cylinder heads are that much lighter. Ram sections of the 426 manifolds are short, and the pair of four-barrels sits above the engine. Overall height was purposely kept low so they would fit under the low hoods of Dodges and Plymouths without having to resort to scoops or bubbles.

The 300J uses mechanical, barrel-type lifters in conjunction with a 268-degree cam. Pushrods are heavy duty, as are the forged rocker arms (a carryover from 1962). One change at this point is a lock nut fitted to the self-locking adjusting screws. Ap-

parently, at sustained high rpm, these screws proved to be a little less self-locking than they should have. Valve springs on the 300J are a little heavier than stock, but nothing like the inner and outer spring combination used on the 426. In addition, the outer spring is fitted with a flat-wound damper insert. The accumulation of springs left no room for the conventional umbrella seal. Instead, the valve guide is machined to accept a Perfect Circle teflon seal.

While the 300J block remains relatively unchanged, the 426 has been revamped to increase oil flow to the bearings. The rod bearing clearance was increased by .0003 inches, and Clevit 77 heavy duty trimetal bearings are used on both rods and mains. Even the big ends of the rods have been beefed up. To increase oil flow, the pickup pipe leading from the screen was increased to a 9/16-inch inside diameter. The screen swings fore and aft, rather than up and down, to keep up with oil motion on hard acceleration or braking. Also increased in size was the swinging elbow. Oil splash is kept under control by baffling that covers the front and rear of the sump. Higher oil flow is insured by bigger oil galleries within the block.

Since connecting rod oil must first flow through the mains, the wider main bearing grooves are used. At high speed, windage and the volume of oil pumped up contributed to a certain amount of oil hanging up in the block (en route to, or returning from, various parts). This would cause the crankcase to run low even though the required oil level was maintained. The problem was very simply solved by raising the oil level in the engine from four to five quarts. Just add the extra quart and put a new mark on the stick.

Whether you contemplate dragging or are interested in a fine street machine with ample pasing power, the 413 and 426-inch Chrysler mills are certainly producing the goods. There is no problem is souping them up, for the equipment is right there on the parts shelf. But then, after driving the new 300J, you may decide its plenty fast as is.

FOMOCO CONTINUED

with this big brother to the much-admired 260 cu. in. V8. The extra inches were gained by boring out .20 inches to an even four. Stroke remains the same (2.87 in.) as in the 260. This HP 289 develops an impressive 271 hp @ 6,000 rpm with very little additional stress having been imposed upon it. Compression has been raised to 11-to-1 and carburetion increased to a single four-barrel Holley.

Among additional modifications made to this 289 are higher compression cylinder heads a, new cam with contoured lobes to provide high-lift opening and greater valve overlap for increased torque (312 lbs/ft @ 3,400 rpm), positive action solid valve lifters for increased acceleration and reliability at high speeds, a direct, free-breathing intake system which draws the fuel/air mixture through low restriction passages for maximum distribution, and a free flow exhaust system whose banks of individual cylinder headers empty into dual exhausts.

As with the 427, only manual transmissions are available with this HP 289. And in line with the transformation of sedate Fairlanes and Meteors into performance packages, certain chassis and driveline modifications become "must" portions of the engine package. These include availability of a four-speed manual transmission in the Meteor for the first time. Mandatory options include a high capacity radiator having heavier core materials for added strength, longer life and greater leak resistance, along with more coolant capacity to keep engine temperatures uniform. Part of the package, too, is a heavy duty clutch featuring thick friction facings and stronger pressure plate springs for positive torque transmission and HP durability. A heavy duty transmission output shaft, heavy duty springs and shocks and a beefed rear end become part of the heavy duty package, too. Heavy duty brakes are optionally available.