# STOCK PARTS HP FOR BIG-BLOCK FORDS

# HOT ROD

EVERY[illegible]'S AUTOMOTIVE MAGAZINE

BUILDING 340 MOPARS-Part I
INSIDE ACTION AT INDY
TRICK HYDRO RATIO CHANGING
500-MILE BAJA BASH
TWO-BARREL PERFORMANCE TIPS

50¢ [illegible] AUGUST 1969

HOT ROD DRAG CHAMP:
LARRY DIXON with the
HOWARD CAMS "RATTLER"

So you have a 350-cubic-inch Chevy engine that wails, huh? And you're cryin' 'cause the only strong competition you have to face is from other 350's. Well, cheer up; you'll soon have another competitor to worry about: the 340 'Cuda. Sure we've seen small-block Chevys pull 450-plus horsepower on the dyno, but we've also witnessed a relatively stock-block 340 Chrysler engine do the same.

Vic Edelbrock, in the process of expanding his line of Street Ram manifolds — including induction systems for Chrysler's 340 design — decided to wring out Chrysler's middleweight in order to determine what components this engine responds to best. That's where we came in.

For a start, to obtain a base line, the engine was run in its stock form with the air cleaner installed and spark lead advanced to 39 degrees. The highest reading came at five grand and showed 280 hp. At 5800 rpm the horsepower fell off to 272, and at 6000 rpm the valve train succumbed to valve float.

In comparison to the factory-rated horsepower figure of 275 (NHRA rerates this engine in the 300-hp range) and the readings we received from Vic's dyno, everyone involved seemed very enthusiastic about the potential of this strong-hearted sleeper.

A set of Hooker headers was installed, and this added five additional horses. The next change was to install an Edelbrock LD-4B manifold with the stock-jetted (.096) Carter AVS carburetor. At 5000 rpm this addition showed 296 hp.

It then became obvious that the engine should undergo certain clearance modifications. To begin with, the main bearing clearance was increased to .0025-inch, and the lower main bearing halves were grooved to allow continuous (360-degree) rod bearing oiling. With the factory clearances, the rod bearings showed scuff marks. So rod bearing clearances were also increased to .0025-inch. Rod-to-crank clearance (rod end play) averaged about .013-inch and was increased to .020-inch. Piston pin fit with the bushed rods was set to .001-inch, and piston-to-wall clearance was micro-honed to .0025-inch. It was found that moly

rings for the top and second compression rings and a segment-type oil ring were the best working combination for both blow-by and oil consumption control. For increased oil temperature control and less chance of aerating the oil, the sump section of the oil pan was dropped six inches.

Let's examine the engine with the blueprinting completed. With no additional changes, save for a .020-inch preload on the lifters, the engine produced 302 hp at 5500 rpm. Valve float became apparent at 6400 rpm, but this still gave us our first readings above 5800 rpm. The power curve was faltering after six grand and fell to 299 hp at 6200 rpm. Immediately, the Carter carburetor took leave, and in its place a No. R-3310 Holley (780 cfm) carb with #70 primary jets and #74 secondaries was installed. This swap alone boosted the entire curve to some extent, but it really

showed its merit in the higher rpm ranges. The best reading came at 6000 rpm, like 326 horsepower. Our next shot was to replace the factory cam with a Racer Brown SSH-25. This cam has 286 degrees duration (intake and exhaust), with .485-inch lift and 62 degrees overlap. At any rate, this cam gained an additional 200 rpm and produced a 6400-rpm dyno reading of 333 hp. However, it showed its best performance in the 4500-to-6200-rpm range and gave the highest figure (347 hp) at 6000 rpm. The Carter carb was given another chance with the newly installed cam and received richer .0995-inch secondary jets to boot. Even so, this lost 13 horsepower at 6000 rpm and 9 horsepower at 6200 rpm.

Cam-changing time again, this time to a wilder Racer Brown SSH-44 (292 degrees duration, .510 lift, and 76 degrees overlap). The No. 3310 Holley came back into play, and total timing was retained at 39 degrees. Valve float was again moved farther up the scale, this time to 6800 rpm. A high of 357 hp (at 6200 rpm) carried strong through the 6750-rpm range, where it finally settled to 340 hp. At this time, the Hooker headers were exchanged for a set of 30-inch primary-length Hedman headers. These headers were worth 6 hp at 6000 rpm and 17 hp at 6750 rpm. Quite a power jump in anybody's header book.

The newly released Edelbrock 340 Chrysler Street Tunnel Ram manifold (STR-12) was next on our list of things to do. So with this installation and a pair of No. 2818 (600 cfm) Holleys (primary jetting #70 and secondary #72), and total advance set at 37 degrees, we were ready to wear out our engine some more. It didn't take long to see the 22-hp increase (at 6000), but as the rpm increased, the power decreased. An Isky 310 (310 degrees, .440-inch lift) hydraulic cam and kit was installed, along with the single four-barrel manifold and carb (No. LD-4B manifold and No. 3310 Holley carb). This combination gave us a top of 356 hp at 6000 rpm. The cam was changed to another Isky unit with 320 degrees duration and .492-inch lift. This netted 9 horsepower over the shorter cam. Now, with the same cam-

shaft, the STR-12 manifold and carb combination was installed. Result: 378 hp (at 6000) — not bad but still 5 hp short of the best reading.

With the addition of the cams, it was evident the engine was down on breathing capabilities. With this thought in mind, we approached Bob Joehnck to rework the heads. While the heads were on their way to Bob's Santa Barbara shop, our attention was focused on the pistons. We noticed that a few of the intake valves were coming in contact with the piston pads. After checking, we found the pad-to-valve clearance was .260-inch, with the piston at TDC. This air gap was increased to .310-inch for the intake pad, thus giving us .100-inch piston-to-valve clearance at the overlap position. After the pistons were cut, the engine was rechecked for actual compression. The ratio had dropped to 9.9:1 (stock 10.5:1). So the exhaust side pad was left unchanged at this time, in order to save compression. The valve guide bosses were spot-faced to accept the combination Racer Brown outer and Isky inner springs. This combination (1 11/16-inch installed height) produced a seat pressure of 130 pounds and open pressure of 320 pounds. Needless to say, the valve train harmonics were very stable at 6800 but tended to float around 7000 rpm.

After all modifications were complete, the engine was set on the dyno, sporting the Joehnck heads, 320 Isky cam, and the No. LD-4B manifold with Holley carb. Proportionally, the 6000-rpm reading was again the highest output (379 hp) for this particular run. The STR manifold and carbs were again installed and produced an impressive 401 hp at both 6000 and 6200 rpm. We knew this engine could pull this kind of power, so we tried for more. A call to Racer Brown was all that was needed to obtain the HYD-44 unit, which, in conjunction with the valve springs, pulled 7100 rpm easily. Remember, all these cams are hydraulic units. As a result, the engine managed another 7 hp (411 hp), but a noticeable miss at high revs soon plagued the engine. Not for long though, as a Spalding ignition for a 392 hemi was converted to fit the engine, and it advanced the power output to 418 hp.

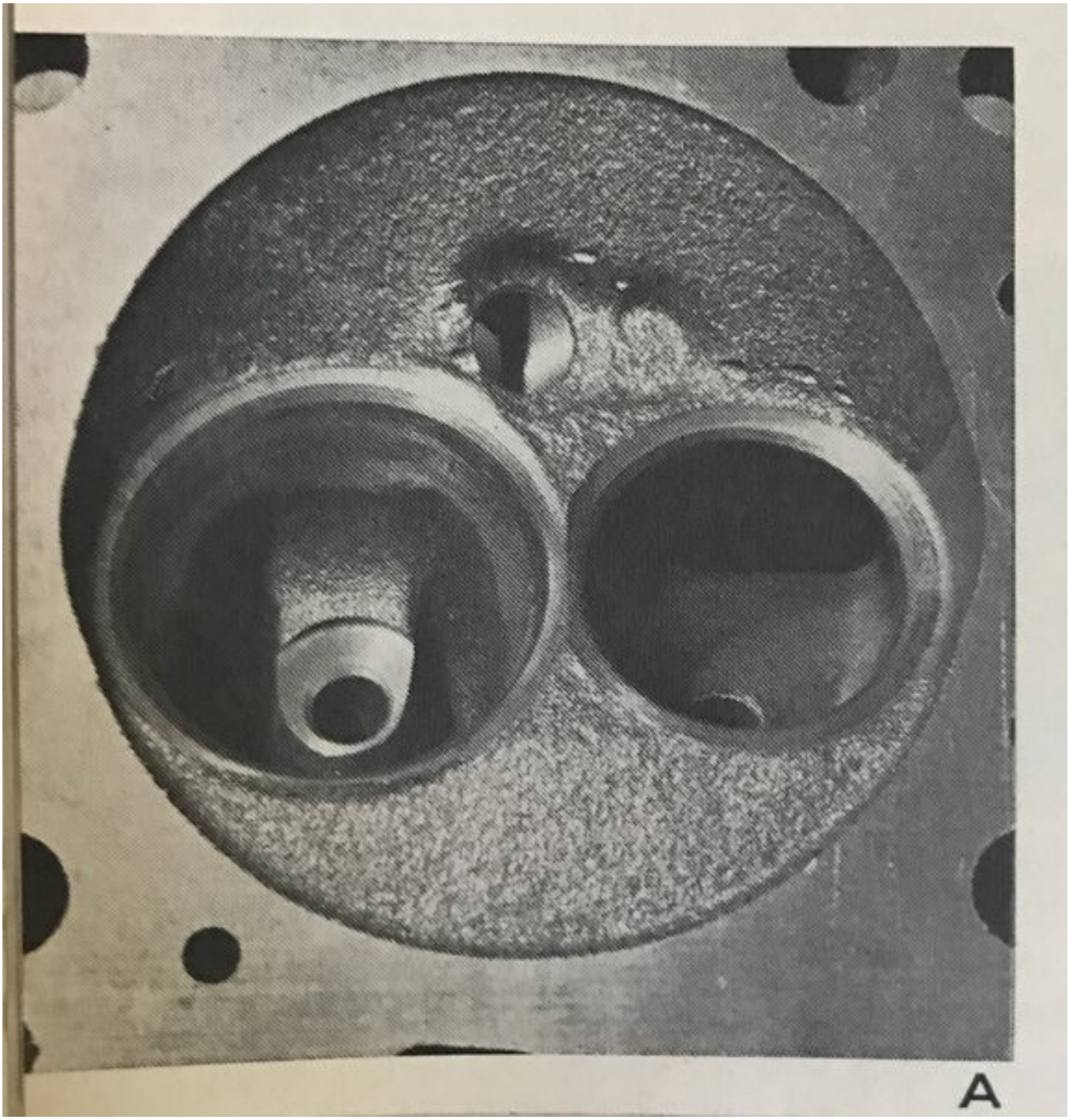
Racer Brown suggested another cam design and kit assembly. However, with the installation of his STX-21 cam (306 degrees duration, .560-inch lift, and 96 degrees overlap), additional exhaust-valve-to-piston clearance was needed. The exhaust pad was cut some .050-inch deeper, to give the recommended .090-inch (at overlap position) air gap. Compression ratio was again checked

and was found to have been reduced to 9.8:1 overall. To complete the valve train, Racer Brown inner and outer springs were set to 1 11/16-inch installed heights, and produced 130 pounds tension in the closed position and 360 pounds open. With this total cam and spring combination, the engine would pull 8000 rpm with no noticeable valve float. Anxiously waiting the results, we soon were pleased to see an impressive curve and a peak of 440 horsepower at 6750 rpm.

A carburetion change was due, and a pair of larger No. 4224 (650 cfm) Holleys were installed. Also a new set of Champion N63Y plugs (.025-inch gap) was added. Although the entire curve was slightly higher, the addition of these carbs greatly improved the mid- and top-end range. At 6750 rpm we saw a dyno reading of 450 horsepower

(watch out, Chevy fans) that started falling off above 7000 (see chart). Upon completion of this dyno run, the engine was run up to check for valve float. The engine started laboring and was about to seize. Checking the lower end, we found No. 3 rod bearing beginning to let go. This ended our testing for the present, but not forever.

If you decide to strengthen your Chrysler "grin buster," hold off another month. You see, while we have the engine apart we plan to go one step further and add more than the compression we lost when cutting valve reliefs. Might even have a "trick" set of rods. About those camshafts: The ones we have in mind for testing won't be hydraulic units. Oil passage modifications are also scheduled. And topping this list will be 500-plus hp readings. We're not kidding a bit. ■■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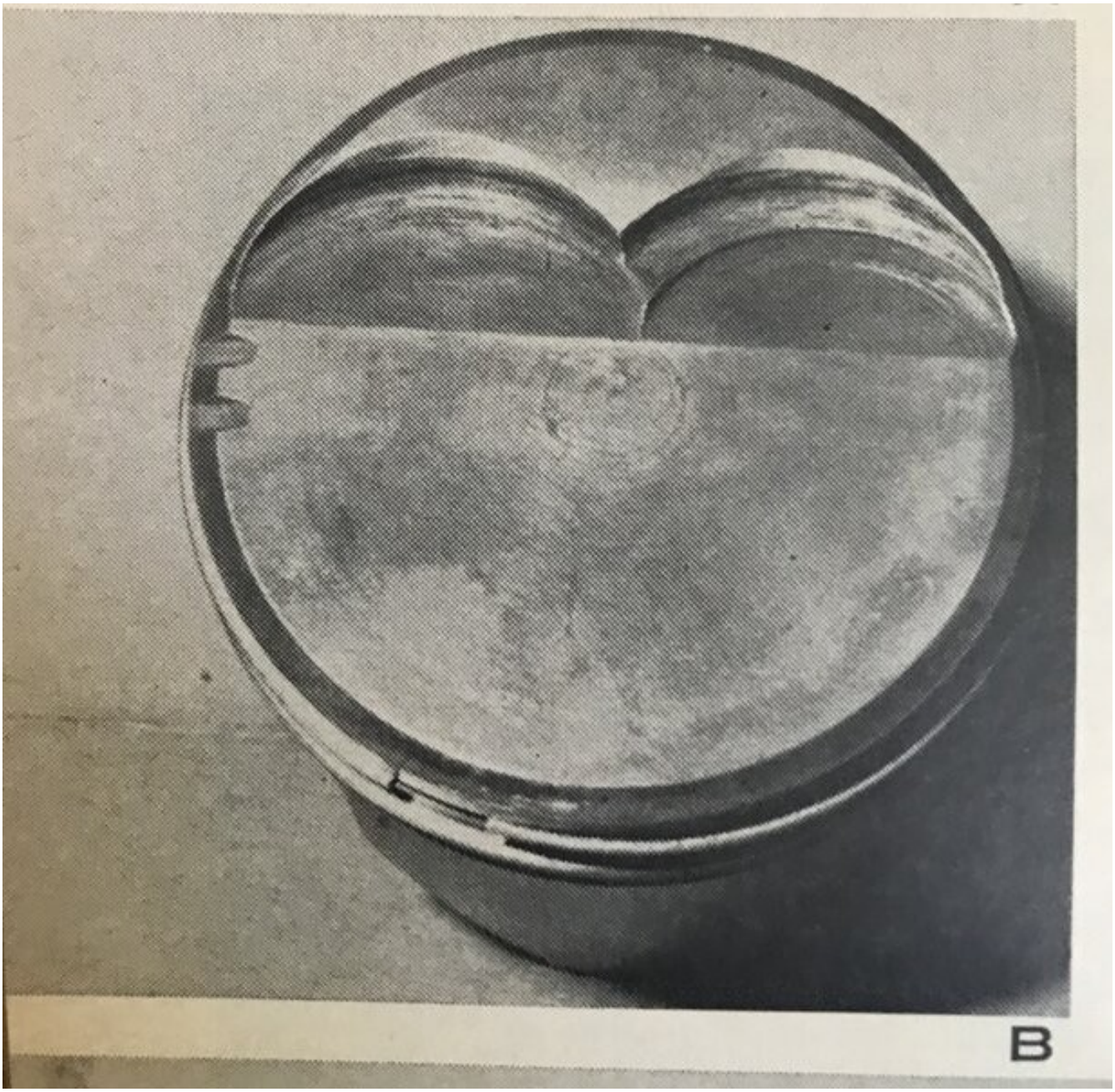
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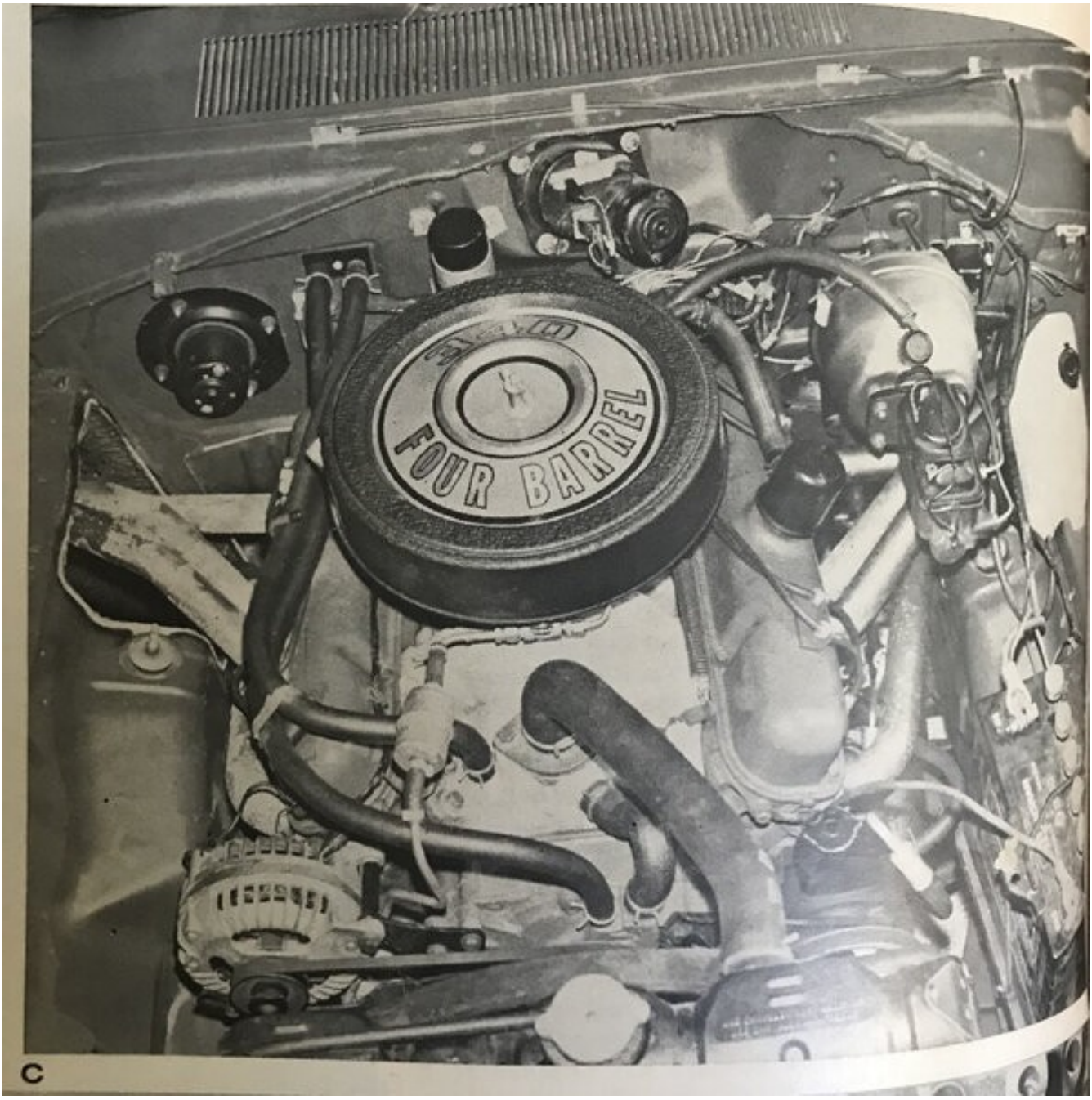


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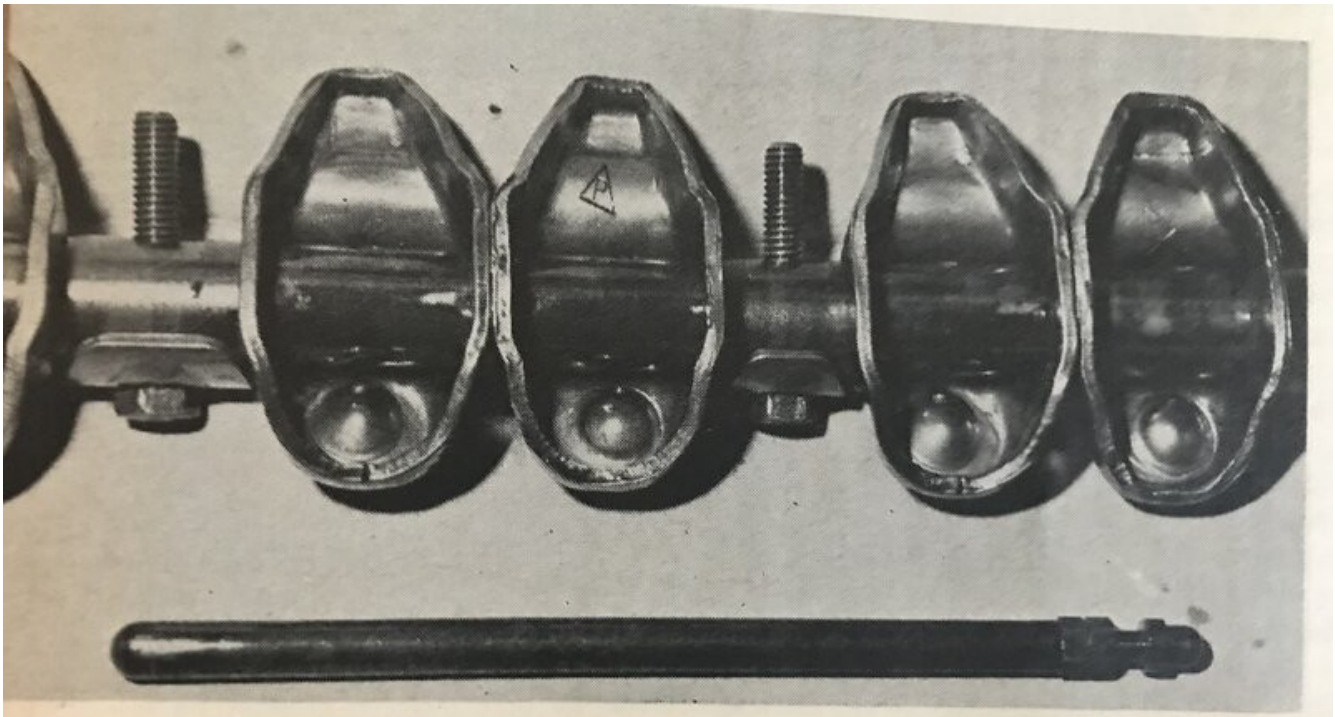



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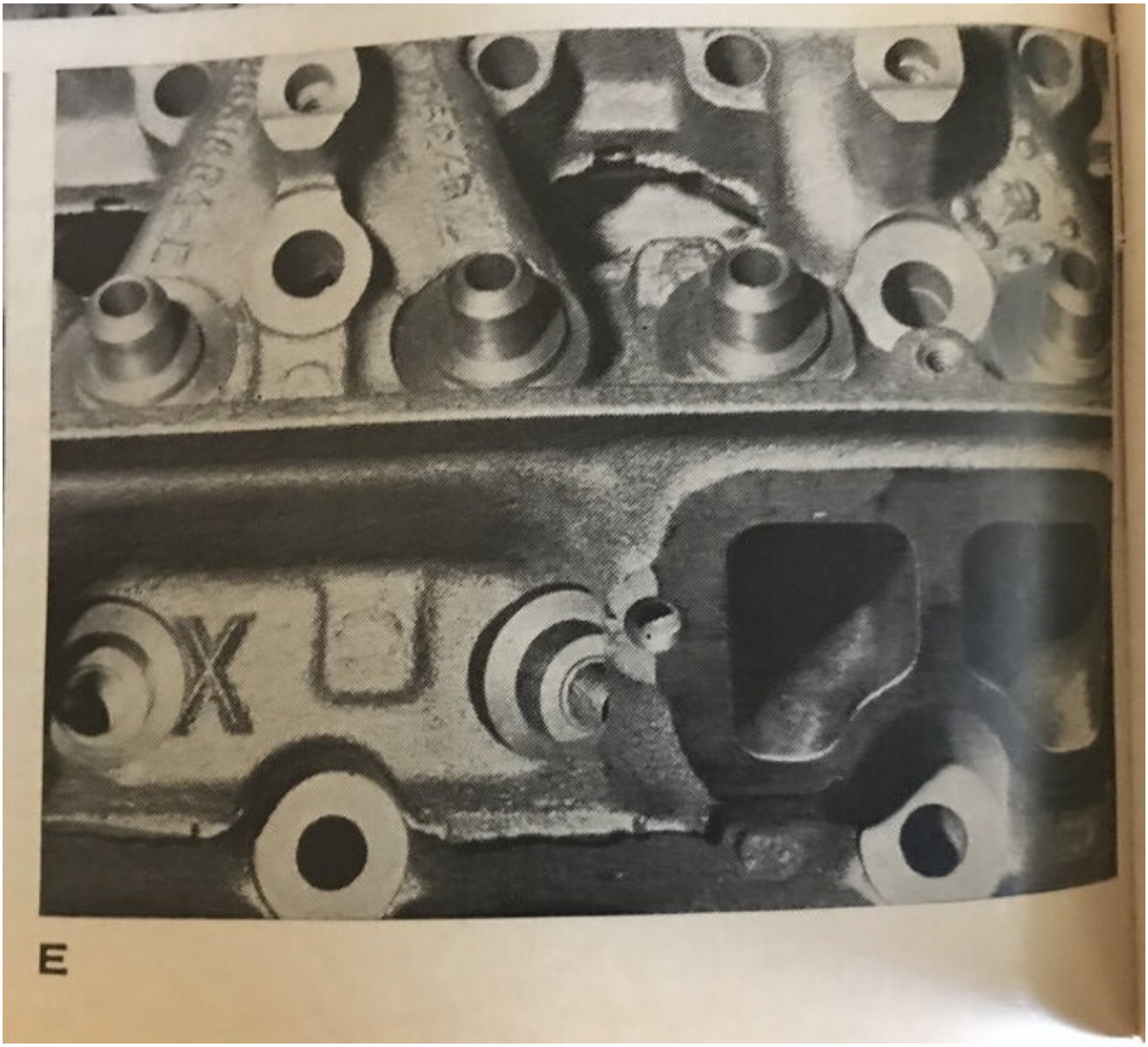

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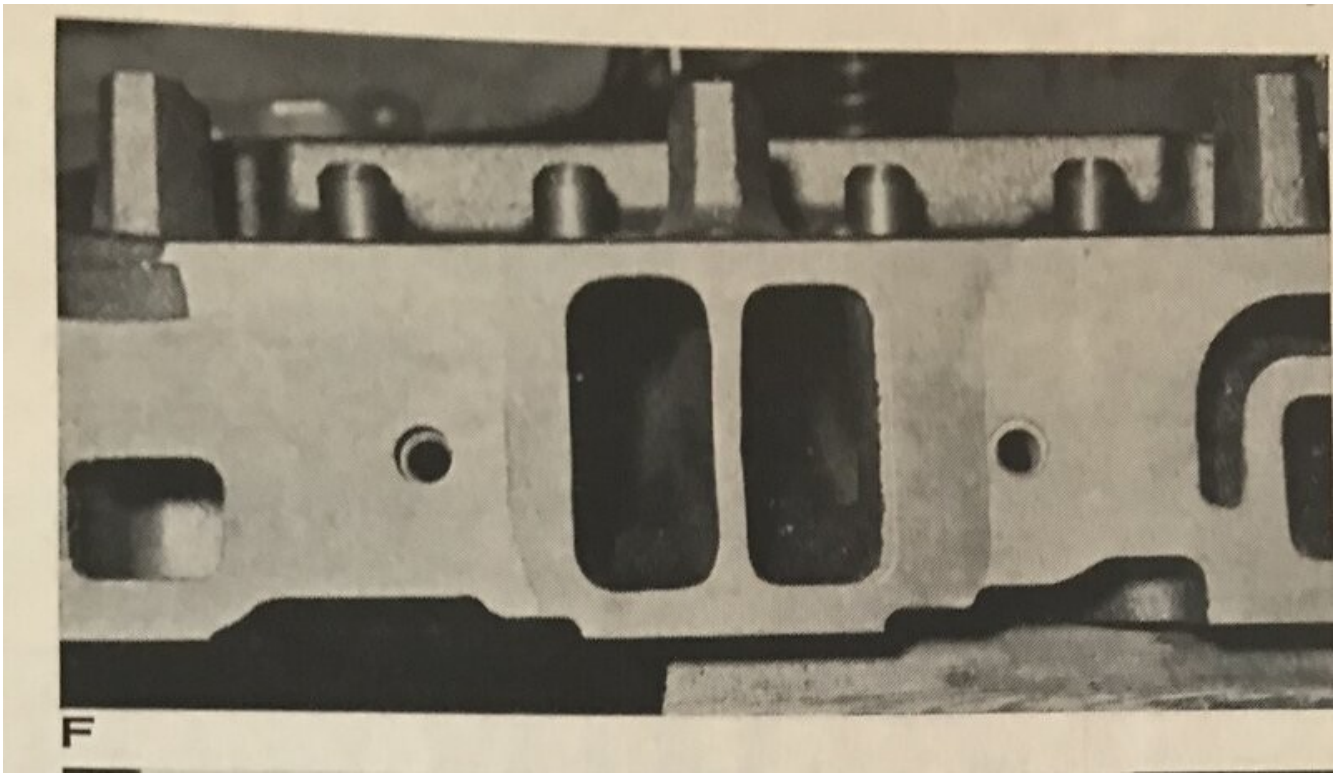

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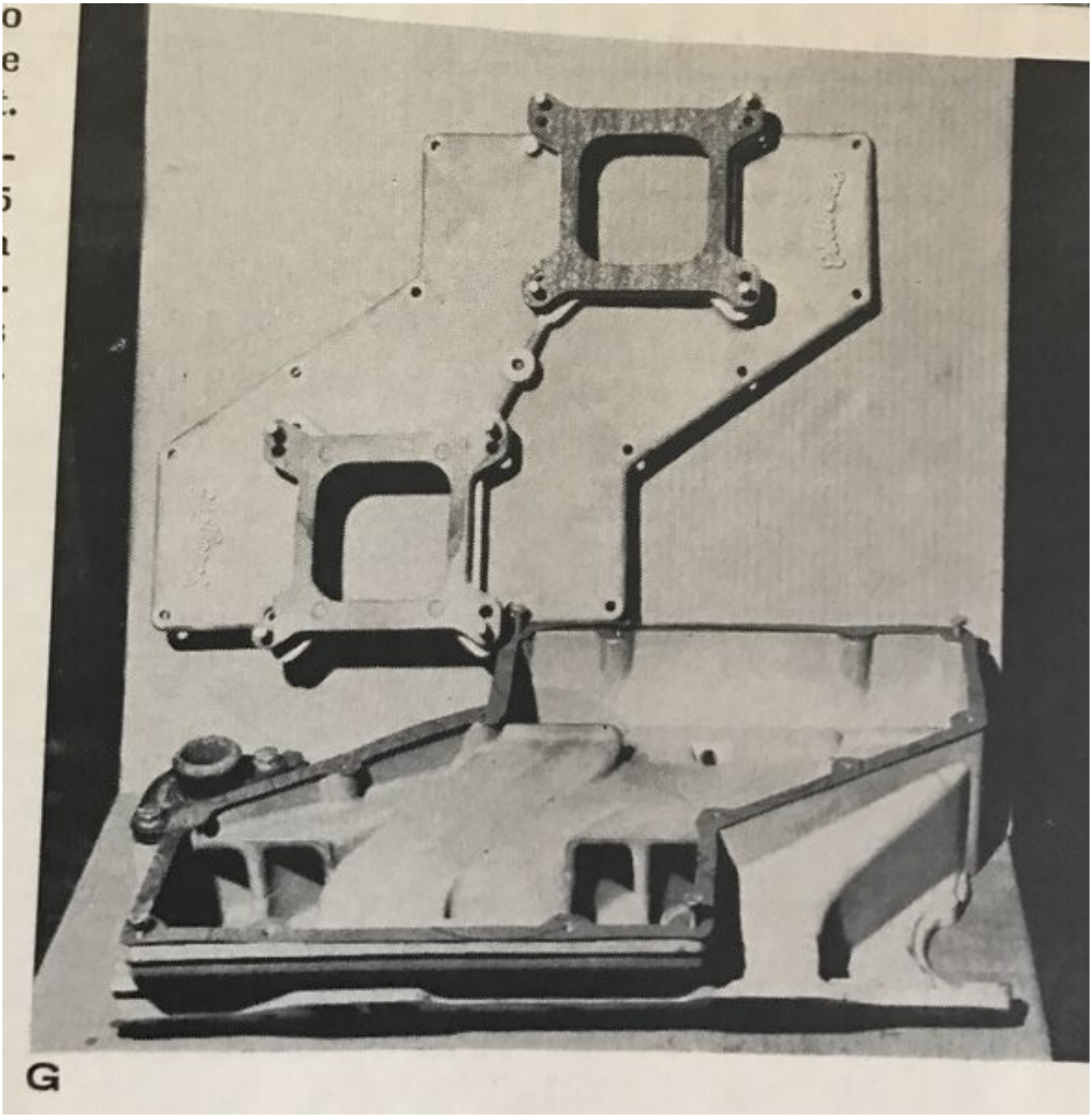

G

*A — Note that these heads aren't polished or hogged out to increase air/fuel flow; instead, Bob removed just the right amount of excess material. B — Shows stock piston configuration after valve reliefs were cut to obtain the needed air gap. C — Here's our 340 Chevy "duster" resting in a very potent Barracuda. D — Due to nonadjustable rockers, Racer Brown adjustable pushrods were used. E — Valve guide bosses were cut to accommodate the dual valve springs. The exhaust ports, while retaining their basic stock shape, were more evenly matched and finely modified. F — Comparison shot of the intake ports reveals before and after dimensions of the runners. Guess which one worked better. G — Edelbrock's new STR-12 manifold proved very promising on the Chrysler 340. It closely resembles Vic's Chevy model, and it performs just as well.*

## EDELBROCK DYNO TESTS ON CHRYSLER 340
### (all horsepower readings corrected)

| TEST \ RPM | 2100 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 5800 | 6000 | 6200 | 6400 | 6500 | 6750 | 7000 | 7250 | 7500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 111 | 138 | 181 | 218 | 247 | 264 | 278 | 280 | 272 | | | | | | | | |
| #2 | 125 | 146 | 187 | 225 | 255 | 271 | 283 | 283 | 274 | | | | | | | | |
| #3 | | 142 | 181 | 225 | 261 | 280 | 296 | 297 | 296 | | | | | | | | |
| #4 | | 143 | 185 | 225 | 261 | 287 | 298 | 302 | 313 | 318 | 299 | | | | | | |
| #5 | | 145 | 185 | 225 | 259 | 287 | 300 | 310 | 321 | 326 | 314 | | | | | | |
| #6 | | 145 | 184 | 224 | 262 | 290 | 315 | 321 | 335 | 347 | 341 | 333 | | | | | |
| #7 | | 143 | 183 | 225 | 264 | 292 | 312 | 315 | | 334 | 332 | 327 | | | | | |
| #8 | | 144 | 183 | 225 | 265 | 298 | 321 | 336 | 346 | 355 | 357 | 342 | 341 | 340 | | | |
| #9 | | 146 | 179 | 212 | 257 | 301 | 329 | 345 | | 361 | 363 | | 357 | 357 | | | |
| #10 | | 142 | 179 | 216 | 286 | 329 | 360 | 379 | | 383 | 380 | | 365 | 351 | | | |
| #11 | | 150 | 186 | 222 | 272 | 311 | 335 | 352 | | 356 | 349 | | 336 | 328 | | | |
| #12 | | 147 | 178 | 209 | 254 | 302 | 333 | 352 | | 365 | 362 | | 359 | | | | |
| #13 | | 143 | 178 | 215 | 275 | 328 | 357 | 372 | | 378 | 375 | | 363 | | | | |
| #14 | | 144 | 176 | 207 | 255 | 303 | 339 | 362 | | 379 | 376 | | 377 | 364 | | | |
| #15 | | 141 | 176 | 212 | 278 | 333 | 370 | 391 | | 404 | 391 | | | | | | |
| #16 | | 144 | 185 | 218 | 287 | 337 | 374 | 397 | | 411 | 408 | | 405 | 389 | 349 | | |
| #17 | | 138 | 181 | 217 | 280 | 336 | 376 | 403 | | 418 | 412 | | 408 | 392 | | | |
| #18 | | 133 | 163 | 192 | 234 | 321 | 370 | 407 | | 431 | 435 | | 437 | 440 | 420 | 393 | |
| #19 | | 133 | 166 | 195 | 242 | 333 | 380 | 412 | | 434 | 442 | | 444 | 450 | 431 | 409 | 388 |

**TEST #1** — Engine stock out of crate. Broken in as per Chrysler specs. Test included stock air cleaner and ignition advanced to 39 degrees. Valve float at 6000 rpm. **TEST #2** — Changed to Hooker fenderwell-type headers. **TEST #3** — Changed to Edelbrock LD-4B manifold with stock AVS Carter and .096 (stock) jetting. **TEST #4** — Engine blueprinted as per test. Pre-loaded lifters (.020) reason for valve float at 6400 rpm. **TEST #5** — Changed to Holley 780 cfm carb No. R-3310. Changed jets to #70 primaries and #74 secondaries. **TEST #6** — Changed to Racer Brown SSH-25 cam with .485 lift. Holley 780 cfm still used. Valve float at 6600 rpm. **TEST #7** — Changed to Carter AVS carb with .0995 secondary jets. **TEST #8** — Installed Racer Brown SSH-44 cam with .510 lift. Hooker headers. Valves floated at 6800 rpm. **TEST #9** — Changed to new Hedman Hedders 1¾-inch diameter and equal (30-inch) length. **TEST #10** — Changed to Edelbrock STR-12 with No. 2818 600 cfm Holleys. 37-degree advance. Jetting #70 and #72. **TEST #11** — Changed to Isky 310 hydraulic cam and kit with LD-4B manifold and No. 3310 Holley. Hedman Hedders still on. Encountered valve float at 6800 rpm. **TEST #12** — Changed to Isky 320 hydraulic cam. Valves floated at 6750 rpm. **TEST #13** — Changed manifold to STR-12 with No. 2818 Holleys jetted same as in Test #10. **TEST #14** — Changed to Bob Joehnck reworked heads with Isky 320 cam. Racer Brown outer and Isky inner valve springs. Valves floated at 6800 rpm. **TEST #15** — Changed to STR-12 manifold with No. 2818 Holleys jetted as in Test #13. **TEST #16** — Changed to Racer Brown hydraulic 44 cam. Valves floated at 7100 rpm. **TEST #17** — Changed to Spalding ignition (converted 392 hemi to fit). **TEST #18** — Changed to Racer Brown STX-21 cam. **TEST #19** — Changed to No. 4224 Holley 600 cfm carbs with #74 primary and .076 secondary plate.