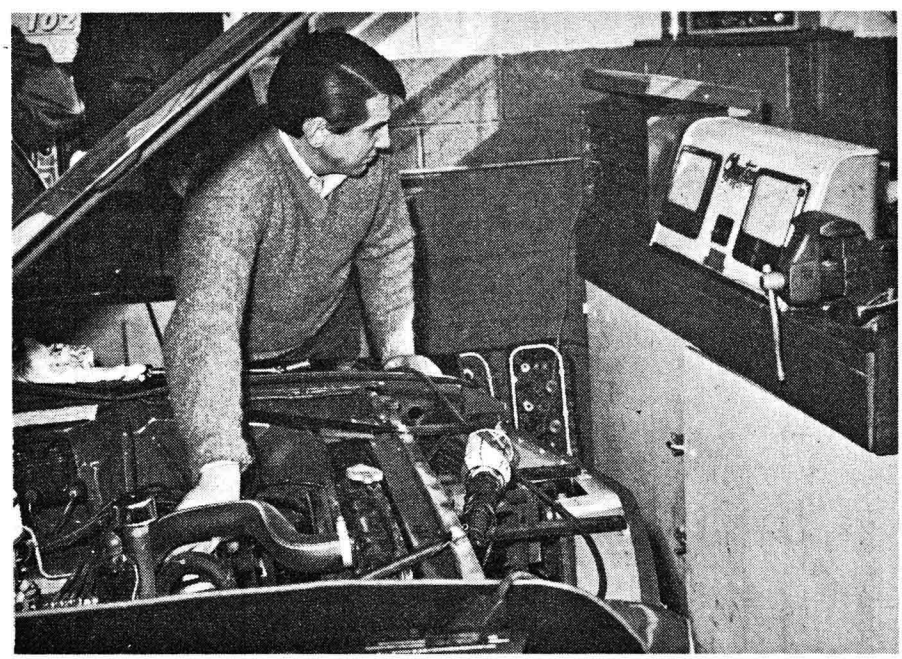
PROJECT 390 SUPER JAVELIN

PART 1, DYNO TUNING

NOW THAT OUR STREET ROADSTER PROJECT IS ALL WRAPPED UP, WE'RE READY TO TAKE ON AMERICAN MOTOR'S 390-CUBIC-INCH SUPER SPORTSTER. FOR A STARTER WE PICK UP 20 REAR WHEEL HORSEPOWER VIA DYNO TUNING. HERE'S HOW

HOW THAT our street roadster project has been wrapped up (see May issue of CARS, "Where the Action is") all attentions have been turned toward our '68 project, 390 SUPER JAVELIN. The idea behind this program is to turn a showroom stock Javelin into an ultimate image and performance street machine without resorting to expensive internal engine work, radical body restyling or anything that might detract from its functional reliability. The finished product, as we and our panel of experts see it, will be a headturner at any drive-in, a super performer on the street, and a candidate for honors at the track. And, needless to say, our Javelin will handle the way a sports GT is supposed to.

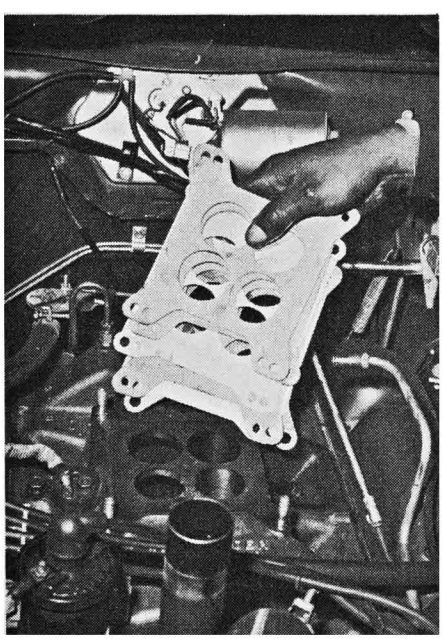
Before going into the first stage of our project—Dyno Tuning—we would like to familiarize our readers with the basic product we're working with. Our project car is a stock 390-cubic-inch Javelin SST finished off with red Acrylic Enamel, white stripes and a black vinyl roof. It was custom built to our specifications and features the following options: headrests, stereo tape, tilt wheel, power steering, power disc brakes, and the complete AMX super-duper suspension which includes the neatest set of traction bars ever to come out of Motown. The only thing missing was the chrome en-



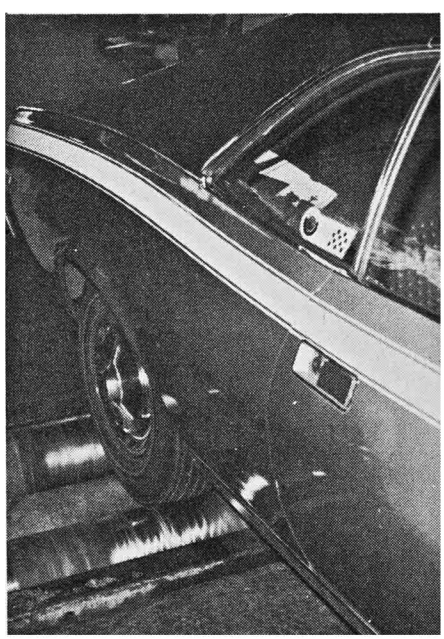
Straight stock 390 mill was set up using a Sun 1020 scope and a Clayton chassis dyno.

For maximum ignition performance, the vacuum advance mechanism was disconnected and the outlet at the Carter quad blocked off.

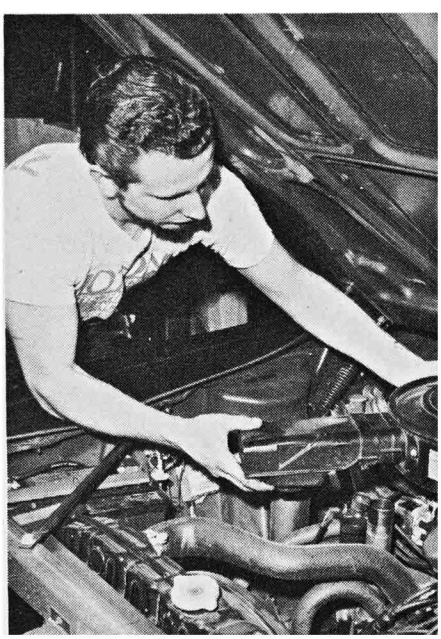
New 390 mill requires minimum mods for maximum street performance



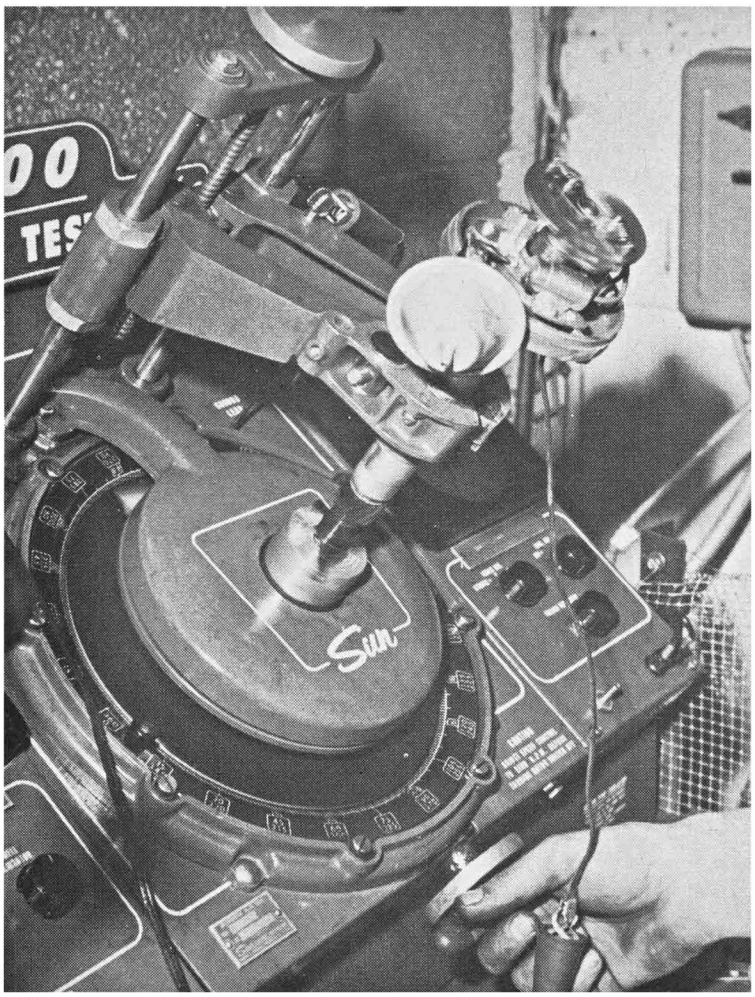
Aluminum composition heat spacers insulate fuel mixture from high engine temperatures.

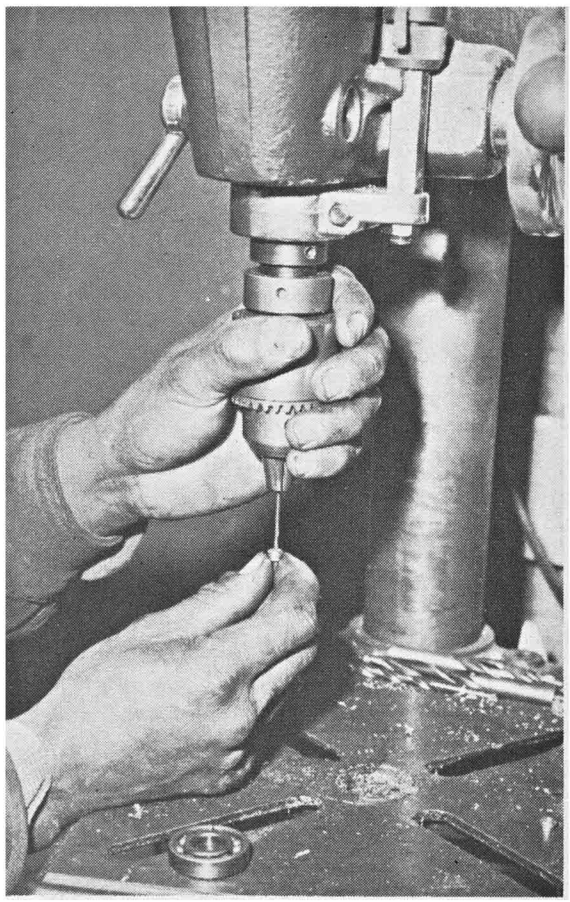


An honest 20 rear wheel horsepower increase was noted during programmed dyno tune.



Stock silenced air cleaner complex was deleted in favor of a chrome free-flow job.





Since replacement jets weren't on hand, the stockers were carefully drilled out .002 inches. Stock distributor was recurved for total advance at 2500 rpm and fitted with special Mallory float-free X-series points.

gine dress-up kit which is standard equipment on the 390. Our 390 was built before the kit was, however. Our's was the very first 390 engine built for Javelin production and was used for engineering evaluation tests before being turned over to *CARS*.

The 390 engine, from all outward appearances, looks like the more consumerish 343 which held the top spot in the AM lineup until now. However, in the case of the 390, it's what's inside that counts. It's rated at 315 horsepower at 4600 rpm and 425 foot pounds of torque at 3200 rpm and sports a 10.2-to-1 compression ratio, new heads with higher flow passages, 2.025-inch intake valves and 1.625-inch exhaust valves, a five main bearing forged steel crank and rods with HD bearings and matched flow intake manifolding. Considering its impressive output, the engine is real lightweight tipping the scales at less than 600 pounds.

Our project Javelin was equipped with AM's three-speed torque converter transmission with the Shift Command console setup and 3.15 limited slip rear gearing. Since we wanted to start with a straight car—one that could be ordered by anyone walking into an AM dealership—we did not push for optional gears that are dealer-installed options. We will, however, change the gearing to a more ideal setup after we go through the programmed engine modifications.

After we got things ironed out (Someone crossed four plug wires which caused rather lazy performance, but was hard to detect because of the close firing order of the engine and the fact that Number one cylinder was correct and the engine was able to be timed) the car

CARS PROJECT 390 SUPER JAVELIN

STAGE I, DYNO TUNING

Shop: Motion Performance, Inc., 598 Sunrise Highway, Baldwin L.I., N.Y.

MODIFICATIONS	PRICE
Dyno Tuning	$35.00
M/P-Mallory X 7500RPM Points	4.95
Champion N-10-Y plugs (8)	6.00
Carburetor spacers	2.98
M/P High Flow chrome air cleaner	6.50
Total Cost	$55.43

felt good, but not really competitive with what's happening on the street nowadays. Handling characteristics were superb with the rear traction bars dampening out all traces of wheel hop, and the HD front sway bar and HD shocks and springs supplying the necessary high degree of roll stiffness. The steering was almost neutral which made for an extremely pleasant handling machine. All in all, the car impressed us far more than we had expected.

The first stage of 'Project 390 Super Javelin' involves the dyno tuning of the straight stock product, substituting a minimum amount of custom parts for the stock stuff to keep costs way down. This is, however, the ultimate method of gaining maximum performance from a straight, street-driven car. This phase of the operation was carried out by the supercar specialists at Motion Performance, Inc.

At Motion the Javelin was tied down on the Claton chassis dynamometer's rollers and the engine wired to a Sun 1020 scope setup. After the spark plug leads were correctly laid out, the car was run up to approximately 5000 rpm for a rear wheel horsepower rating of 170. Not very impressive by today's wild engine ratings, but not bad for stock honest horsepower.

In their quest for additional horsepower, they removed the Carter AFB quad, and dismantled it for jetting. Because of the automatic transmission and extremely mild rear gearing, the stock metering rods and primary jets were retained and the secondaries drilled out .002 inches. Since replacement jets weren't on hand, the stockers were *carefully* drilled out by hand on an electric drill press to avoid inaccurate scoring of the jets. The choke lockout arm on the driver's side of the carburetor was removed to prevent the secondaries from hanging up at a later date. Before the carburetor was reinstalled, a set of aluminum composition heat spacers was installed on the manifold riser to help isolate the carb and fuel from engine heat, thus protecting against fuel percolation and vapor lock. The outlet for distributor advance vacuum was blocked with a section of hose capped by a bolt.

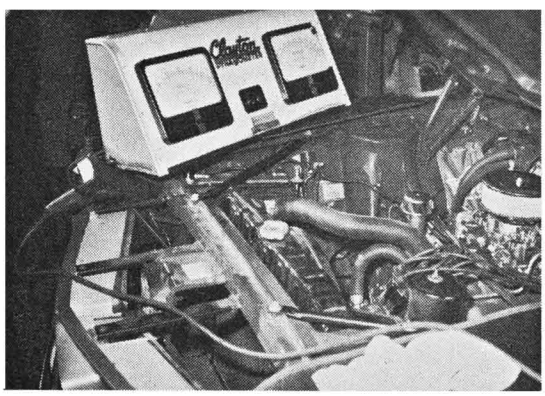
Next the Delco-Remy distributor was pulled, put on a Sun machine and recurved (special springs) for total spark to come in around 2500 rpm. It was also fitted with a set of Mallory float-free special X-series M/P points. Since a correct curve must be set up on a professional distributor machine, it doesn't really pay to go into the step-by-step procedure used to curve the distributor. The average cost is 12 dollars and it's included in the basic dyno tune. The distributor was reinstalled, sans vacuum advance, and a fresh set of Champion N-12Y (super long reach plugs) sparkers gapped at .032-inch were installed. For track use one heat range colder plugs are recommended.

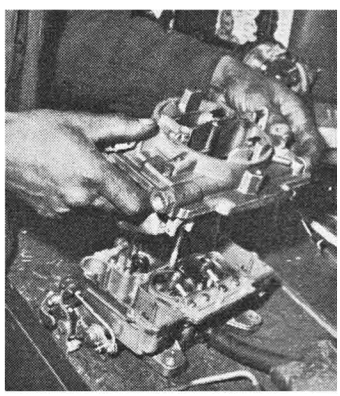
The car was run up again on the dyno to determine ultimate power timing and to see how much horsepower we picked up. The engine immediately sounded more powerful, which was attributed to the high flow non-silenced chrome M/P air cleaner which was substituted for the big stocker. Positive crankshaft ventilation was altered via the installation of a hose which is fitted to the rear of the intake manifold and runs down along side the bellhousing of the engine. This time the engine revved up considerably quicker and maximum horsepower (190) came in with timing set at 35-36 degrees. An honest increase of 20 rear wheel horsepower.

After tuning we road tested our Project Javelin and were amazed at the newly-found power. Since wheel hop is dampened out by the factory suspension, we were able to come off as hard as the tires allowed without any problems. Best performance was recorded by manually shifting the automatic at 5500 rpm with no traces of hydraulic lifter pump up or transmission slippage. We were genuinely surprised as redline on the

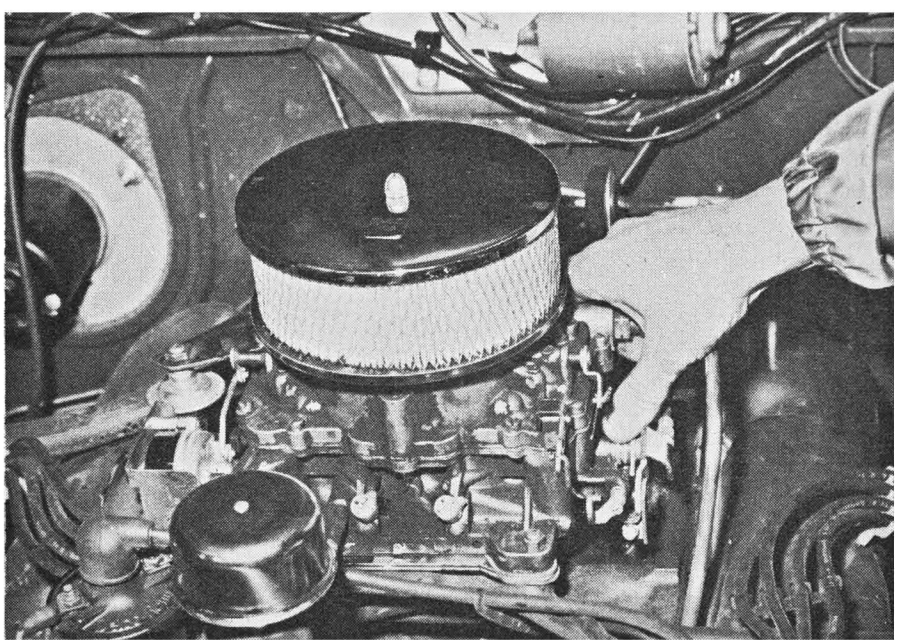
(Continued on Page 80)

It's a natural for bolt-on engine hopping





With minor mods planned, 390 mill shows a rear wheel horsepower potential of well over 250. Stock quad was jetted and floats checked prior to reinstallation.



Choke lockout link was removed from the quad to insure positive secondary operation.

to 850 cubes especially when you can't even tell there's a second transmission shifting. It's absolutely unreal!

What started out as an individualized GT has grown to become a monster. Local executives in the area have seen and ridden in the original and are begging for copies. Now Grant MacCoon can't decide whether to keep it as a one-of-a-kind car or build duplicates on order for customers. Anyone for a 770-horsepower Toronado?

SUPER JAVELIN continued

engine is approximately 4800 rpm. Motion's test driver blew the doors off a big block four-speed Mustang and a 350 Camaro, packing it out to 5500 rpm in First and Second. It takes a while to pack out Third due to the 3.15 gearing.

That's it for Stage I. In the following months we'll go into various high-rise induction systems, tuned headers, special ignition, suspension tricks and some interior and exterior restyling as we turn our Project car into a four-wheeled happening.

MAIDE IN DETROIT continued

way. With the right drivers, AMX 390 should be able to hold its own in any event. The price of 3,295 dollars beats Corvette by a grand.

Californians like specialty cars. Imports grabbed 20% of the Golden State market last year, double the national average. Things like Firebird, Riviera and Cougar also topped their nationwide penetrations in California. This explains Pontiac's decision to build Firebird at Van Nuys Plant, starting in March, and the success of Buick's California GS Riviera. California GS, a high-performance coupe previously sold only on the Pacific Coast, now it is being marketed nationally. The Gran Sport offers the following items on its 2-door Riviera: 4-barrel carbs, automatic transmission, chrome-plated wheels, full exterior chrome moldings, custom vinyl top, front and rear carpeting and a California GS insignia on the rear fenders. The Engine is Riviera's 350 CID V-8. Buick is defying an industry jinx by national marketing of a car with a local US nameplate. Many such efforts have been tried, buy only three survive: Chrysler's New Yorker, and Pontiac's Bonneville and Catalina.

There will be a series of turbine-powered STP-Lotus racing cars built this year by Andy Granatelli, creator of the famed STP-Turbocar, and Colin Chapman, chairman of Lotus Cars, Ltd. Six turbine-engined racers will be built for 1968 Indianapolis 500 classic at Lotus Cars, Ltd., Norfolk, England, and in the STP-Paxton shops at Santa Monica, California. Engines will be Pratt and Whitney ST6B Turbines conforming to 1967 racing rules, under which the STP-Turbocar almost won last year's race. Drivers of three of the '68 turbocars will be Parnelli Jones, who drove an STP-Turbocar last year, and former world champs Jimmy Clark and Graham Hill. All three are former Indy winners. The plans are to run four cars and keep two in reserve.

GM is playing it coy on formalized racing sponsorship. An exchange between a reporter and new president Ed Cole at a mid-February press conference in Detroit was unpublicized: "Mr. Cole, do you believe GM should get back into racing?" Cole answers: "That's an unfair question." He is known to be a racing enthusiast, sympathetic to division general managers' yen to back speed teams on an authorized basis. The reporter, hanging in there, like a good reporter should: "I didn't hear you answer." GM Chairman James M. Roche, seated next to Cole and a racing dissident: "I'm waiting for the answer, too." (Laughter.) Cole replies, "Under the circumstances, no." GM is taking a cautious "safety first" approach on formalizing racing re-entry. Former chief Cole, of course, would flash the green light for resuming full-scale early Chevy and Pontiac programs. But GM was burned so badly by Nader that it is still paying dearly in terms of poor publicity whenever a Congressman raises the question of price increases related to safety equipment, smog emissions or the like. So when Cole says, "under the circumstances," he is reflecting the climate of the moment rather than his personal convictions.

The biggest news out of the Chicago Auto Show was Chevrolet's intro of the clutchless shift transmission for Chevy II and Camaro Sixes. Priced at 69 dollars, Chevy's new "Torque-Drive" is a 2-speed torque converter transmission operated by a shift lever on the steering column. Driver may start from a complete stop in either low or high gear and manually shift or downshift at normal speeds. Price-wise, Torque-Drive undercuts other six-cylinder Chevy automatic transmissions by about 100 bucks. It is aimed to vie in appeal with Volkswagen's new semi-automatic Beetle transmission, which is accounting for upwards of 10% of VW sales in the U.S. Chevy has another unstated goal: To hype sales of sixes which declined for all makes with escalation of V-8 appeal. Chevy would also like 18 months of road-testing of Torque-Drive on stock sixes to prepare for the intro of a subcompact more directly competitive with VW, Opel, Toyota, et al. By the way, a 4-cylinder engine is still available on the Chevy II. A total of 453 Chevy II fours were sold last year, down from 1,003 in 1966. Speaking of Chevy's downside, Corvair ended 1967 with 24,736 retail deliveries, sliced from 88,591 in the previous year. Barring

(Continued on Page 82)

PROJECT 390 SUPER JAVELIN

PART II, BOLT-ON SOUPING

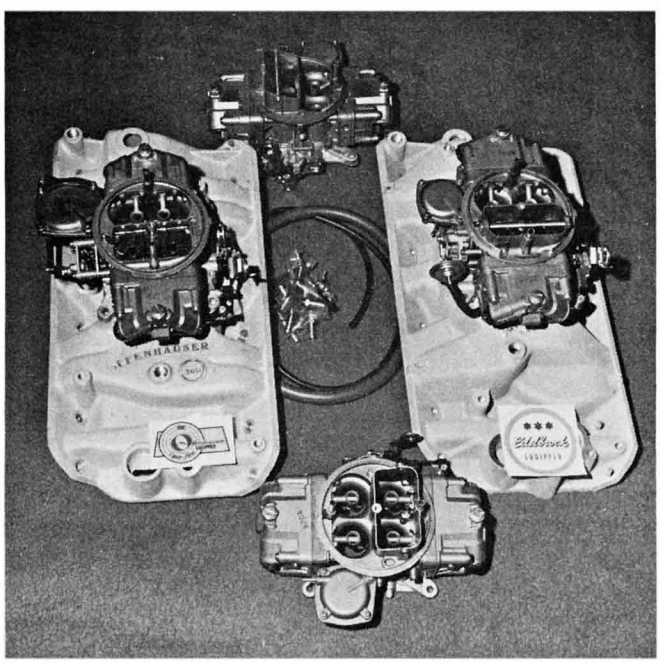
Here's the straight scoop on bolting 30 rear wheel horsepower on AM's 390-inch wedge

IN PART I of our Project 390 Super Javelin, we surprised everyone, including ourselves and some American Motors executives, picking up an impressive 20 rear wheel horsepower (170 to 190) via simple dyno tuning and a low, low cash outlay of just 55 dollars. We would love to keep the horsepower/cost ratio about the same throughout the project, but anyone who has ever tackled a performance project understands that this is almost impossible. The first horsepower gain is always the easiest and the cheapest.

For the second stage of our performance-image project, we have decided to deal with the most simple, easiest-to-understand-and-handle performance modifications—the bolt-on's. The areas covered by the modifications are carburetion and ignition.

To come up with the ultimate setups we worked closely with the top names in the speed equipment industry—Holley Carburetor, Mallory Ignition, Edelbrock and Offenhauser. Each supplied a variety of component parts, so that we could run our own dyno and street tests and come up with the right combination. In fact, Holley supplied us with two cases of careburetors, containing fuel feeders of all sizes and shapes ranging from a 565 cfm little guy to a 950 cfm three-barrel.

Both Offenhauser and Edelbrock make excellent high-riser aluminum manifolds (for three and four-barrel carbs) for the 290-343-390 line of AM motors, so it was really impossible to make a choice. After testing both manifolds, with a full range of carburetors (reading plugs to de-



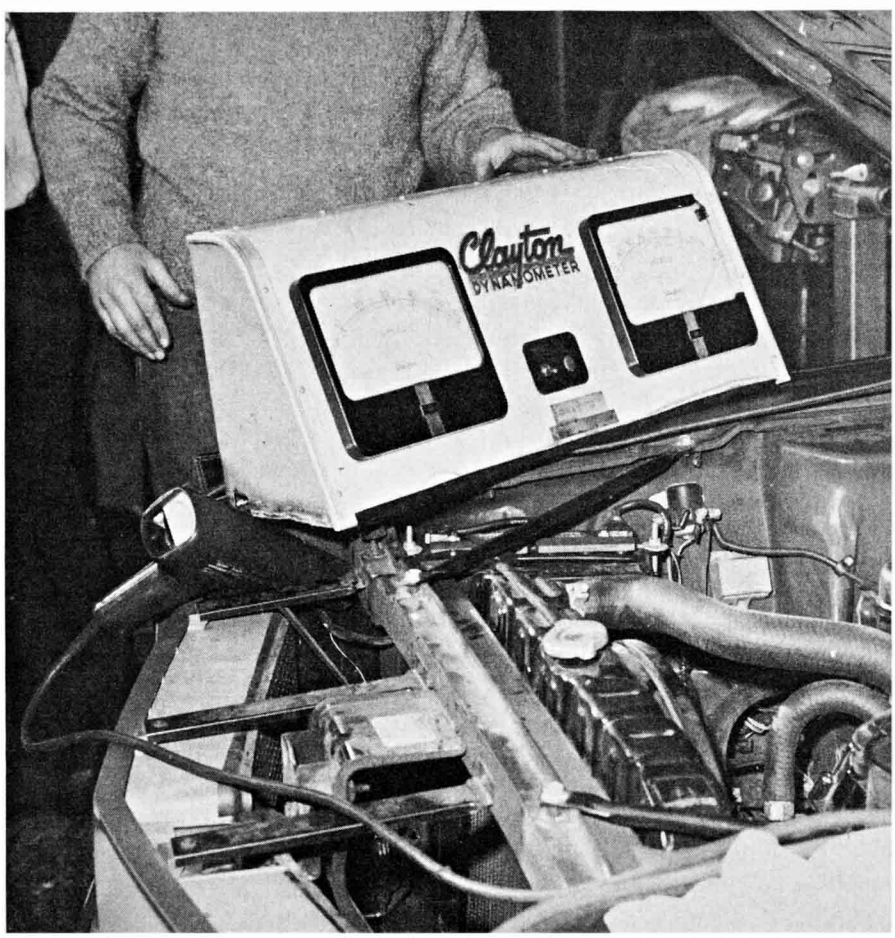
Edelbrock and Offenhauser manifolds with Holley pots used on 390.

Dressed-up mill is fired by M/P custom-calibrated Mallory ignition.

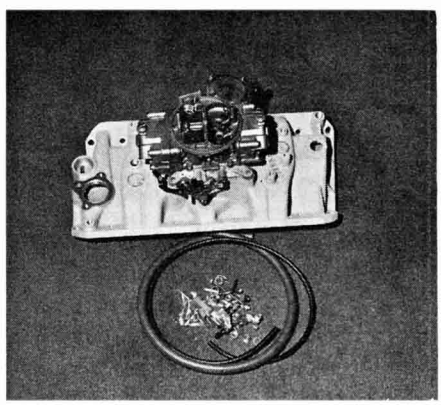
CARS PROJECT: 390 SUPER JAVELIN

STAGE II, BOLT-ON SOUPING
Shop: Motion Performance, Inc., 598 Sunrise Highway, Baldwin, L.I., N.Y.
MODIFICATIONS

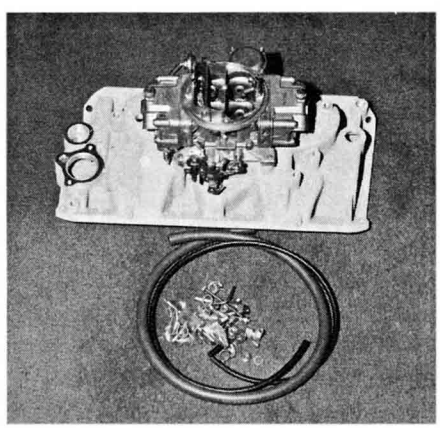
EDELBROCK R-4B #2295 High-rise manifold	$109.50
Edelbrock Equipment 411-C Coral Circle El Segundo, California	
EDELBROCK 2296 K Installation Kit	$16.50
Installation w/carb	$35.00
OFFENHAUSER 360 #5771 High rise manifold	$92.50
Offenhauser Equipment Co. 5300 Alhambra Ave. Los Angeles, California	
OFFENHAUSER air cleaner #5717	$19.95
OFFENHAUSER finned valve covers	$52.50
Chrome dual gas line kit	$6.50
HOLLEY R-3310-AAS 780 cfm quad	$80.00
Holley Carburetor Co. 11955 E Nine Mile Road Warren, Michigan	
Holley 3916-1AAS-950 cfm three-barrel	$150.00
M/P MALLORY SUPER-SPARK IGNITION Distributor, coil, Ramcharger wires	$94.95
Mallory Electric Co. M/P Division 12416 Cloverdale Ave. Detroit, Michigan	
Installation	$15.00
M/P SUPER PUMPER dual electric fuel pump	$29.95
Motion Performance, Inc.	
Installation	$20.00



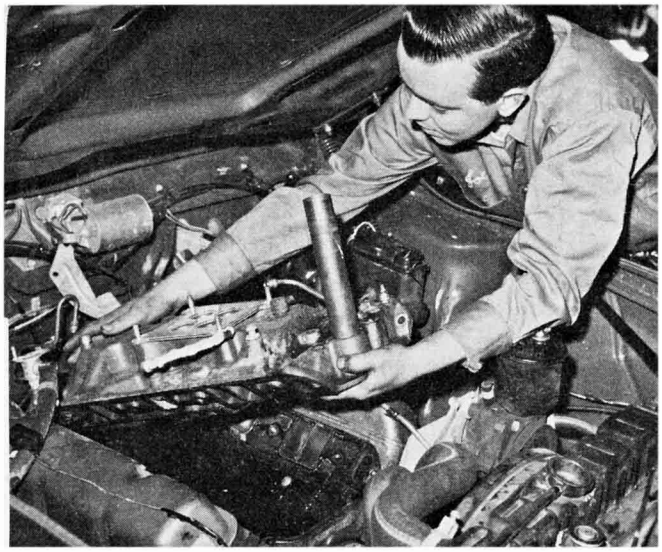
With ignition and induction goodies bolted on, mill put out 210 hp at 4700 rpm, 220 at 5000.

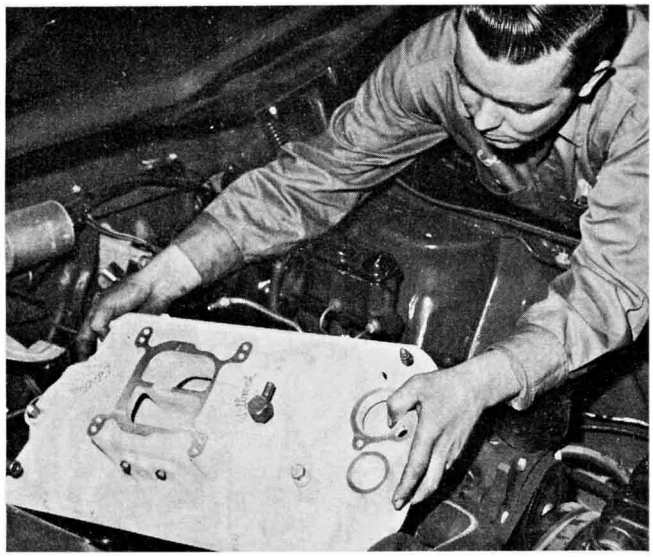


Offy 360 degree manifold with Holley 950 cfm three-barrel reserved for strip testing.

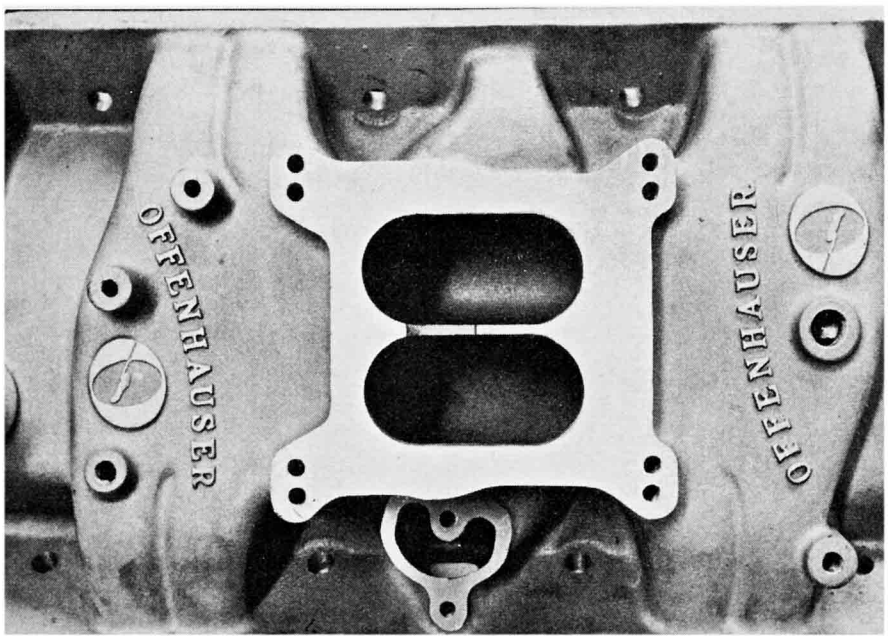


Edelbrock high-riser with 785-800 cfm Holley Corvette quad as used for street testing.

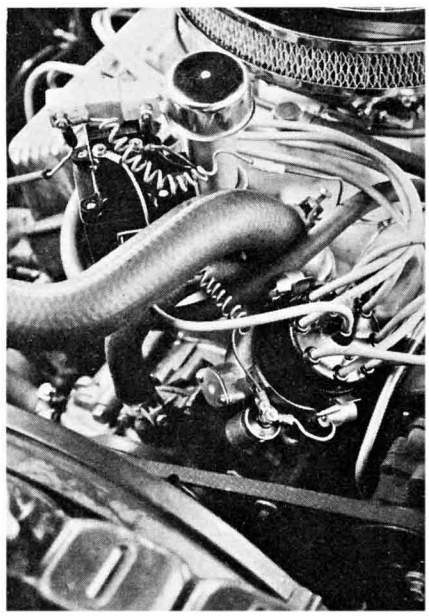




High riser aluminum manifold swap is a straight bolt-on. Edelbrock and Offy manifolds weigh much less than bulky cast iron stocker.



Offy manifold features 360-degree layout, takes all Holley three and four barrel carbs.



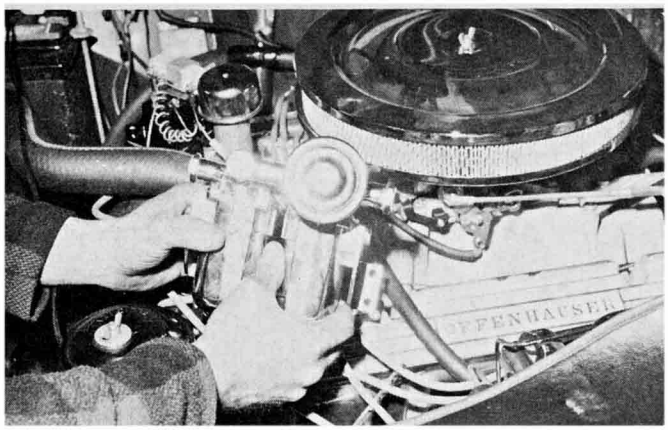
Full centrifugal advance Mallory ignition fires plugs thru Ramcharger stainless wires.

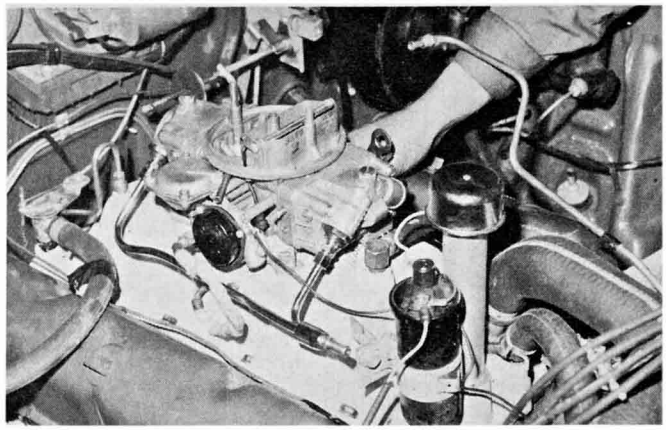
termine jetting and fuel distribution characteristics), we settled on what we think is a top combination. We decided to use the Edelbrock 180-degree manifold with a Holley R-3310-AAS four-barrel (780-800 cfm 425 hp Corvette model) with stock out-of-the-box jetting on the street. The Offenhauser 360-degree manifold will be used with a Holley 3916-1AAS three-barrel (950 cfm) when we install the special AM 302 cam and kit, 3.90 gears, and Grant Flamethrower dual coil ignition system. The beauty part of the Corvette quad carb is that it has an automatic choke and performs as though it were made for the 390 engine. And, the jetting is right there. All we did was remove the spring from the secondary diaphragm control.

Since the car will be run on the strip at a later date with the Offenhauser manifold and three-barrel, we installed an M/P dual electric fuel pump near the tank to prevent the car from running out of gas at the top end. This pump carries a 75 gallons-per-hour rating.

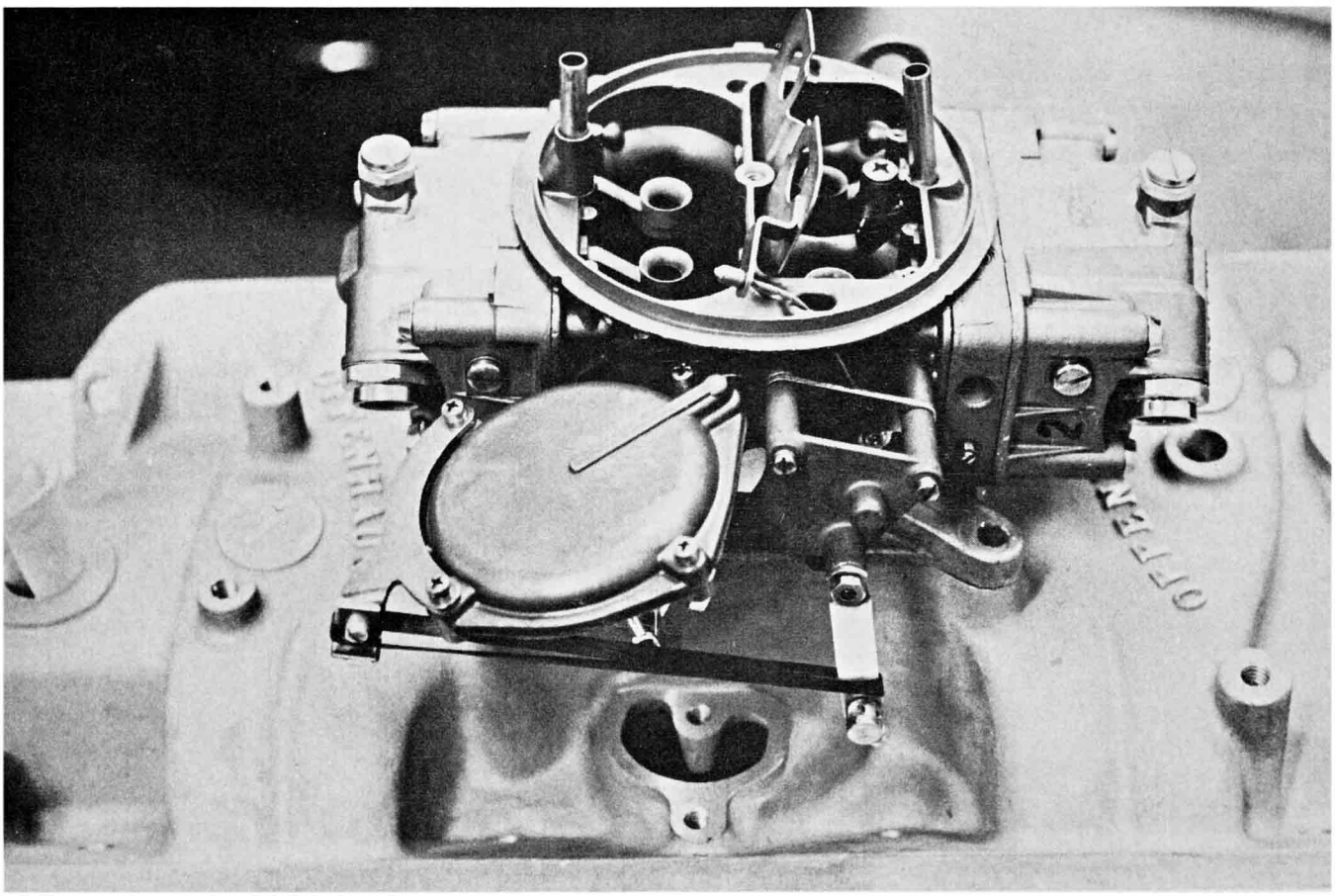
Both the Offenhauser and Edelbrock manifolds are staright bolt-ons. When installing the Edelbrock manifold we had to remove the oil shield at the base of the stock cast iron manifold and attach it to the lightweight aluminum manifold. The Offenhauser manifold comes with its own shield attached. We used a stock AM gasket between the manifold and the block, but there is an optional AM blocked heat riser gasket (# 3208750) available for track use and street operation in warm weather.

As part of the dyno tuning outlined in Part I we modified the stock single point distributor using special springs and Mallory points for total advance (35-36 degrees) to come in at 2500 rpm. For maximum ignition efficiency we replaced the stock single point system with a M/P-Mallory *Super-Spark* package consisting of a dual-point custom-calibrated distributor, Mark II coil and a Ramcharger burn-proof pre-cut wire kit with Rajah spark plug clips and burn-proof boots. The full-centrifugal advance distributor was set up on a distributor machine for a 12-degree curve at 2000 rpm and dropped in place. The engine took approximately 12 degrees timing,





To insure an adequate supply of fuel at high rpm, a dual electric fuel pump was installed. A chrome dual gas line kit adds class.



Holley three-barrel and Offy 360 manifold will be installed when the 390 is fitted with optional AM cam, Flamethrower ignition.

which, when added to the 12 degrees in the distributor (24 crankshaft degrees) equals 36 degrees total timing. The Ramcharger stainless steel wiring was installed with matching boots as the engine will be fitted with tube headers which give off a lot more heat around the spark plugs than do stock cast iron units.

Because of the shape of the Mk II coil, we had to make a clamp style mount so that the coil could be mounted close to the distributor. It's now mounted off the oil filler tube.

To help in the image department, we also bolted on an impressive pair of finned aluminum valve covers and a chromed free-breathing paper element air filter. Both these super sharp items are from Offenhauser.

To find out where we were at, we once again tied our project car down on the Clayton's rollers, checked out timing and ran it up the scale. In dyno tunes stock form the mill put out 190 rear wheel horsepower at 5000 rpm. With the new goodies the meter showed an impressive 210 hp at 4700 rpm and 220 hp at 5000 rpm. A solid 30 honest horsepower gain by simply changing carburetion and ignition. On the street we ran into a few traction snags, as the engine was really putting out and the suspension wasn't beefy enough to cope with it under banzai off-the-line starts.

Considering our success with bolt-on part, we're looking forward to bigger and better things when we start adding the good stuff. In the following features we will cover anti-hop suspension, camming and head work, a custom exhaust system, boss chromed Cragar mags with Good year Wide Tread GT tires and bolt-on customizing using AM body parts.

PROJECT 390 SUPER JAVELIN

III, ANTI-HOP SUSPENSION

Here's how to tame the newly found horsepower and put it to the pavement

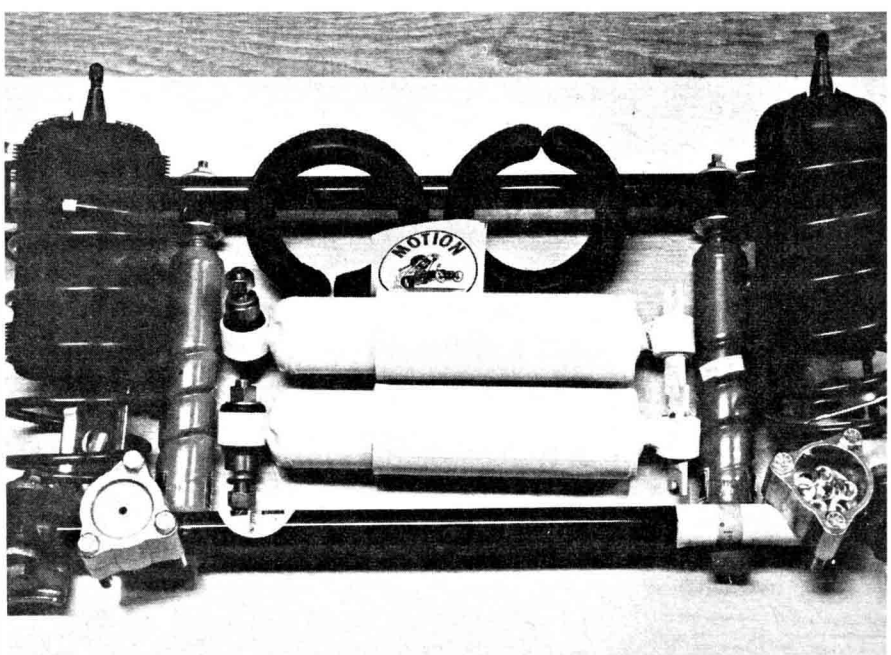
IT'S INTERESTING to note that the bolt-on modifications outlined in Part II of our Project 390 Javelin in this issue were strong enough to cause a super wheel hop and traction loss problem that was not obvious after super tuning the stock mill. Everyone involved with our Javelin was most impressed with the AMX (optional on Javelin) traction bars and heavy duty suspension as there were no traces of traction loss and wheel hop after the dyno tune. However, once the carburetion, manifolding and the ignition were altered, we were plagued with suspension problems.

During the road testing operation after the bolt-on mods were made, we could not torque load the automatic and come out hard. The wheels would hop up and down and the car would come out sideways. We even tried nailing it hard from idle but that didn't work either. The car obviously needed traction bars and heavier duty shocks.

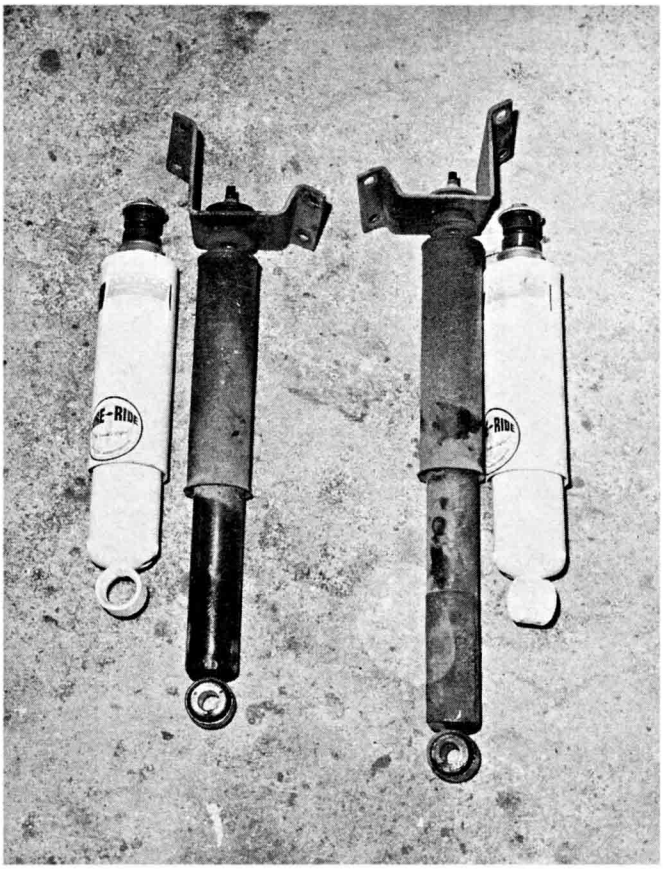
To offset the traction problems we installed a Super-Bite suspension kit which consists of traction bars, four (progressive sequential valved) shocks and 9/16-inch front spacers. At a later date, we will install the Air Lifts and front lift kit which are parts of the Competition-model package.

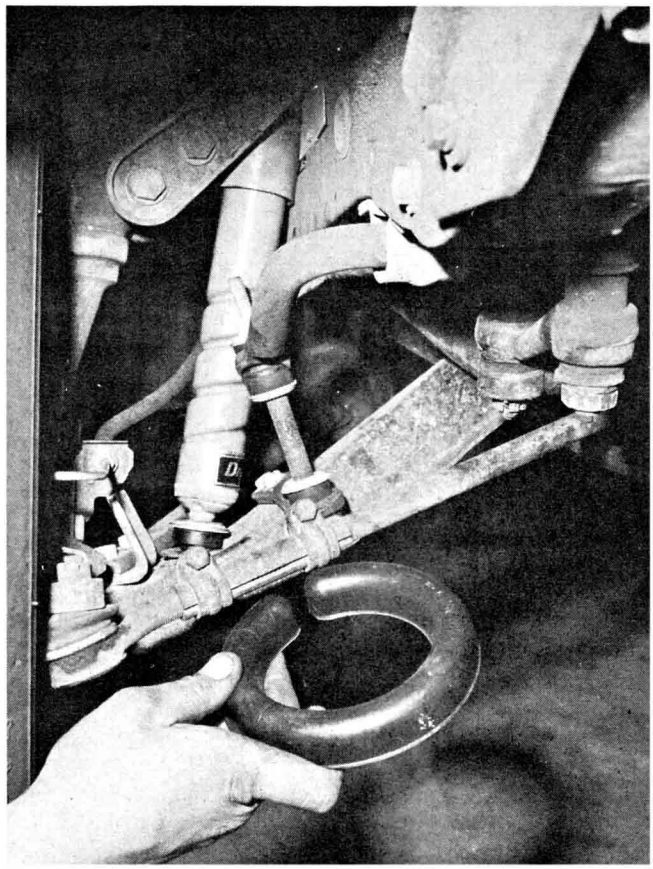
The bars supplied in the kit are constructed of *Super-Tuff* steel, bolt up to the rear leaf spring perch and must be welded to the unitized chassis rails. Since these bars are not of the type which severely limit spring travel, they do not negatively affect normal ride characteristics. To protect against possible breakage, we electric (arc) welded the bars to the chassis and retained the factory AMX bars which are fitted to the top of the rear end housing.

Installing the custom-valved Super-Bite shocks (made by Cure-Ride to M/P specs) proved to be a real simple chore. They're basically a straight bolt on. The front shocks are calibrated to 55/45 (jounce/rebound ratio) for good weight transfer and a

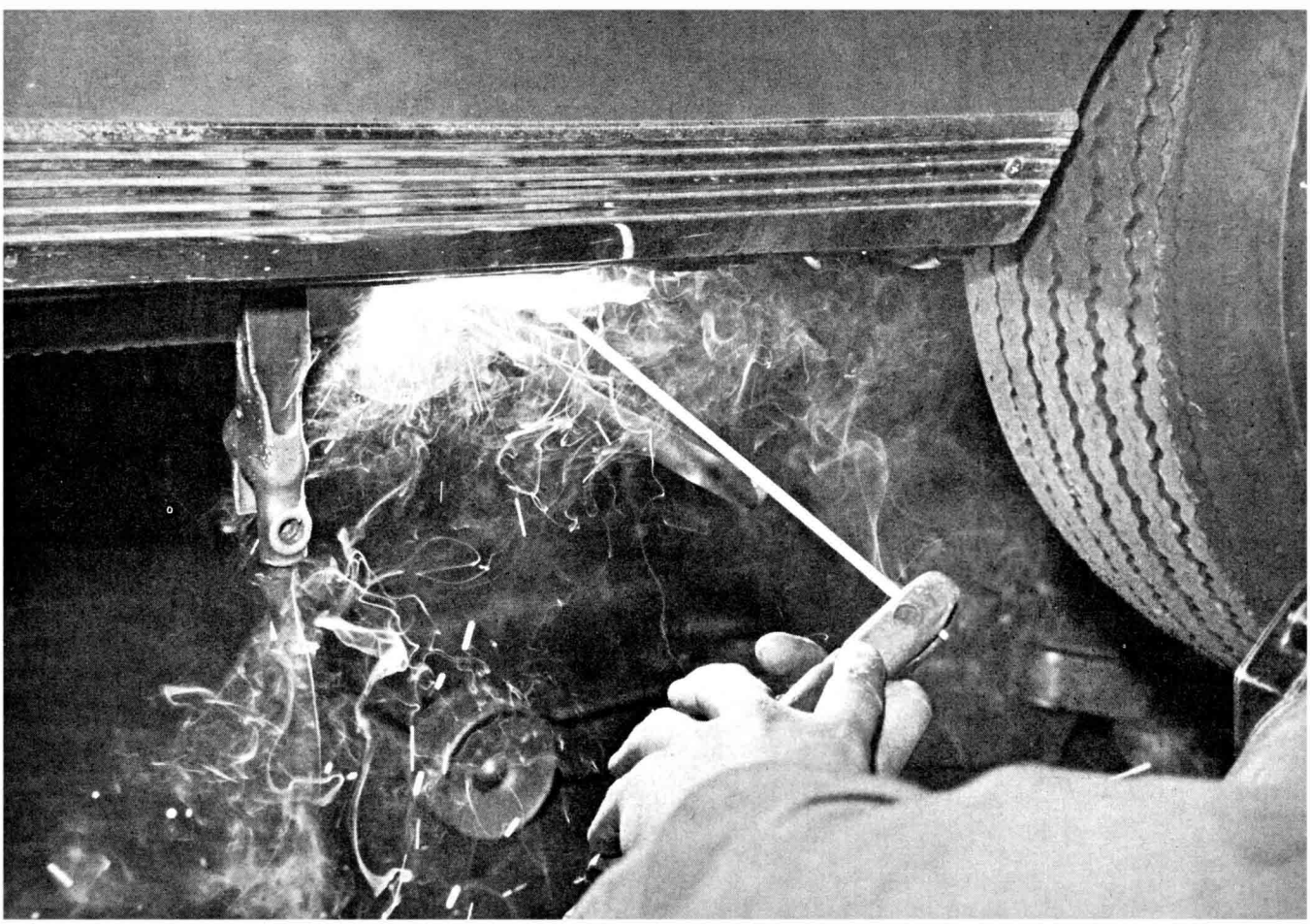


Full competition Super-Bite kit with Air Lifts and front lift kit for all-out track traction.

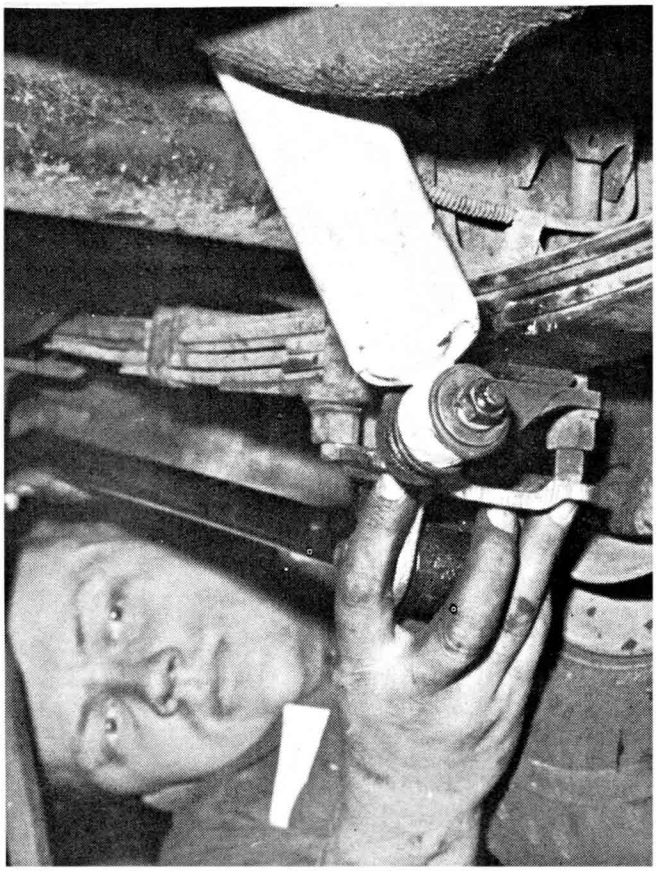


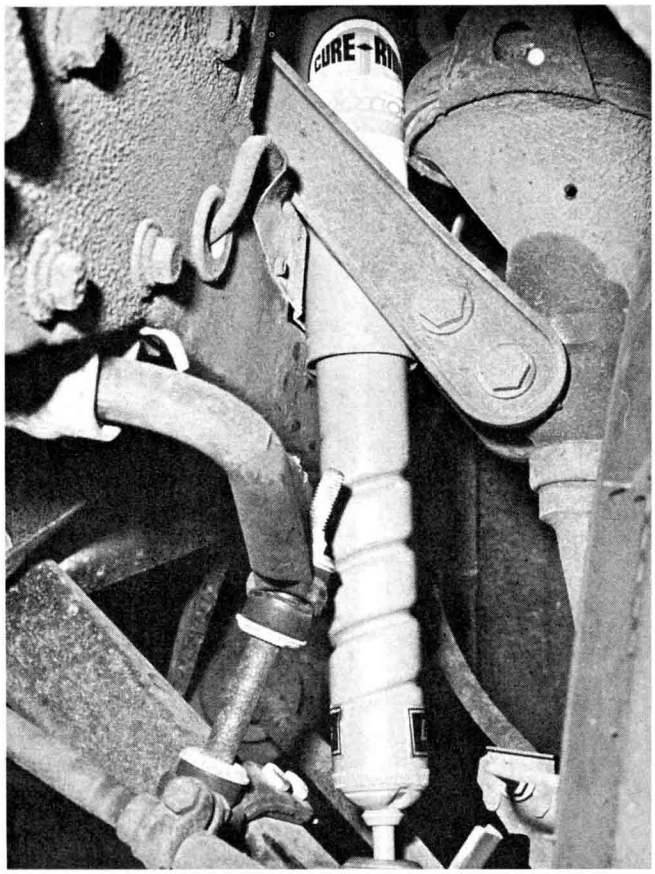


Special Cure-Ride rear shocks are valved (progressive sequential) to M/P specs, offer maximum control and traction under full acceleration conditions. Special 9/16-inch front spacers go under and over left front coil for suspension and chassis preloading.



Traction bars bolt up to rear spring perch and must be welded at the other end to the unitized chassis. Arc (electric) welding is a must.





Super-Tuff steel bars bolt up to spring perch mounting. Note huge rear shocks. Front shocks are also made by Cure-Ride to M/P control specs. Shocks on project car feature 55/45 street-strip valving. Front shocks are also available for max perf (90/10) strip use.

solid safe road ride. The rear (progressive sequential valving) huge shocks stiffen up the ride appreciably, but really do a job of keeping the rear wheels on the ground. We had to alter exhaust pipe (driver's side only) location slightly as the huge shock sat to close to the pipe.

Since we were not really interested in maximum strip performance at the time of the traction bar installation, we did not install the 9/16-inch coil spring spacers. They will be added at a later date when we go for the Air Lifts and slicks. Both spacers are supposed to be installed under and over the left front coil spring to insure maximum preloading. Just for the record, the front end must be realigned after installing the spacers.

With the bars and shocks locked in, we ran our acceleration tests again. There were no traces of wheel hop or side motion coming out of the hole when torque loading the transmission, punching it from an idle or dropping it into gear from Neutral at 3000 rpm. All parties concerned do feel however, that the Air Lifts will be needed when we go for the cam, three-barrel, gears and ripple wall slicks. For the street and limited track use, the straight Super-Bite kit is the way to go.

Suspension modifications are mandatory for street use once mill has been reworked

CARS PROJECT 390 SUPER JAVELIN

STAGE III, ANTI-HOP SUSPENSION

SHOP : MOTION PERFORMANCE, INC.

MODIFICATIONS

M/P SUPER-BITE KIT $89.95
Motion Performance, Inc.

Installation $25.00