CARBU-RATING

THE STOVEBOLT

Edelbrock's Edelbrock spills the beans while HRM's McFarland gathers in the same for a potful of tabulated results from all the dyno time. Pair of Holley 4-bbls. sit atop Edelbrock's XC-8 cross-ram manifold. Responsive little Chevy liked 'em.

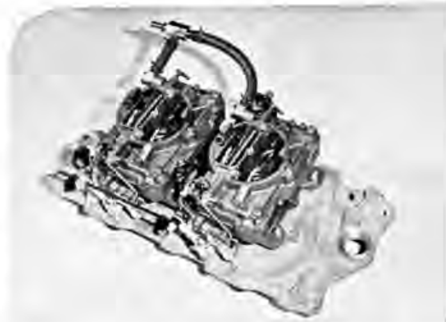
Vic Edelbrock and the Chevy V8 are a pair known well in racing circles. Both respond exceptionally well to soup-up provocations, and each, when placed in the proximity of the other, displays an increased state of performance. Recently, Vic, together with Chevy engine-builder Bob Joehnck of Santa Barbara, California, clamped half a dozen intake manifold/carburetor combinations on a "blueprinted" 327-inch stovebolt and uncovered some data that should delight owners of late *or* early bent-eight Chevy engine equipment. Vic and Bob cranked out ten separate tests on Vic's Clayton 700 dyno and recorded sufficient amounts of the various engineering goodies so that a quick glance at the tabulated results should relieve much of the financial burden fashioned by "guesstimation" when performance bolt-ons are under consideration. At the peak test rpm, the best carb/manifold combo produced 61 horses over the stock setup. Doesn't *that* blow your hat in the creek? A single bolt-on item! Suppose we set the stage and then unfold the happenings while you keep your pencil stub handy.

The test engine was a 365 hp (as per '65 GM specs) 327-incher with a single Carter 4-bbl. According to plan, the engine was uncrated, brought up to specs, chucked up in the dyno, loaded with Valvoline 20-40 XLD (Extended Long Duration) lube, tuned to factory recommendations, and subjected to about an hour of run-in at 2500 rpm with a 40-horse loading. It should be noted that the engine was *not* balanced, since it was felt that many owners for whom the following results are intended might not be able to pull and balance their engines. A pre-test inspection of the crank indicated that a slight amount of straightening would be necessary to bring the main bearing centers onto a common axis. A little airhammer work brought 'em onto line, and this, with a micro-finish to .001 undersize, prepped the crank for laying into the block. While we're discussing the crankshaft situation, it might be wise to reveal the fact that the increased demands placed on the crank pulleys of 327 Chevys have caused some rather strange front main bearing setups to come out of Detroit. The problem has been met by the installation of slightly undersized or even "tapered" front main upper halves. Since most builders remove much of the power-robbing accessory equipment, it has become a practice to replace the factory bearing with standard or undersized halves of the same journal size—upper *and* lower. Bob made such a switch and finished off the pre-test work by installing a set of Ramco rings (including the moly top ring). He also cut the guides and slipped on a set of P. C. valve seals to remove any chance of oil drainage and subsequent mixture contamination in the cylinders.

Once the engine was loosened and initial dyno charts filled in, a cam selection was made. Five sticks were run into the engine with the intent that the cam of maximum output capabilities would be used for the major test series. Following the cam choice, a Mallory YL (dual-point, no vacuum) distributor was dropped in with an initial lead of 16° which, with the 12° in the igniter, brought the total advance up to 40°. Total advance varied only slightly from this figure throughout the tests. Tailoring an advance curve to each engine test situation would probably have uncorked a few more horses, but as we mentioned earlier, Vic's tests were designed to show improvements from carb/manifold combinations only. Both Autolite AT1 and Champion HO3 plugs were used successfully. Settings of .025 for the Autolites and .022 for the Champions proved the best with the stock compression of 11.0:1. Bear in mind that alterations of cam timing or compression are going to dictate ignition timing changes to both advance

(Continued on following page)

Popular pair of AFB jugs. The 3720SA Carters on the C-26 manifolding formed the fuel-delivering source for Test #4. Hardware makes vacuum secondaries manual.



Here's a dyno'd run-down on a Chevy V8, a batch of carbs, and some of the many manifolds of Edelbrock

by Jim McFarland

TEST NUMBERS
(Corrected Horsepower)

ENGINE RPM	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
3000	163	168	169	160	160	169	170	160	170	170
3500	203	200	211	197	205	210	207	205	205	210
4000	236	232	240	225	242	245	240	244	240	249
4500	255	259	261	262	263	269	276	272	273	280
5000	280	288	295	299	292	298	319	320	313	317
5500	292	309	312	318	308	312	340	340	340	341
6000	300	318	320	330	330	330	357	360	353	350
6500	302	321	326	340	340	340	361	363	360	363

Carburetor Information: (all floats were run at stock settings)

Test #1	3720SB Carter AFB	Stock jets
Test #2	3310 Holley	#66 primaries, #72 secondaries
Test #3	2818 Holley	#67 primaries, #76 secondaries
Test #4	3720SA Carters	Stock jets
Test #5	2818 Holley	#67 primaries, #76 secondaries
Test #6	3310 Holley	#66 primaries, #72 secondaries
Test #7	1-13 Holleys	Stock jets
Test #8	3729 Carter AFB's	120-224-.0995 primaries, 120-186-.061 secondaries, .073-.063, 16-204 metering rods
Test #9	2818 Holleys	#61 primaries, #66 secondaries
Test #10	1-9 Holleys	#52 primaries, no secondaries, economizer valves removed and holes plugged

Manifolding Used:

Test #1	Factory 4-bbl standard manifold
Test #2	Factory high-performance manifold
Test #3	Factory high-performance manifold
Test #4	C-26 Edelbrock, double 4-bbl, inline manifold
Test #5	C-4B Edelbrock high-rise, single 4-bbl manifold
Test #6	C-4B Edelbrock high-rise, single 4-bbl manifold
Test #7	XC-8 Edelbrock double 4-bbl, cross-ram manifold
Test #8	XC-8 Edelbrock double 4-bbl, cross-ram manifold
Test #9	XC-8 Edelbrock double 4-bbl, cross-ram manifold
Test #10	X-1 Edelbrock six carburetor, ram log manifold

This is a meaty chart, so don't pass it over lightly. Carb/manifold combinations and individual results can save you time and money — on or off the quarter-miles.

MAIN JET NUMBERS VS. DRILL SIZE FOR HOLLEY CARBS

Main Jet Number	Drill Size
60	.055
61	.0595
62	.0595
63	.0625
64	.0625
65	.0635
66	.0635
67	.067
68	.067
69	.070
70	.073
71	.076
72	.0785
73	.0785
74	.081
75	.082
76	.084
77	.086
78	.089
79	.091
80	.093
81	.093
82	.093
83	.094
84	.098
85	.101

It should be noted that some jets use the same drill size. Flow is controlled by hole size, length of restriction, and configuration of opening (attack angle of face) leading into the hole in the jet. Jets are sized and numbered acocrding to flow characteristics which are influenced by each of the preceeding factors.

rates *and* total advance for a given engine application.

Finally, we want to mention that straight dyno readings as such are not as valuable as *comparative* readings. For example, a given engine can conceivably indicate different output figures on different dynos. Thus, the merit of such testing lies largely in comparative readings on the *same* dyno as engine components are changed or altered. Percentage of increase or decrease can be seen from test to test and, of course, this is the yardstick for evaluating modifications. Let's read 'em and see.

Test number one set up the baseline. The stock factory 4-bbl. cast iron manifold, a 372SB Carter AFB adjusted to factory specs, and stock jetting formed the beginning. Dyno figures are charted under the Test #1 column heading. Since valve float was occurring just under 7000 rpm, 6500 was set as the maximum test speed for all the work. Rev kits and other trick stuff could have raised the "float" limit, but once again the pocketbook of the average rodder got the nod, and the valve train remained "factory."

With the first test logged, a factory high-performance manifold installed, and the Carter AFB pulled and replaced with a 3310 Holley (785 cubic feet/minute flow rate) jetted with #66 primaries and #72 secondaries, Test #2 was run. The jets were leaned slightly from stock, since the 3310 is designed to dump into a 396 Chevy – almost 70 cubes larger than the 327. Venturi area for the 3310 is just a hair over 6 square inches at 6.23. This is a rough increase of 2.6% over the 6.07 square inches of area in the bottom of the 3720SB Carter. The increased area dropped the intake charge velocity slightly but enabled the engine to breathe a little more freely in the upper rpm ranges. Peak horsepower in Test #2 was up 19 horses at the 6500 rpm ceiling.

Still operating with the factory high-performance intake, the 3310 Holley was replaced with a 2818 Holley (stock jetting at #67 primaries and #76 secondaries). The venturi area of this jug drops to 5.98 square inches, but a close investigation of primary and secondary diameters will support the test results. Each primary bore of the 2818 has a diameter of 1.25 inches and yields an area of .52 square inch smaller than the primary side of the 3310. The smaller openings increase the intake velocity and, theoretically, should increase power during engine speeds for which the primary side of the carb is designed. The theory holds, as the 2818 produced its greatest boost in the 3000-5000 rpm range. Outputs of the 3310 and 2818 began to merge around 6000. The test chart should serve as clarification if you're still a little "confusicated." At the core of the whole business is the fact that the engine needs as much air/fuel mix as it can get, as quickly as it can get it; and, during the lower rpm, the smaller venturi carburetors can be of help.

Test #4 involved an Edelbrock C-26, double 4-bbl., in-line manifold and a pair of 3720SB Carters. This setup lacked response through mid-range engine speeds, although the inherent breathing capabilities of the increased carburetion ran peak output up 14 horses over the maximum of Test #3. Mid-range readings were comparable to those for the single 4-bbl. rig used in Test #1. Both Carters were jetted and "floated" according to book specs.

Tests #5 and #6 concerned the high-rise, 4-bbl. manifold that Vic produces (C-4B) and two Holleys – the 3310 and the 2818. The advantage of the high-rise design lies partly in the fact that added chambering between the carburetor base and intake ports (in the heads) provides the engine with a greater volume of air for intake gulps. Volumetric efficiency is a comparison of gas mixture weights. More exactly, it is the weight of a gas mixture drawn into an engine by the sucking action of a piston divided by the weight which would fill the same cylinder if it were left open and under the influence of standard conditions of atmospheric pressure at 60°F. The high-rise manifold presents the inducting cylinder with a greater volume of mix when the intake opens and thereby runs up the volumetric efficiency of the engine – all else being equal. So, up goes the output figure. With the same carburetor and only a change in manifolding

(continued on page 106)

ABOVE–Here's the way home for street rigs – C-4B high-rise loaded with the 2818 Holley. Anybody's grocery-getter.

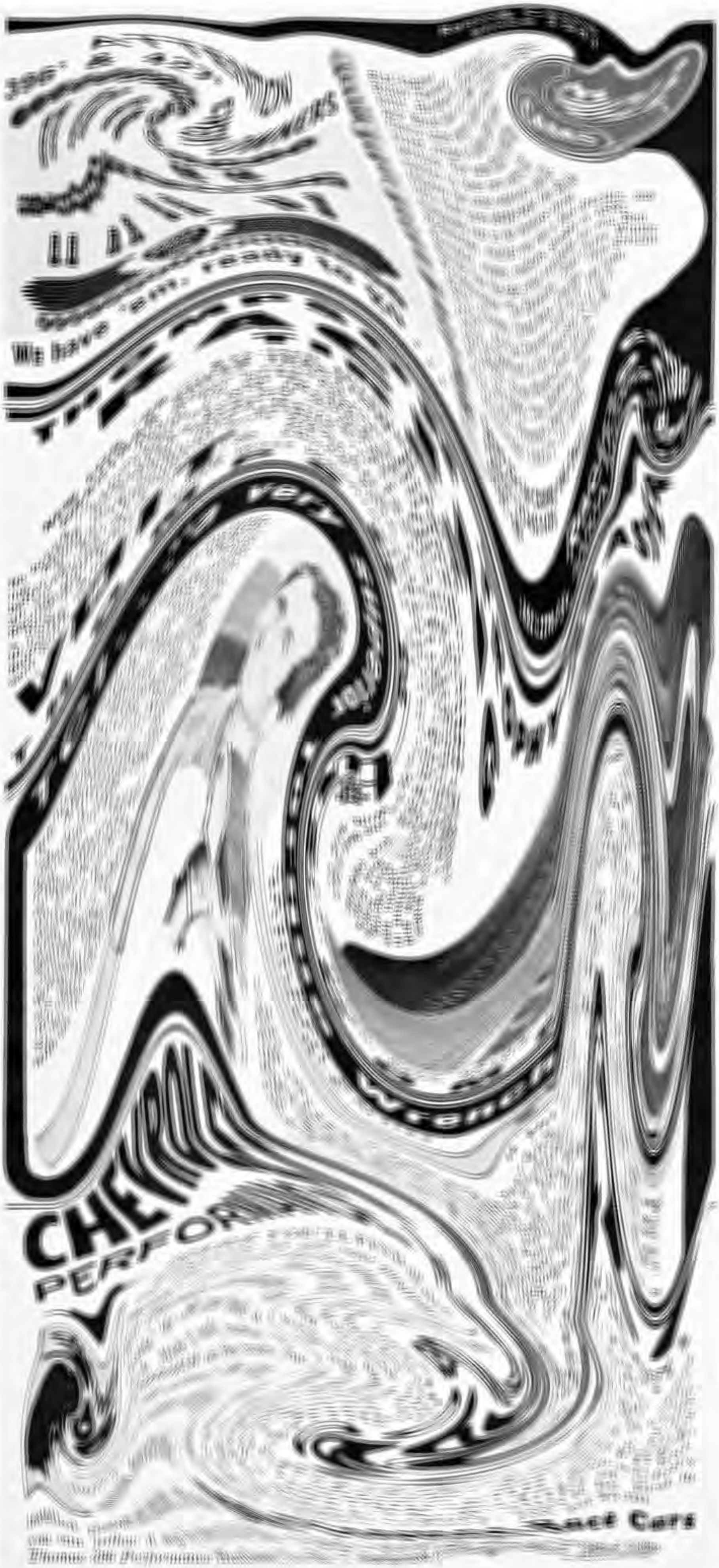
TOP – Trim this list out and stick it in the lid of your favorite toolbox. It could save you the price of a pill.

FAR RIGHT – The poor-boy's Webers. Six 1-9 Holleys on the X-1 cross-ram suction box produced some 60 horses over the factory rigging. Hungry, huh?

RIGHT – Tube pipes mentioned in the story. Gases were muffler-routed.

CARBU-RATING THE STOVEBOLT

continued from page 36



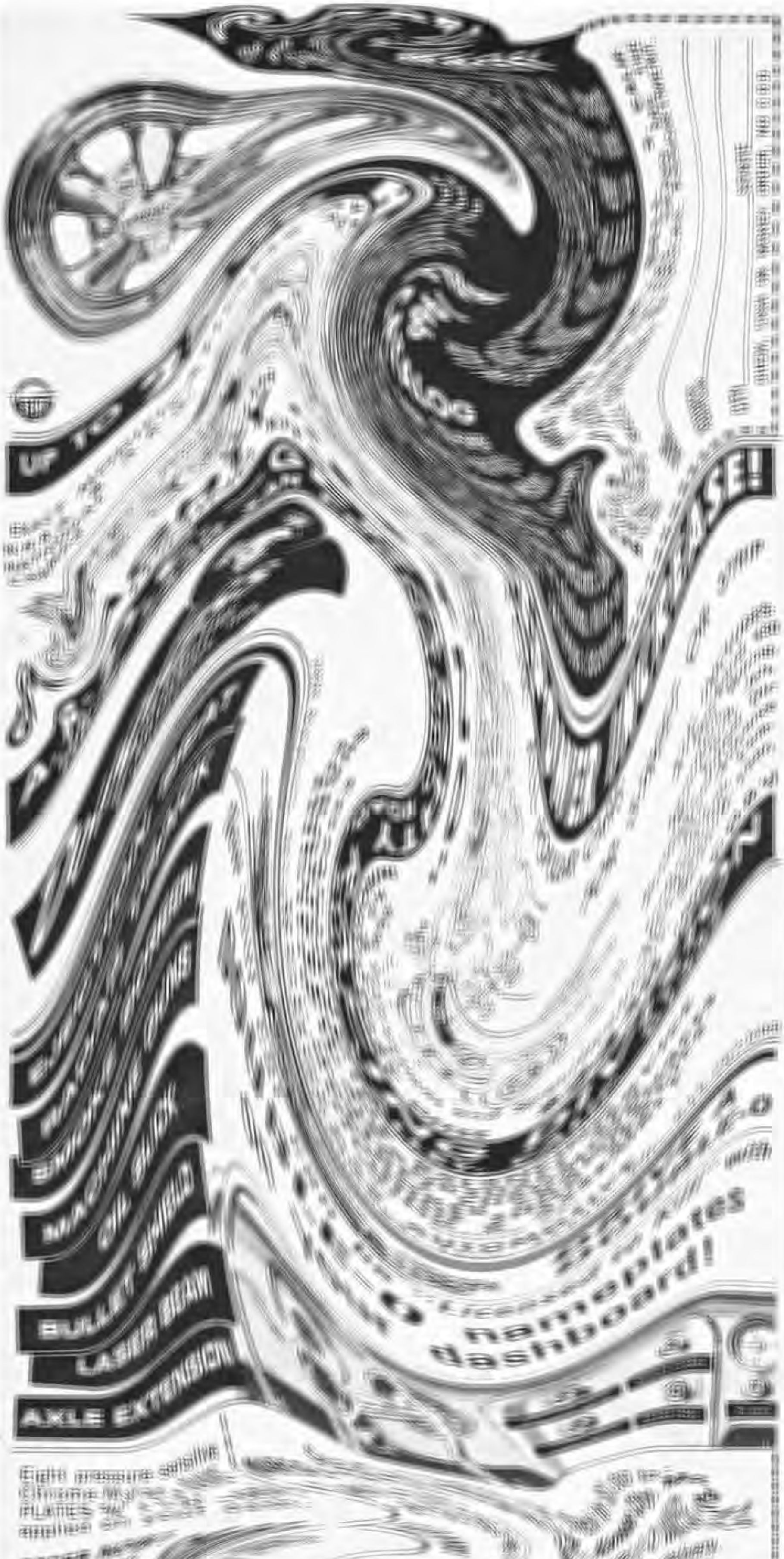
(stock cast iron to aluminum high-rise), power was up 39 horses at the test rpm peak. As per the chart of test information, both the 2818 and 3310 retained stock jetting and float settings throughout Tests #5 and #6.

Next up was the cross-ram manifold that sports two 4-bbl. carbs. Three tests (#7, #8 and #9) were run with this manifold with results so similar that for "flat-out" applications, little or no advantage seems to result from the different carburetor types tested. Street versions of this rig might best be built around the 1-13 Holleys which, with this manifolding, produced a slight edge over the 2818 Holleys and 3720SB Carters. A glance at the chart will reveal that the choice of which carb type to use is almost a toss-up. Feel the pulse of your pocketbook and start pickin'.

Following Test #9 and a little wrench work, the 6-carb, cross-ram manifold lay snugly between the heads, bearing resemblance to a nest full of young birds; heads up and mouths open. The six 1-9 Holleys squatting on the manifold had undergone a slight change that would merit our investigation. During engine operation, the columns of air in the ram-type manifolds tend to pulsate. When carburetors with economizer valves are subjected to this positive and negative alternation, a certain amount of unnecessary fuel is drawn into the manifold. In effect, the economizer valves wiggle up and down and dribble in the extra juice. Vic remedies this situation by pulling the economizer valves and plugging the holes. With such a modification, metering is accomplished through the high-speed system only. This, with the removal of the choke assemblies from each carburetor, completed the piddlin' necessary on the 1-9 Holleys. Incidentally, Vic decided to use the 1-9's in lieu of the Stromberg 97's since the Holley jugs come with a price tag of about $22.00 as compared to the $38.00 or so that you'll shell out for the 97's. That's a difference of 64 quarters, new *or* old!

One additional pair of tests was run. These concerned two different exhaust manifold types; one, the factory "ram's horn" castings introduced shortly after the Chevy V8 made its debut in '55, and the other, the Hedman rig shown in the picture on page 36. At the test peak, the tube jobs drew out 22 more horsepower than the factory manifolds. At no time in the 3000-6500 rpm range did the factory headers produce more than the tube works, although the most noticeable gains came in the upper engine speeds. This, of course, is where the increases derived from special exhaust manifold-

(Continued on page 108)



CARBU-RATING THE STOVEBOLT

continued

ing are normally developed. Don't forget that all the extra mix the fancy intake setups provide must be removed when all the fire is out.

The whole program bore out the fact that for "stock-type" applications, the C-4B manifold with the 2818 Holley would probably be the wisest choice. This rig will deliver performance boosts and still retain a reasonable degree of economy. The hungrier engines can benefit from the 3310 Holley on the C-4B manifold, since the exotic cams, higher squeeze ratios, and other pep-up options need the extra mix. On all double 4-bbl. arrangements, the secondary systems should be made to operate manually instead of by vacuum. If you don't make this seemingly small alteration, you can lose as much as 20 horses, although the single 4-bbl. outfits don't require this move. Vic has a kit (#2307) for about $1.50 that makes this switch a snap.

Before we button this up, we want to point out a few bits and pieces regarding Holley jetting and maybe clear up some of the malpractices being employed for jet alteration. Holley jets are sized according to total flow characteristics, not simply by the diameter of the jet opening. In the accompanying chart, notice that although some main jets are denoted by different numbers, they have the same drill size opening. Hole diameter alone doesn't make the jets identical. The length of the restriction, the angle of the taper leading into the opening, *and* the diameter all combine to produce a particular flow rate for a particular jet. Keep this in mind when you start running a bit through a Holley pill. Hopefully, the chart will give you an assist.

So now while Vic's dyno is catching its breath, the little 327 is losing its tendency to flinch whenever someone places another intake setup on the bench nearby, and you are digesting the results of all the dyno hassle, we'll amble off down to the house of Edelbrock and see what's up next. Rumor has it there's a fresh wooden crate sitting in the dyno room and that Vic is rummaging around for his pry-bar again. Better keep that fifty cents handy. ■■