Far fiercer than the first Old Yaller, yet friendly enough to fetch the family bacon, Max Balchowsky's latest road-racer puts function before finery.

► When one of the world's top-ranked Grand Prix racing drivers climbs behind the wheel of a virtually unproven homebuilt special, turns record times on the difficult Riverside Raceway after only a few laps in the machine, then voices his opinion about the car, it makes sense to hear him out. The driver, Dan Gurney, stepped out of Max Balchowsky's new Old Yaller (designation Mark II) bubbling over with praise. "This is as good as the finest car I've driven," said Dan, "and as comfortable as a baby buggy." Dan's only qualification was, in effect, complimentary. He said that he felt he could lap Riverside in two minutes flat if the car only had spot brakes. (Two minutes is the magic lap time sought by all, so far achieved by none during official practice.) Dan's best lap in Yaller was 2:07.8.

Quite frankly, we couldn't find anything wrong with the brakes, but then our skill behind the wheel precluded giving Old Yaller the sort of ride around Riverside that Dan did. There just wasn't any fade coming off the back straight, braking down from an honest 150 mph (not tops, but our limit of bravery). And Max has never had any brake problems either. The '58 Buick bimetallic drums and linings currently on the car are far from new. Linings have been on for 25 months, dating back to the original Old Yaller. Many races and several thousand street miles failed to diminish their effectiveness until Gurney got in the car. His foot is heavier than Max's and about midway through the recent Riverside G.P. for sports cars the front brakes began to chatter. Later it was discovered that heat hadn't dissipated quickly enough, the natural result being a parting of company between the dissimilar metals in the front drums. Bad as it was, Dan's times slowed only slightly.

The fact that Old Yaller failed Dan while he was leading the event with victory

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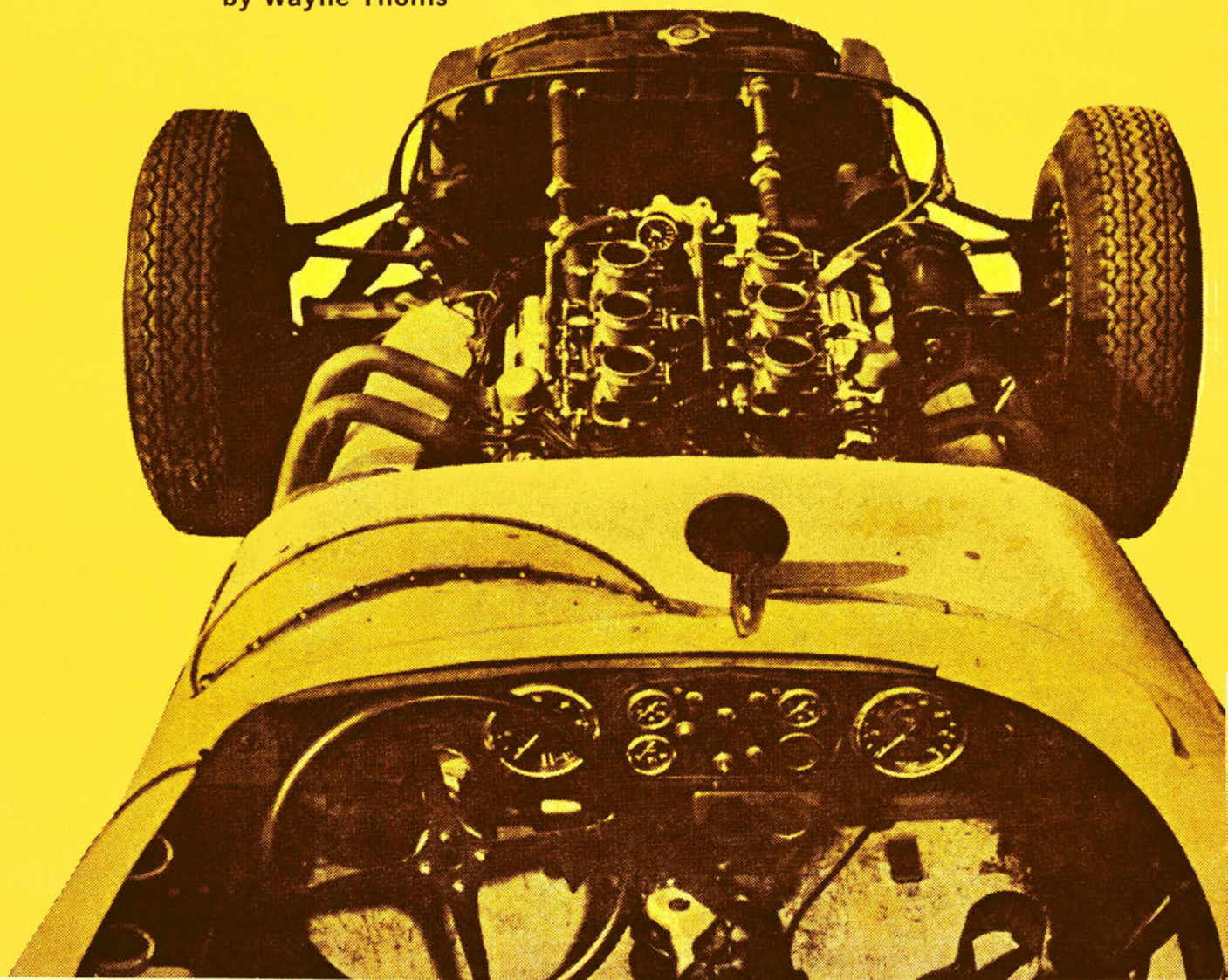
BEAUTY BENEATH THE SKIN

by Wayne Thoms



in sight was disappointing but didn't lessen his enthusiasm for the car. Why it failed, incidentally, is part of this story. As are the steps that have been taken to prevent the same failure in the future.

WHO MAKES IT GO?

What makes Old Yaller so great? Very simply, the know-how, work and faith of one of the most unusual teams in racing — Max and his petite brunette wife, Ina. This is one wife who goes far beyond the usual mere tolerance of hubby's building and racing a sports car; she not only helped design and build this car but she does most of the maintenance, acts as chief mechanic at the races and doubles as "hostess" at Max's Hollywood Motors repair shop during the week. And it's no gag. She really knows what makes the wheels go 'round. During chassis building, for example, she chalked off the frame shape on the floor and bent the tubes to match.

But the real impetus behind the car is Max — a non-conformist in an age of conformity. He is the refreshing sort of individualist who believes in his ideas and sees them through, even when others equally experienced assure him the ideas won't work. And in this case there were many dissuaders including the engineer associated with a fantastically successful and expensive racing special who assured Max that his frame tubes weren't strong enough — would never stand the load. Max proved him wrong by the simple expedient of crashing a guard rail at high speed (not deliberately) with no measurable frame damage.

No newcomer to the sport, Max's varied racing career began back in 1951 when Phil Hill and Ken Miles were also learning their ways around the first West Coast road racing circuits. In those days it was a Jaguar XK120 for Max (he still holds with Jag gearboxes for his specials). Then came a pure hot rod — a '32 Ford roadster with a Buick V8 that was capable of running with the big Allards and Ferraris. It seemed perfectly natural to stuff a Buick into his handsome Triumph-powered Doretti and this car, too, became a familiar sight on California starting grids. Finally came the Morgensen Special (SCI, May '57) christened "Old Yaller." It wasn't invincible but it was invariably the popular favorite — a homely local answer to Italy's sleek artistry in coachwork. Max furnished the engine, Eric Hauser the car, and they split driving chores with near-equal success.

HOW AND WHY OF MARK II

After a friendly dissolution of the Balchowsky-Hauser arrangement last year in which Eric took the engineless chassis, Max determined to build a new car, something that would be his own creation. His aims were not revolutionary. He wanted a machine that would be easy to work on and this meant accessibility of all component parts; it must be capable of being driven by anyone anywhere, a true dual-purpose machine; parts must be readily-available stock items and must be generally inexpensive, and it should win a main event now and then.

Most special builders start with approximately those goals. Somehow, most get so wound up in the growing complexity of building an automobile that they rarely accomplish everything in one package. Max has done it and in such deceptively simple fashion that many experts look at the evidence before their eyes without really believing that he *has* done it.

Just a year ago Max and Ina began construction. Seven weeks later they had a new car without body. Then followed the forming of the aluminum skin and fitting it over a framework of slender chrome-moly-tube body formers. Max admits to very little skill in the coachwork field. The existing body is the result. Ugly? Crude? Examine it closely. It's admittedly not a work of art, but it's anything but crude. Nose, hood, fenders and rear deck come off as units held by Dzus fasteners. The entire body can be stripped in

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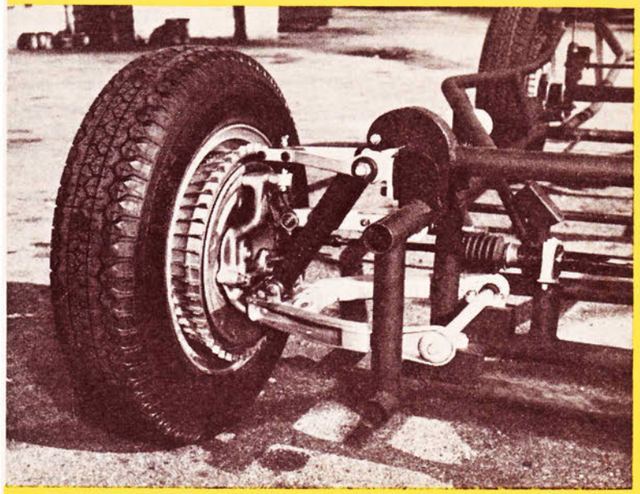
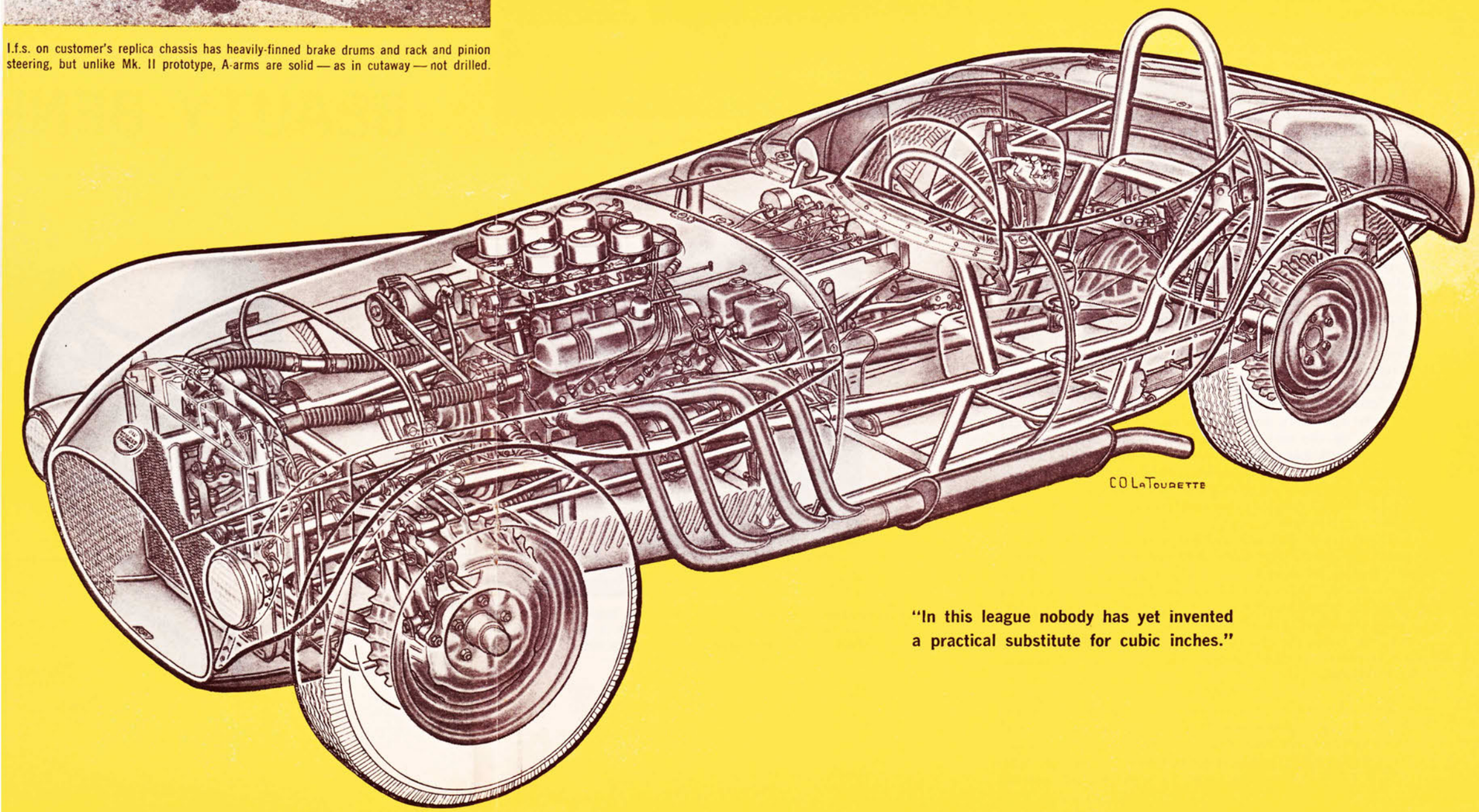


l.f.s. on customer's replica chassis has heavily-finned brake drums and rack and pinion steering, but unlike Mk. II prototype, A-arms are solid — as in cutaway — not drilled.

OLD YALLER MK. II

Manufacturer:	Hollywood Motors 4905 Hollywood Blvd. Hollywood 27, California
Displacement	401 cu in, 6571 cc
Dimensions	Eight cyl, 4.1875 x 3.640
Compression Ratio	9.5 to one
Power	305 bhp @ 5400 rpm (dyno)
Valve Gear	OHV, pushrods, solid tappets
Valve Timing	Intake opens 40° BTDC, closes 83° ABDC; Exhaust opens 83° BBDC, closes 40° ATDC. 303° overlap. 500 rpm idle
Fuel Capacity	30 gallons, super premium, 7.2 mpg with carbs; 6.2 with fuel injection
Carburetion	6 Stromberg 97's on Edelbrock log-type manifold or Hilborn fuel injection
Transmission	Jaguar 4-speed and reverse
Wheelbase	93.75 in
Tread, F, R	56, 55 in
Frame	Chrome moly 1¾ x .058 in tubing, upper and lower tubes with crossmembers
Suspension	F, independent, '58 Pontiac A-arms, Morris Minor torsion bars; R, rigid axle, 2 semi-elliptic leaf springs
Shock Absorbers	Monroe or Gabriel tubular
Turns to Full Lock	1⅜
Tire Size	F, 7.10 x 15; R, 7.10 or 7.60 x 15
Brakes	Drum, stock '57 Buick
Weight	1940 pounds with 10 gallons of fuel; 52 percent on driving wheels



"In this league nobody has yet invented a practical substitute for cubic inches."

about 10 minutes. And everything is accessible. Max says, "People used to laugh — and then they watched us work. Just pull off a panel and dig in. It may not look perfect but it's functional."

CHASSIS AND SUSPENSION

As the body appears rudimentary, so does the frame appear basic. Just one step beyond a simple ladder type, Max terms it his "distributed load frame." Main upper and lower tubes are formed from 1¾ by .058-inch chrome-moly, as are cross-members and the two roll bars at cowl and head heights. "My idea is a distributed load," says Max. "There is no maximum concentrated loading at any point. That's why it can be so light — about 110 pounds. If there's no concentrated load there are no failures. We figure that it will take a 110-ton impact without damage. Not that I want to be in it when that happens, but it's nice to know that it won't collapse around you."

Front suspension and steering are relatively conventional. Independent A-arms and stabilizer bar are from a '58 Pontiac, torsion bars and rack-and-pinion steering from a Morris Minor, and tube shocks — either Monroe or Gabriel will do. Both may be used as long as they're not the most expensive racing models, which are too stiff. Strangely enough, Max installed the "good" shocks initially and spun on a long banked turn at Riverside. As an experiment, he disconnected the shocks and stabilizer bar and was able to go faster. The front shocks are now from a Willys and the rate checks out at 55/45 when new. Rear shocks are 60/40 or 65/35. "Get them too soft and you bottom on every little bump," explains Max. "And a heavy shock keeps the wheels off the ground. It handles horribly with heavy shocks."

Incidentally, people who believe the myth that Old Yaller's parts come from wrecking yards may be interested to learn about the steering arms. New, they were cut down, welded and X-rayed. Those X-ray negatives testify to Max's thoroughness.

ORIGINAL APPROACHES

The upper A-arms have been well drilled, but not for lightness. The Balchowskys want something to bend in case of collision. When Max hit the crash rail in practice, all that went was the left suspension. He believes that had the arms had their original strength the top front of the frame would have been demolished. "If you make everything too rigid or too strong, you just crack or tear things. Have one part that will bend," he says. "It doesn't take as long to fix that way."

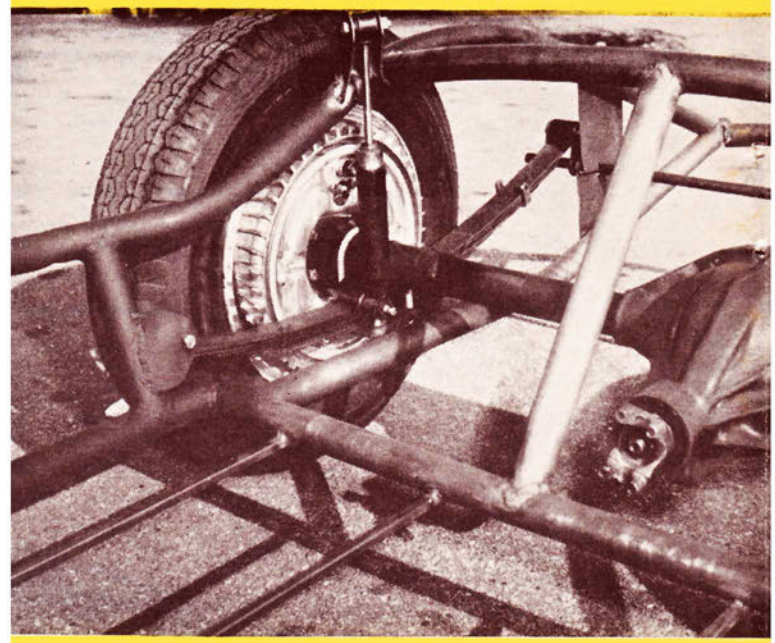
Max has some thoughts on rear suspension that bear investigation. With an engine that delivers brute torque and an open driveshaft, where are the radius rods? Or something to soak up the rear axle windup? "I just tell people 'no torque' when that question comes up," laughs Max. There's plenty of torque — so much that the only place it is necessary to floorboard the accelerator is on long straights. The trick is not to punch it too hard coming off the line — and *never* use first gear!

"The fact is that this car has a trick stabilizer on the rear," says Max. "The whole rear assembly is self-aligning — it'll float as much as ¼ inch." The system is similar to that used on the original Old Yaller. Rear semi-elliptics are mounted conventionally at the forward end. At the rear the lower shackle bolts have been replaced by a solid steel bar running across the chassis. Action on one spring produces an immediate reaction on the other, through the shackles and this bar.

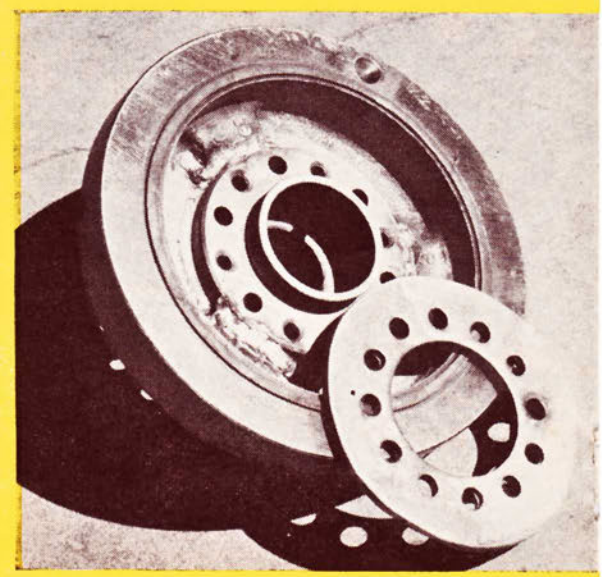
HANDLING

How does the suspension and steering work in practice? Nearly everyone complains that the steering is too light. Just before Gurney took over, Max put a little more tension on the steering rack and it seemed to help. But the front end is really good. After trying to avoid a front anti-roll

(Continued on page 86)

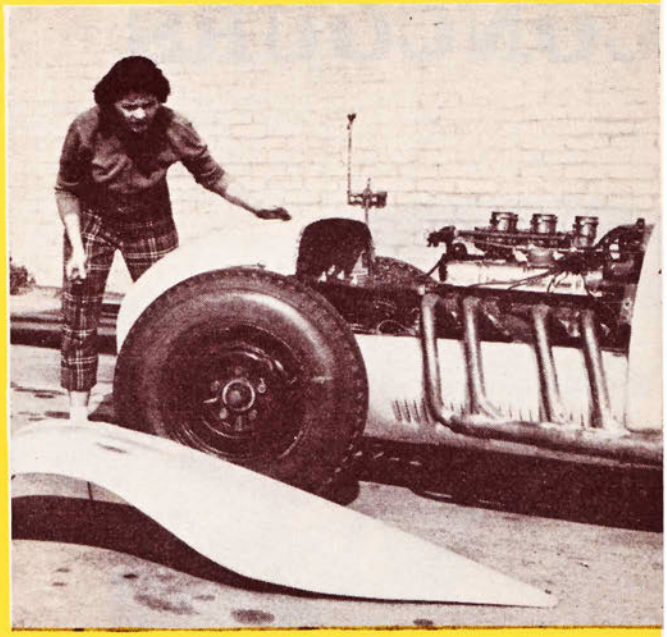


Rear end of new chassis, under construction, shows simple leaf spring axle location. Bar connecting shackle pivots can be seen at right.

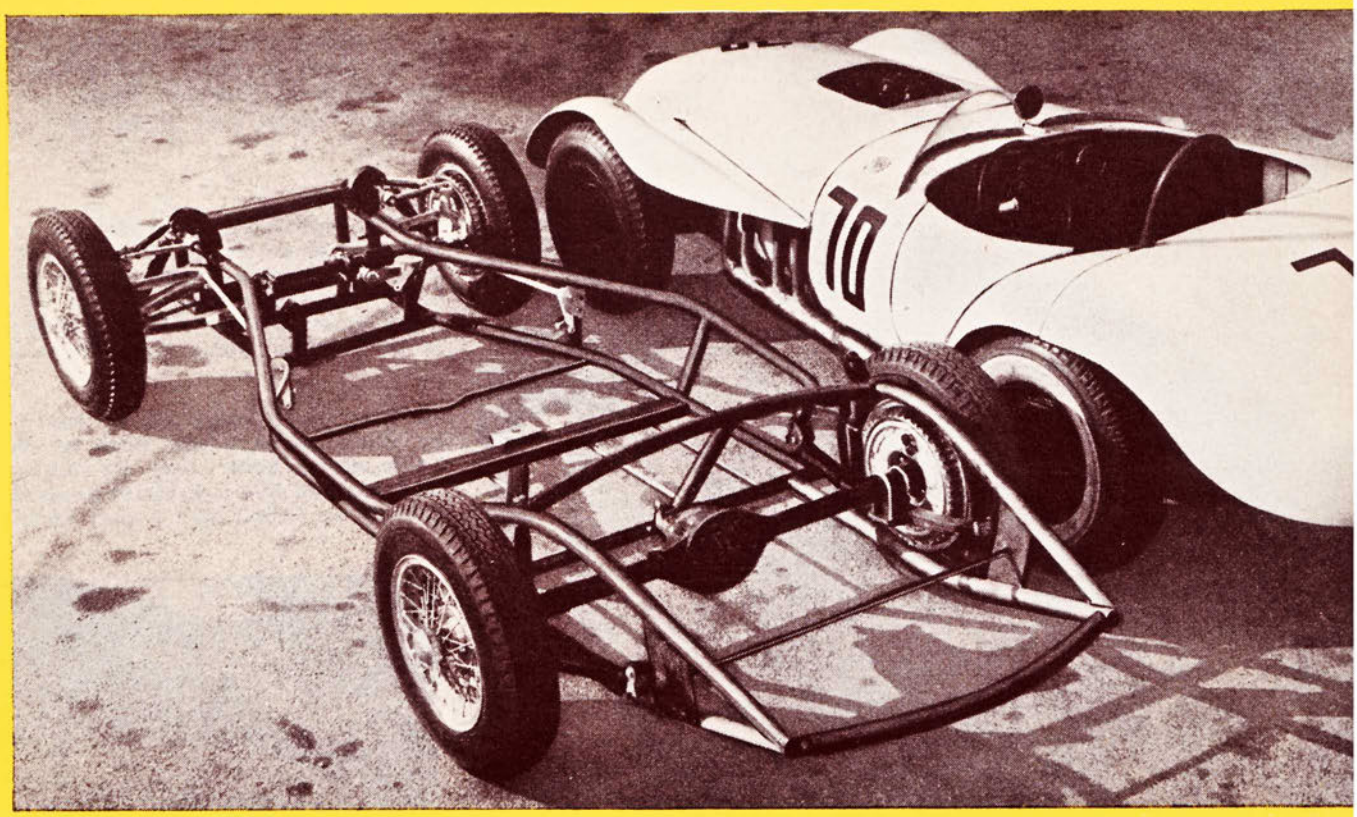


Persistent slippage of the harmonic crank balancer has plagued Max. He hopes the solution is this union of Ford truck housing and Buick balance plate.

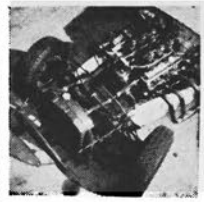
Max himself drove Old Yaller Mark II in the Saturday amateur races at Riverside (SCI, July, 1960). Styling is strictly for go, not for show.



As author Thoms points out, petite Ina Balchowsky had a lot to do with the new machine. Here she quickly bares the big six-carb Buick.



Longer wheelbase of new frame under construction at Balchowsky's Hollywood Motors shows up in comparison with Old Yaller II. Roomy, stiff frame is excellent job of practical engineering, easily handles the genuine 305 bhp from Max's modified Buick V8. Frame buyer specified Borrani wire wheels.



BEAUTY BENEATH THE SKIN

from page 50

bar, Max installed the 5/8-inch Pontiac part and we are here to say that the front end just doesn't break loose. The car's quite neutral, neither an over- or understeerer to any degree, and comes as close to being a four-wheel-drifter as anything we have driven. You just set up your cornering attitude and hold it with the throttle.

Of course, the locked rear (Studebaker Champion with Cook locking spool) helps. It feels flat while cornering although photos reveal some lean. But no matter how severe the corner, the steering never gets stiff. It takes only 2 3/4 turns lock to lock, so it's easy *and* quick.

For the gals, Ina says that the car is terrific in traffic. Those race announcers aren't kidding when they say she drives it to the market. Not only to the market, but to the race course as well.

CREDIT TO TIRES

Max is emphatic in handing much of the Mk. II's handling credit to the Goodyear Blue Streaks (whitewalls, no less) that he runs. "New ones scuff in so quickly that I can go full-bore after two laps," he says. And they last. After a short race at Pomona, the latest set was run some 39 laps at Riverside and still had plenty of tread left. He has tried about everything that will fit on his 15-inch Lincoln rims but his choice is still Blue Streaks.

On the front end the tire size reads 7.10 x 15; at the rear it's 7.10 or 7.60 x 15, depending on the rear-axle ratio. Generally he uses 7.60's with the 3.31:1 axle. With the 3.7 ratio installed for shorter courses, he juggles 7.10's or 7.60's for best times.

UNDER THE BONNET

Max's penchant for Buick engines is so firmly established that it came as a considerable shock to find that he was ready to switch to something else — almost anything else — after engine failure at the Riverside race. "I was spoiled," he related. "When I built and ran '56 engines there was never any trouble — and now this." "This" turned out to be the failure we mentioned earlier—a crankshaft vibration damper, the third one, to be exact. "The first time I figured it was just one of those things. The second I felt might be my fault. But not three in a row!"

When the harmonic balancer starts slipping at high revs, several undesirable things happen. The timing mark moves (30 degrees off for Max) so the engine gets slightly lumpy. Under the prolonged stress of imbalance the crankshaft breaks, usually taking a couple of rods and pistons along. That is precisely what happened at Riverside. The method of fastening the balancer together, with a pair of flat grooved rubber discs to take up shock, lends itself to failure. The unit slips neatly around the grooves and that's all.

But there's always an answer, sometimes not easy or cheap, but an answer. Max found it in a Ford Six truck engine balancer. The adaptation was fairly simple; it meant using the Ford housing which *should not* slip, and using the old Buick balance plate and spacer disc. The spacer disc, which has multiple bolt holes, has been left with a high side so that it can be rotated to the best balance point. Some nickel welding rod joined Ford and Buick in what appears to be a happy union.

The fact that such an adaptation was necessary rankles Max. "I used to say that I ran a stocker," he says. "But with these phony little troubles it's rough." He means "stocker" in the sense that major components except all-out speed parts such as cams and intake manifolds may be purchased right off the shelf.

We asked Max why he doesn't go back to the old reliable '56 Buick mill, especially since they're currently available at bargain prices. "Very simple," he replied. "It's only 320 cubic inches, so right away you should bore at least 1/8 inch and stroke 1/4 and then you can't use standard parts any more." The '59's and '60's are a whopping 401 cubes (6571 cc) and in this league nobody has yet invented a practical substitute for cubic inches.

ECONOMY AND POWER IN RACING

For all the swept volume in Max's Buick, topped by six hungry-looking, air-and-gasoline-gulping Stromberg 97 carburetors, the fuel mileage while racing is excellent. After careful checking a figure of 7.2 mpg was determined. Many hot Corvette engines are lucky to get five mpg, a difference that can be significant in long races. During some experimentation with Hilborn injection the mileage dropped only one mpg. The carbs top an Edelbrock log-type manifold, incidentally, and there may be eight instead of six before long.

With carburetors an honest dyno reading (engine warmed, no advance curve tinkering for flash readings) comes out 305 bhp at 5400 rpm — conservative compared to what some builders claim. Torque reads 360 lb-ft at 3500 revs but it wants to continue to climb and the dyno won't hold it. "I have yet to get an engine to produce as many horses as stockers are rated," says Max. "But nobody is beating me. Conversation horsepower doesn't mean much."

The injectors add a net 24 horses. Then why not use injection? Max simply doesn't need it. There just aren't any courses where that extra power is needed or desirable for now.

CAM AND VALVE TRAIN

The camshaft is a Winfield product with 303 degrees overlap, which is quite a lot. So much, in fact, that the low-end flexibility and torque the engine displays would seem difficult to come by. But there they are. It idles nicely at about 500 revs — just like a good stocker should. The overlap has dropped cylinder compression from a stock 180 to 155 pounds. Compression ratio is only 9.5 to 1.

A fairly common complaint with hot engines is camshaft wear, something with which Max has never been bothered. Possibly one explanation lies with the fairly light valve springs — 185 pounds on intake and 170 pounds on exhaust. The engine is never turned past 7100 rpm, and that high only rarely, with no valve float. In

fact Gurney never exceeded a safe 5600 during his Riverside stint. Max's comment is that every time he misses a shift or goes to 7000 all he can see are dollar signs.

Valves have been lightened, while flash chrome lessens carbon formation and wear in the guides. It has been necessary for Max to fabricate longer pushrods, a minor irritation. He used 5/16-inch chrome-moly tubing and it rubs slightly on the side of the head. There is a solution which entails lengthening '57 Buick speed kit pushrods.

MINOR MODIFICATIONS

Virtually the only other speed adaptations are the normal ones including porting and polishing heads and boring .003-inch for added clearance. Bearings have not been grooved and apparently it hasn't been necessary. Until the balancer failed, they had been in seven months and five races without trouble.

To eliminate overheating it was necessary to remove the Buick water log, install a '58 water pump, and run a smaller crank pulley to reduce water pump speed. Also, an oil pan baffle is essential to prevent oil from sloshing around in the stock pan.

The flywheel is Buick's '57 model, machined and rebalanced.

Fire comes from a distributor that is a family heirloom. It dates to 1946, and Max has run it on nearly a dozen of his various cars. He runs a total of 48 degrees advance — an amount he finds hard to believe — but it works.

The engine applies its power through an Auburn 960-pound explosion-proof clutch. The engine adaptor is by Cook of E-40 aluminum that doesn't require heat-treating. It's light, extremely strong and won't distort.

Rummaging through the parts bin brought out the present '50 Lincoln radiator. Originally water was cooled in a Studebaker Champion core, 30 pounds lighter than the Lincoln, but the altercation with the guard rail brought forth the need for a quick replacement.

ANYONE FOR A REPLICA CHASSIS?

Nearly complete at this writing is a chassis that very nearly duplicates Max's race car. The primary difference is a longer wheelbase, 100 inches compared to 93 3/4. The experience gained in building the first chassis has allowed some refinements in the new one. For example, grease points have been reduced from 12 to four through the use of rubber bushings.

The price is not unreasonable. Delivery time is about a month and the figure quoted is $3500. This includes the chassis with suspension and steering, a new Buick engine set up much the same as the race car (or however the customer may order it), Lincoln, Buick or Pontiac disc wheels (wire knock-ons at extra cost), Buick brakes, and a Studebaker limited-slip differential with 3.31 or 3.7 gears. What the customer doesn't get is the recommended Jag close-ratio box and miscellaneous items such as drive line, pedals and master cylinder. Even so, it's not a bad deal. One might purchase a chassis and install any of several fiberglass bodies on it for a distinctive machine. Or with a little persuasion Max and Ina might build another body to match the one on Old Yaller. That *would* be distinctive. — *WT*