THE BUGS THAT FLEW–KEN W. PURDY

SPORTS CAR GRAPHIC

MAY 1961 · 50c

FORMULA FORECAST
1961's Championship Cars

ROAD TESTS:

Porsche Super 90

Devin "D"

Mercedes 220 SE

Peugeot 404



Lotus Monte Carlo-

TECHNICAL REPORT, CUTAWAY, SPECIFICATIONS


PEUGEOT

...the 404

for
facts
and
features
turn
page

A continuity of excellence marks the 72-year history of Peugeot automobiles. In the Forties, it was the 203. In the Fifties, the 403. The latest expression is the 404. A new engine was designed for this car. It is a four cylinder, overhead valve 1618 cc engine which produces 72 brake horsepower at 5400 rpm. It is mounted at 45 degrees to lower the hood line and improve visibility. Canting makes engine components easier to service, too. Engine performance is improved by a new automatic fan clutch. When engine temperature drops below 167°F, a thermostat automatically declutches the fan—releasing 5 hp. Engine drag is lowered, gas economy increased 6%, and fan noise eliminated. Should the temperature reach 183°F, the fan cuts in. A new four-speed transmission was developed for this car. Fourth gear is direct drive. All forward gears, including first, are synchromesh. The 404's performance will please the motor enthusiast. A favorable power-to-weight ratio (31.9 lbs. per hp), high torque at low speeds (maximum occurs at 2250 rpm), coil spring suspension all-around, and precise, rack-and-pinion steering makes the 404 remarkably easy to handle; top speed is 90 mph. The 404 has a ride that is deceptively soft, yet cornering is very flat. The 404 is maneuverable; its turning circle is just 31 feet, 7 inches. "Body styling that will undoubtedly become a classic in the years to come" says *Car and Driver* (formerly *Sports Cars Illustrated)* about the 404. It is a pleasing blend of the modern and the conservative: form follows function in the 404. Ornamentation is at a minimum (and what there is, is stainless steel). A luxury car with airliner-type reclining seats, sliding metal sunroof and deluxe interiors, the 404 is inexpensive to own. You can reasonably expect 30 mpg, very low maintenance, 40,000 miles on a set of tires and no mechanical trouble. The 404 has no optional extras. Accessories conservatively valued at $525 are installed at the factory and included in the fully-equipped price of $2575 (East and Gulf Coast P.O.E.). They include sunroof, 4-speed transmission, heater-defroster, whitewall or Michelin X tires, reclining seats, cloth or leatherette upholstery, automatic fan clutch, electric clock, padded dashboard, windshield washers, trip mileage counter, outside rearview mirror, bumper guards, arm rests, sun visors, and others. The 404 does not replace the 403. It is an addition to the Peugeot line. Both cars will be sold and serviced by over 500 Peugeot dealers throughout the U.S., Canada and Mexico.

PEUGEOT

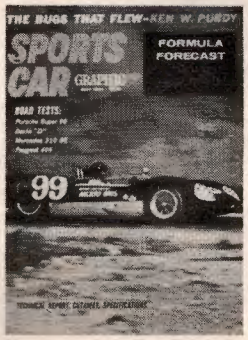
PRONOUNCED "POOJ-OH"

For illustrated brochure on the new 404 write to: Peugeot, Inc., 750 3rd Ave., N. Y. 17, N. Y. For overseas delivery, see your dealer or write: Peugeot, Inc., Box 158, Long Island City 4, N.Y.

Volume I Number I May, 1961

SPORTS CAR GRAPHIC

Published Monthly



Dan Gurney hustles along under a lowering sky on his way to take the big Nassau money in the Lotus Mk XIX. For tech report, see P. 42. Ektrachrome by D'Olivo

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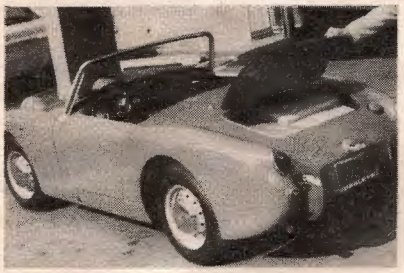
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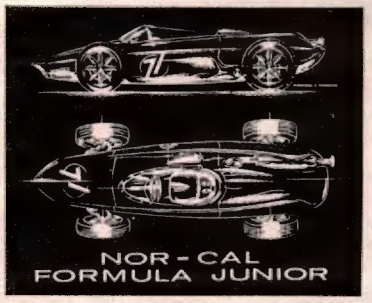
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FROM THE EDITOR

THIS ISSUE OF SPORTS CAR GRAPHIC marks the double debut of the magazine under new editorial direction and as a monthly publication. It is the intention of the editors to make SCG the leading magazine for the man who likes to drive, who feels that an automobile is more than a mere machine for moving the form supine from point A to point B and, above all, for those who would understand the automobile as a machine to enjoy.

To this end we have recruited known talent from all over the motoring world, people who do things and who will be bringing our readers first hand information on the things they do and the things they see. A glance at the masthead will give you a clue.

SCG's man on the European scene is Bernard Cahier, who will be sending in the latest news on anything exciting and/or automotive that happens over the water. As soon as we get it, you'll be getting it. Promise. On the technical side we have Jerry Titus, who has been known in recent years for doing good things with the innards of Ferraris, Maseratis and the like. He's something of a tiger in Formula Junior circles, too. In the copy slot is W. R. C. Shedenhelm, of Birdcage Sprite fame. He it was who figured the freezing temperature for vodka ice cubes. For any readers interested in the experiment, the temperature for solidifying the 90 proof stuff is minus 33 degrees Centigrade. If you're addicted to 100 proof, you'll have to turn the box down to minus 37 degrees C. Deponent manages to get around a bit too; witness page 52.

On the contributing side we have with us experts on all phases of the motoring and motorsport scene.

For instance, do you want to enter a production car in competition? Each month we'll bring you an example of a given car and tell you how to make a specific production car both competitive and safe. This month, see page 64.

* * *

If you'll turn to page 20 you'll see a story that is unique in at least one way — of all the pieces published about Bugatti in the English language since 1935, Ken Purdy's story of The Racing Bugattis is the only one that does not contain even one useage of *any* of the following words: (1) Marque. (2) "Ettore." (3) Le Patron. (4) Drool. It is truly refreshing to read a piece on *vitesse pure* Molsheimware done without *one* of the usual cliches — especially "drool."

* * *

Starting on page 28 you'll find a preliminary round-up of the machinery that will be battling it out for the Formula I and Formula Junior Championships this season. The more perceptive readers will see that all it takes, basically, to turn a Formula Jr. machine into a Formula I charger is an engine swap, beefier drive components and a little weight. There's a bit more to it than that in the doing, but basically that's the route.

This could be great in some ways. In other ways this ease of conversion, consideration of expense aside, could be deadly. In the one sense it means that a man of moderate means could run for experience and/or cash in Juniors and then, perhaps with a sponsor, invest in a do-it-yourself F-I kit and go try a shot at the Championship.

In the other case, it could also mean that someone with a tad more money than good sense could have a Junior and, becoming disenchanted with the relatively short power curve, stuff it full of full-house 1500 cc engine. Being short on sense and experience and long on enthusiasm and horsepower, he could quickly render himself, and possibly others, very dead.

You can't exactly legislate this danger out of existence but there is a two-fold way out. First the organizers of Championship events are going to have to be very careful indeed as to the past records of those they let run. Secondly, there has to be some way by which the Junior driver can bridge the gap from 80-odd horses to the 200 that the F-I cars will likely have by the end of this season.

To this end SCG proposes what we hope is a rational class which, for lack of a better term, could be called Formula Senior. Or, perhaps for lack of such a current class, Formula II. Our proposal is simply that such a class be formed using the current Junior chassis rules for the 1100 cc sub-class and allow the use of Grand Turismo homologated engines up to 1600 cc displacement — in other words, production under-1600 cc engines and limited to those modifications allowed under the production rules. Alternatively, the limitation could be production up-to-1600 rocker-head engines and overhead cam engines up to 1300 cc, all modifications except to displacement to be legal. Voilá, torque with moderate bhp!

Comment is invited. Any takers?

—— *john christy*

LANCIA

FLAVIA

SENSATION OF THE TURIN AUTO SHOW COMING TO AMERICA SOON

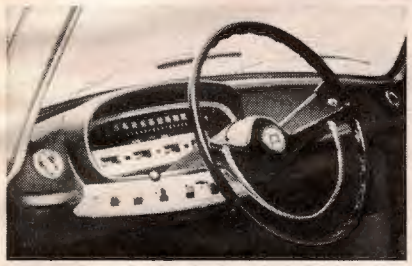


The most exciting and revolutionary car which came out of Europe in 1960, possessing agility, speed, quietness and unmatched quality.

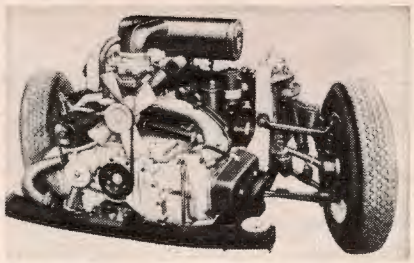
In designing the Flavia, cost was of secondary consideration as the primary motive was the production of the finest automobile possible, manifesting the most advanced Lancia technique.

The Flavia offers extremely comfortable journeying at high cruising speeds with absolute relaxation for the driver.

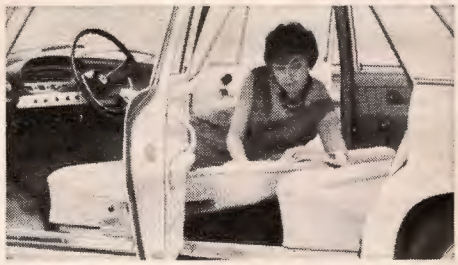
With countless typically Lancia attributes and many remarkable innovations and improvements... new 1500 cc horizontally-opposed 4-cylinder 90 hp engine... front-wheel drive... all-synchronized 4-speed gear-box... servo disc brakes on all four wheels... De Carbon hydraulic shock absorbers... 15" wheels... reclining seats adjustable to sleeping arrangement... tachometer... leather-cushioned dash... heater and fresh air conditioner... deluxe steering wheel... safety lights in doors... combination ash tray-cigarette lighter... over-size luggage compartment... etc.... etc.... etc.... at a suggested retail price of $3,680 fully equipped (P.O.E.—N.Y.). Nine different Appia and Flaminia models available—Sedans, Coupes and Convertibles—from $2,398 to $6,485 (P.O.E.—N.Y.).



Leather-covered dash features big, easy-to-read gauges, and tachometer. Control switches are grouped in crescent-shaped unit under driver's left hand.



Key to performance and comfort of Lancia Flavia is the aluminum block 90 hp engine and the independent, double wishbone and torsion bar suspension.



Typical of the luxury are the seats... adjustable to sleeping position. Also, there are lights on the front-door edge that indicate when door is open or ajar.

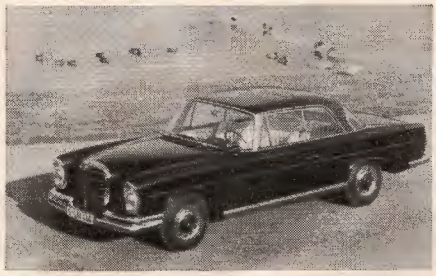
See Your Nearest Lancia Dealer or Write For Catalog

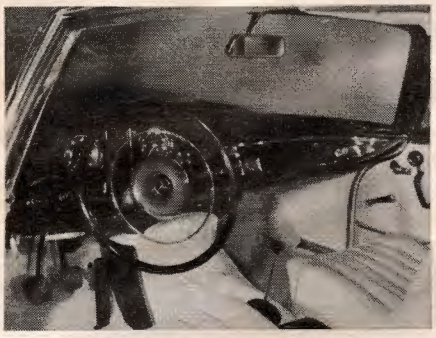
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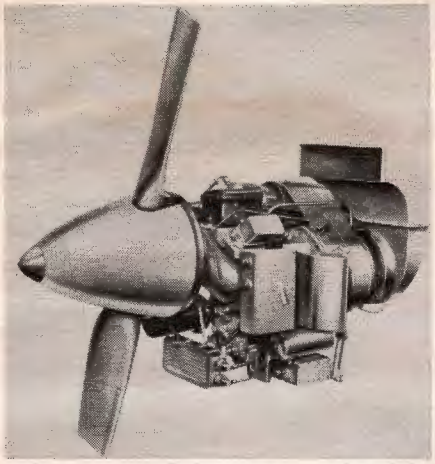
AROUND THE WORLD IN 30 DAYS





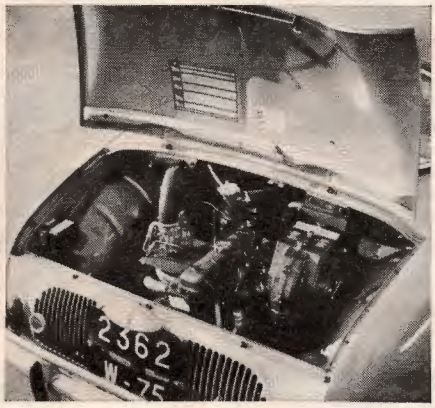
MERCEDES-BENZ 220SE COUPE has fuel injected engine, suspension and transmission similar to the 220SEb sedan road tested in this issue (page 60), but comes equipped with disc brakes (the first time Mercedes has used them), floor shift and rev counter.

Watch for the full report by SCG's European Editor, Bernard Cahier, in the June issue.



ROVER OF ENGLAND has made another step in the transition from piston engines to gas turbines for personal transportation with a pair of engines for light aircraft. Weighing only 235 pounds, these two mills develop 60 and 90 cruising horsepower, with 70 and 120 takeoff hp available.

Rover, it will be remembered, is the company which set up a prototype roadster with a gas turbine engine and cranked up a flying mile at 151.196 mph and a standing mile at 95.668 mph *average* speed, all this nearly a decade ago — June 26, 1952, to be exact.



THE RENAULT GORDINI looks the same as the standard Renault Dauphine on the outside, but packs 25 percent more power (40 hp) inside. The Gordini-modified engine has hot cams, bigger valves and carburetor, new intake and exhaust manifolds and a four-speed gearbox in place of the standard three-speed.

It will cost $260 more than the Renault Dauphine.

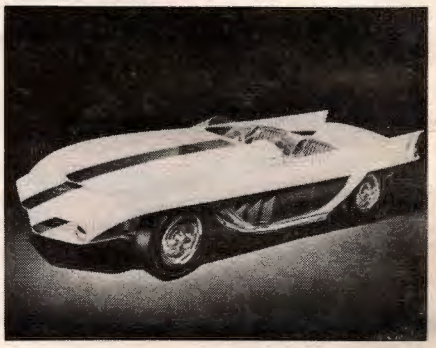


THIS VOLVO SEDAN, driven by Gunnar Anderson, was the overall winner of the 1960 Argentine Gran Premio Nacional. The 2,873-mile bash ran over dirt roads, 10,000-foot mountain passes and through streams, with a winning average speed of 72 mph.

Previously, these cross-country enduros have been the exclusive property of wildly hot-rodded Detroit iron. This time Volvo placed 5 in the first 8 overall, against 125 starters of all makes and sizes.



ELVA will produce this well-designed hardtop coupe for 1961. It was first shown at the 2nd Annual Racing Car Show in London.



REMEMBER THE EXCALIBUR sports racing cars turned out by Brooks Stevens a few years back? Stevens is planning a new "Ecurie Excalibur," with Latham blowers on the engines of his brand new cars.

SCCA Convention

New York's third blizzard did nothing to enhance the recent 1961 national convention of the Sports Car Club of America. But, as expected, things got more than a tad lively in the meetings, both public and private, centering around the Contest Board and the ever-present question of just exactly what constitutes "amateurism" and what constitutes prize money. Sherrie Zuckert, on the scene, reports:

"The outstanding event of the convention was the open Contest Board meeting. A group of the SCCA's best drivers, including Augie Pabst and Roger Penske, were ready to pull out of the Club and race strictly pro as the result of the ridiculous decree coming out of the Board of Directors meeting in November to the effect that *everybody*, owners included, must remain strictly amateur in order to race with SCCA. In other words, no one could accept money for anything, or race in a pro race that wasn't approved by the SCCA, or, God forbid, collect prize money for such approved races.

"So — this was the main issue kicked around at the Contest Board open meeting. The Board of Governors met first and came up with a complete about face about who could accept money where — not only was it about face but it took the whole thing back to two years ago. Now SCCA drivers are allowed to race 'outside the territorial limits of the United States, accept their prize money, and still remain amateur here.' Exactly *what* constitutes the territorial limits was batted around and, in the process, the U.S. suddenly acquired Nassau, Bahamas, as part of its territory — which should be news to the British.

(continued on page 13)

GET FATHER AND MOTHER LOADED — WITH ACCESSORIES

MG Mitten

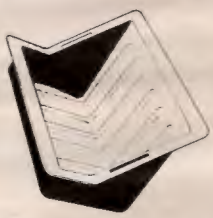
Hi, there! Both Mother's Day and Father's Day are hard upon us and it behooves us to remember them generously (M. & F. that is). Also, be nice to your car . . . you're the only friend it has.

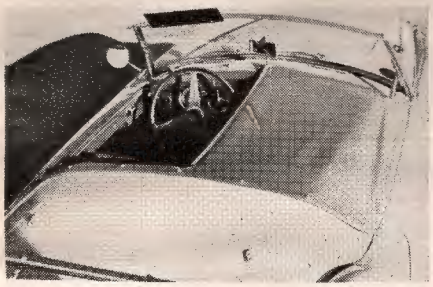
A Streamlined Racing Mirror might be just the thing for nearly anybody (including you). Solid mounting



with two bolts, weight of only 9 oz., and fully adjustable and lockable focus are features of this chromed beauty. 3¾" mirror, flat or convex.....$6.95 ppd.

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Spring and Summer weather calls for a tonneau cover. This splendid invention permits you to enjoy top-down comfort and exhilaration and still save precious leather and interior. MG Mitten has tailored tonneau covers for all cars at tremendous savings. (Send 50c for catalog—refundable—with full listing). If you own an **MGA**, don't wait, order our **Special:** Top quality Vinyl in RED, WHITE OR BLACK, center zipper, only.....**$17.95 ppd.**



A brand new product, and one long needed, is a line of replacement boots for gear change levers. These are a new plastic which is impervious to oil, heat and fumes, will look new for thousands of shifts. Available for **MGA ($2.95) TR ($3.95) Morris ($2.95) Healey ($3.95)** (specify 3 or 4 spd.) **Sprite ($1.95)**

Something any drinking enthusiast will appreciate is a set of beautiful tumblers in fine glass with



24 K gold fired insignia of the world's great cars. Four styles. (Per set of 4) **Slim Jim:** (7" tall) $3.95, **Texas Jigger:** $3.95, **Old Fashioned:** $2.95 and **Goblet:** $4.50.



Another similar and much-desired table piece is this huge (12" sq.) Ash Tray (or platter) in smoked glass **with 24 K** gold decorations — car crests, of course. **Heavy and impressive. Give it to a friend or keep it yourself, for only.....$7.95**



Here is a heavy silver link bracelet which will delight any auto-minded gal. To it she can attach authentic, full color charms, replicas of famous car emblems such as MG, Ferrari, Mercedes, Porsche, TR, Alfa, Jag, Volvo, Healey, Corvette. Looks far more costly than it is. **Bracelet**.....$3.00 ppd. **Charms**.....$1.00 ea.



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500TX.....**$37.00 ppd.**
Shorty.....**$35.00 ppd.**
Visors for above.....**$1.50 ppd.**
Bubble Shield (fits either) $4.95 ppd.



Gloves make motoring more comfortable and protect the hands against blisters. **Two styles: Grand Prix,** (shown) with cape palms and vented backs . . . **$7.95 ppd. Leston,** cape palms and knit mesh back . . . . . **$6.50 ppd. Grand Prix** are natural or black, **Leston,** natural color. Sizes 6½-10.

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MG Mitten
Healey Hugger
Triumph Tunic
Alfa Apron (Spyder)
Fiat Frock (500, 600, 1100, 1200 Rstr.)
AC Apron

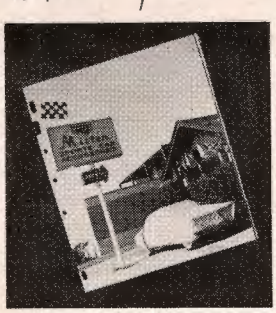
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Renault Romper
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Mercedes Muff (190-300SL, 220)
Corvette/Corvair Cap
Jaguar Jacket (XK140, 150, 3.4)

Lightweight/Canvas **$26.95**
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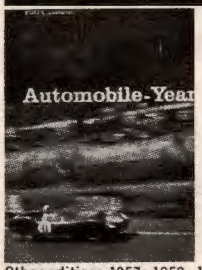
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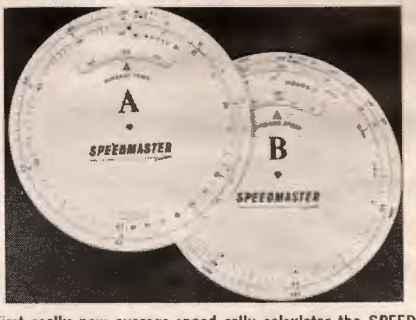
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"Then it was decided that owners could accept money, but not deviously now—in other words one couldn't transfer his car to his wife's name and have her collect the loot. One also couldn't drive but collect as the car's owner. One *could*, and this is absurd, really hurting the little guy, do these things if he owns an auto agency or large corporation to which winning a race would be publicity. If the driver happens to be the president of said corporation, *he* can collect personally and get away with it. There were, of course, screams and yells about this but the Governors presiding left the whole thing up in the air saying that they really couldn't make a definite decision on this anyhow, or on anything else going on at the meeting, because it would have to be put to a vote of the Board or something. The whole bit was left there, but Pabst and Co. were pacified.

"Now very interesting things began to happen. Briggs Cunningham stood up and made the most sensible speech of the day so far. He stated that he didn't see any harm in any driver, anywhere, being thrown a couple of bucks here and there. They race and spend lots of money on it, so why all the fuss about who collects — and who checks everything anyway — and whose idea was the whole thing, the Contest Board's or the drivers' who apparently weren't asked.

"Next Bill Kimberly delivered a 20 minute speech from the audience, saying, in gist, that this wholly amateur bit was all right at the onset of sports car racing because in those days things were new and all for the sport *and* local. If a local hot shoe went up to Canada and cleaned up to the tune of the cash register, no one really ever knew about it and therefore no one yelled. Nowadays, the communications situation has changed, with the country well supplied with all kinds of specialty magazines — especially in the motor racing field. Therefore, everyone knows immediately who does what where.

"Bill Kimberly likened the present rules and restrictions to Prohibition, contending that both made sinners of us all. He asked why it would not be possible, in view of the present status of motor racing in this country, to eliminate these rules and revise the whole concept of 'amateurism.' He suggested that as long as the big bore modified cars draw the crowds, they, from class F up, should be allowed to race pro. This was sort of a moot suggestion, but he did have a most reasonable basic premise for the thing.

"He was, naturally, shut up real fast and the meeting came to an abrupt end."

* * *

Wraps Off Jaguar

Yes, Virginia, there *is* at last an E-type Jaguar and it isn't, nor was it ever, Briggs Cunningham's LeMans hot rod. In a last minute before press-time call, Bernard Cahier gave us the word that Jaguar had removed the wraps from their secret project that has been the target of much guessing for many months. In the short time available, Bernard revealed that it is to be called the E-type Grand Touring model and will be made available in both coupe and roadster versions. In form it resembles the Cunningham machine at the front but with a more normal tail in the case of the roadster. The coupe has the same frontal aspect with a fast-back closed body in the accepted English conformation a-la Aston Martin and Aceca. Underneath lie many real changes including an all-independent suspension system. Power comes from the well-tried 3.8 liter engine set up as was the 150-S. A run down the Jabbeke pike with the car netted a sizzling 149.7 mph. The standing quarter was turned in 14 seconds and 0 to 100 mph was clicked off in 16 seconds. The price range is scheduled to be similar to that of the 150-S. Watch for a full report in the next issue of SCG.

* * *

Citroen Victory

The rally team of Trautmann and Verrier drove their battered Citroen ID-19 to victory in the annual Tulip Rally in Holland. The car had been invloved in a serious accident earlier and was not expected to be able to finish.

The Tulip Rally, like the Monte Carlo and other top European rallies, test the car and driver at very high speeds over extremely difficult terrain.

* * *

Legal Decision

Ray Lavely, manager of the Continental Divide Raceway, near Denver, sent us a note on an important legal decision rendered by the Industrial Commission of Colorado.

During the inaugural sports car races at the Raceway, in 1959, Robert Ramsey, a volunteer flagman on one of the turns, was hit by one of the participating cars. Ramsey was covered by the Raceway's insurance, but also filed a claim under Workman's Compensation with the Industrial Commission.

As Ramsey was an amateur club member, volunteering his help without pay, the Commission's referee ruled that Ramsey's case be "dismissed and denied." This was the first decision in a case of this type in the United States.

* * *

Indy Rumor

Jack Brabham, 1959 and 1960 World's Champion Grand Prix driver, is entered for the Memorial Day Indianapolis "500" in one of two 2.5 liter Cooper Climax ex-Formula I cars. Brabham shook up the American oval-racing fraternity last October, on his way to the US Grand Prix at Riverside, when he casually drove his independently suspended Formula I Cooper around the Indy circuit at better than 144 mph, using road race tires and pump fuel.

While Brabham drifted the road race machine through the turns as fast as anyone ever recorded at Indy, the car couldn't have matched the top speed of the 4.2 liter Indy cars down the straights, nor their acceleration out of the turns. The road race-tuned Cooper was not then especially geared for the Indy circuit and Brabham stayed in top cog while at speed. The new car, which John Cooper is preparing for the race, and last year's winning car, will have a special three-speed box, with a gear for starting, one for the turns and another for the flat-out straights.

The two cars, sponsored by James H. Kimberly, of Chicago, will arrive for practice May 1. Both Brabham and John Cooper will spend much of their lives on jet planes during May, with practice and qualifying for Indy, the Monaco and Dutch Grand Prix for points and the Indy "500" for money.

* * *

Model Cars Stolen

Thieves stole 15,000 1961 Ford customizing convertibles recently from a Chicago freight terminal when a huge semi truck van was used to transfer 1200 cartons of model car kits.

The AMT kits, valued at $19,000, were a brand new release item ready for introduction on the model car market. This shipment represented several weeks' production and its loss will thus delay the appearance of these new kits on hobby shelves.

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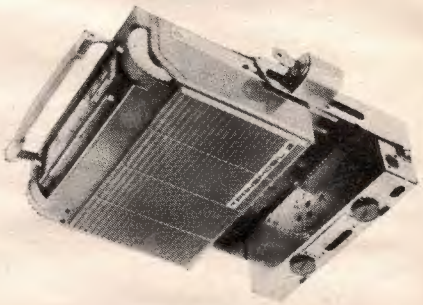
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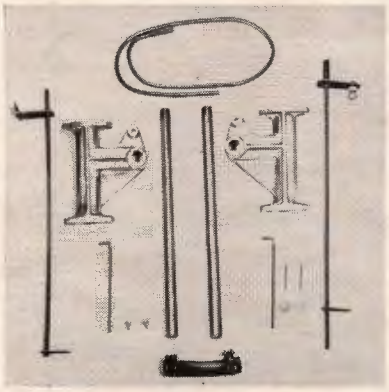
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TWO GUIDEBOOKS, both 16 pages, give a wealth of tips on winter driving and on economy driving. Both are free at Renault dealers, with the Winter Driving Guide available in the northern states and the Economy Driving Guide in the southern states. See your local Renault dealer.



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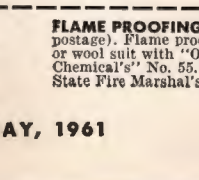
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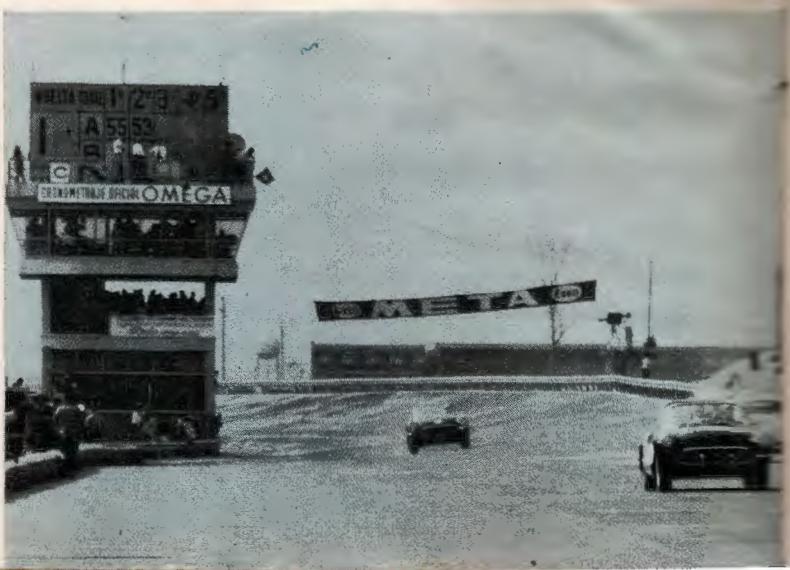




Jim Hall (top) worries about tuning the Cooper for the 7,300 feet altitude. Big bore production race was another victory for Ricardo Rodriguez.



President Mateos of Mexico greets Ricardo Rodriguez in the pits before the Formula Jr. race. Ricardo had an excellent pit crew.



PHOTOS AND STORY BY JACK BRADY

de MEXICO *Here We Go Again*

IF YOUR LINGUISTIC CAPABILITIES extend to the romance tongues, and you happen to subscribe to a Mexican newspaper, you know that some exceptional racing was recently staged on Mexico's immense Deportivo or sports park. Located just 15 pesos worth of very hairy taxi ride from the center of Mexico City, the park includes more baseball diamonds, football and soccer fields, swimming pools, fountains and statuary than any other similar area in the world. More important, it is partially encircled by a beautifully engineered auto racing circuit. Completed in 1958, only a single 500 kilometer compact race had been held on the 3.2 mile course prior to January of this year.

The 1st Carrera Ciudad de Mexico was billed as the greatest racing endeavor in Mexico since the much-mourned passing of the Carrera Pan Americana. In the strictest interpretation this was true, but to compare the two requires more imagination than even the most devious Latin journalist could muster.

Racing has been officially in general disrepute since Mexican Road Race days because of the multiple casualties involved in that event. With the support of President Adolfo Lopez Mateos, and an influential group of enthusiasts, the future looks more encouraging.

Lopez Mateos' interest is not a passive one. He owns a Ferrari, a Maserati, and has been known to stand at the fence during some of the races in the hinterlands and observe with quiet but obvious enthusiasm.

Our race weekend properly started on Thursday prior to the Carrera. Bucking a tight schedule that didn't permit the 5000-mile round trip drive, we caught the very pleasant CMA Comet 4C Jet from Los Angeles International Airport.

Returning from Nassau earlier in the month we took the alternate route to Los Angeles via Mexico City. This side trip had been inspired by that crusty West Coast journalist, Gus Vignolle, a long time friend of Don Pedro (Papa) Rodriguez. We wanted to get a look at the track and hear first hand what was being done. Luis Zalce, secretary for the Committee of Organizers, took us to the Autodromo at the Deportiva and we actually drove the course to be used in the upcoming Junior race.

Later at lunch, a pleasantly late lunch with Don Pedro Rodriguez, the topic of the most suitable machine for the race and the course, came up.

This was to be a forty lap event, the longest Formula Junior race ever run on this side of the Atlantic. Club Roda, the sponsoring group for the yearly races at Avandaro, had just received word from Colin Chapman that the remainder of the ten cars ordered by some of the Roda members were to be delivered in Vera Cruz shortly. Four of the Lotuses were already in Mexico. Don Pedro had not yet decided what car would be the most suitable for Pedro and Ricardo, and of course was considering the Lotus. The two Scorpions driven by the Rodriguezes are fast, but don't seem to be in the same class with the Cooper-Lotus clan.

I have the unfortunate Irish habit of being quite emphatic when asked my opinion about almost any subject. Performing right up to expectations, I deposited foot in mouth and gave his query as to what car I thought would do the job a most enthusiastic response.

After watching Walt Hansgen's performance at Riverside in the 1961 prototype from Cooper's Surbiton shop, and going over the car as carefully as time and a watchful mechanic would permit, I was convinced that it was the sturdiest and the cleanest Junior I'd seen to date, and I said so.

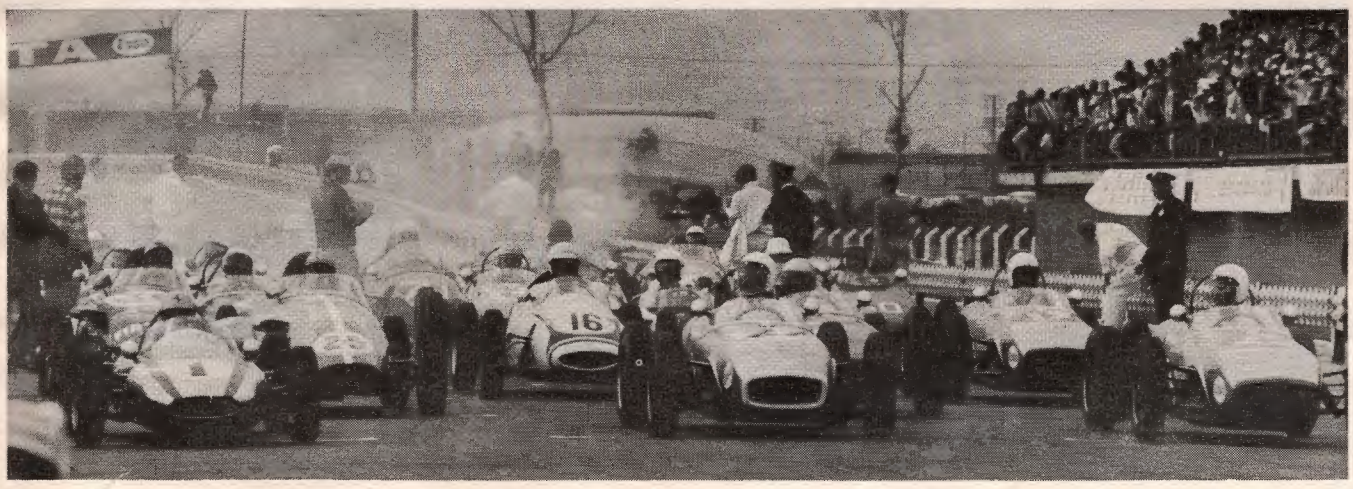
With a smile "Papa" suggested: "Call Alfred Momo when you get back to the States and see if you can arrange something." Just like that!

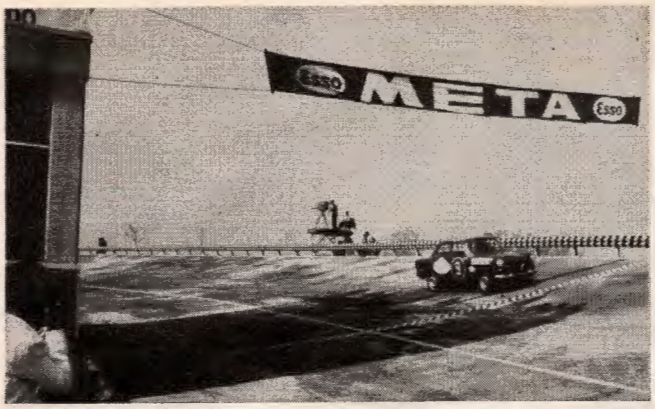
The sum total of my arrangements was a call to the Momo Corporation in New York and a quick description of the problem. To Alfred, one small item stood in the way of a prompt decision. The car was still on the road from Riverside.

Alfred promised to check with Briggs Cunningham, and contact the Rodriguez family as soon as possible. We passed the time of day and that was that. In typical Momo fashion, he not only sent the prototype Cooper to Mexico, but also a Stanguellini for Pedro to drive. A mechanic to see to the welfare of both was also included.

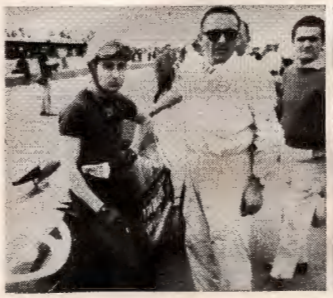
In a very unusual move for a Mexican

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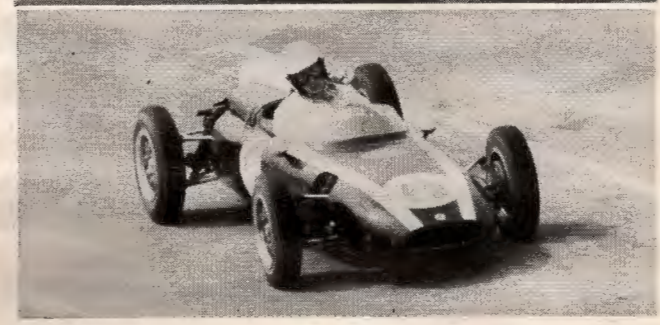
Ricardo Rodriguez streaks across the finish line in an Alfa, very far in the lead, to win the Turismo A event.





Lorenzo Bandini, Italian Junior ace, awaits with his crew. President of Mexico, Mateos, (right) starts big race.

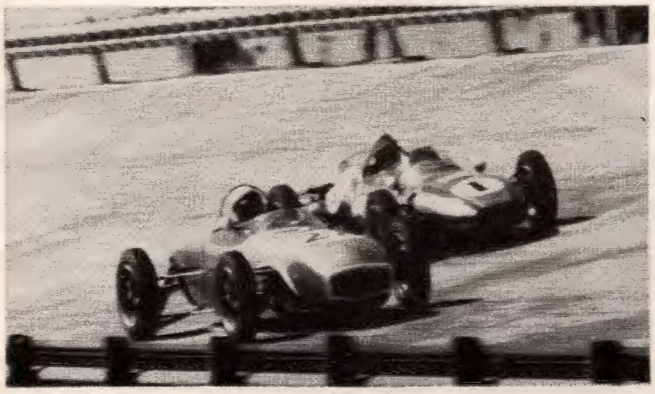




Ricardo signals for a pit stop during practice session in the 1961 prototype Cooper with which Walt Hansgen won the Formula Junior race at Riverside. Jim Hall (bottom), who was to take the third spot, gives fellow-Texan Hap Sharp's new Cooper a workout on banking at Mexico City.



Start of the $20,000 Formula Junior race at the sports park in Mexico City saw 28 starters, 23 finishers. In front row, left to right, are Ricardo Rodriguez, Adolfo Valasquez and brother Javier. Jim Hall #15 is in 4th row.





Ricardo takes his Cooper past Adolfo Valasquez' Lotus on the banking. Hap Sharp (above) in Jim Hall's Cooper, running 11th in the fifth lap, leads the Van Beuren Lotus #8 and the #19 Mitter DKW under the start-finish banner.

sponsor, the Pepsi-Cola Company of Mexico bought the Cooper Junior for Ricardo. Since there is very little tax relief for advertising in Mexico, sponsors are not inclined to spend the money that sometimes goes into a racing enterprise in the U.S.

This whole sequence of events traipsed through my head as our jet landed. Hoping that everything had gone smoothly and we would see Ricardo and the Cooper together under favorable circumstances, we made a rapid trip through customs, with a complimentary Daquiri in hand, and headed for our hotel. A smiling Don Pedro had been waiting behind the customs desk for us. The Cooper was in Mexico and doing very well in early practice.

Bud Hull, Dolphin manufacturer from El Cajon, California, hailed us as we checked in. He wanted to know "where they were hiding race headquarters." Bud had been through a six-hour struggle with Mexican officials at Nogales before they just threw up their hands and let him across the line. He might have been there yet if he hadn't been able to speak Spanish. He claims to have tackled everyone from the border guard to the chief of the port customs. When orders originate in Mexico City nearly 2500 miles away from the border, the progress of information, permits, etc., to the provinces can be agonizingly slow.

Many a prospective entry from the U.S. has been discouraged by this sort of thing in the past, but purses such as the $20,000 posted for the January race tempt even the lazier competitors. Admittedly, distances are prohibitive and without a lot of advance planning you could not race successfully south of the border. Among those tempted this time were Jim Hall and Hap Sharp, who, living up to their Texas reputation, put two Juniors into Mexico for the race, then showed up six days later at Palm Springs for an SCCA regional event. They not only had the Juniors this time, but two Cooper Monaco's and a Ferrari. This harks back a few years to the time when the giant vans of Edgar, Kimberly and the others were on the road during the entire season. More power to the Lone Star contingent. Hall and crew are providing top flight machinery, competitive driving, and color.

Half an hour after we checked into our hotel on the Reforma, we were in Luis Zalce's office. The Mexican greeting for a friend is the continental embrace, a pleasant custom when you understand what is happening, but a little unnerving during the initiation. We were immediately packed off to Woolworth's for credential pictures. These, as usual, looked like the best attempts of the Chicago police department. The credentials are good for the entire year, and with the photograph attached, they become a little harder for the irresponsible element to pass over the fence.

A small party was held that night by Don Pedro, to introduce the new cars to the press. With the help of a sympathetic cab driver who had no English, and my acute grasp of sign language, we were soon in dire straits. This, incidentally, wasn't anywhere near the party location. The driver finally called a bi-lingual dispatcher on his radio who got us to the affair with a minimum of difficulty.

The Rootes Group had forwarded the Sunbeam Rapiers, which had been driven with much gusto at Riverside by Hopkirk and Harper, to Mexico and were out in full force for the party. We were informed that the Rodriguez boys were to drive the Sunbeams and some three of four other cars yet to be decided. Most of the sporting press was on hand and George Montezuma, motoring mentor of Radio Mil, got us involved in one of his enthusiastic and often riotous conversations.

One of the major topics of conversation was a 1:44.7 lap turned by Ricardo, Monday afternoon.

Motor racing is not new in Mexico. If you are addicted to musty archives, you can find pictures of gargantuan racing cars careening over a dirt course in Guadalajara in 1907. The abiding interest of the Latin in speed was reemphasized for us on Friday and Saturday. During practice and qualification, the stands were jammed to the railings.

Anticipating a pretty nasty crush at the track, we boarded a taxi just after nine on Sunday morning. The entire city was shrouded in a thick fog with only an occasional produce truck in evidence, or a bicyclist with a flat basket of immense proportions balanced on his head on his way to the great city markets.

The crowd was already thick along the fences with the first race an hour away. The traffic jam we anticipated, didn't materialize until after the race. Where they came from then, I'll never know. I didn't think there were many cars in the city.

Next year's Mexican season should see at least two races on the Autodromo. One will probably be an unlimited sports car race, the other a repeat of the January race. Avandaro will have a Junior race added to the regular sports car events. There may also be prize money involved here. If the Autodromo or another course can be approved this year, a bid for a Formula I race might be forthcoming in 1962, according to Zalce.

Under the new Mexican laws, no finished automobile may be imported. They must either be assembled or manufactured completely within the country's border, and the sale price cannot exceed $4500. (U.S.) In a move to train and employ the immense labor pool in Mexico, the government is taking some very stringent steps. Cars to be used exclusively for competition are the only exception to these laws. If a U.S. competitor has a good car and is willing to sell it, he might inquire into the possibilities before going down to race. The new laws, I am led to understand, make this a much easier proposition than before and possibly you might pay the expenses of the trip.

Rodger Ward has a pet phrase that he applies to people who move into another sphere of racing and expect to clean up on a grand scale:

"You can't just go in there and expect to pick a grape, because it won't work."

This may well hold true for anyone heading for Mexico. Make no mistake, there's plenty of prize money, but you'll have to fight for every peso of it. Discounting the obvious talents of the Rodriguez boys, we saw a full field of capable drivers. Some, with more experience, will stand up to the best on the Continent.

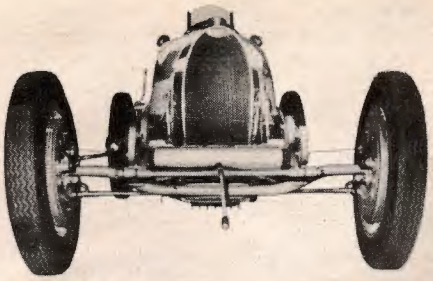
A very real shortage of mechanics familiar with the refined breed of machinery and tunable chassis that are coming out of Europe is one of the major problems at the moment. With the influx of good cars there will, in all probability, be an increasing emigration of capable mechanics as well as an increasing number of good men learning the business in their country. Mexico is a frontier, and master mechanics in any field are much sought after.

The committee that organizes these races does it as a labor of love. No private promotion is permitted in the Deportiva and all the proceeds are directed to the city's charities.

There is one other ghost that we should lay to rest, permanently, if possible. Somewhere along the line, the Latins have acquired a reputation for being wild, sometimes to the exclusion of their own safety and that of everyone else on the track. You can simply forget this fable, at least where sports cars and the Juniors are concerned. I'm told that the Mechannica National races are really brutal and far outclass our early jalopy races. A very high quality of sportsmanship was reflected in all the drivers that we were able to observe during the three days of practice and racing.

The complete lack of accidents, with only two machines damaged in practice and no injuries, is quite an enviable record on any course.

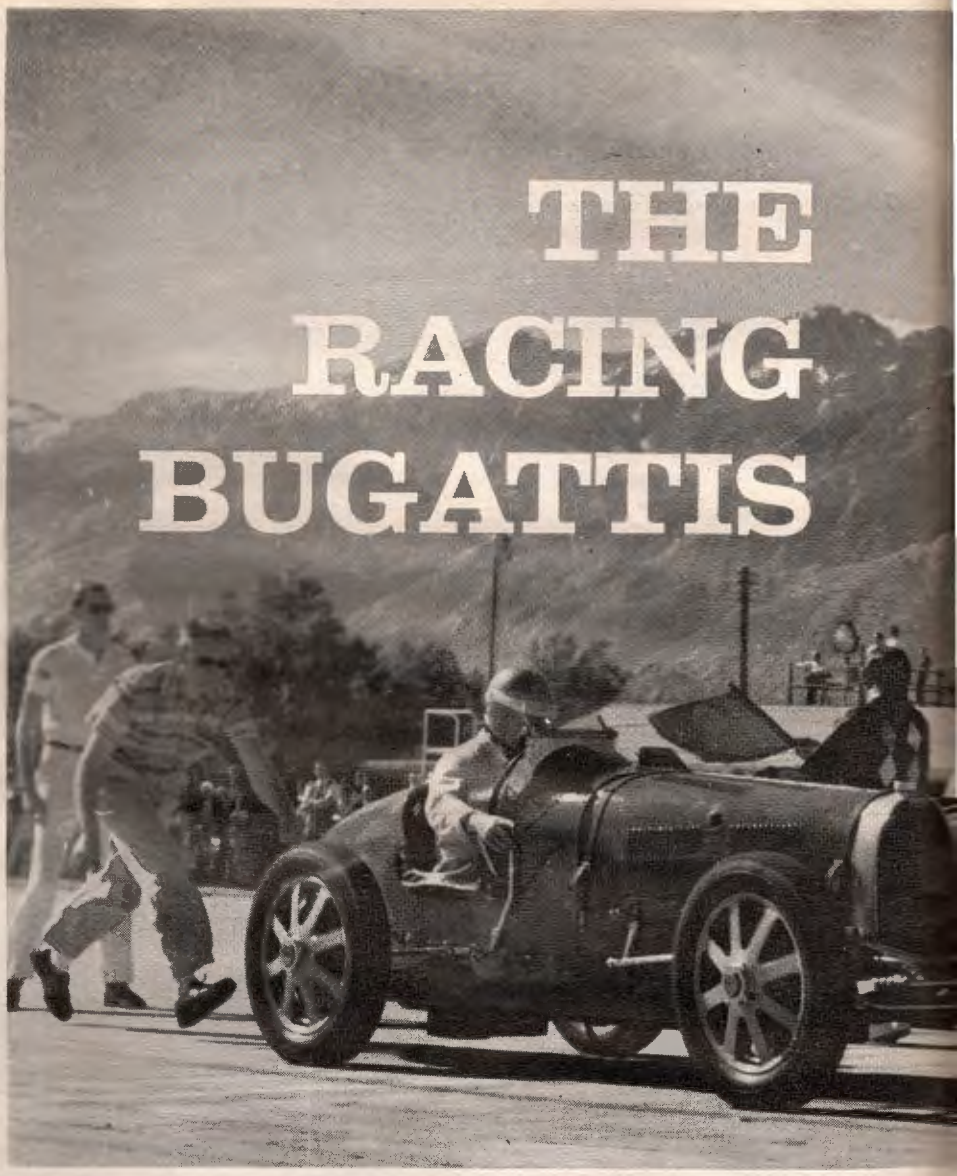
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THE RACING BUGATTIS

When Molsheim Conquered the World

BY KEN W. PURDY

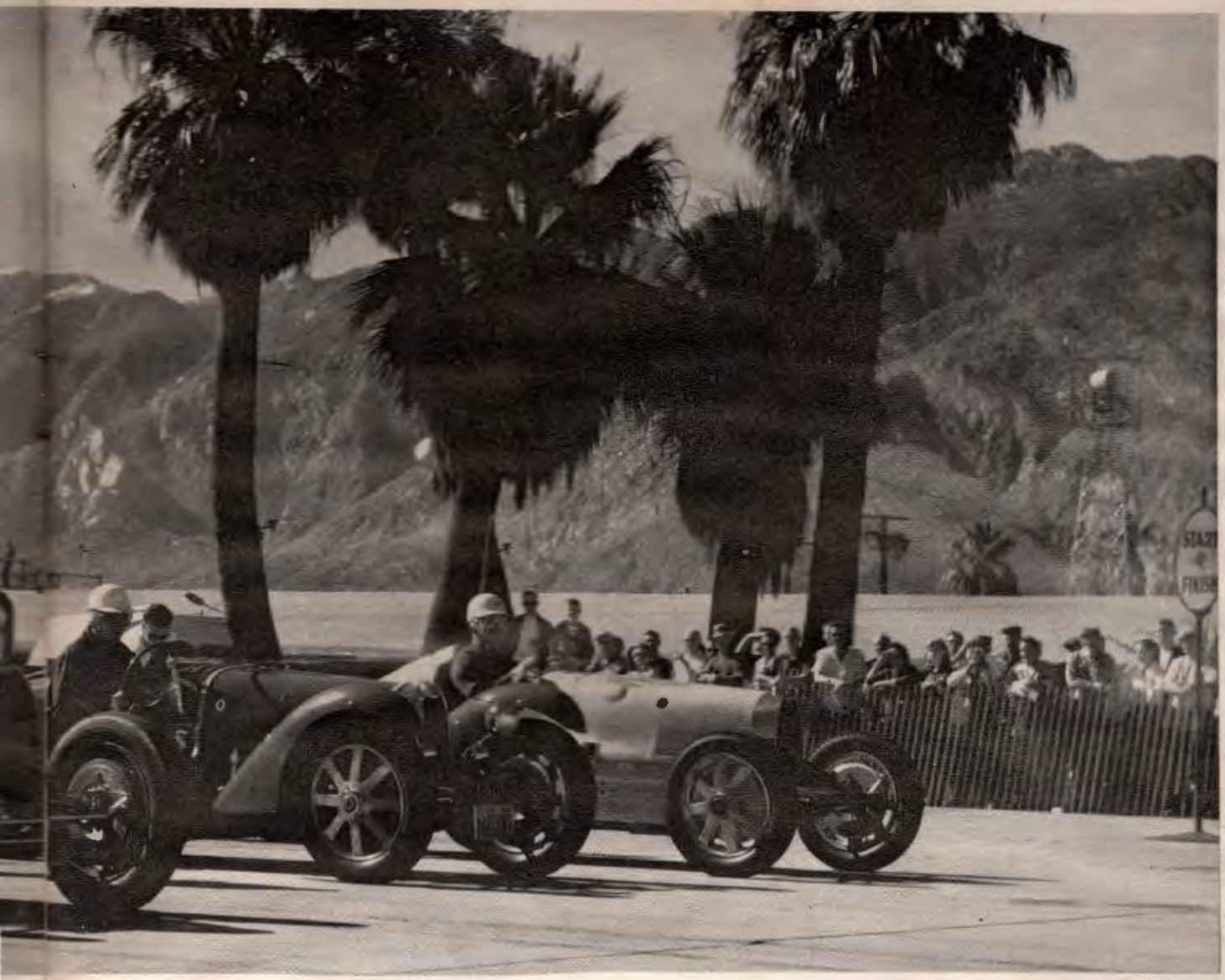


THE FIRST BUGATTI RACE-VICTORY of consequence was the Grand Prix du Mans in 1911, when Hemery won overall on a six-liter FIAT and Ernest Friderich won the "petite cylindree" class with a 1.4-liter Bugatti weighing 660 pounds; the last notable triumph for the make was the *Coupe des Prisonniers* in September, 1945 — the very first post-war race — won by Jean-Pierre Wimille in a 4.7-liter over a 1¾-mile circuit in the Bois de Boulogne. Over this span of 34 years Bugatti automobiles won events estimated variously up to 4000 in number. The exact figures probably cannot be determined. For one thing, the factory's records were dispersed and lost during World War II. Even the official total of cars made during Ettore Bugatti's life-time, 9,500 is an approximation.

In recent years it has become almost mandatory to follow any mention of the Type 35 Grand Prix Bugatti with the qualification that this is the most successful racing automobile of all time. Lawrence Pomeroy's dictum is often quoted: "The Type 35 Bugatti may certainly claim to be the world's most successful racing car and as such can justifiably be taken as a norm against which prior and subsequent designs may well be compared. Certainly no other model has been capable of such wide use, that is to say for sprints, hill climbs, track racing, and road racing, and in the hands of both professional and amateur drivers, expert and not so expert."

Mr. Pomeroy published that estimate in 1949, in the first volume of his monumental *The Grand Prix Car*. It is fair to assume that he wrote it some time in 1948, and perhaps earlier. In 1948 Enzo Ferrari was only beginning his manufacturing career. The remarkable Type 158/159 Alfa-Romeo had not yet put together the record for which it would always be remembered, and *Herren* Uhlenhaut and Neubauer had really no right even to dream of anything like the W196 Mercedes-Benz. Ferdinand Porsche had his plans, but they were some distance from fruition.

In 1949 Pomeroy could say, "Bugatti cars have won more road races than any other make, quite possibly more than all other makes added together." This too was true, in 1949. In 1925-26, Bugatti automobiles, most of them Type 35 variants, did win 1,045 events, and in 1927, piled up 806 wins. These are astonishing figures. In seven years, the Types 35 and 51 won 33 major races. At the time, and for years afterwards this was a unique accomplishment. However, in the seasons of 1947, 1948, 1950 and 1951 the Type 158/159 Alfa Romeo won 31 races, placed 2nd 19 times, 3rd 15 times, and made fastest time of the day 23 times. And since then we have seen Ferrari win thousands of events. The parallels between Bugatti and Ferrari, incidentally, are striking: the cars were in each case unique in their eras; the men who made them were both Italians, gifted, egocentric, domineering, and well aware of the utility of the talented wealthy amateur in building up a record of racing successes. (There were 19 Bugattis entered in the 1928 Targa Florio. Not surprisingly, one of them came in first.) Each knew the wisdom of clinging to a well-tried design. The Ferrari 3-liter engine has been in process of development and refinement for much more than a decade, and it has been said of Ettore Bugatti that in essence he designed only one engine. The Type 59, the last car the factory ran in a team in Grand Prix racing, just before World War II, showed clear points of similarity with the machines that ran under Bugatti's name in the Grand Prix of Strasbourg in 1922. (These were the much publicized round-nose cars with exhaust pipes exiting, rocket-like, from the center of the tail. They were one of M. Bugatti's little oddities, like the slab-sided cars of 1923, of so short a wheel-base — 6 feet 6 inches — that the rear of the engine came into the cockpit between driver and mechanic. The track was exactly half the



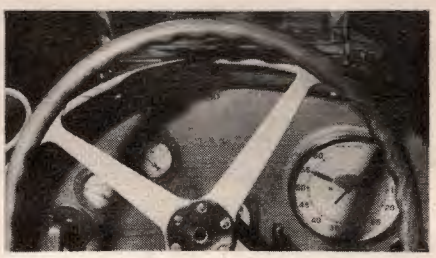
wheelbase, which made the cars steer in an interesting fashion on the straights.)

The Type 35 engine, at the height of its glory, was an old design. It had clear points of parallel with Bugatti creations going back as far as World War I. It was a two-liter straight eight, ball and roller bearings, solid connecting rods running on a crankshaft put together with taper and key. There were three vertical valves, two inlet, one exhaust, timed for 30 degrees overlap. In the supercharged variant, the 35-C, 120 horsepower was produced at around 5500 rpm, nothing extraordinary for a blown Grand Prix engine of the period. At least four contemporary cars could exceed the Bugatti's 125 mph: FIAT, Delage, Talbot, Bentley.

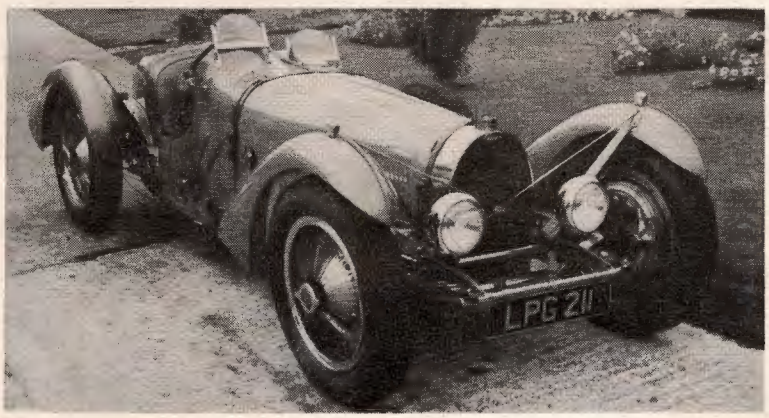
However, the 35's could accept speed and horsepower handicaps from contemporary rivals and beat them, and not only with drivers of Nuvolari's calibre in charge. The reason was not to be found, let it be said at once, altogether

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Start of 1960 Bugatti race (above) at Palm Springs had a 2.3 liter S/C Type 35B, a 1.5 liter Type 37A and monoposto with a 1.5 liter 39A S/C engine.



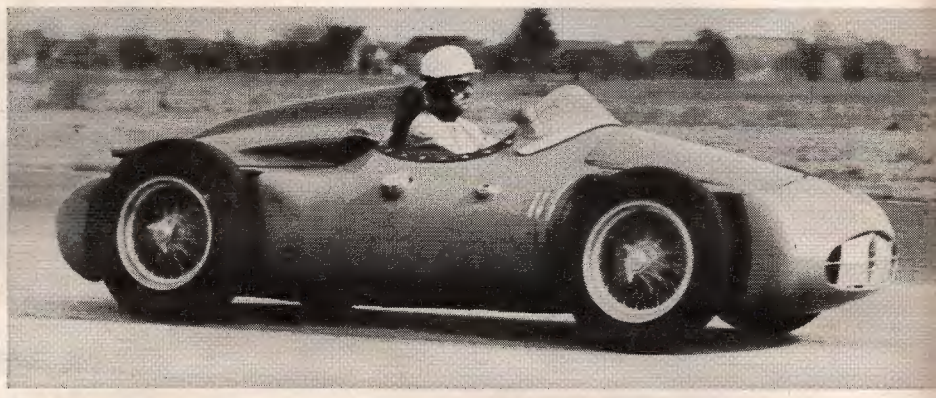
Dash of Otto Zipper's monoposto 39A is sparse, with oil & gas pressure, tach. Type 59 (below) has piano wire spokes and 3.3 liter supercharged engine.





Ettore Bugatti favored solid front axles, cable brakes and huge drums integral with spoked magnesium wheels.

THE RACING BUGATTIS *continued*



The only Bugatti GP car manufactured after World War II, here driven by Trintignant, was the Type 251, having a 2.5 liter straight-eight engine mounted transversely in the rear. It didn't do too well and was dropped.

in the brakes, although M. Bugatti's unique eight-spoke alloy wheel, which exposed the brake-shoes when it was taken off, and gave a new drum with each wheel-change, did help a good deal. It not only maintained the braking-power of the car, but by relieving the driver of the necessity of brake-conservation, it encouraged him to hurry along by staying on the throttle well into the corners. Although Bugatti had used hydraulics at Strasbourg in 1922, he was so enamored of mechanical brakes that he designed them even into the rail-cars which he made so lively a feature of the French railways. The driver of a Grand Prix car was in no danger of being pitched over the windshield on his head, but his brakes would adequately slow the car if he was not delicate about pedal-pressure. The Bugatti cog-and-chain arrangement was excellent for balancing the effort side-to-side and fore-and-aft.

Primary in the Bugatti's ability was its handling. The 35's, and the 51's succeeding them, were notably good road-cars: firm, rock-steady, forgiving, and without vicious or even tricky behaviour traits. Bugatti understood the worth of a stiff chassis. A G. P. Bugatti with its skin off is esthetically quite lovely as well as mechanically interesting: the chassis side-members, just ahead of the engine bulkhead, have a depth that would be suitable for bridge-girders, but at the front ends, they measure less than an inch; seen from above, they are not straight but bowed. The engine itself locks the two members together at the front. The quarter-elliptic springs at the rear must deflect occasionally, but rarely sufficiently to be detected by the naked eye. Strong tubular braces run across the car at mid-point. Result of this purposeful and intelligent effort is a race-car that will behave on wet or dry, smooth or rough surfaces. The Types 35, 37, 39 and 51 Bugattis were remarkably amenable to direction and did not kill off amateurs before they had learned the trade. Drivers of the first rank, on the other hand, could do almost anything with them.

Venerable in design, under-powered, under-braked, over-complicated, but sturdy and reliable and wonderfully roadable, the G. P. Bugatti of the golden years was a splendid race-car. The steering was delightful, and the British writer who said that nothing nearly as good was known in the world until the Porsche came along was right. The clutch, if kept in good order, would hold no matter what happened. (M. Bugatti had cunningly arranged for it to grab tighter as the revs mounted.) The brake pedal was well designed for its purpose (all the pedals worked best for people with small feet) and the gear lever truly did not seem to be connected to anything at all. All this is true. What is usually included in the car's catalogue of virtues, and is emphatically not true, is that it was comfortable. It was not. It was too narrow to accommodate two people, and, that trifle aside, the same stiffness that contributed so much to its tenacious road-holding ensured a brutal ride. A common sensation in a G. P. Bugatti, one that I have many times experienced without ever learning to like it, is to be in the descending phase of an air-borne transition across a bump when the seat comes up, as it were, to greet one. I don't know anything that will so vividly call to mind the toughness of the 1920-1935 race-drivers as to take a Type 35 Bugatti, two up, over 50 fast miles of secondary road. No, comfortable, it was not.

How many models of racing cars did M. Bugatti field under his own name, leaving aside those he certainly designed for FIAT, Deutz, De Dietrich, Isotta-Fraschini, Mathis (Hermes) and Peugeot? It's impossible to say with finality. Hugh Conway, historian of the Bugatti Owners Club, believes that the first entry of a Bugatti as a Bugatti was made in 1905, in August, in an event called the Bleichroder Race. Bugatti himself drove it. He didn't win. Earlier, much earlier, in 1898 as a matter of fact, Bugatti apparently modified a Prinetti & Stucci tricycle (he added a second engine) and successfully raced it. Bugatti definitely designed a car for the 1903 Paris-Madrid, a big one for the day, mounting a 50-horsepower engine, but was not allowed to start because of what the organizers conceived to be a dangerously low driving position. (They were probably right: drivers of that day relied heavily on a good clear view of the telephone poles as navigational aids, and to be seated low in the dust-storm churned up by the fellow just ahead was no advantage.)

The car Bugatti called the Type 13 was a homework project in which he engaged while he was working for Deutz, in Cologne. He built it in the cellar in the winter of 1908-09. When, in 1910, he set up shop at Molsheim, the Type 13 was the first model put into production. The Type 22, similar except for a slightly bigger engine, 65 x 100 instead of 62 x 100 millimeters, pressure oil-feed instead of wick, and quarter elliptic instead of semi-elliptic springs, was made in 1914. It had a 7 foot 10½-inch wheelbase. With six inches more wheelbase it was called the Type 23.

In 1911-12 a single racing car was built using two of the 1.4-liter engines that had powered the little car Friderich had won with at Le Mans. The two engines were hooked together with "rubberised leather" and the vehicle did 86 miles an hour. It was fast enough, but it had other problems, and it was not to achieve immortality. Another 1911-12 car was a Bugatti treatment of the chain-drive principle, a 5-liter overhead camshaft engined automobile. It would do 100 mph, a velocity to terrify all but hearts of oak in 1908. One of these cars, the famous "Black Bess," still lives. For years it was a foundation of the notable C. W. P. Hampton collection of Bugatti automobiles. A long-stroke, conventional-drive variant of this 5-liter was entered for Indianapolis in 1914, Friderich driving, but dropped out with axle failure.

The famous "Brescia" model was so called because it took the first four places at that circuit in 1921. The car had a 16-valve 1496 cc engine. The "Brescia Modifié" was, as the name suggests, less hot.

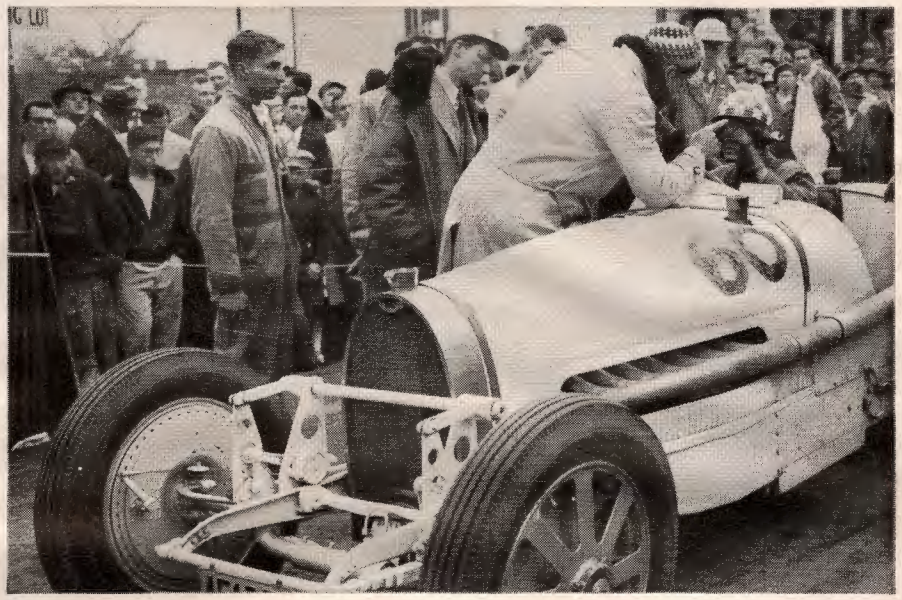
The slab-side cars that ran at Tours in 1923 were Types 29, and the Type 35 series included A, B, C and T. The 35A was a 35 "Modifié — sometimes referred to, even by the factory, as an "Imitation." It looked like a Type 35 but it ran on wire wheels and was around 10 miles an hour slower. The C's were supercharged, the T's had 2.3 instead of 2-liter engines and the B's were blown T's. Type 37's were four-cylinder 1500 cc Grand Prix cars and 37-A's were supercharged. Type 39 G. P.'s were eight-cylinder 1500 cc cars and again A marked the addition of a Roots blower.

Bugatti's Type 45 was a 16-cylinder engine, similar to the King-Bugatti aircraft engine, in a Grand Prix chassis. A special version of the Type 50 engine called the 50B and said to put out 500 horsepower was used in several G. P. chassis, including the 4.7 single-seater, just before the Second War. Gene Cesari brought one of them to this country in 1960.

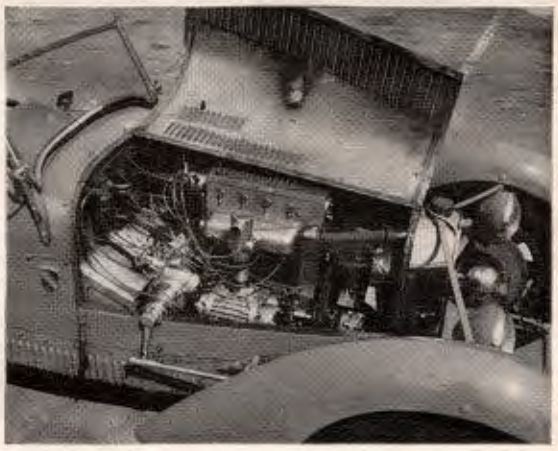
When Bugatti went from single-stick to d.o.h.c. in 1931 the result was the Type 51, 2.3 liters. The engine did not otherwise differ notably from the 35's They were put into the familiar sharp-tailed, 8-spoke G. P. configurations, the most beautiful racing automobiles, surely, of all time, the ultimate expression of the classic design that perished when the big German cars appeared in the mid-1930's. The 51C was a blown 2-liter, and the 51A had 1500 ccs and a blower. The Type 53 and the Type 54 were 4.9-liter G. P. cars, but the 53 had four-wheel drive. The 54 was not

(continued on page 81)

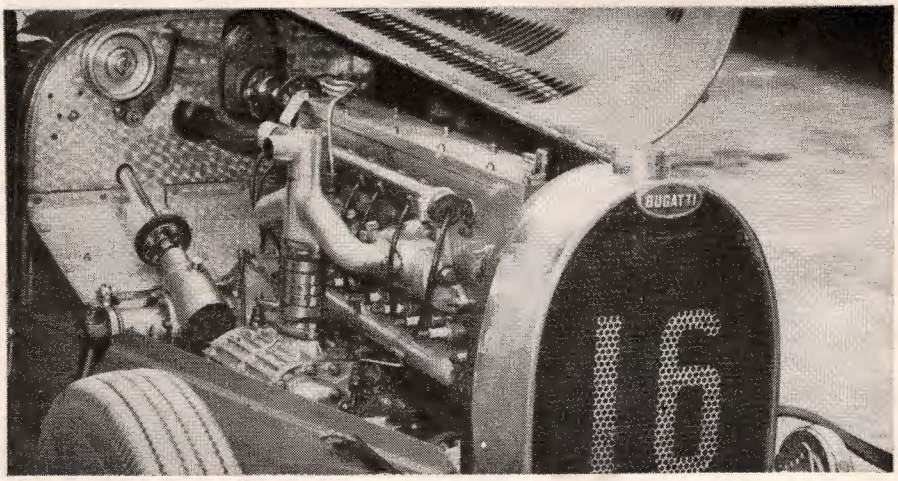
PHOTOS BY KEITH DANNATT, LESTER NEHAMKIN, PRESSE SPORTS, W.R.C. SHEDENHELM, DICK THIERRY & WALT WORON.



The Type 54 Bugatti, here driven by W. F. Milliken, was notoriously hard to hold at high speeds. This particular car was equipped with Dynaflow!



Type 37A (right) had 1.5 liter 4-cylinder blown sohc engine, while highly successful Type 35B (below) had a supercharged 2.3 liter eight-cylinder sohc engine.





POWER AT A PRICE

TO BE FULLY APPRECIATED, the Porsche Super 90 must be considered a highly-specialized model. It's neither fish nor fowl in that it's much healthier than the 1600 Super, but lacks the real Gran Tourismo performance of a G. T. Carrera. Price and docility are the obvious entities that keep it from approaching the latter yet make it a more palatable purchase. Basically, the Super 90 is a hot-rodded version of the normal bushing-bearing 1600. By means of the "Three C's" (cam, carburetion, and compression ratio) the 90 develops 15 more horses than the Super, 30 more than the Normal. Handling changes have been incorporated with the increased power by the addition of a compensating spring in the rear suspension, and the results are *very* interesting.

Sole (obvious) exterior engine changes appear to be the replacement of the Zenith dual-throat carburetors of the Super with Solex 40's of the same type. The latter, however, have bigger throats and venturis along with a jetting arrangement that lends itself to high-performance work and tuning. A half-point increase in compression ratio over the Super engine and a higher-lift camshaft combine with the breathing improvements to move horsepower, torque, and rpm range up a considerable percentage. These modifications work out extremely well, yet the engine remains very docile. In fact, we'd hazard that it's tamer in traffic and lower speed ranges than the 1600 Super. The high torque and wide rpm range combine to give the impression of many more cubic inches than there actually are. Getting off the mark fast from a standing start takes some practice, however, as the big carburetors can't be dumped open too fast. Once the biggest chunk of inertia is overcome, you can go to the floor with the pedal and start moving out very fast indeed. In fact one of the most impressive things about this engine is the feeling of torque — sheet push in the shoulders — that one gets on booting the throttle with the tach in the green zone. As is the case with all Porsches but the likes of the GT Carrera, there isn't the feeling of wild acceleration from a stand-

ing start, but once under way it comes on with increasing force. The effect of this is that, unless one is used to this particular Porsche characteristic, speed builds up far faster than one would believe possible. After one of these seemingly mild starts, the first look at the speedometer can come as something of a shock since that instrument may well be telling you that you are unwittingly breaking every speed law in the book. More than one Porsche pilot, SCG's Editor included, has on occasion found himself trying to explain this phenomenon to an unsympathetic arm of the law.

Aside from the individualities of the Super 90, changes wrought in Porsches over the past few years are not too outwardly apparent but amazing in effect. Gone is the lightness in the steering and the unpredictable oversteer that often found you looking back in the direction from whence you had come. The steering is now firm and lets the driver establish a "feel" of adhesion. Another item that's altered is the formerly delicate shift mechanism that, under any misuse, would warp or break any place from the handle clear in to the synchro rings in the transmission. All of this is beefed up and a tad stiffer. The lever is more conveniently placed and the throw is shorter, eliminating the former long reach to third. Gone are the days of the one-finger shifts, but we'd rather have it this way.

The clutch is light, smooth, and takes a positive bite without that all-in, all-out feeling. Detail improvements have been made to eliminate the former tendency to snap clutch cable ends in such inconvenient places as dark country roads or mid-town Manhattan during rush hours. We found it necessary to abuse the clutch some to obtain maximum acceleration readings and found it far stronger than in previous models, the Carrera De Luxe included.

The brakes are potent and smooth with better than average balance and virtually nil fade. The only possible objection was a slightly spongey pedal feel that was probably more due to arm length than any other factor. Required pressure was quite light and the resulting stops from any speed were phenomenally strong.

While the handling of the newer Porsches in general is vastly improved, the characteristics of the Super 90 are different as well. The compensating spring, consisting of a single transverse leaf that centers under the gearbox and connects — through rubber biscuits — to the trailing arms, enables the spring rate to be softened slightly but stiffens roll-resistance. Result: it's strictly a flat cat in a corner. To improve adhesion the German Dunlop Sports tire is made standard equipment. It is a soft, high-tread skin very similar to a motorcycle tire and provides maximum bite in the wet or around low-velocity corners. We felt, however, that they made the Porsche become squirrely in fast, dry corners as they seem to squeegee under maximum load. But we should first state that the "90" isn't cornered like a Porsche! Normal procedure with a Push-ee is to "drive it in," letting the front end plow to compensate for the rear coming out. In the S-90 that technique will net you a trip through the tules. It must be set into a drift attitude before the corner and varying amounts of power applied. Regardless of technique, the car would only negotiate a corner smoothly when it was quite a bit below its actual limit. With harder racing tires installed, the breakaway would probably be gradual, any drift or slide more controllable. Applied to normal road usage, however, the effect is fantastic. You just crank the wheel, brace yourself, and watch it make the turn. This test gave us one more example, as though we needed one, that when one is going racing, a racing tire should be used, and when touring is contemplated, there's nothing like a touring tire.

The ability to soak up both long and short bumps is amazing in the "new" Porsches. This has always been a long suit for Porsche, but it's even better now and even the slight tendency to pitch, caused by the short wheelbase, has been virtually eliminated.

Seating is different, at least in the roadster, in that one seemingly sits higher, in a more chairlike position. (To some it's desirable but classic Porsche pushers may prefer the old, down-in-the-car seating, reduced visibility and entry difficulty notwithstanding.) There's lots of room in the cockpit both laterally and longitudinally — but not necessarily vertically; a six-plus footer could just bump his head on the top bow.

In the lighting department there is another change and, in our estimation, not necessarily a desirable one. After turning on the lights with the usual

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Numeral 90 tagged to Super nameplate is the only clue to the identity of the potent newcomer to Porsche family.

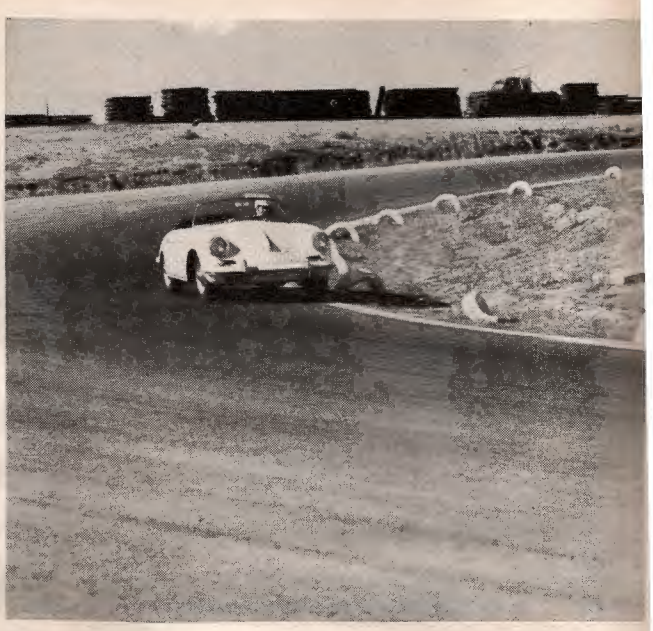


Only slight revisions in styling have been made since the Porsche design originated in the early post-war period.

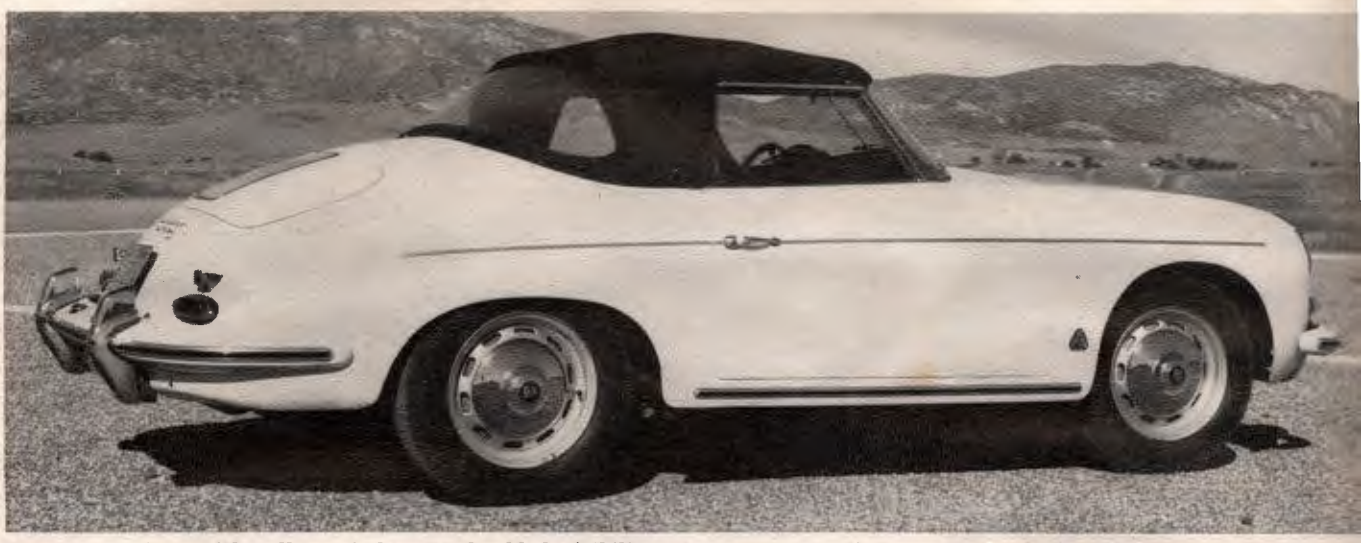
PHOTOS BY PAT BROLLIER



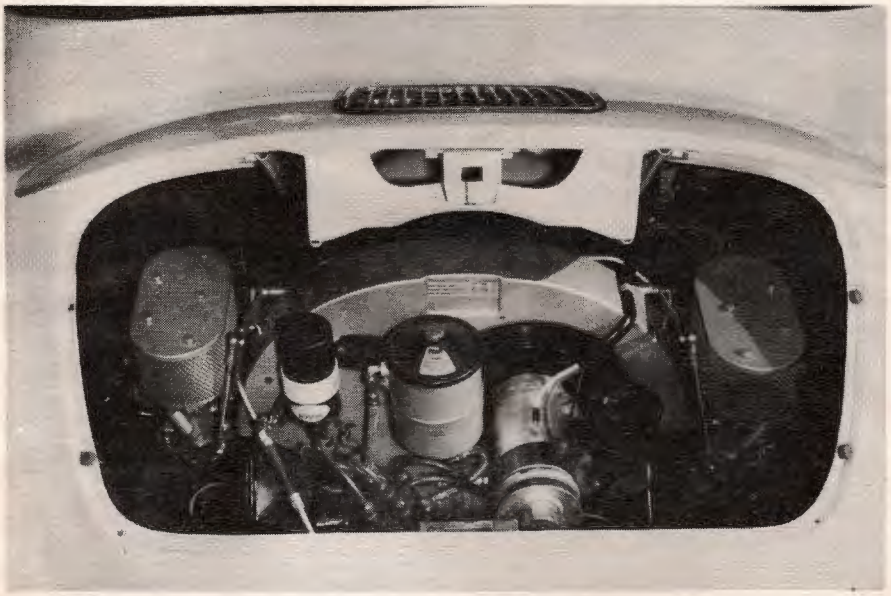
Nose into the inside of the turn, the Super 90 barrels through a decreasing radius, downhill bend like flat cat.



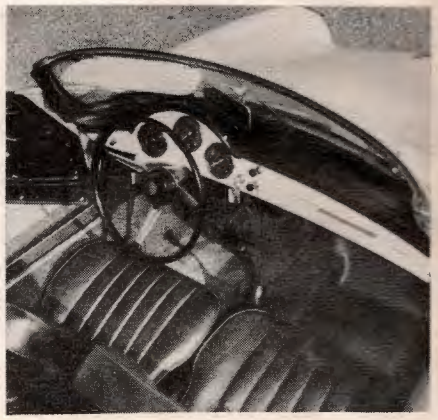
Driving techniques with the Super 90 are quite different from those of standard versions; this one really drifts.



Touring comfort with rollup windows and added visibility of new top styling are bonuses for Porsche purchasers.



Engine compartment remains starkly simple, and offers good accessibility.



New seats have more cushion than old speedster buckets, and less cradling.

POWER AT A PRICE *continued*

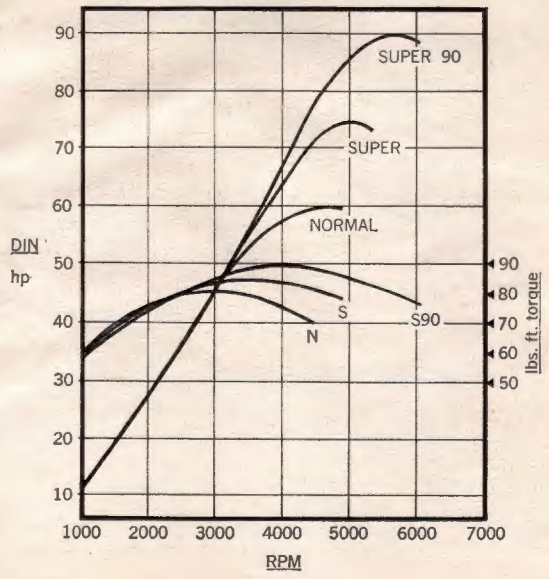
dash switch, we washed the windshield eight times before the fact sunk in that there was no dimmer switch on the floor, only the washer pedal. The dimmer is on the steering column and is operated with the left hand. Once the operation is mastered it is no particular handicap, but is seems to us that the change was not necessary — it's just something more for already busy hands to do.

Except for this one item, however, Porsche has done its usual neat job in the small control department. All the various knobs, now black instead of the former ivory that was almost an identification mark of *any* German car, are well placed and simple in their push-pull operation. The instruments, too, are well placed in such a way that there is only minimal eye-shifting from road to dash and back again to check operating conditions. In the left group there is a fuel level gauge and an oil temperature indicator which, unfortunately, doesn't give the actual temperature but merely lets you know if things are hot, cold or something in between. The center instrument is the beautifully marked tachometer that has been the mark of a Porsche virtually since the beginning. In addition to the usual numbers and gradations it, like all Porsche tachs, is marked with green, striped red and solid red zones. For the benefit of those unfortunate enough to be unfamiliar with the Porsche in any guise, these zones indicate various running and/or power conditions. The green zone is the area in which full throttle may be used, particularly in top gear. You can run below this engine speed but the power isn't there and max throttle should not be used. The light red area tells you that you're approaching peak power and that you're above safe cruising speed — momentarily yes, steadily, no. The red zone is the same as the red-line on any tach — it means roughly: Watch it, bub, or you'll run out of valves, gears, rods or something else equally expensive if you go much higher.

As it is, with the S-90, engine speeds can be taken about 800 rpm higher than with the other versions. In terms of performance this gives somewhat more range than is the case with the other pushrod versions. The car is a healthy cut above the 1600-S and several rungs up the ladder from the 1600-N. It is roughly equivalent in push to the Carrera DeLuxe, though not in terms of rev range, since even this mildest of four-cam engines will turn willingly to 7000 rpm and 6000 revs is pushing hard in the case of the stock rocker-box versions. However, the S-90 can sustain con-

(continued on page 71)

PORSCHE ENGINE OUTPUT COMPARISON CHART FOR:
SUPER 90, SUPER, NORMAL



ROAD TEST/1
TEST DATA

VEHICLE ..... Porsche
PRICE (as tested) ..... $4375 POE (West Coast)
MODEL ..... Super 90
OPTIONS ..... None

ENGINE:

Type ..... Flat 4-cylinder, 4-cycle, air-cooled, bushing-bearing
Head ..... Alloy, hemispherical chambers
Valves ..... Pushrod-rocker actuated, single cam
Max. bhp ..... 102 @ 5500 rpm
Max. torque ..... 89 lbs. ft. @ 4300 rpm
Bore ..... 3.25 in. 82.5 mm.
Stroke ..... 2.91 in. 74 mm.
Displacement ..... 96.5 cu. in. 1582 cc.
Compression Ratio ..... 9.0 to 1
Induction System ..... 2 dual-choke Solex 40 PJJ-4
Exhaust System ..... Direct port-to-muffler, dual outlet
Electrical System ..... 6v single distributor ignition

CLUTCH: ..... Single disc, conv. pressure plate
Diameter: ..... 7⅛ in.
Actuation ..... cable

TRANSMISSION: Integral with differential, full-synchro
Ratios: 1st ..... 3.09 to 1
2nd ..... 1.76 to 1
3rd ..... 1.13 to 1
4th ..... 0.85 to 1

DIFFERENTIAL: ..... Spiral bevel
Ratio: ..... 4.43 to 1
Drive Axles (type): ... Swing, enclosed

STEERING: ..... ZF worm-and-peg
Turns Lock to Lock: 3
Turn Circle: ..... 36 ft.

BRAKES: Drum or Disc
Diameter ..... 11 in.
Swept Area ..... 218 sq. in.

CHASSIS:

Frame: ..... Pressed steel, welded box section
Body: ..... Semi-unit, steel
Front Suspension: ..... Ind., trailing arm, torsion bar
Rear Suspension: ..... Ind., swing, trailing arms, torsion bar
Tire Size and Type: ..... 5.90 x 15, Dunlop SP

WEIGHTS AND MEASURES:

Wheelbase: ..... 82.7 in.
Front Track: ..... 51.4 in.
Rear Track: ..... 50.1 in.
Overall Height: ..... 51.6 in.
Overall Width: ..... 65.7 in.
Overall Length: ..... 157.7 in.
Ground Clearance: ..... 5.9 in.
Curb Weight: ..... 2010 lbs.
Test Weight: ..... 2310 lbs.
Crankcase: ..... 5.5 qts.
Cooling System: ..... (air)
Gas Tank: ..... 14.7 gals.

PERFORMANCE:

0-30 ..... 4.0 sec.
0-40 ..... 6.0 sec.
0-50 ..... 8.1 sec.
0-60 ..... 9.7 sec.
0-70 ..... 14.6 sec.
0-80 ..... 18.8 sec.
0-90 ..... 24.0 sec.
0-100 ..... 29.5 sec.

Standing ¼ mile 19.0 sec. @ 84 mph
Top Speed (av. two-way run) 110 mph

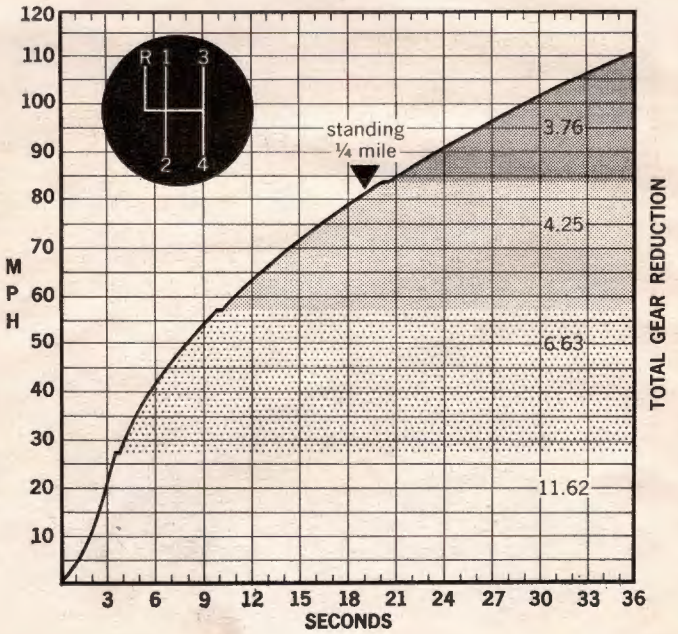
Speed	Error	30	40	50	60	70	80	90
	Actual	28	38	48	58	67	77	86

Fuel Consumption Test: ..... 16 mpg
Average: ..... 27 mpg
Recommended Shift Points:
Max. 1st ..... 30 mph
Max. 2nd ..... 58 mph
Max. 3rd ..... 85 mph
RPM Red-line ..... 5800 rpm
Speed Ranges in gears (Green zone):
1st ..... 0 to 30 mph
2nd ..... 26 to 58 mph
3rd ..... 45 to 85 mph
4th ..... 55 to 112 mph

Brake Test: 80% G Average, over 8 stops
Fade encountered on 8th stop

REFERENCE FACTORS:

BHP per Cubic Inch 1.06
Lbs. per bhp 19.45
Piston Speed @ Peak rpm ..... 2667 ft./sec.
Swept Brake area per lb. ..... 0.108 sq. in.



BY BERNARD CAHIER *SCG European Correspondent*

the BIG battle

Formula Forecast—1961

AFTER SEVEN YEARS of existence marked by some of the most exciting racing ever witnessed and, unfortunately, by tragedy as well, the 2500 cc Formula I ended gloriously last November on the sun-drenched track at Riverside with the running of the second Grand Prix of the United States.

Now, when Formula I competitors meet again in May on the picturesque circuit at Monaco, site of the first round of the 1961 World Championship battle, their racing cars will no longer be the 2500 cc machines, but, rather, the new 1500 cc ones with a minimum weight of 450 kilograme, or about 900 pounds. A new page of motor racing will truly begin, but will the new, smaller cars soon make us forget the days of the bigger, noisier, more powerful machines which gave us so many exciting moments? Let's see.

The first question is will the British, the undisputed masters of the 2500 cc Formula I during the past three years, be able to uphold their supremacy in the new 1500 cc Formula? This is very difficult to answer as it is known that the British are not in a particularly good position to do so during the 1961 season. The basic reason for this has been their seeming reluctance to accept the facts of racing life during the past two years. With their rather blind faith that the 2500 cc Formula would continue for at least another year, they left aside the development of their 1500 cc Formula II cars and engines, thus putting themselves at a great disadvantage with their up-to-date competitors.

Indeed, if we take the three main British manufacturers, Cooper, Lotus and BRM, we find they will all have to use an only slightly improved version of the present four-cylinder d.o.h.c. Climax engine. Climax is busily working on a new V-6 racing engine, but they are late in their developmental work due to following the general British trend in thinking that the new 1500 cc Formula would not come through after all. The new Climax engine is not expected to be ready until the very end of the 1961 season. Cooper, Lotus and BRM will have to use the slightly improved, but never-the-less old, four-cylinder engine which, even with a gain of six or seven horsepower, will not deliver more than about 155 hp. This is not much when the new rear-engined Ferrari is getting 175 hp, and the Porsche 200 hp.

This problem of power for the British cars is worsened in that both Cooper and Lotus will have to add considerable weight to their cars to bring them up to the allowable minimum. Lotus has to add 150 pounds and Cooper about 70 pounds, more than eating up the slight gain of the improved Climax engine. Both manufacturers are quite concerned about where to put this extra weight. It will have the advantage of allowing them to build stronger cars and to use the heavier knock-off wheels. This last could come in extremely handy in 1961 since all the Grandes Epreuves will be run over a minimum distance of 500 kilometers, rather than the 300 kilometers required in 1960.

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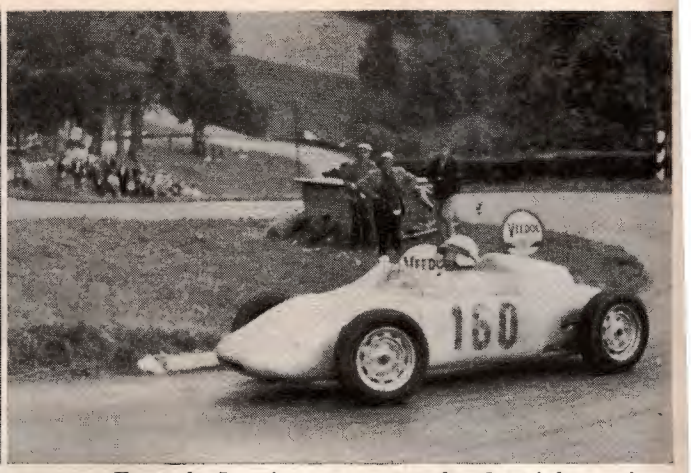


The 1961 Cooper Formula Junior was driven at Riverside by Hansgen (right) and in Mexico by Rodriguez, winning both events. The major changes in converting for Formula I are an engine swap and adding a required 70 pounds.

# of little inches

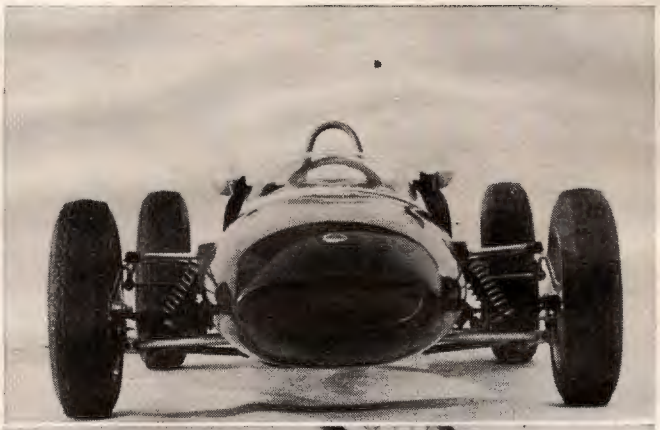


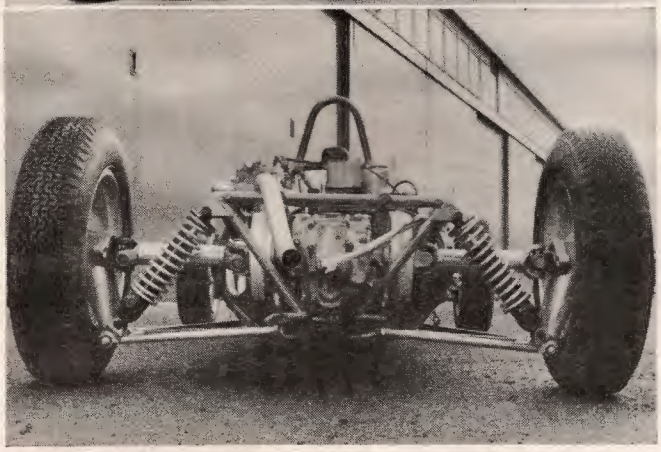




Porsche can convert easily from the 1500 cc Formula II to the 1500 cc Formula I, using a new 200 hp flat-eight engine. Here Bonnier, in an older F-II car leads von Trips in the new. The first showing of this car (right) was in August 1960.

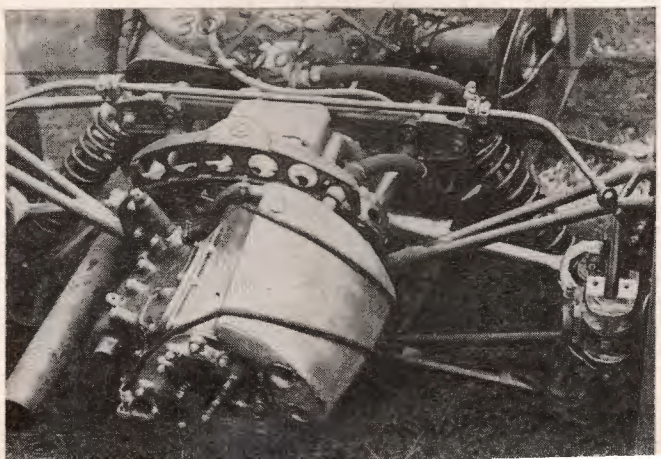
PHOTOS BY BERNARD CAHIER, PETE BIRO, MICHAEL BOYS, GORDON WILKINS, GEOFFREY GODDARD



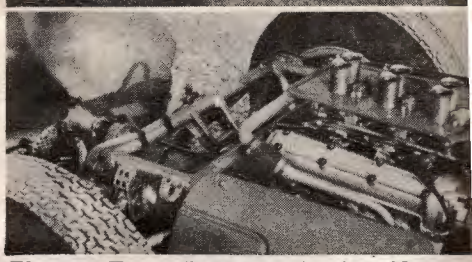


The 1961 Lotus Formula Junior is extremely low and fast. It is expected that the Formula I car will use the same chassis, slightly beefed up and with knock-off wheels.

Prototype of the new BRM (right) was tested by Graham Hill and has outboard brakes and oil tank on the gearbox.







The new Ferrari's V-6 engine is said to put out 180 hp, 20 less than Porsche but 25 more than Climax-powered British.







Emeryson's Formula I (above) and Junior were built by Connaught and Brian Lister. A Ford 105E engine is used in Junior model and a Coventry Climax in Formula I.



THE BIG BATTLE OF THE LITTLE INCHES

continued

While the British are busy with their own problems, the new rear-engined Ferrari, a powerful 175 hp machine, well within the weight limit, was all ready to go months before the start of the season. Porsche, who managed, along with Ferrari, to beat the Cooper-Lotus teams six times out of nine in major Formula II (1500 cc) races during 1960, is building a new eight-cylinder engine which is expected to give as much as 200 hp, a gain of 40 hp over their older flat-four used so successfully this last year. Let us not forget that this old engine proved good enough to beat the best British Formula II cars several times during the period when the British cars were favored by their great lightness. It is also true that Trintignant won the 1958 Grand Prix of Monaco in a 180 hp, two-liter Cooper against a field of 280 hp Ferraris and Vanwalls, but things have changed a lot since then and we don't see how the 155 hp Climax engine can overcome the handicap of 25 to 50 horsepower, particularly with the equalized weight of the new Formula. Climax engines were never known for their great power, but rather for their excellent reliability and outstanding torque at all ranges. Will these advantages be enough this time? It is hard to believe.

This year, more than ever before, the choice of top drivers will be of extreme importance, with men of the caliber of Moss and Brabham always being able to upset the picture, regardless of the cars they choose to drive. Besides these two exceptional men, there are 24 other experienced Grand Prix drivers, 14 of whom I would consider to offer the highest potential to any team. These drivers, without any attempt to classify them, are Jo Bonnier, Phil Hill, Graham Hill, Innes Ireland, Tony Brooks, Bruce McLaren, John Surtees, Wolfgang von Trips, Roy Salvadori, Maurice Trintignant, Hans Hermann, Dan Gurney, Olivier Gendebien and Jimmy Clark. There you have 16 first-rank Grand Prix drivers. This is not very many and indicates the shortage which exists today following the last few accident-filled years. The above mentioned drivers will certainly have little trouble finding good rides for 1961, as there will be no less than 14 factory and private teams competing, with the possibility of six more!

The Cooper factory will be racing again, with two cars to be driven by Brabham and McLaren. These cars will be only slightly different from the ones we have seen in 1960, the engines being

(continued on page 33)



John Cooper's cars, with Brabham up, will be hard to beat during 1961.



Phil Hill, first American to win a GP in 29 years, will drive for Ferrari.



Trintignant, the Champion of Franc is still undecided as to his moun



Brabham (above) shown winning the GP of Holland last year, will be teamed again with Bruce McLaren for Cooper.



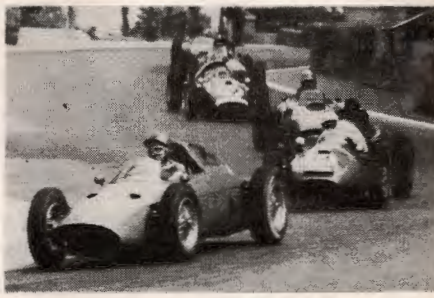


Innes Ireland (top) talking to Moss, will drive for Lotus Team while Roy Salvadori (bottom) will head Yeoman Credit Team using Cooper-Maserati. Moss (right) will be a threat with both a Cooper and a Lotus for Rob Walker.









Jo Bonnier (left) shown with Barth and Von Hanstein, will head the highly favored Porsche team, with Gurney and Hermann. Tony Brooks, (left, center) may drive for BRM or Yeoman Credit, Phil Hill is Number One with Ferrari and Dan Gurney has signed with Porsche. Ginther, shown (right) on the first rear-engined Ferrari leading Trintignant's Cooper-Maserati, is Number Three for Enzo. Ferrari Team has 2 Americans, 1 German and no Italians.

THE BIG BATTLE OF LITTLE INCHES *continued*

the 150 hp Climax, of course, to be replaced with the new V-6 Climax when it is ready. With such a team and such a background of victories (Cooper was World Champion for Constructors and Brabham-McLaren were first and second in the driver's World Championship for 1960) Cooper's prospects are good, although they will not be at their best in the early stages of the new Formula.

Like Cooper, Lotus will stay basically the same and will have the problems of the under-powered Climax engines, plus the problem of adding 150 pounds to their present machines. With Ireland, Surtees and Clark as team drivers, Lotus should be well in the picture, particularly once the new Climax engine is available.

The courageous but too often unlucky BRM company has developed a new car based on their present rear-engined Formula I machine. A prototype was raced in England during October, but with a 2500 cc engine. They, too, will start the season with the four-cylinder Climax engine, but, unlike the others, are working hard on their own V-8 power plant. Nearly horizontal in layout, with the cylinder banks at 135 degrees, this engine is based on the famous old 1500 cc blown mill which caused so much controversy when it was used from 1949 to the mid-Fifties and turned out as much as 600 hp.

So far only one driver, Graham Hill, has signed with BRM, but Tony Brooks may join the team and Olivier Gendebien may drive a few of the bigger races for them. Their prospects may be better than one might think. The new cars are well designed and streamlined, their road-holding is particularly good, they have no major problems with the weight restrictions, and for 1961, at least, they will be using the old but extremely reliable Climax engine. Very little is known about their new engine, but plenty of horses can be expected from it.

The Rob Walker Team, certainly the most successful independent team of all time, will be using a Lotus and a Cooper quite identical with those of the works. These two cars, plus another Lotus in reserve, will be at the disposal of Stirling Moss. With a driver such as Moss only great things can be expected and the Walker Team should shine once more this season.

The recently-formed Yeoman Credit Team will be using Cooper chassis with the latest version of the Maserati four-cylinder d.o.h.c. engine, said to develop over 160 hp. The experienced Roy Salvadori has signed with them and will be occasionally supported by Gendebien and perhaps by Brooks, if he doesn't sign with BRM. It is difficult to say how the as-yet-untried Maserati engine will work out, but it has the advantage of being slightly more powerful than the Climax. Yeoman Credit is a wealthy, well-run team which this year will have the precious support of Reg Parnell, famous ex-team manager for Aston Martin. Parnell, along with Ugolini, is just about the best in the business.

The British Racing Partnership is a new team made up of the Laystall Engineering Company, Alfred Moss and Stirling's manager, Ken Gregory. Lotus cars with Climax engines will be used. Cliff Allison and the young and coming driver Henry Taylor have signed with them so far, and they intend to try out other drivers who have good Formula Junior experience, like Trevor Taylor, who was Formula Junior Champion in England last year. BRP is a well-organized, aggressive team, but I would say that their winning chances are limited.

Two newcomers in Grand Prix racing this year will be the Elva and the Emeryson. Elva, under the able management of Frank Nichols, has built several hundred sports cars and no less than 140 Formula Juniors, of which 80 have been exported to the States. At the end of the 1960 season Nichols brought out a new, rear-engined Formula Junior car which proved to be so good its first time out (it finished third behind two of the then unbeatable works Lotus Juniors) that he decided to make a Formula I car closely following the same design. The chassis of the Formula I Elva is of multi-tubular construction reinforced with duraluminum sheets. The independent front suspension has double wishbones and coil springs. The rear suspension is closely related to that of the Lotus, with low-slung bottom wishbones and hub-carriers with twin trailing arms on each side. Magnesium wheels and disc brakes are used. Here again, the manufacturers will have to rely on the Climax engine. No drivers have been signed yet, but they will probably hire their best Formula Junior driver, a promising new man named Dietrich.

The Emeryson car is the fruit of this company and of ex-driver Alan Brown, now Managing Director of Connaught. The Emeryson Formula I car has a rigid space frame chassis. As with the Elva, the suspension is all independent, with coil springs and double wishbones in the front and Lotus-type suspension in the rear, incorporating fixed length half shafts, twin parallel trailing arms and coil springs. Outboard disc brakes

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FORMULA I 1954 to 1960

2500 cc unsupercharged

750 cc supercharged

NO SUMMARY of this important period of motor racing can be made without first mentioning that unforgetable Argentinian, Juan Manuel Fangio, who not only was World Champion four years out of the four he raced under the 2.5 liter Formula, but showed that he was able to accomplish this in whatever car he chose to drive. He won for Mercedes-Benz in 1954 and 1955, for Ferrari in 1956 and for Maserati in 1957.

The first two years of the new Formula, 1954 and 1955, were the great years for Mercedes, winning nine Grand Epreuves out of the twelve the silver cars entered. Maserati, Lancia and Ferrari managed to beat the almost invincible German cars at Silverstone, Barcelona and Monaco.

With the retirement from racing of Mercedes, 1956 was a Ferrari year, in spite of the challenge of Moss driving a Maserati. The still unreliable Vanwalls appeared this year, led by the spirited Harry Schell.

In 1957 Fangio drove for Maserati, soundly defeating the Ferrari team. The main opposition this year was from Vanwall, led by Stirling Moss, who scored three impressive wins, at Aintree, Pescara and Monza, the first time a British car had won a Grand Epreuves since 1925.

Vanwall won the Championship in 1958, thanks to Stirling Moss again and to Tony Brooks, in spite of the brilliant driving of Hawthorn, Collins and Musso for Ferrari. Vanwall scored six Grand Prix wins against Ferrari's two, but already a new threat was appearing — the light, less-powerful but very fast, rear-engined Coopers which won in Argentina and Monaco, with Moss and Trintignant driving.

In 1959 Cooper fully confirmed its potential by winning five out of eight Grand Prix, Ferrari and BRM winning the other three. This Cooper supremacy was the final blow to the big, heavy, front-engined cars.

As the 1960 season began both BRM and Lotus had switched to rear engines, with Centro Sud using Maserati engines in the rear of their Coopers. This final year of the 2.5 liter cars was an almost complete victory for the British, with Cooper winning six Grand Prix, Lotus two and the front-engined Ferraris winning only the Grand Prix of Italy, where the British cars did not compete.

The tragic racing accidents of the 1958 to 1960 period, which took the lives of so many top Grand Prix drivers, encouraged the FIA to develop a new and less powerful Formual to begin in 1961. After much arguing and bickering, the new Formula I was set for 1500 cc unsupercharged engines, using pump fuel, and with a minimum weight for the car of 450 kilograms or 992 pounds.

A new era of motor racing begins.

ROAD TEST/2

Devin "D"



"D" STANDS FOR DELIGHTFUL

THE DESIGNATION "D" obviously stands for "Delightful" in Devin Enterprises' latest creation. Bill Devin's idea to utilize standard VW suspension, driveline, and power plant components has given birth to a practical, inexpensive sports car that is available in kit form or as a complete assembly.

The kit, which includes everything but the bolt-on VW (or Porsche) components, is offered for $1495.00, enabling the purchaser to complete — by scrapping his sedan — a sleek sports car exactly like that shown in the accompanying photos. For those not having a VW to disassemble, the completely assembled car can be purchased for $2950.00 (FOB South El Monte, Calif.) with brand new '61 components included.

Initial appearance of the fiberglass-bodied Devin is impressive; the lines and exterior finish denote a 300 hp, $10,000 custom machine. Proof of this impression was that several Corvette owners challenged us to a "stoplight Grand Prix" firmly convinced they were up against hardy competition. But forty horses will net just so much acceleration, even in a 1200 lb. vehicle, so we didn't take them on.

After many disappointing tests of other fibreglass specials, it was a surprise to find the Devin dead quiet, very comfortable to ride in, and fully finished in the interior. The surprises continued as we discovered the "do-it-yourself" top assembled into both an attractive and weather-proof cover, locking into a lip in the extruded windshield frame. Though nonadjustable, the bucket seats are molded into the body shell and covered with Naugahyde — over — foam — rubber. Tunnel, floor, firewall, and doors are fully upholstered to provide a finished interior you'd expect — but don't often find — in a top-quality, mass-produced machine. Combine this with excellent glasswork and framing (made especially for Devin by Pittsburg and Alcoa) and the good initial impression seemed to get even better.

Ease-of-entry is slightly tighter than, say, a Healey or TR3, especially with the top up, but we've climbed into many roadsters that were worse. The seats, as we mentioned, don't adjust, but height and design will accommodate a wide variety of passenger shapes and sizes. Leg-room under the wood-rimmed steering wheel is reasonable. The stock VW clutch and brake pedals used are closer together than we consider really comfortable, but there's enough room

(continued on page 37)



Pigmented glass body is extremely smooth and durable. Black band on leading edge is not a de-icer, but a hard-rubber bumper. All electrical components are stock Volkswagen parts.



Devin D is rare instance of sleek lines looking as well with top up or down. Side curtains combine with good fitting top to make car weatherproof, warm.

Photos by AL PALOCZY



Excellent adhesion and stability allow the Devin to be cornered fast and accurately with minimal effort. The lean of the car when cornering is negligible.

Excessive rear negative camber is evident as we start off our acceleration runs. Large scoops in deck ventilate the engine. The rear bumper is spring steel.





Looping into Riverside's Turn 6, the "D" settles into perfect drift; a rare instance in an under-powered, rear-engined machine. Note the geometry of the inside wheels.



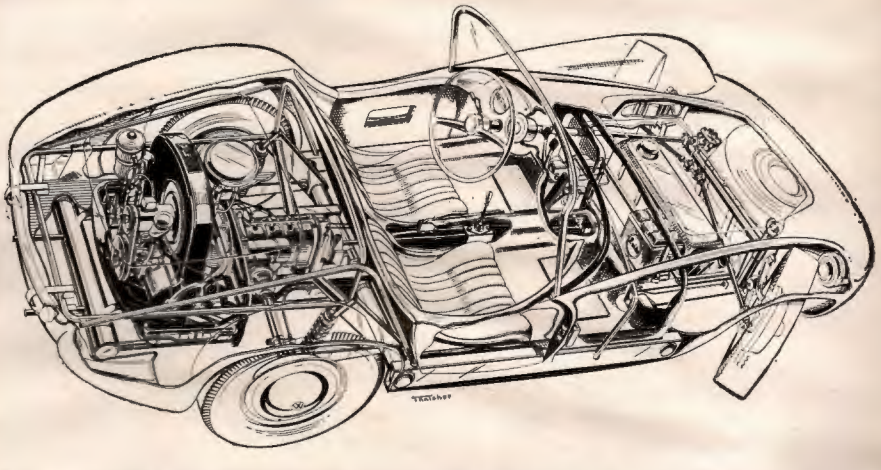




Top: Engine compartment is spacious as compared to original. Carburetor and manifold are moved forward of shroud.

Center: Trunk space is small and there is no space for storage in the car. Only about one suitcase can be squeezed in.

Bottom: Cockpit is neat, roomy, functional. A tachometer can be installed in the space at the left of the speedo.



Bob Thatcher's cut-away shows component location and the strong framework. Notice how the rear suspension is now coil-sprung, with units bolting in place of the original shock absorbers. Entire front end and steering is stock VW with column tilted at a lower angle. Devin's design actually improves chassis balance and weight-reduction, which, in combination with torsion bar re-timing, account for the good handling. Basic shape of the bucket seats is molded into the body.



Overall appearance of the roadster belies both its meager price and horsepower. Drag challenges were extended by several owners of Corvettes during our test as they fully expected the little bear to have over two hundred ponies under its hood.



for easy use. Also from VW is the uni-dial speedo-warning-light assembly recessed in the flat molded dash. A small, centralized plaque contains the light, ignition, and wiper switches. In the same-as-stock position on the tunnel are shift and emergency brake levers. They are, however, a lot closer to the driver and much easier to operate.

Trunk area is roughly comparable to Volkswagen, perhaps a little larger. The space, though, is shaped to better accommodate both luggage and tools. Front and rear decks open with simple, key-actuated latches and the hinges have no counter-balancing or any means of holding them open. This would be a simple situation to remedy, but it's an area in which Devin chose to economize. The engine compartment is effectively ventilated by two large scoops in the hood and, to facilitate a low profile, the intake manifold is reversed and bolted on *forward* of the fan shroud, between the latter and the firewall. In doing so, the heat riser is blocked off; a not-too-healthy condition since the small carburetor is already critical to icing. Again it would be a simple matter to correct this, but we didn't experience any trouble during our test. A stitch-quilted aluminum foil provides insulation in the roomy compartment. Plug-changing is now, incidentally, a snap, rather than a juggler's masterpiece. We took our test car to Joe Vittone's Economotors, in Riverside, for a last minute check before going to the Raceways, but all it needed was a minor timing adjustment.

Steel tubing of 2½-inch diameter makes a sturdy, non-twist frame for the Devin "D", insuring body quietness and longevity while holding down the total weight. Saddles for the engine in the rear and the torsion tubes in front are provided so that these assemblies can be bolted in. The original flat-steel trailing arms are retained but the torsion bars are eliminated. Instead, pivot pins and bushings fasten the arms to the chassis and coil-shock combinations bolt in the original shock-mounting position to provide both spring medium and dampening. There are more than just weight-saving advantages to this clever substitution, as handling, stability, and ride are better controlled.

Except for lengthening the steering column and dropping its angle, the entire front end and steering from the VW is retained in its original form. The kit includes the extension pieces to make this change. Our test car had optional 13-inch, wide-rim road wheels instead of the normal 15-inchers, but with a 6.40 cross-section the circumference is roughly the same. Handling and controllability were excellent. The car's "attitude" was generally neutral with a slight tendency to understeer in slow corners, oversteer in the fast ones. Since the ride was soft we concluded that the big skins must be an improvement. Devin, however, disagreed with this, saying he'd found the stock 15-inchers — when equipped with Michelins — made the car dead neutral at all speeds and that the ride qualities were equally as good. His main reason for installing the special wheels was appearance!

An item that's a weak point on the VW sedan becomes even more so on the better-performing Devin; brakes. As those of you with VW experience will attest, their brakes deteriorate rapidly under hard usage. Such was the case with our test car. The binders never failed to pull the car down to a stop, but they protested mightily, juddering harder and harder, finally developing a partial lock. This was during our "normal" circuits around Riverside Raceway and was enough to discourage our attempting the severe brake-test segment of the road test. Devin confirmed that the condition existed on this particular demonstrator but said he'd experienced no difficulty on his other car or those of his customers. Even so, Porsche brakes, while increasing the cost by a hundred dollars or so, would be a very worthwhile

(continued on page 83)

ROAD TEST/2

TEST DATA

VEHICLE .....Devin "D"
PRICE (as tested) .....$2950.
MODEL .....VW Components
OPTIONS ....13 in. wheels, price n.a.

ENGINE:

Type: .....VW flat-opposed four, air-cooled, four-cycle
Head: .....O.H.V., alloy casting, removable from cylinders
Valves: .....Pushrod, rocker-actuated, in-line, 2 per cylinder
Max. bhp .....40 @ 3900 rpm
Max. Torque .....n.a.
Bore .....3.031 in. 77 mm.
Stroke .....2.520 in. 64 mm.
Displacement .....72.74 cu. in. 1192 cc.
Compression Ratio .....7.0 to 1
Induction System: .....Single downdraft Solex
Exhaust System: .....Stock VW pipes and muffler
Electrical System: .....6v, single distributor ignition

CLUTCH: .....Single disc, normal pressure plate
Diameter: .....8 in.
Actuation: ..... cable

TRANSMISSION: .....Integral with differential, alloy casting, full-synchro
Ratios: 1st .....3.80 to 1
2nd .....2.06 to 1
3rd .....1.32 to 1
4th .....0.89 to 1

DIFFERENTIAL: .....Integral with transmission, spiral-bevel
Ratio: .....4.375 to 1
Drive Axles (type): .....Swing axle, enclosed

STEERING: .....VW Worm & Peg
Turns Lock to Lock: 2¾
Turn Circle: .....33 ft.

BRAKES: ...Stock VW Duplex-Simplex, single master cylinder

CHASSIS:

Frame: .....Steel-tube main frame with stringers
Body: .....Fiberglas
Front Suspension: .....VW upper-lower trailing arms with laminated bars
Rear Suspension: .....Swing with trailing arms, coil-shock combinations
Tire Size & Type: .....6.40 x 13 tubeless

WEIGHTS AND MEASURES

Wheelbase: .....82.75 in.
Front Track: .....51 in.
Rear Track: .....49 in.
Overall Height .....44 in.
Overall Width .....62 in.
Overall Length .....150 in.
Ground Clearance .....8 in.
Curb Weight .....1180 lbs.
Test Weight .....1360 lbs.
Crankcase .....3½ qts.
Cooling System .....air
Gas Tank .....7½ gals.

PERFORMANCE

0-30 ..... 4.8 sec.
0-40 ..... 8.2 sec.
0-50 .....12.3 sec.
0-60 .....16.9 sec.
0-70 .....28.9 sec.
0-80 .....— sec.
0-90 .....— sec.
0-100 .....— sec.

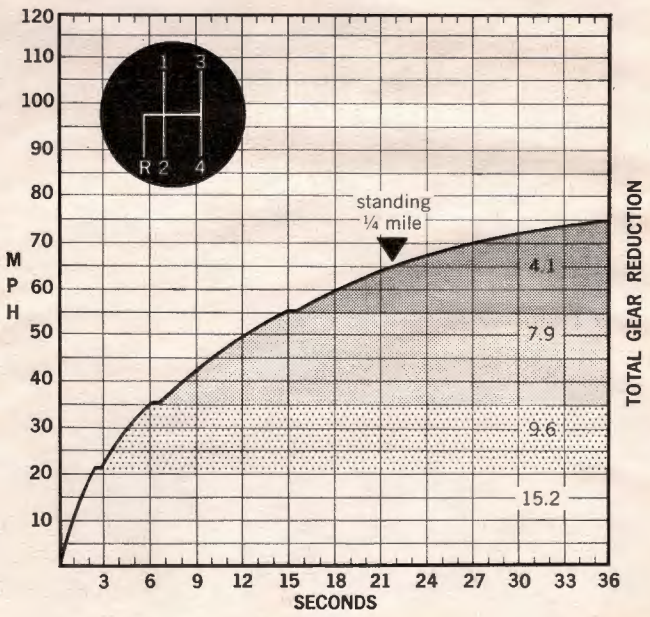
Standing ¼ mile 21.7 sec. @ 65 mph Top Speed (average two-way run) 78 mph

Speed Error	30	40	50	60	70	80	90
Actual	29.5	40	48	61	68	77	—

Fuel Consumption Test: .....17 mpg
Average .....28 mpg
Recommended Shift Points
Max. 1st .....22 mph
Max. 2nd .....35 mph
Max. 3rd .....55 mph
RPM Red-line .....5500 rpm
Speed Ranges in gears:
1st .....0 to 18 mph
2nd .....10 to 30 mph
3rd .....25 to 50 mph
4th .....35 to 80 mph

REFERENCE FACTORS:

BHP per Cubic Inch 0.55
Gross Weight per BHP .....29.5 lb.
Piston Speed @ Peak rpm .....1638 ft./sec.



R for RACING

Available parts + work = Dr. Powell's Formula Junior

BY JOHN O'DONNELL

The new Junior Formula has been called the greatest boon to motor racing since the invention of the wheel. While this may be a slight exaggeration, it comes the closest to being true for the home builder.

Before the introduction of Juniors, the man who built his own cars, particularly with limited funds, had only a very slight chance of beating the factory-built cars other than in Class H modified. When the 750cc twin-cam OSCA came along, his chances became even less.

Thus, when Formula Junior and its rules were brought out, many home builders greeted the new class as though someone had given him a Mercedes Benz 300SLR engine and a year's supply of spare parts.

Many a "special" builder has developed a chassis that would equal, and many times outhandle, the best that Europe has to offer, only to be left behind on the straight with a shortage in horsepower. Being unable to afford the exotic engines that had the necessary horses, he suffered in silence, unless someone would listen to his tale of woe. Things looked bad for the home team.

With the ruling in Formula Junior that all engines used had to be derived from production car engines, the home team was given a new lease on racing. Many feel that there are mechanics in this country who can build just as hot a racing engine as the Europeans, given the same basic components with which to start.

One such person is Dr. Lyle Powell, of Walnut Creek, California. An eye surgeon by profession, Dr. Powell's evenings are spent building race cars. Having constructed two Class H Panhard-based specials and successfully raced them in Northern California events, Dr. Powell was intrigued with the possibilities of the new Formula.

A methodical person, he did not rush into the construction of the car via the chalk-on-the-garage-floor routine, but carefully figured out chassis types, suspensions, engines and drive train layouts. One evening, with papers and plans under his arm and a gleam in his eye, he went out to his self-built shop and started construction.

The concept Dr. Powell had for his Junior was a rear-engined layout using a DKW engine coupled to a VW-Porsche transmission and final drive. The independent front suspension and low-pivot swing rear axle were to be á la Porsche RSK.

Work was started on the chassis using 1" and 1½" mild steel tubing. A space frame, designed to take both beam and torsional loads, completely encloses the driver and has the roll bar as an integral part. This affords maximum protection without sacrificing strength or gaining weight. Physical dimensions are 119 inches long, 20 inches wide and 20 inches deep.

Front suspension is fully independent, using Fiat 1100 spindles and shortened stock upper A frames. The lower A frames were fabricated from 1" tubing and are mounted with 6 degrees caster. Coil springs and Monroe shock absorbers in unit are mounted from the upper main frame rail to the lower A member, with 90 pounds rating on the springs. An anti-sway bar is connected between the two upper A frames and the chassis to prevent excessive body lean during cornering. Stock Fiat 10 inch Alfin brakes are mounted outboard front and rear brakes fail, the other would still be able to bring the car to a stop.

Twin Girling master cylinders from an Austin-Healey operate the braking system. Front and rear brakes are operated independently of each other. This system was used so that if either the front or the rear brakes fail, the other would still be able to bring the car to a stop.

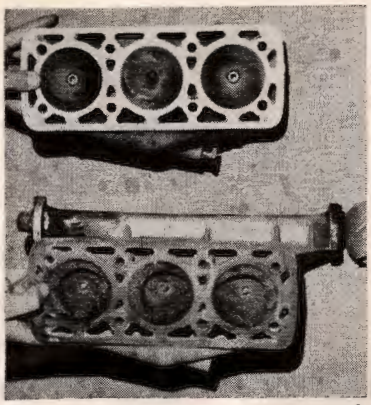
The steering unit is a modified MG-TD rack and pinion. With the extreme angle of the steering column, a spicer spline joint is used to prevent binding due to changing length of the shaft between the U-joints in the steering assembly under stress or tension.

The pivot point of the swing axle rear suspension is on a longitudinal frame member located directly under the differential carrier. From this point a single arm, fabricated from 1½" tubing, extends outward to a fabricated hub carrier. Two smaller arms of ¾" tubing

(Text continued on page 41)



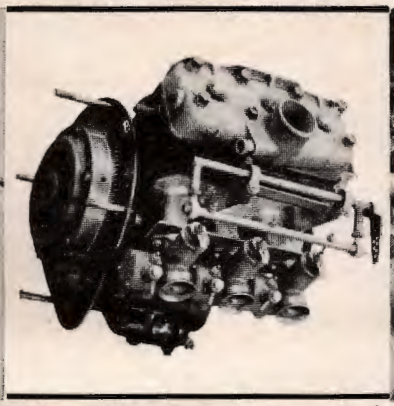




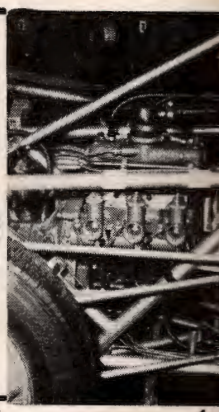
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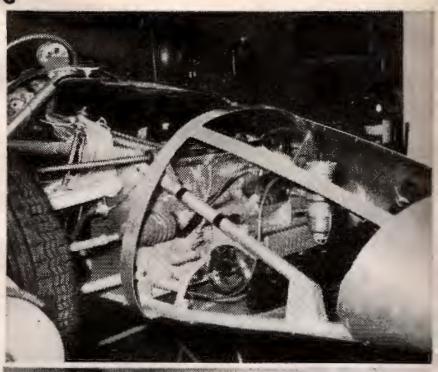
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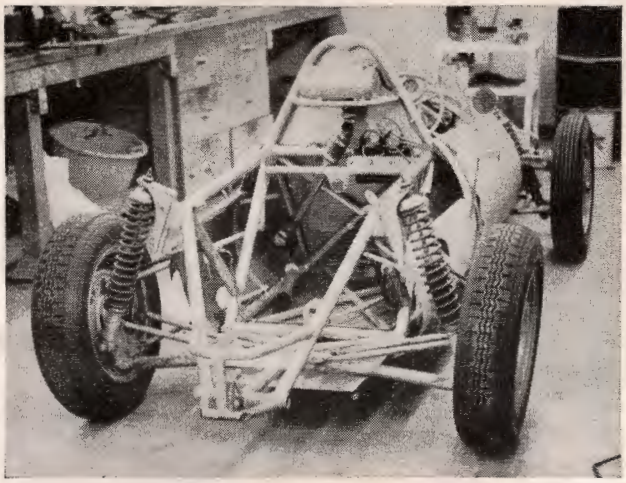


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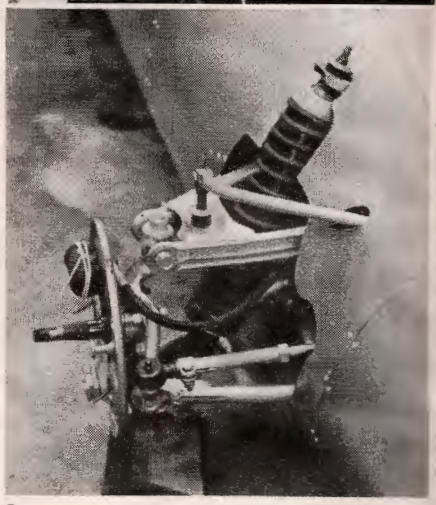
Photos by PETER BIRO

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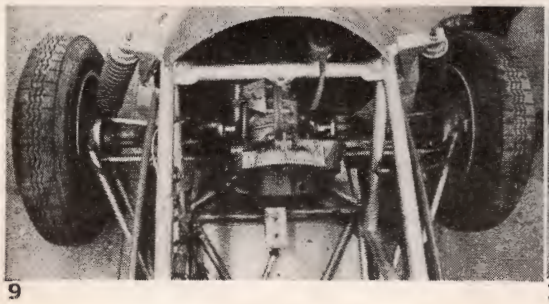




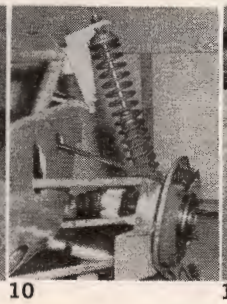
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10



11

R for RACING *continued*

1. Standard DKW head was filled, ground dome-shaped and fitted with 14mm spark plugs. Fan shaft assembly was discarded.

2. Single, wide intake port was filled with epoxy iron resin, then machined out to give three, smooth-flow induction ports.

3. Amal Monobloc carburetors are mounted on specially fabricated intake manifold. The pressure plate and clutch are Porsche.

4. DKW engine is mounted in the rear of Dr. Powell's Formula Junior. Roll bar brace is removable for easy engine access.

5. The unpainted DKW-engined Powell Formula Junior exhibits the excellent design and workmanship of its aluminum body.

6. Tilted radiator, battery, fuel pump and tanks are forward for weight distribution. Aluminum skin is shaped to hoops.

7. With engine out, frame and rear suspension are clearly shown. Nerf cage at extreme rear protects the shift mechanism.

8. Front suspension is by unequal length A-frames, coil springs in unit with tubular shocks, anti-roll bar to top frames.

9. Fully independent rear suspension features VW gear box-differential, swing axles, trailing arms and coil spring-shocks.

10. Rear brakes are 10-inch Fiat Alfin units. Additional air is ducted to brakes by sheet metal scoops on backing plates.

11. The fully painted DKW Junior, with designer-builder Powell at the wheel, resembles a Squalo Ferrari minus sidetanks.

extend from the top of the hub carrier and join the bottom arm just outboard of its pivot point. These two arms can be adjusted to change rear camber and toe-in. The hub carrier is located fore and aft by twin trailing arms to the frame. All attachment points are made with Heim joints to give complete freedom of movement.

The transmission-differential unit is Volkswagen, with the case machined to take Porsche gears. The ring and pinion was reversed so that the gear box extends to the rear of the differential. Chevrolet axles were cut down to form inboard stubs and use Volkswagen fulcrum plates to position them in the differential carrier. The axles are located and supported by a sealed bearing just outside the case. Final drive is transferred, through half-shafts fabricated from Plymouth drive shaft U-joints, to the outboard stub axles located in the hub carrier. Coil springs and shock absorbers in unit are mounted to the aft side of the hub carrier and then to the top frame rail. Eighty-five pound spring rating proved ideal for the rear suspension.

Final drive is 6:31, using Porsche BBAB transmission gears. The rear wheels are Fiat 1100 centers mounted in 15-inch rims and having a 5" wide base on the rims. Rear tires are 155 x 380 Michelin X. Wheelbase is 83½ inches with front and rear tread at 46 inches. Ground clearance is five inches with the roll center six inches above ground level. Camber is zero on the front and two degrees negative on the rear.

The shift linkage runs from the rear of the transmission case, underneath it through the pivot point frame member and up to the right hand side of the driver's seat. A reverse gear lockout was added as a precautionary measure.

A 1957 DKW engine was procured from the friendly neighborhood wrecker and the job of putting a few more horses in it began. The block was bored out to take 74 mm pistons which bring the displacement from the original 896cc up to 980cc. The cylinder head has a casting on top which housed the radiator fan shaft assembly. This was cut off the head with a band saw and discarded.

Dr. Powell was not satisfied with the shape of the stock combustion chambers and had the chambers filled and machined dome shaped and fitted for 14mm spark plugs. This raised the compression ratio with Mahle 74mm pistons to 11 to 1. Stroke is stock at 76mm.

A study of the breathing of the two stroke DKW engine showed room for improvement. The stock single, wide-intake manifold and wide intake port taper down to three individual ports at the cylinder walls. Dr. Powell felt that three separate ports, with the same contour from the carburetor to the piston, would give much better intake breathing.

Fabrication of the intake manifold was not a serious problem, but filling in the engine block was a different matter. The idea of filling with weld was discarded, both as too costly and in that it might warp the block. The final solution was simple enough, although it entailed a lot of work. The port was filled with epoxy iron resin and, after drying, was ground to shape.

In two-stroke engines the timing is determined by the position of the intake, transfer and exhaust ports in relation to each other and to the piston. By raising or lowering these ports, the timing can be changed, much the same way as by changing the contours of the cam lobes in a four-cycle engine. So, as the new intake ports were being ground out, the timing was altered to 72.5 degrees on the intake. The transfer port was altered to 59 degrees, with 79 degrees for the exhaust.

A stock DKW distributor is used, with timing set at two flywheel teeth before top dead center, determined empirically. The three stock DKW coils were replaced with Chevrolet coils, which have a higher output.

The lower end, with its roller-bearing crank, remains unchanged other than the lightening of the flywheel to 14 pounds. A Porsche pressure plate and clutch disc transfers the power to the transmission. A slave cylinder was fabricated to actuate the throwout bearing and is operated by means of a third Girling master cylinder in the front of the car. An adaptor plate of 3/16-inch sheet stock mates the engine to the transmission.

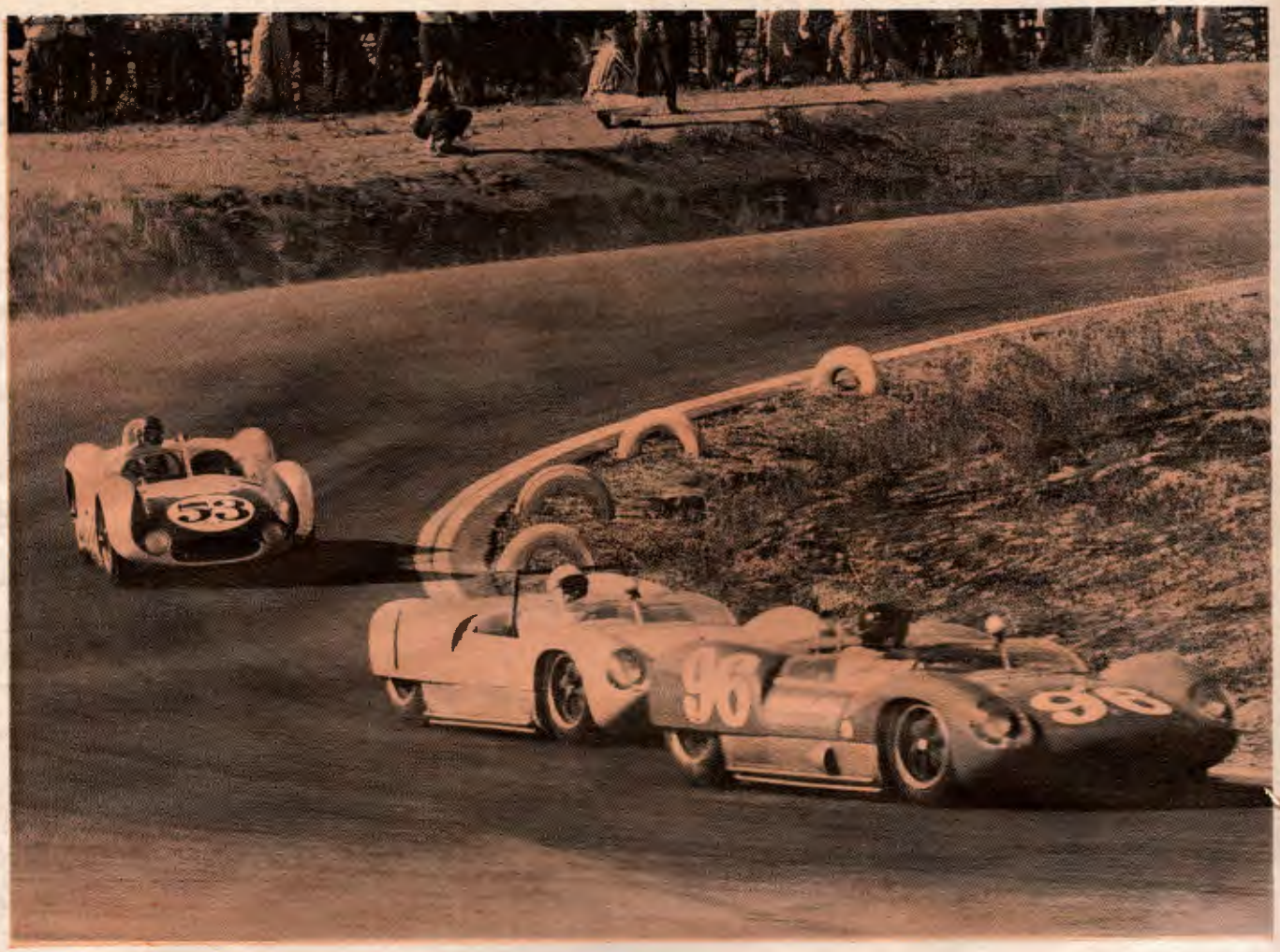
The air-fuel-oil mixture is supplied by three Amal 1 3/16-inch monoblock carburetors, using a Stewart Warner variable-pressure electric fuel pump.

The temporary exhaust system consists of three pipes leading from the individual ports to a collector pipe. A study of two-stroke exhaust systems is being carried to determine the best one for the rebuilt engine.

Since DKW uses a thermal syphon system for cooling the engine which was felt insufficient for racing purposes, a Simca water pump was reworked and mounted on the left side of the engine. Renault supplied the radiator, tipped downward 45 degrees in the front of the car. The water is carried back to the engine through 1½-inch stainless steel tubes.

To get as much weight forward as possible, the gas tank, battery (Chevrolet 12 volt), fuel pump, radiator and master cylinders are mounted forward of the driver. The gas tank holds seven gallons and has a mixer built in to stir

(Continued on page 83)



TECH REPORT:
Lotus Mk. XIX

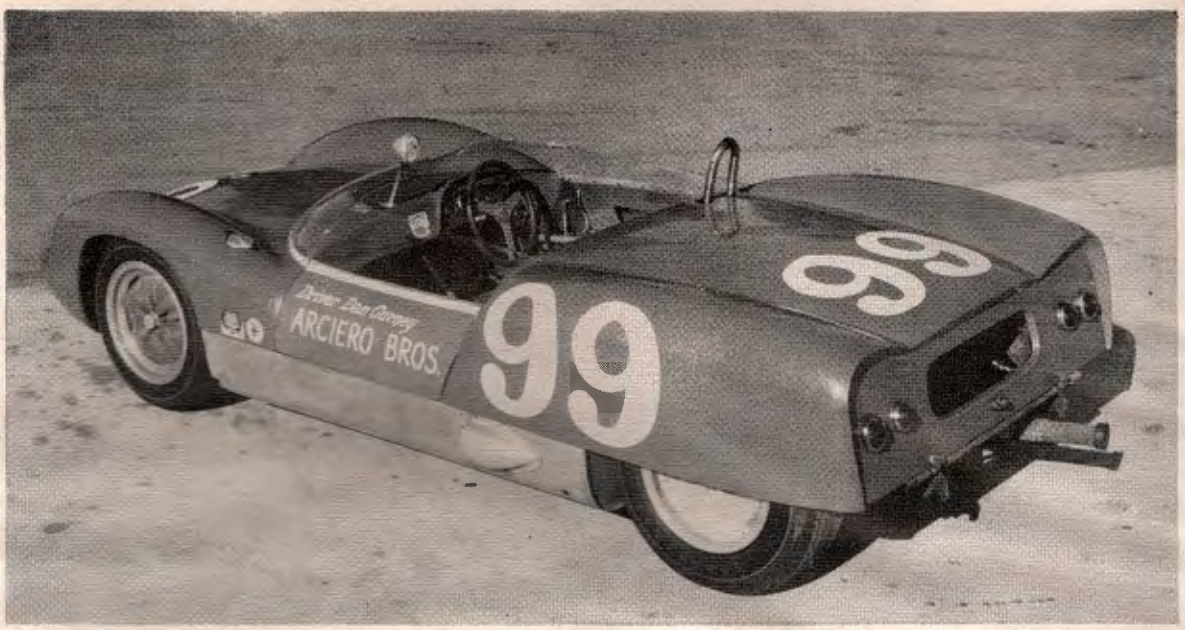
THE WINNER THEY DON'T WANT TO BUILD

THE NEWEST LOTUS sports-racing car is proving to be a thorn in Colin Chapman's side. This is unique, as the Mk XIX has thus far proven a highly successful "thorn." Busily engaged in development of a '61 Formula machine and increasing production of his trim Elite coupes, the British designer decided to stretch a Formula 1 chassis into a two-seater on a let's-see-what-happens basis. The resultant prototype exhibited so much potential that prospective buyers were soon hard after Chapman for similar machines. Among them were Rob Walker, Stirling Moss' sponsor, and West Coast contractor Frank Arciero, the man who gave Dan Gurney his first ride in a really hot modified car, Arciero's 4.9 Ferrari. Dan practically camped at the Lotus factory, trying to get the machine finished in time for the Riverside and Laguna Seca USAC races.



Arriving barely in time for qualifying at Riverside, Gurney's hastily-assembled machine was out of the main event after 17 laps when a cylinder liner chipped at its upper ridge and lost the compression seal. Moss' Lotus lasted but 10 laps before transmission trouble put him out of the race. But before that, the cars were magnificent. Gurney had qualified his Mk XIX over four seconds faster than the existing lap record, set two years earlier by Chuck Daigh in one of the extremely fast Scarabs. Moss qualified his Lotus three seconds slower, but still almost a second ahead of the old record.

A week later, at Laguna Seca, Moss set a new course record in qualifying, then went on to win both 102-mile heats in the Mk XIX. Gurney was still having bad luck and sheered the flywheel bolts during practice. After frantic work in the pits, the car made the starting grid, but an un-



Front and rear sections of the Fiberglas body are quickly removable. Scoop in the aluminum rocker panels was installed to duct air to the differential and inboard disc brakes.



Instruments are placed in forward bulkhead, switches on flat panel at right. Note well-insulated radiator return hose to the right of driver's seat, gearshift in center of cockpit.

completed petition to delay the race kept the USAC officials from letting it run, even though the delay had been granted.

Nassau, however, allowed Arciero's chief mechanic, Bill Fowler, time for adequate preparation. Gurney's relaxed win demonstrated that Arciero's crew has the know-how to do the job. Dan's smooth handling of the car is given a great deal of credit by pit crew for the car's reliability, but, from a performance standpoint alone, the reputation of the Lotus Mk XIX as a Birdcage-eater is obviously well-deserved.

In changing his F1 design to fit FIA sports car specifications, Chapman altered very little of the basic layout. Wheelbase, track, and suspension design remain nearly identical. The Climax 2.5-liter powerplant and the compact transaxle lie in the same position with only the widened frame causing small changes in mounting. The light-tube, semi-bulkhead, modular construction is likewise identical.

Despite a weight addition of over 400 lbs., changing to a full-fendered, aerodynamic body apparently helped — not hindered — top-end performance. The "Monte Carlo" (a moniker suspected as a gentle jibe at John Cooper's "Monaco") reportedly pulls 100 more rpm in 5th gear than the F1 car when gearing is identical. The body construction is both unique and extremely practical. Underpanning and the oversized rocker panels are formed from aluminum. The removable nose and tail sections are molded in color-impregnated Fibreglas, the subject vehicle being a brilliant orange. Aside from collision damage, this assures a dent-free, shiny car no matter how much it's handled or campaigned. Once off, these sections allow major service without further skin removal and it only takes seconds to part them from the chassis.

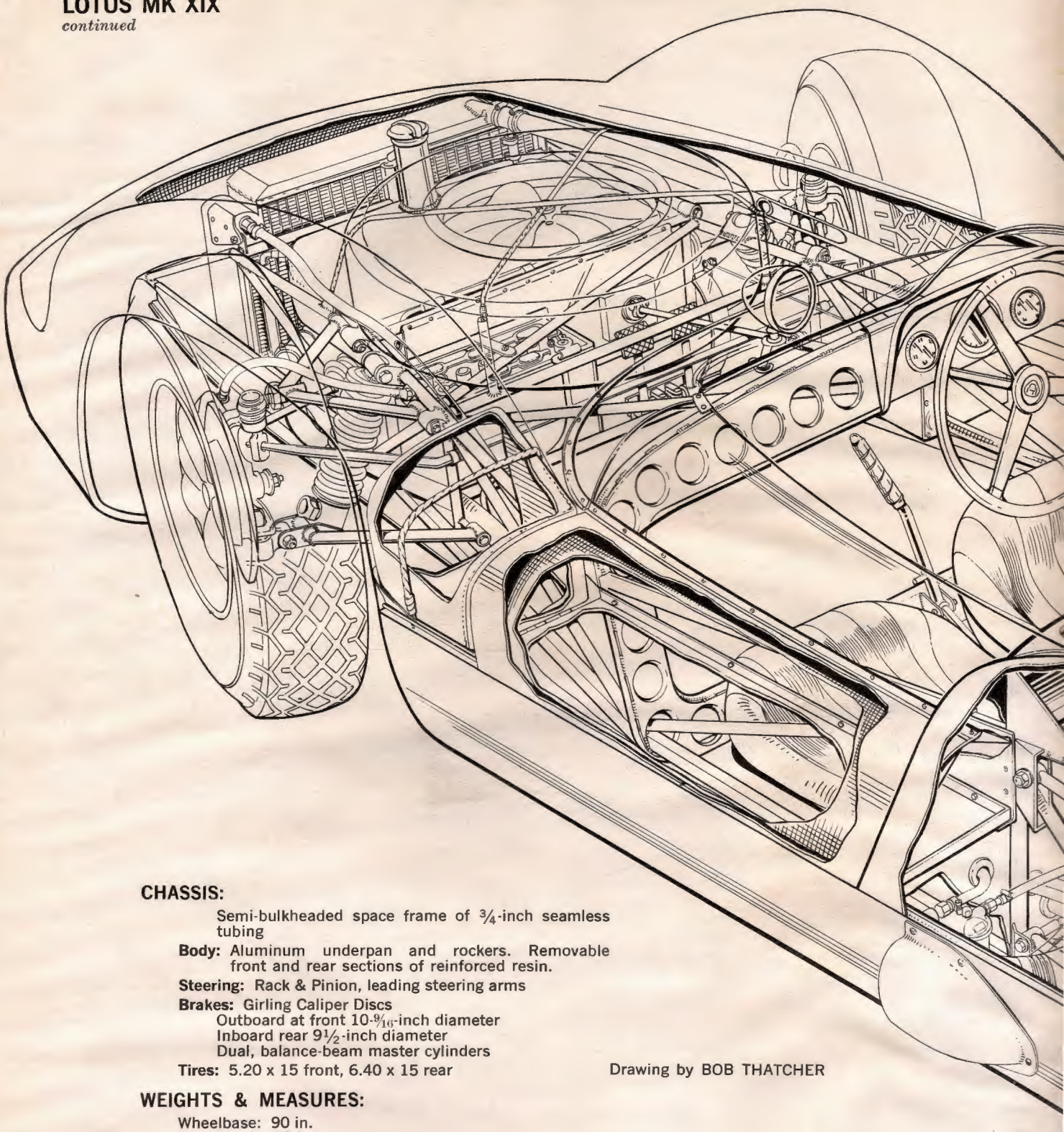
The much-discussed and oft-condemned transmission seems to have most of its problems eliminated. Jay Chamberlain, well-known Lotus driver filled us in on its development history, relating how it was ahead of the differential in the front-engined '58 GP car, then moved behind it in '59 with the advent of the rear-mounted engine, finally assuming its present compact form in this position for the '60 F1 car. An amazing piece of engineering, the five-speed box is "progressive" both in the way it's shifted and the gears' relationship to each other. Foregoing the usual shifter-fork design, a sliding sleeve engages the gears internally and also serves as a carrier shaft for this primary set of gears. The sleeve, in turn, is internally splined at one end to accept the output shaft from the clutch. Six small pawls on the sleeve, with *no* synchronizing and only a slight amount of taper, are forced into engagement with the gears. Spacers in between each cog act as neutral positions. Aside from being one of the most compact five-speed boxes ever constructed, it has a quick-change advantage whereby *all* transmission ratios may be individually altered in a slightly longer time than it would take to swap one secondary set in a Halibrand rear! All this is accomplished in a 10-inch length.

An elaborate lubrication system for the transaxle has been further augmented on the Arciero car. Basically consisting of two pumps (one pressure, one scavenger) and an external filter, a front-mounted oil cooler now supplements this system. We get to the reason for this modification further on.

Tying in closely with the transaxle design, the rather wild rear suspension has caused even more controversy. While long, trailing arms absorb power and stabilize the rear, the actual suspension consists of low-mounted, *reversed* A-members *and* the half-axles themselves. Cast hub-carriers extend downward to connect with the outer ends of these arms while the axles, with U-joints acting as pivot points, serve as the upper members. Naturally, with this design there can be no slip-spline incorporated in the axles and it would seem that lateral load against the wheel would be

(text continued on page 46)

LOTUS MK XIX
continued



CHASSIS:

Semi-bulkheaded space frame of ¾-inch seamless tubing

Body: Aluminum underpan and rockers. Removable front and rear sections of reinforced resin.

Steering: Rack & Pinion, leading steering arms

Brakes: Girling Caliper Discs
Outboard at front 10-9/16-inch diameter
Inboard rear 9½-inch diameter
Dual, balance-beam master cylinders

Tires: 5.20 x 15 front, 6.40 x 15 rear

Drawing by BOB THATCHER

WEIGHTS & MEASURES:

Wheelbase: 90 in.
Front track: 51 in.
Rear track: 50 in.
Overall height: 31 in.
width: 60.5 in.
length: 139.25 in.
Ground clearance: variable
Curb weight: 1240 lbs.
Lubrication system: 2½ gal.
Cooling system: 16 qts.
Fuel capacity: 32 gal. (2 tanks)

ENGINE:

Coventry-Climax DOHC four-cylinder, four-cycle water-cooled, alloy castings
Bore & Stroke — 94 x 88.9 mm
Displacement — 2495 cc (152 cu. in.)
Compression Ratio — 10.3 to 1
Maximum BHP — 232 @ 6800 rpm
Max. Torque — 200 lbs./ft. @ 5000 rpm
Carburetion — Two Weber 58DCO3's
Exhaust — Tuned headers (4 into 2 into 1)
Ignition — Lucas single distributor
BHP per Liter — .95
Fuel Consumption — 9.5 mpg

CLUTCH:

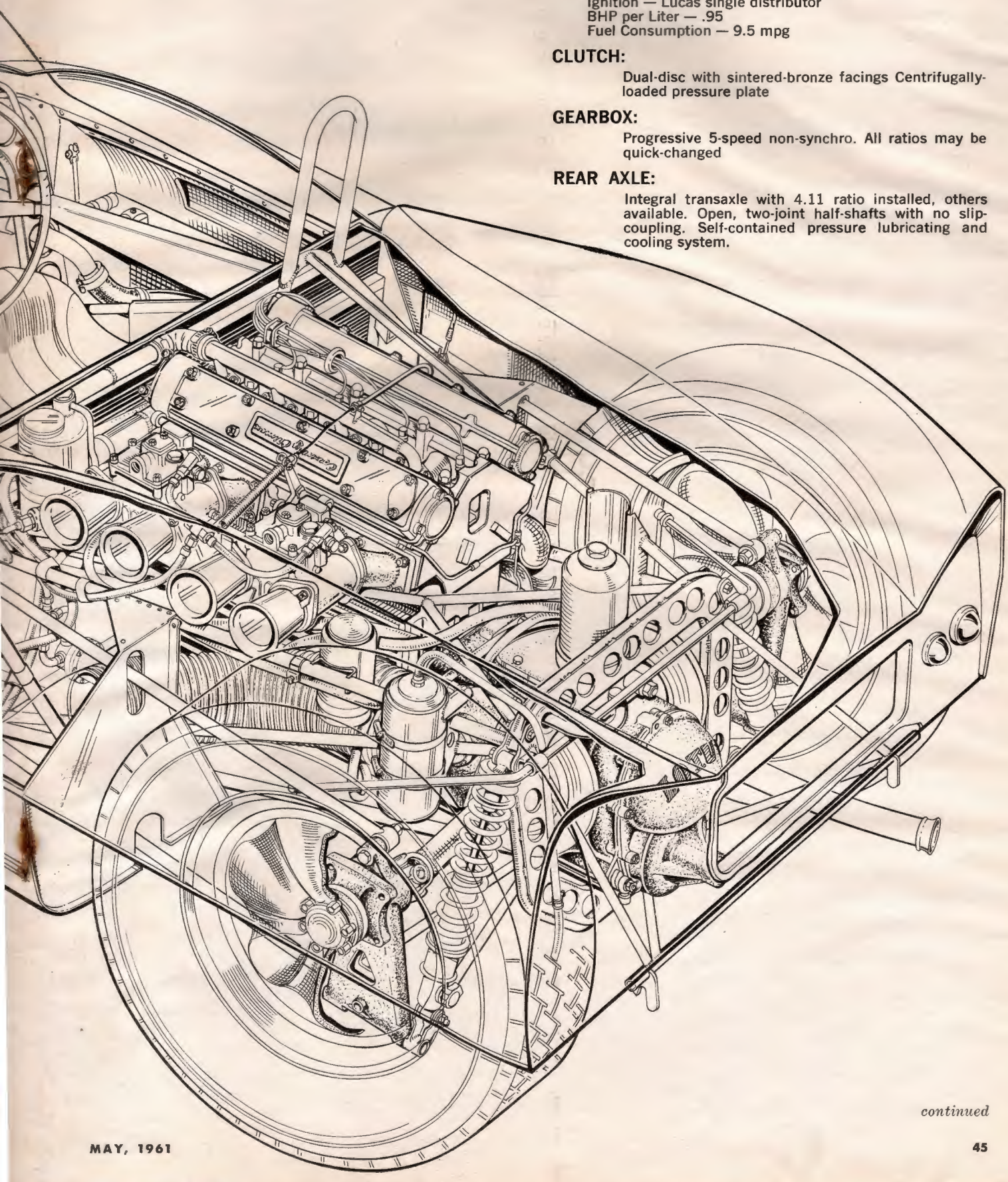
Dual-disc with sintered-bronze facings Centrifugally-loaded pressure plate

GEARBOX:

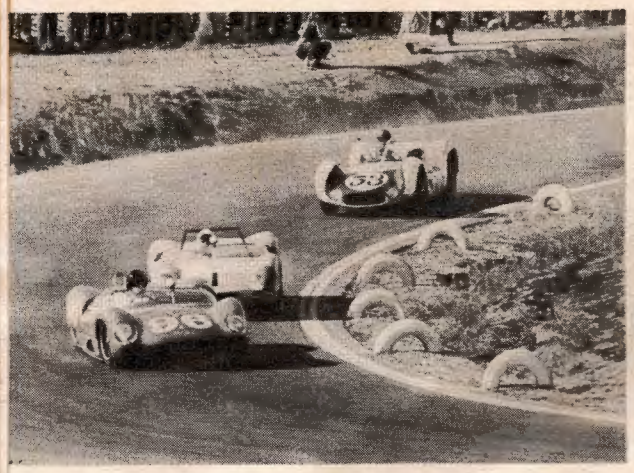
Progressive 5-speed non-synchro. All ratios may be quick-changed

REAR AXLE:

Integral transaxle with 4.11 ratio installed, others available. Open, two-joint half-shafts with no slip-coupling. Self-contained pressure lubricating and cooling system.



continued





The Gurney-driven Arciero car will be campaigned in p races this season with possibilities of Formula Libre parti ipation as well. Bill Fowler is responsible for maintenanc

THE WINNER THEY DON'T WANT TO BUILD *continued*

transmitted directly into the differential bearings. The geometry is such, however, that the axles remain in stretch-tension, rather than compression, most of the time. This tends to neutralize any load trying to get in at the differential. Adjustable Armstrong coil — shocks provide the spring — dampening media and a thin stabilizing bar completes the design, the latter located high in a leading-arm position, but with a long connecting link to the lower ends of the hub carriers.

Good points of the design are lightness, a degree of simplicity, a low roll-center, and ideal caster-camber changes. Like the gearbox, however, it has exhibited enough "bugs" to consider them bad points. One example; the hub carriers extend so low that a flat tire lets them contact the road surface. This fact alone caused considerable consternation on the Formula One circuit. There have also been axle failures. When an axle is also a suspension member, breakage can get horrendous in a hurry. Moss confided that, as a safety precautions, these shafts were replaced before every race on the Rob Walker F1 cars. Differential failure is likewise not unknown, though overheating, rather than load on the tiny ring gear, has been diagnosed as the cause. On the prototype Mk XIX, the inboard disc brakes were moved out to the hubs, but Fowler chose to install large cooling ducts *and* the oil radiator we mentioned earlier, leaving the brakes mounted to the differential and utilizing the sprung advantages. Installation of a temperature gauge has thus far indicated his modifications to be a success.

The gearbox, from the driver's standpoint as well as the designer's, has been a nightmare on the earlier cars. Chamberlain remembers several instances of approaching corners at above 150 mph only to discover a downshift had netted a "false" neutral! Outright failures were frequent, too; enough so, to discourage everyone but Chapman who stuck doggedly to his design and made linkage, spacer, preload and sleeve changes to bring it to its present state of development. Gurney uses caution, but has thus far experienced no difficulty in fast, positive shifting.

Front suspension is light, compact, and conventional. The Armstrong coil-shocks are used here and the short, unequal upper-and-lower A-members have minimal geometry changes in deflection. A tie-rod end on the upper members serves as a ball joint and provides easy camber adjustment. Roll stabilization is controlled by a thin transverse bar mounted like the one in the rear, except that it links directly to the upper arms, instead of the lower. The steering arms are the "leading" type and connect through short tie-rods to the rack-and-pinion reduction.

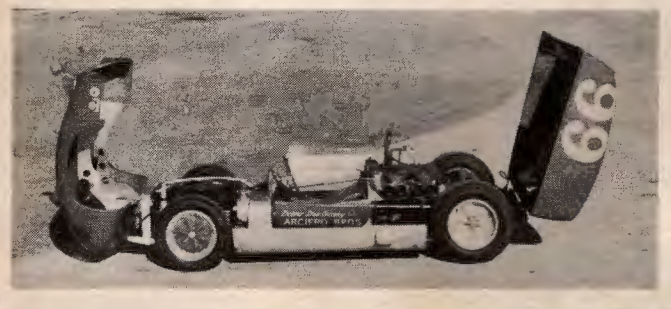
While adequate on the light F1 car, the Girling discs are reportedly critical on the Mk XIX; prone to fading and high wear when used excessively. In combination with the overall design, however, their stopping power is excellent. In the two races in which this writer was able to observe the cars, only the best RSK Porsche was, at times, able equal the depth in corner-approach that the Mk XIX's we using consistently. No servo mechanism is used, but du master cylinders, now pretty much S.O.P. on high-potenti racecars, actuate the binders under moderate foot pressur

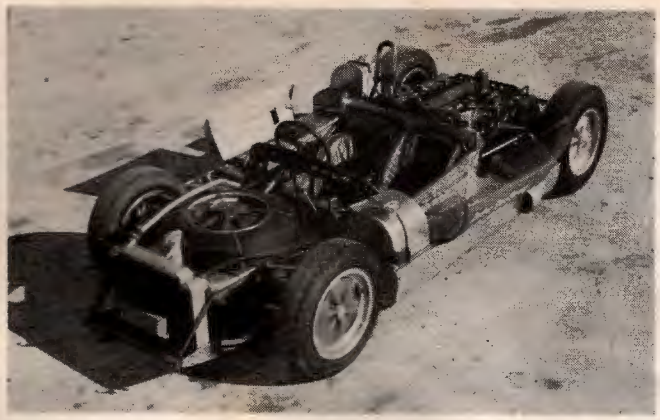
The "office" is extremely comfortable, with a low-slun bucket holding the driver's entire torso snugly. Centrall located on the floor of the right-hand-drive machine is th gearshift. All switches are at the driver's right hand on th wide, flat panel directly under the door. The instrumen are mounted directly in the forward bulkhead, centered b hind the wheel and running down to the right. Hidden unde the dash is a small, meets-FIA-requirements emergenc brake. From this, a cable leads to the brake pedal, rathe than to any mechanical actuation that would normally b associated with such a device. Clutch engagement is hy draulic, depressing the centrifugally-loaded pressure pla and, in turn, releasing the dual discs that are lined wit sintered bronze.

Pumping out an estimated 232 horsepower (SAE), almo a hundred-per-liter, the Climax engine is conservativel red-lined at 6800 rpm. No attempt is made to air-ram th huge 58DCO3 Weber carburetors which use 51 mm venturi to draw oxygen through their side-drafted dual throats. Ca overlap is 85 degrees, with the intake valve opening at 4 BTDC. Via three pumps buried deep in the crankcase (o pressure, a separate scavenge for front and rear sections the dry-type sump is fed oil from a 2½-gal. tank in the fron The oil is used, filtered, then sent back up front again to b circulated through coolers on both sides of the radiato and cored integrally with it. Crankcase breathing is cleverl — but Fowler admits, rather messily — exhausted into th frame tubes. Dozens of tiny holes in the lower rails let fume and any blow-by to atmosphere. Aside from meticulous re assembly, little else has been done to the powerplant in th Arciero machine. Replacing the single Lucas distributo with a magneto of the same make is being considered bu no ignition problems have been encountered. Forged re placements for the cast pistons are being made up to en hance the reliability margin as much as possible. The tw 16-gal. fuel tanks now have a crossover system incorporate so that either one of the dual electric pumps and separat filters can be used with either tank in another effort t eliminate problems before they occur.

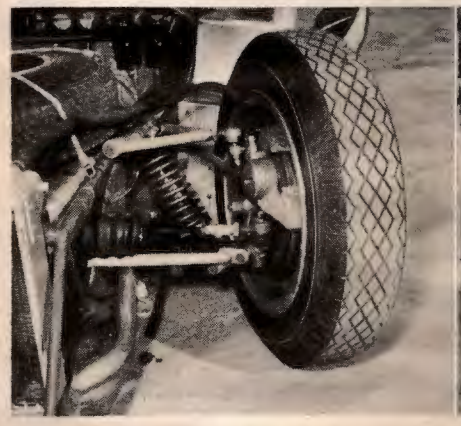
Investigating the handling how's-and-why's gave us som insight into the car's remarkable flexibility. As it stood, th suspension was set up for the Nassau course; an extremel rough surface with hard acceleration, cornering and brak ing. "Fudging rings," or spacers under the coils, lifted th car above its normal ground clearance — both front and rea

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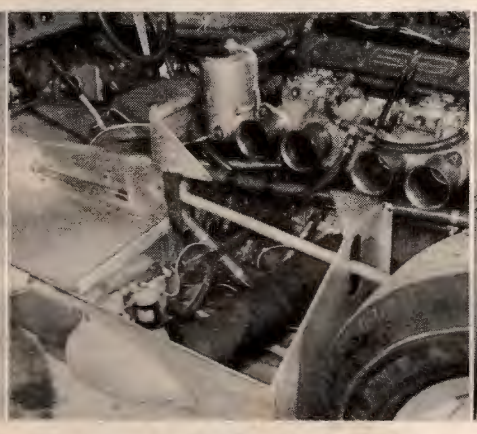




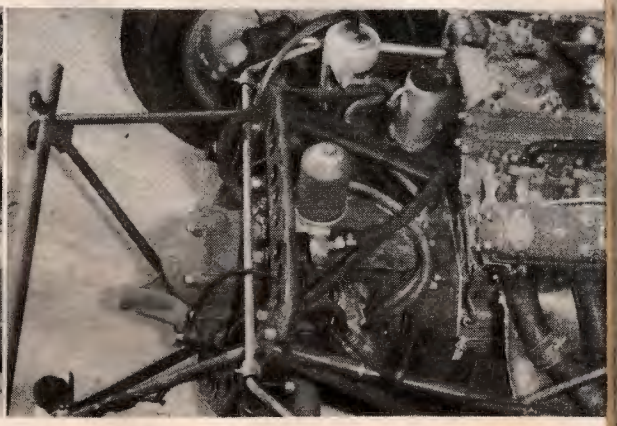
The two photos above demonstrate ease with which the Mk XIX can be "skinned" to facilitate repairs. Gas tanks are located behind left front wheel, ahead of right rear. Located behind the radiator and under the spare tire is the three-gallon oil tank.



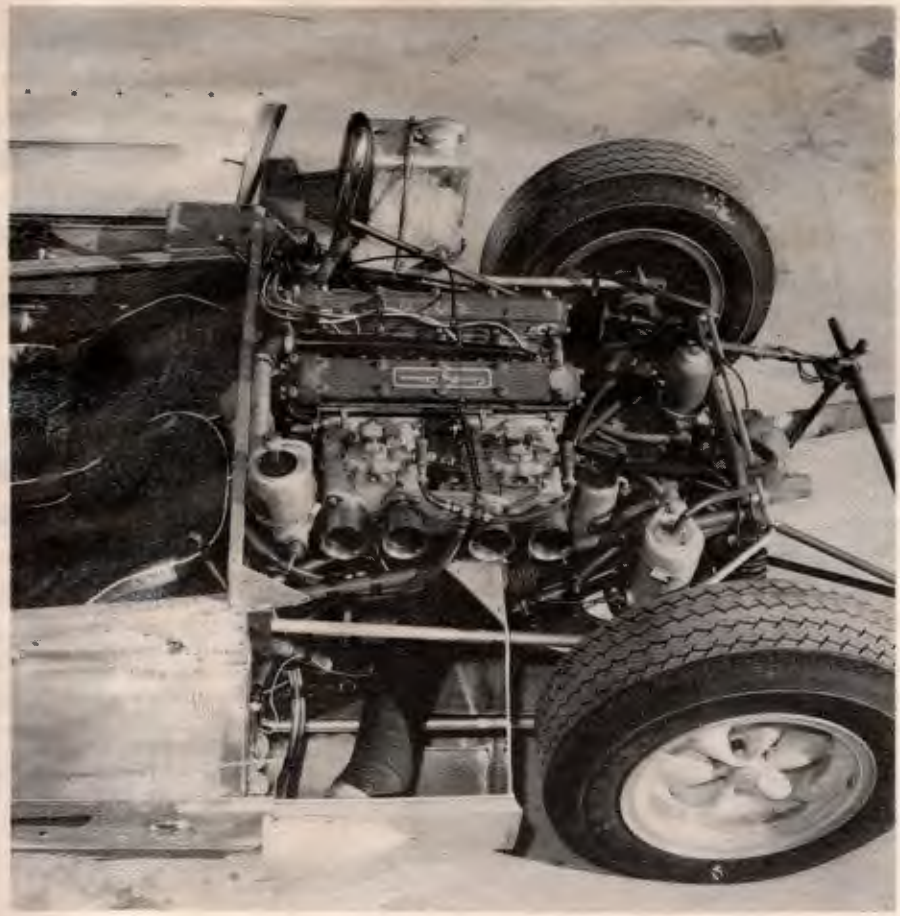
Due for gusseting before further races is the delicate front end. Disc brakes and ball-joints are clearly visible here.



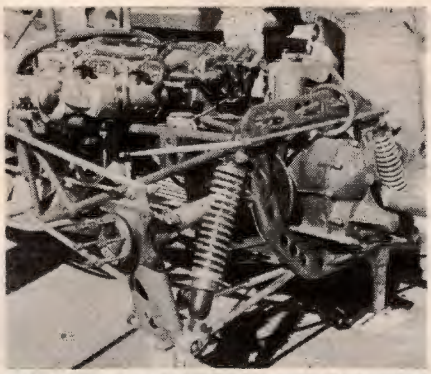
Huge velocity stacks of the twin Webers will accommodate a hand. Fill-expansion tank for water is object to their left.

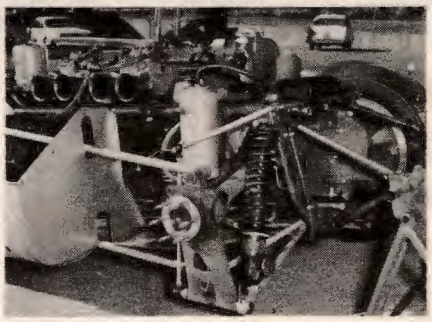


The Chapman-designed gearbox is probably the most compact 5-speed ever built though its shift linkage is oft-cursed.



It's hard to believe that the entire power train of the potent sports car is contained in this small section behind seats and with room to spare, but it's true.





Which twin is the phony? More than just similar are the rear ends of a Lotus Formula I (above) and the Monte Carlo.

THE RACE ON PAPER

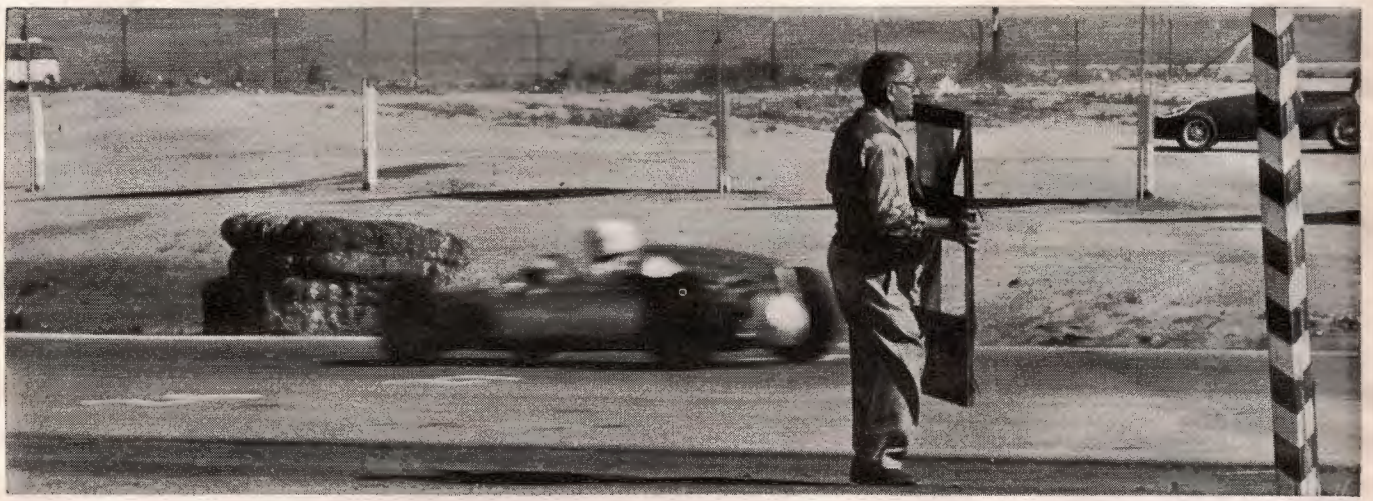






Lap Charts and Scoring

BY SHERRIE ZUCKERT



PHOTOS BY PETE BIRO

TEN YEARS AGO a well-attended sports car race in this country had twenty or thirty entries ranging through all classes of production and modified cars. Five years ago 75 to 100 made an exceptionally good field, and ran in four basic races, with over and under 1500 cc divisions. Today, at top East and West coast races, a total entry of 250 cars is not too rare. With 30 or more cars running within a single class, accurate scoring has become more and more important to the driver who has any aspirations of taking home a trophy or a bundle of money.

In a five or ten lap race, scoring can be kept fairly simple. In longer races, particularly with a great many cars

in the same class, an accurately-kept lap chart can well mean the difference between winning or losing, finishing or being a DNF.

It is a bit embarrassing to blow your engine trying to catch the car ahead of you, only to discover later that you had lapped him early in the race and he posed utterly no threat to your position.

Basically, keeping a lap chart is merely a matter of recording the number of each car as it passes in front of you. The total number of cars in the particular race to be scored is listed in a column down the left side of the chart. Across the top is the number of laps in the race. As each car passes the person scoring, its number is entered in the column for the lap it is completing. At any time during the race you have a visual picture of what is going on and where your particular car stands in relation to all the others. At the end of the race, you have a permanent record of each car's progress during the race.

A lap scorer is a vital member of the pit crew of any serious racing team and none of the European factory teams would think of racing without one. Professional racing is a serious business, involving a great deal of money for preparation and for publicity. How can you signal your driver intelligently if you don't know for sure where he stands in relation to the other cars in the race? Is the man trying to pass your driver a threat or is he a lap behind?

It should, you may say, be fairly simple to keep track of one's own car during a race, so why all the bother? Just for kicks, try keeping track of the next 10-lap race you watch, without a lap chart. At the finish, before the winners are announced, list the first 10 finishers the way you have them, both by classes and overall.

Accurate scoring does take practice. Basically, you simply sit and record everything you see coming by — until things start to happen, and in racing things always happen fast.

The flag drops and the pack takes off. As they come around, completing the first lap, they are usually still in a bunch and at that time, it is pretty useless to try to get all the car numbers into the little squares on your chart. Use a piece of blank paper and, without looking at it, write down as many numbers as you can as the cars roar by. When you miss a car's number, draw a dash in its place to indicate that the missed car belonged there. If you don't, your chart will not be accurate. In fact, you will have dropped the ball completely, as the future positions will be all wrong. After the pack has gone by, you can use the lull to transfer the numbers into their proper squares on the chart.

The next few laps are fairly easy as the cars will have strung out. You will have time to put the car numbers directly onto the chart. Then, all of a sudden five cars will go by, dicing almost hub to hub at 100-plus miles an hour. Back to your blank sheet of paper, only this time a little faster, as you have all the other cars to record, too. By now the faster cars will be lapping the slower ones, and you may be working on two or three laps simultaneously.

When the leaders come by, before you've completed a full column, place them at the head of the next column, where they belong. In the meantime, continue filling in the stragglers in the last column, as they are still completing the preceding lap.

This all sounds rather frantic, but actually it's not too difficult. As you continue to record the car numbers, they become almost automatic and you know just when to expect most of the cars. If you forget, you can glance at the preceding laps on your chart and get a good idea of which cars should be where.

The actual methods of scoring vary little from a 25-lapper to the 12-Hours of Sebring. In longer races, however, you will be recording more pit stops.

When a car is missing — doesn't come by anywhere near where it's supposed to be — continue putting down the numbers as you see them. Don't draw a line for the missing car as, obviously, its position has changed and it's a matter of waiting for him to appear again in his new position.

If you are sitting where you can see the pits, as the missing car comes in, put down his number as though he were on the course and had dropped back behind the pack. Do this only if he passes the start-finish line in getting to his pit. This is very important, as a car is not officially listed as completing a lap until it crosses over this line. If his pit is past the finish line, the car will complete a lap in getting to it. If his pit is before the finish line, he will not have completed whatever lap he is on until his pit work is finished and he crossed the start-finish line on his way back onto the track.

Most of the confusion at the end of a race results from this particular bit, so it is one of the most vital phases of scoring to keep careful check on the pits.

As a car crosses the start-finish line in the pits, record him on your chart in his proper lap position but circle his number. This circle indicates that he pitted, so there can be no doubt about what went on when reviewing the race later. Usually, in an endurance race, a leader is so far ahead that he may not lose his position in pitting, since the other cars have a few laps to go to catch up to him. In a sprint, you will want to know whether or not the guy in the pits, although losing a few positions, also loses a lap on the other leaders.

If you happen to be scoring for the second place car and know that he is in the same lap as the car in the pits, now is the time to hang out the "GO!" sign.

The group running a race always has its own team of scorers and timers recording the laps. Their object is absolute accuracy — they are the officials. However, don't ever ask an official scorer who's leading during the race. At that moment, he has no way of knowing.

One method of official scoring, used at Nassau and again at Sebring, is done with mechanical flip cards. These cards are numbered consecutively and flip into sight at one second intervals. The large group of scorers are assigned individual cars to track. When a scorer's car comes by, he notes what time is on the flip card and records this. At the end, after extensive tabulation, the race results are officially compiled.

At Sebring and Le Mans official hourly reports are handed out to the pits. If scoring a race of this kind, be sure and draw a line down your chart on the hour. This will indicate later

(continued on following page)

how things stood at that point, and also enable you to correct your chart when you get the official version.

At the end of a race, as soon as the flag falls for the winning car, draw another line down the chart (just before the final empty lap squares) and record the remainder of the lap in the usual manner as the cars pass by you. This final line means that the cars past it have taken the checker. Sometimes a car will blow on the last lap and not finish the race at all, or change its position radically. If this happens, your "checker" line will say so.

In a race involving more than twenty-five cars, it is advisable not to try to carry all of them. What counts most is the first fifteen, or in specific cases, the particular car you are scoring for. Don't lose your head, or the whole chart, trying to straighten out a position of a car that you may have missed. Although this is important, it's not worth losing the whole thing about it — you can make it up later.

The importance of lap scoring cannot be over-stressed. Most people around races don't even know what it is, or that it is even occurring — all they know is that someone, writing things down frantically, knows what's going on. So a lapscorer is usually a very underestimated addition to the pits, but actually is most instrumental in how that pit functions.

One thing that a scorer cannot do, however, is time the races. During a race his concentration is such that he cannot become involved in this particular phase of pit work.

Timing is itself an art. If you are fortunate enough to have one of those triple watch boards, the procedure is fairly simple. These gimmicks usually have one lever that does all the work. When pressed, it stops one watch, starts another, and resets the third. All a timer has to do in this case is pay attention to things and be able to read the clocks.

The "why" of timing should be fairly obvious. During practice it is wise to keep an eye on how your immediate competitors are running and compare their times to your own. Elaborate race strategy has often evolved from in-practice timing. Perhaps the most famous was the stunt Alfred Neubauer pulled at Le Mans one year. He had a very obvious timing station set up for all to see and seemed to be timing a particular car from there. In actuality, he had another hidden timing station and two identically numbered cars on the course. The decoy would present credible but slow times as taken from the in-view stand. At the same time the car actually being tested was going like stink and being timed accurately where no one else could keep track of it. It worked, of course, and no one really knew just how fast the Mercedes was going until the race itself. By then it was too late.

So practice timing is vital, almost as important as race timing itself.

If you are limited to one or two watches, and that's all, there are a number of ways to still keep aware of how the other cars are going. First, you will want a time for each lap your own charge is doing. If you have two single-hand stop watches, just start one as you stop the other, and record the consecutive laps. If you have only one watch, you can still get consecutive laps.

With one watch, instead of timing your boy in the same spot each time around, pick him up wherever you can. In other words, take his first time as soon as you see him start down the straight. Read the watch as fast as you can, reset it, and then try and pick him up again as he hits the S/F line, or perhaps one of the corner markers. As he comes by again, stop the watch at the place where you picked him up and repeat the routine, taking him at a spot further down the line.

On a track where visibility is fairly good all the way around, you can get every lap with your one watch. Under other circumstances, when you run out of timing points, you will have to miss a lap and then pick him up at the beginning again. In any case — this method is more constructive than the time-a-lap-wait-a-lap routine usually necessitated by having only one watch.

If you have only one watch, but it is a split-hand timer, you are really in business — for now you can take every car on the track, every lap.

This method is not simple, and requires mathematical ministrations. It involves the total time of whatever is going on. If you are timing five cars, write their numbers on a piece of paper. Start the split-hand timer and keep the main hand running throughout. When one of your cars comes by (taken from one set timing point only) stop the split hand and record the total time shown on the watch opposite his number. Do this for each of the cars, recording the aggregate time plus the fraction indicated by the stopped second hand. Naturally, as soon as you have noted this fraction, join the split-hand back to the main hand. Your paper should look like this:

Car#	*Times each lap*		
42	2:05.4	3:10.3	4:04.0
56	3:10.0	4:02.2	5:00.6
247	3:06.2	4:00.3	5:05.1

To find out exactly what times these cars are turning, you simply subtract preceding lap times from the following lap total, for each car.

Once this method is learned it is possible to time any number of cars and an expert can take a whole field on the one split-hand clock.

Timing during a race, of course, is almost mandatory if one is serious about competition. It is usually a matter of time-distance between your car and your closest competitors, whether in your own class or overall. With a lap chart and accurate times, your pit can then signal exactly how your car stands, and whether it can take it easy or must go like stink to make up the seconds. It is also important to take the overall lap times of your car as this gives a fair indication of how it is performing, and can warn of trouble (for instance, if it's going around *much* too fast it can mean he's apt to blow it and should be slowed down.)

One word of caution about scoring and timing — *NEVER ARGUE WITH THE OFFICIAL TIMING STAND* unless you are absolutely sure of your records. If the official results differ radically from your own version and you are certain that you are right, then present your case. Occasionally the officials are wrong and may not check unless you ask them to. If you have been wronged, and can prove it by your accurate charts, they will listen, and remedy the results.

So, if you are serious about your racing, a competent scorer and a timer in your pits will be of a great deal more value than an extra blonde or the neighbor's kids. If you can get the blonde to keep your lap-charts, and can rustle up a brunette to work the stop watch, you've got it made, buddy!

HERE IS THE WAY your chart might look during a 10-lap race with eight entries. You are driving the #7 car, an aluminum-bodied special with a detuned Morris Minor engine. You are starting at the back of the pack and all that you have to do to win the race is to pass Walt Hansgen, Birdcage Maserati, #60—Max Balchowsky, Old Yeller Mk. II, #70—Bob Drake, Birdcage Maserati, #49—Ken Miles, Porsche RS60, #50—Jim Chaffee, Pink Elephant-Corvette, #25—"Bat" Masterson, Batmobile-Corvette, #220 and Jack McAfee, Porsche RSK, #88.

The starter drops the green flag, your left foot comes off the clutch and your right foot jams down on the accelerator. Everyone beats you through the first turn.

	1	2	3	4	5	6	7	8	9	10
1st	60	70								
2nd	70	60								
3rd	49	49								
4th	50	50								
5th	25	25								
6th	—	220								
7th	88	7								
8th	7	88								

Figure 1 — LAP TWO: On the first lap the cars came by the pits in several tight bunches and your scorer was unable to see the number on the sixth place car. A dash was put in the space to keep the race order correct. During the second lap Balchowsky #70 took the lead from Hansgen #60 and you outaccelerated McAfee #88. Your scorer caught the missing number this lap and added #220 to the chart where he belonged.

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70						
2nd	70	60	60							
3rd	49	49	49							
4th	50	50	50							
5th	25	25	25							
6th	—	222	7							
7th	88	7	220							
8th	7	88								

Figure 2 — LAP THREE: During the third lap you blasted by the Batmobile #220 and moved into sixth place. Balchowsky #70 lapped the rear-end car #88 just before the start-finishing line, thereby completing his fourth lap a few seconds before McAfee finishes his third. As soon as #88 crosses the start-finish line, his number will be added to the bottom of the third lap column. Your pit signals you to press #25, whose engine sounds sick.

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70	70					
2nd	70	60	60	60	60					
3rd	49	49	49	49	49					
4th	50	50	50	50						
5th	25	25	25	7						
6th	—	220	7	220						
7th	88	7	220	88						
8th	7	88	88							

Figure 3 — LAP FOUR: If the chart were stopped at this exact moment there would be no way of telling the actual sequence of cars upon the course, although the overall positions are evident. A race chart is in a constant state of flux as the cars pass each other or drop from the race. Notice that Chaffee #25 has disappeared from the chart. The scorer does not know what has happened to him, only that #25 failed to come by. This automatically moves you into fifth place. Your pit gives you the GO sign.

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70	70	70				
2nd	70	60	60	60	60	60				
3rd	49	49	49	49	49	49				
4th	50	50	50	50	7					
5th	25	25	25	7	50					
6th	—	220	7	220	220					
7th	88	7	220	88	88					
8th	7	88	88	25						

Figure 4 — LAP FIVE: Arrows indicate the actual sequence across the finish line. It is less confusing to record this on a separate sheet of paper. You have out-cornered Miles #50 and both of you have completed your fifth lap. Then came #70 completing his sixth lap, followed by #222 completing his fifth lap, in sixth place overall, behind #50. Then came #60 and #49, in second and third spots overall, followed by #25 slowly motoring past and by #88 finishing his fifth lap. This information can be valuable.

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70	70	70	70			
2nd	70	60	60	60	60	60	60			
3rd	49	49	49	49	49	49	49			
4th	50	50	50	50	7	7	7			
5th	25	25	25	7	50	50	50			
6th	—	220	7	220	220	220	220			
7th	88	7	220	88	88	88	88			
8th	7	88	88	25						

Figure 5 — LAP SIX: Chaffee #25 pitted after crossing the start-finish line, so his number was circled. Balchowsky #70 has just crossed the finish line, completing seven laps, and the chart at this instant shows that he has lapped every car except 60-49-7. We will not be able to tell from the chart how many cars each of these three have lapped until each of them crosses the finish line, completing the full lap he is on. With the cars on the course constantly changing positions, this is the only time when the positions are "official."

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70	70	70	70	70		
2nd	70	60	60	60	60	60	60	60		
3rd	49	49	49	49	49	49	49	49		
4th	50	50	50	50	7	7	7	7		
5th	25	25	25	7	50	50	50			
6th	—	222	7	222	222	220	220			
7th	88	7	222	88	88	25				
8th	7	88	88	25	25					

Figure 6 — LAP EIGHT: The sequence now is that #70 is closing on #50 and cars #70 and #60 have lapped #220. Cars #49 and #7 are sequentially behind #220, but are actually nearly a lap ahead. On the sixth lap McAfee #88 pulled into the pits without crossing the start-finish line, so is not credited with having finished that lap. His number is circled on his last completed lap. Chaffee #25 ras re-entered from his pits. When McAfee #88 crosses the s-f line coming out of the pits, he will be credited with finishing lap 6.

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70	70	70	70	70		
2nd	70	60	60	60	60	60	60	60	60	
3rd	49	49	49	49	49	49	49	49	49	
4th	50	50	50	50	7	7	7	7	7	
5th	25	25	25	7	50	50	50	50	50	
6th	—	220	7	220	220	220	220	220		
7th	88	7	220	88	88	25	25			
8th	7	88	88	25	25	88				

Figure 7 — LAP NINE: As Balchowsky #70 takes the checkered flag, finishing his tenth lap, a "checkered flag line" is drawn so that all cars crossing the start-finish line behind him will be recorded to the right or below it, indicating their actual finishing position and laps completed. If the cars held their present position, the sequence across the finish line would be 60-220-49-7-25-88 (now out of the pits and across the finish line, therefore on lap seven) and 70 on his cool-off lap. You will be fourth overall. Pity!

	1	2	3	4	5	6	7	8	9	10
1st	60	70	70	70	70	70	70	70	70	70
2nd	70	60	60	60	60	60	60	60	60	7
3rd	49	49	49	49	49	49	49	49	49	49
4th	50	50	50	50	7	7	7	7	7	
5th	25	25	25	7	50	50	50	50	50	
6th	—	220	7	220	220	220	220	220	220	
7th	88	7	220	88	88		25			
8th	7	88	88	25	25	88	88			

Figure 8 — FINISH: The situation completely changed on the last lap, after Balchowsky took the checkered flag. Hansgen #60 blew his engine and was a DNF. Drake #49, whom you had been slip-streaming, spun off Turn 8 and was unable to catch you. Miles #50 threw a wheel on the last turn and was another DNF. Chaffee #25 pitted with a seized engine and was DNF. McAfee #88 ran out of gas but pushed the car across the finish line. You finished in Second Place. Start thinking about beefing up the car with an Isetta engine!



ROAD TEST/3

Peugeot 404

ENGINEERED FOR PLEASURE

UNDER A GRAY, LEADEN SKY, the narrow *Route National* wound its way haphazardly through the southeastern French countryside. The air was cold, damp and filled with an odd mixture of snow and rain that could best be described by the term "snush."

It was hardly the most auspicious set of circumstances in which to make acquaintance with a new car. Weather and road conditions such as these are neither conducive to comfort nor to that feeling of security so necessary for the *simpatico* attitude that begets instant liking for an automobile.

But inside the car we were warm and dry and, even better, the car clung to the miserably slick blacktop as though it had been grooved into the pavement. Abruptly the road started to climb and the "snush" turned into patchy ice and then into real snow — the heavy, wet variety. Still the car remained controllable, admittedly without that on-rails feeling, but still controllable. When we got to the point where the depth of the snow was getting to be psychologically hazardous we simply turned the car around at a fork in the road and proceeded down the mountain, again without mishap or even the feeling of impending mishap. All this, mind you, was done without the sign of a tire chain or even a snow-tread.

Later, that night, we were to make a barreling 50-mile trip, guided by a Gallic type who obviously was a frustrated Tour de France pilot. The trip was made over the slick road in approximately 50 minutes despite the added hazard of driving behind those miserable yellow headlights that are required by French law. It might best be likened to driving through wet yellow wallpaper, for all the usable light these units throw. Needless to say, these lights are *not* on U.S. models.

Thus went our first day behind the wheel of the "new" Peugeot 404 on its native heath. It was a most impressive introduction. Under abominable weather conditions and over roads that could at best be charitably described as secondary by U.S. standards, the 404 handled like a baby carriage. Through the several days that followed during which the car was driven over every conceivable type of road and in every possible (and impossible) sort of weather, very little happened to alter our original high opinion of the car as a vehicle that is everything its designers and manufacturer intended it should be.

Let it be understood here and now that it was never intended to be a racing car, a sports car or even a rally car (in the European sense, that is). It is none of these. It was intended, rather, to be a practical, safe, reasonably fast, good handling sedan of excellent quality for day to day driving. It is certainly all of this. By American standards it might even be termed sporty in its handling with its moderately quick steering and good road holding. In terms of accelerative performance it is no stand-out by the U.S. meaning of the word, but the handling and roadability give it the capability of holding high average speeds over long distances.

Our test trip took us from Sochaux, where the car is manufactured, to Besancon (the terminus of that first night's dash). Then came a day's trip to Lyon, followed by a run up into the French Alps to the ski resort of Chamonix through snowy mountain passes and then back down again to Geneva. This was followed a day later by an afternoon at play on the banking and road circuit of Montlhery where it was discovered that the factory claim of a top speed of 88 to 90 mph was substantially accurate, our particular car clipping off one lap of the banking at 89.6 mph. In short, we were able to give the car a wringing out on a rather monumental scale. It isn't often that one gets a chance to test a new car in its native land, and so get an idea of the thinking of the designer and the conditions for which it was conceived. In actuality, the Peugeot 404 is not a new car; it was launched in a moderately quiet (for France, that is) way a year ago on a "for home consumption only" basis. During the course of the past year various minor modifications were made to suit the car for export. It is making its U.S. debut in the New York International Automobile Show as a companion piece, *not* a replacement, for the already successful 403.

Other than for the exception noted above, the 404 is an entirely new machine, not a rehashed, face-lifted or rebodied 403. From the basic structure to the outer skin the 404 differs from its predecessors, the only kinship being the excellent roadability, quality craftsmanship, gearbox shift pattern (but not the same ratios), and the worm drive rear end of the earlier Peugeots. Virtually every other part is different. But it isn't different because of dissatisfaction on the part of customers, U.S. and otherwise, with the 403. Quite the contrary, the 403, which is of a size and price to be directly competitive with U.S. compacts, has enjoyed a steadily upward sales curve with virtually every car shipped to the U.S. sold immediately on arrival. No, the reason was simply that the powers that be in Paris and Sochaux, felt that a new car should be *new*.

New it is. From the Pininfarina designed body through the 45-degree canted engine to the front suspension things are different.

Let's take things in the order mentioned and go on from there.

First, the body — as mentioned, it is a Pininfarina design with all the implications involved therein. Smooth and with a crisp look, it is a definitely attractive piece of coachwork, well put together. About the only criticism we could come up with was that it gives the car a sort of kinship to the new BMC line and the 2100 Fiat. In fact, the Pininfarina form is fast becoming so universal as to give European cars a "look" and, if continued, could just reverse the old criticism leveled at American cars not so many years back to the effect that you couldn't tell a Cadillac from a Chevrolet, or any other car for that matter. However, in the case of the Peugeot 404, the design is cleanly executed and while it doesn't exactly offer a unique appearance, it does make for an extremely attractive automobile.

During the first year in Europe, the 404 was offered only in muted shades of solid color — blue, gray, light green with a few going to dealers in muted red and that fine Peugeot standby, conservative black. Plans are now made, however, to offer several livelier shades of metallic colors such as bronze, red and silver. Examples of these, which we saw in Paris, were atractive in the extreme and, when equipped with leather and synthetic interiors, carried an aura of luxury not seen in anything within a thousand dollars of the price.

On the inside, with the exception of the leather-lined versions, the aspect is comfortable but not plush. The seats, on earlier versions too soft, are now just on the firm side and seemed to us just fine for long cross-country hauls to which we subjected the car. The front seats are adjustable fore and aft, and have backs that tilt in several positions from bolt upward to what one observer referred to as "full adultery." We can't vouch for the latter as we didn't test it to that extent.

The back seats are equally comfortable and the legroom is more than sufficient. There is also a pull-down center arm-rest, complete with ash tray. Material in the standard trim is of what the maker refers to as Rhovyl nylon jersey, which to an American could be misleading since it looks like no jersey we ever saw. Good looking and comfortable, the cloth has a slight gripping action that holds the driver or passenger gently in place without mussing or dragging clothing.

The steering wheel is pretty normally

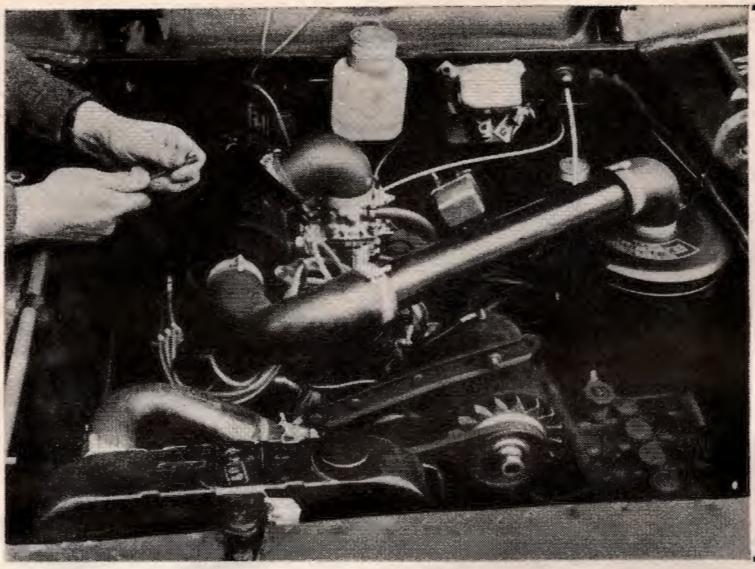
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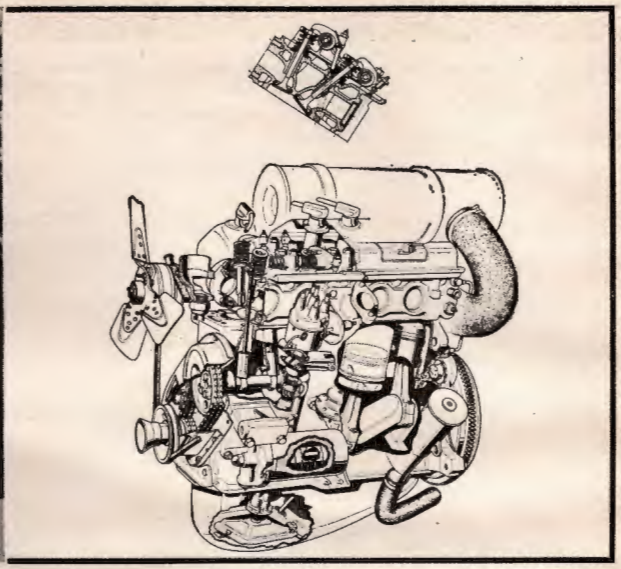


Companion pieces: Peugeot 404, left, and the older but still continued 403 on the right. On Peugeot test track the 404 proved livelier, thanks to the larger, faster engine.

The factory claim of a top speed of from 88 to 90 miles an hour for the 404 was borne out on the banking at Montlhery; several 88 mph laps were turned, one at 89.6.





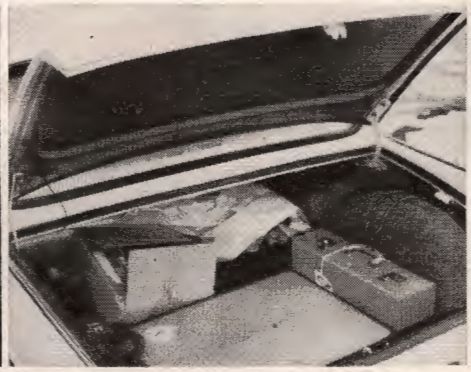


Engine of 404 is slanted at 45 degrees to allow a lower hood line, making for excellent accessibility for minor service. Cutaway shows the new head and combustion chamber layout. Also indicated are Welch plugs opposite the intakes.



Even in deep mountain snow the 404 handled with complete security in spite of the absence of chains or snow treads.









Driver's office is roomy and comfortable. Seats rake back in six positions. Trunk (center) is big enough to accommodate at least two suitcases plus other impedimenta. Back seat armrest pulls down to reveal handy ashtray. Combination handgrip and doorpull uses light thumb pressure on trigger to release lock.

"American" in concept, being neither too horizontal nor overly vertical. Below it the pedals are slightly offset to the left but not so much that the position is awkward. Even better ,these pedals are widely enough spaced so that there is no trouble even when wearing hunting boots, as we did on occasion. Forward of the wheel, in direct line of vision, is the instrument grouping under a shaded cowl. Easily read, it has all the instrumentation needed in a general purpose sedan — water temperature and fuel level gauges, a speedometer, an oil pressure warning light and a clock.

Hung on the column on the right are the shift lever and the direction switch, the last of which takes getting used to due to long ingrained habits of reaching for this switch with the left hand. The left hand is not left idle, though. Hung on the left of the column is the compound light switch which waggles through four positions to control all the necessary lighting conditions from off through parking, dims, to high beams. It's a little confusing at first to any but Frenchmen, but is soon learned. It makes sense in a Gallic sort of way when you remember that the French seem to detest strong lighting in any form driving only on parking lights in the cities and in the country behind those yellow perils which they generally keep turned on the dim position. Thus, if it is inconvenient to operate the high beams you won't be tempted to use them.

Down underneath and to the front are where the horses live. These, 72 of them, exerting 95 lbs./ft. of torque, are housed in an entirely new engine of 1618 cc displacement. This is canted 45 degrees to the right, primarily to get a low hood line. The radiator, too, is offset to the right, leaving the space on the left for the battery. This tilting and offsetting leaves gobs of room for servicing all the accessory equipment without having to delve down into dirty or tin-shielded innards and, since the exhaust is on the right or downward side, without danger of burning hands — praise be.

The engine is slung directly over the front crossmember-suspension assembly, mounted at its midpoint and tilted slightly rearward. The third point of the engine suspension is at the rear of the transmission. All this mounting is done with large rubber blocks which very effectively damp out resonances, of which there are few in this engine anyway.

The engine itself is a gray-iron casting with wet steel cylinder liners which are centrifugally cast and then machined to size. In these cylinders ride nicely cast and machined aluminum alloy slipper-type solid-skirt pistons with good, sturdy connecting rods. The crank is forged, not cast, and is statically and dynamically balanced, using bolt-on counter weights. We can believe the balancing part since we could get no noticeable vibration out of the engine up to the point of valve float.

The head is also a completely new design, using what the Peugeot engineers refer to as an "offset spherical cap" form of combustion chamber. While sometimes described as hemispherical, it isn't — quite. What it amounts to is a very shallow spherical "dish," offset in the direction of the intake valve in such a way that the intake valve has considerably more angularity in respect to the bore axis than does the exhaust valve. The valves are actuated by extremely short, stiff rockr arms operated by offset pushrods. This chamber design, so claim Peugeot engineers, gives a smooth, squish-type chamber performance with many of the good gas-flow attributes of the hemispherical type of chamber. For those who like such good things, the head appears completely and entirely suitable for power and speed modifications. Although it would seem tha the intake manifold is

(continued on page 84)

ROAD TEST/3

TEST DATA

VEHICLE	Peugeot	MODEL	404
PRICE (as tested)	$2575. POE NY	OPTIONS	Michelin "X" tires

ENGINE:

Type:	Inclined 4-cylinder, 4-cycle, water cooled
Head:	Alloy, hemispherical combustion chambers, integral intake manif.
Valves:	Overhead, pushrod-rocker actuated, inclined
Max. bhp	72 @ 5400 rpms
Max. Torque	95 ft. lbs. @ 2250 rpms
Bore	3.3 in. 84 mm.
Stroke	2.85 in. 73 mm.
Displacement	98.9 cu. in. 1618 cc.
Compression Ratio	7.4 to 1
Induction System:	Single downdraft Solex 32 PBICA
Exhaust System:	4-port cast manifold-to-muffler-to-resonator
Electrical System:	12v single distributor ignition

CLUTCH:	Single disc, conventional pressure plate, carbon throwout	DIFFERENTIAL:	Wheel-&-worm
Diameter:	8.5 in.	Ratio:	4.2 to 1
Actuation:	mechanical	Drive Axles (type):	enclosed, semi-floating
TRANSMISSION:	4-speed, full-synchro, alloy case	STEERING:	Rack & Pinion
		Turns Lock to Lock:	4
		Turn Circle:	32 ft.
Ratios: 1st	4.10 to 1	BRAKES:	Duplex-Simplex cast-iron drums
2nd	2.20 to 1		
3rd	1.41 to 1	Drum or Disc Diameter	9 in.
4th	1.0 to 1	Swept Area	126.3 sq. in.

CHASSIS:

Frame:	Integral, steel, unit-welded
Front Suspension:	Single, lower A, pillar coil-shock
Rear Suspension:	Live-axle with torque tube, coil springs
Tire Size & Type:	6.50 x 15

WEIGHTS AND MEASURES

Wheelbase:	104.3 in.	Ground Clearance	6 in.
Front Track	52.6 in.	Curb Weight	2359 lbs.
Rear Track	50.4 in.	Test Weight	2682 lbs.
Overall Height	57 in.	Crankcase	3.5 qts.
Overall Width	63.9 in.	Cooling System	7 qts.
Overall Length	173.5 in.	Gas Tank	11 gals.

PERFORMANCE

0-30	6.8 sec.	0-70	26.9 sec.
0-40	10.2 sec.	0-80	35.8 sec.
0-50	14.1 sec.	0-90	— sec.
0-60	19.3 sec.	0-100	— sec.

Standing ¼ mile 19.9 sec. @ 63 mph Top Speed (av. two-way run) 89.6 mph

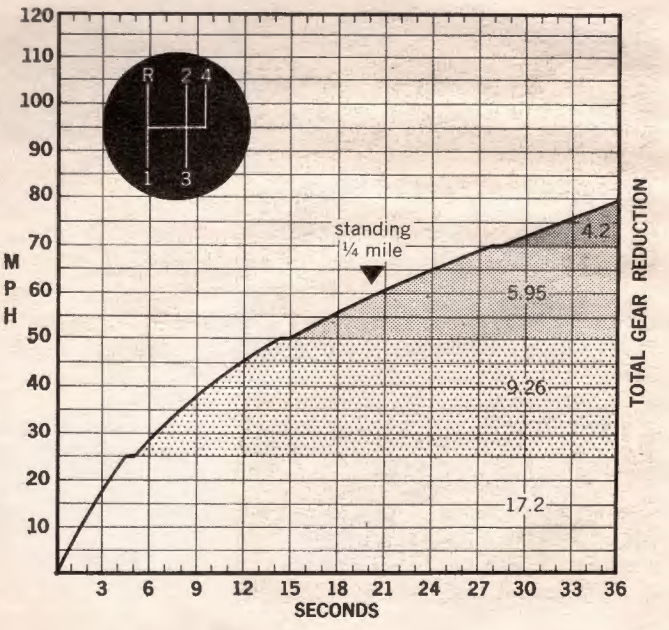
Speed Error	30	40	50	60	70	80	90
Actual	29	38	47	57	66.5	76	—

Fuel Consumption Test:	25 mpg	RPM Red-line	5400 rpm
Average	30 mpg	Speed Ranges in gears:	
Recommended Shift Points		1st	0 to 25 mph
Max. 1st.	22 mph	2nd	12 to 48 mph
Max. 2nd.	45 mph	3rd	28 to 70 mph
Max. 3rd.	68 mph	4th	40 to 88 mph

Brake Test: 60% G Average, over 5 stops.
Fade encountered on 3rd stop.

REFERENCE FACTORS

BHP per Cubic Inch	.727
Lbs. per BHP	32.7 lb.
Piston Speed @ Peak rpm	2565 ft./sec.
Swept Brake Area per Lb.	.053 sq. in.





LONDON RACING CAR SHOW

Lotus Mk. XX is the Star

by Milt Brown & Pete Biro

THE SECOND ANNUAL Racing Car Show, put on in London by the British Racing and Sports Car Club, was an even more brilliant success than its predecessor. During the week of the show more than 63,000 people crowded the exhibition halls and unanimously agreed that not only was Lotus the star of the show, but that Colin Chapman has done it again. After producing the all-conquering 1960 Lotus Formula Junior, which won all three English Formula Junior Championships last year, and the unbelievable Mk. XIX "Monte Carlo," Chapman unveiled his all new Junior, the Mk. XX.

This young man from Cheshunt could have, had he wished, merely produced a modified version of the successful 1960 car. Instead, he had the courage to let Lotus fortunes rest on a sleek new model, the Mk. XX. Last year's Junior was praised the world over by journalists as "the one car that can't possibly be improved." Chapman has made them eat their words, by not only improving the improvements, but by producing a car with 30 percent less frontal area, a higher top speed and, if you can believe it, improved road-holding!

The new Junior is easily distinguishable from its highly successful but boxy-bodied predecessor by its (frankly) Cooperish nose section. The self-colored Fiberglas body is composed of four easily removed sections. Unlike last year's body work, which was made up of glass nose and tail sections with aluminum panels, this year's body is all glass. Many refinements to construction details make the Mk. XX a highly finished looking piece of equipment, which is more than can be said of some of the other marques.

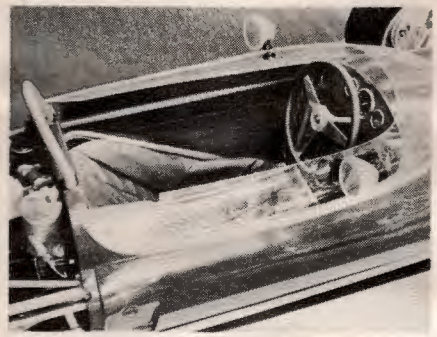
Generally speaking, the limiting factor in reducing the projected frontal area of a race car has always been the size of the human body. There is no sense to building a low car if the driver sticks out like a human air-brake. One often thought of method is to have the driver lie in a prone position, thereby obtaining the lowest frontal area possible, but this can be difficult for the driver. Chapman hasn't gone this far yet, but he has managed to reduce the effective height of the driver. This seemingly impossible feat was accomplished by inclining the back of the driver's seat 45 degrees, thus reducing the effective height of the driver by several inches. Even though the new model is 5 inches lower than last year's, only the driver's head protrudes above the car body.

The driver, in his compartment, is surrounded by a steeply raked compound curved windscreen. Immediately behind the driver's shoulders are two air intakes. The one on the left supplies cool air to the two twin-choke Weber carburetors, while the one on the right supplies cool air for the inboard mounted rear brakes. At the extreme rear-end of the body an exit is provided so that the air will flow freely

(continued on page 58)



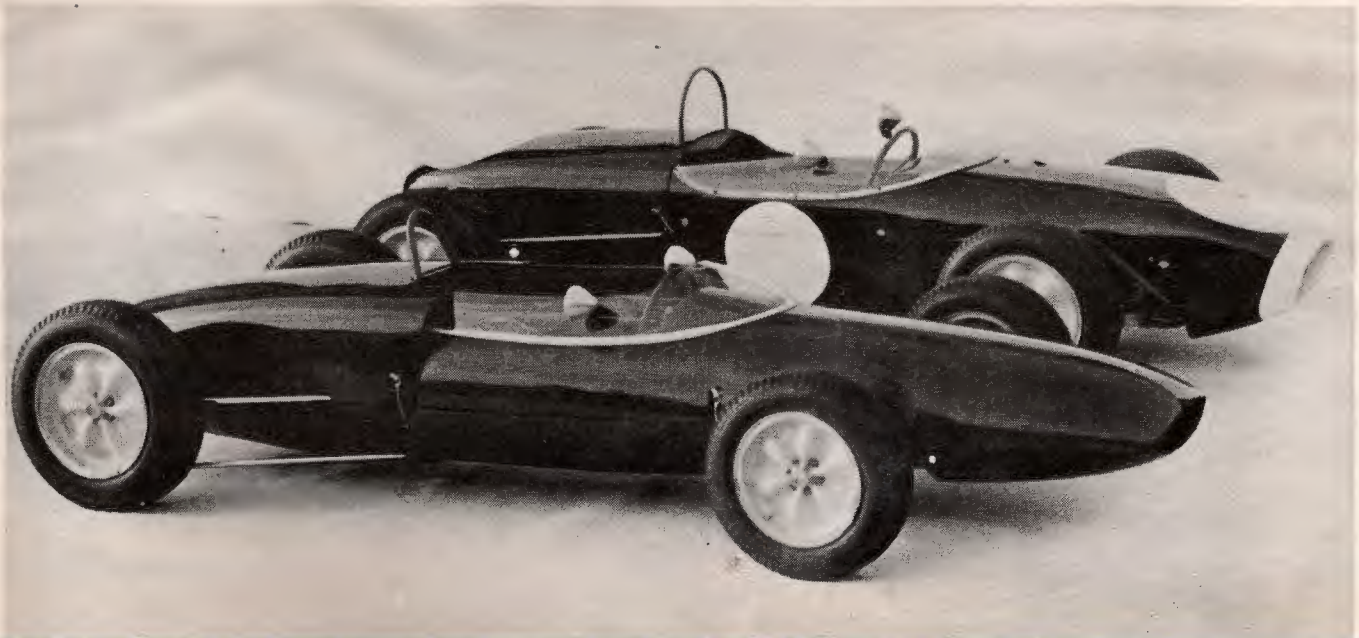
The star of the Racing Car Show was the 1961 Lotus Formula Junior Car, a look at things to come for Formula I.



Seat back is at 45 degree angle for lower driving position. The entire car (below), compared with 1960 Junior, is lower, faster, and it has 30 percent less frontal area and corners better.



The New Lotus Mk. XX Junior uses magnesium bolt-on 13 inch wheels in the front and 15 inch wheels in the rear.



LONDON RACING CAR SHOW *continued*

through the engine compartment.

The multi-tubular space frame is completely new, although it follows the same general layout as before, and is constructed of 1¼, 1 and ¾-inch mild steel round and square tubes. The height and width have been reduced considerably to accommodate the new body shell. The Lotus-introduced scuttle hoop at the cowl carries over, but is not incorporated at the rear of the frame.

The 90-inch wheelbase, 49-inch front tread and the 48-inch rear tread remain the same as last year's model. Overall length is 11 feet 7 inches, width is 57 inches, height 2 feet 8 inches to the headrest. Ground clearance: 3¾ inches.

The front suspension is relatively unchanged, with unequal length A-arms and a separate anti-roll bar. The major change is the reduction in the size of the bolt-on mag wheels from 15 inches to 13 inches, reducing considerably the unsprung weight. Springing is by combined coil spring damper units.

The independent rear suspension is similar to last year's, with lateral location of the 15-inch bolt-on mag wheels provided by a reversed lower A-arm and fixed length articulated drive shafts. Fore and aft location is still provided by the twin trailing arms. The rear brakes have been moved inboard to reduce unsprung weight and are mounted to an inverted Volkswagen gearbox. A 5.04:1 final drive ratio and special close-ratio gears are supplied as standard. Alternate final drive ratios available are 5.34:1, 4.78:1 and 4.43:1. The gearbox was mounted to the engine in an inverted position to allow lower placement of the engine gearbox mass in order to obtain a lower center of gravity. The Renault gearbox used in the past was abandoned as having proved too fragile. Gear changes are effected by a remote control gear lever mounted in the cockpit at the driver's right.

The hydraulically operated brakes on all four wheels are no longer Alfin units and their diameter has been reduced to 8 x 1½ inches. This was considered necessary since last year's cars were over-braked and prone to locking wheels.

Moving the rear brakes inboard necessitated the design of new rear hub castings. The new units raise the outboard pivot point of the lower rear A-arm 2 inches. This provides Lotus with the much-needed additional ground clearance, and should overcome the frequent objections that the rear A-arms were too close to the ground to be considered safe.

The body width and height have been reduced to the absolute minimum so the car literally fits the driver like a glove. There wasn't sufficient room above or beside the driver's legs for mounting the gas tank. Where did they put it? Simple. Chapman just reduced the tank's capacity to 8 gallons and placed it directly behind the driver, concentrating more weight on the rear wheels.

Steering is by lightweight rack and pinion, with a leather-covered steering wheel that was reduced from 15 to 13 inches to provide adequate knuckle room in the extremely narrow capsule. The steering wheel is small enough so that it wouldn't look out of place on a Go-Kart.

Instruments include a 0 to 9,000 tachometer, an oil pressure gauge and a water temperature gauge.

The numerous suspension refinements endow the Lotus Mk. XX with even better roadholding than its 1960 counterpart. It will get around corners faster, but will require a very skillful and sensitive driver to fully exploit its fantastic roadholding. This is fine for Team Lotus, having the top Formula Junior drivers in their ranks, but makes it difficult for the less skillful private owners.

Power is supplied by the race-proven Cosworth-modified Ford 105-E engine. The power output of this 997 cc overhead valve four has been increased so that an 85 horsepower mill is now supplied as standard equipment. This is a full five horse bonus over last year's delivered machines.

A dry sump oil system is offered as an option for the first time. Cooling consists of a crossflow radiator mounted in the nose, with a remote header tank and an integral oil cooler.

With this outstanding new Junior, it looks as though the boys from Cheshunt will be the ones to beat in '61. And, if last year's procedure is to be taken as a guide, you're also looking at the 1961 Formula One Lotus chassis.

While the new Lotus was the ultimate star of the London Race Car Show, the other 72 exhibitors excited a great deal of interest from the 63,000 spectators who attended. The Formula I and Formula Junior Emerysons were out for their first public showing. The Equipe National Belge (Belgian National Racing Team) has purchased three of the Formula I cars and a Junior. The Formula I cars will use the

(continued on page 82)



The complete 1961 Emeryson Junior and the Formula I chassis behind it are almost identical except for size of the wheels (13 inch vs 15 inch) and engines. The Junior uses a Ford 105E, the Formula I uses a Coventry Climax.



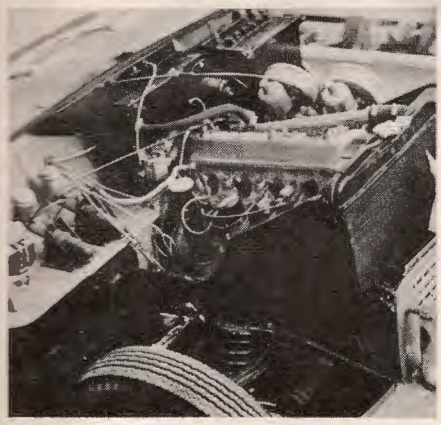
Jack Brabham's 1960 World's Championship 2.5 liter Formula I Cooper Climax was given center stage at the auto show.



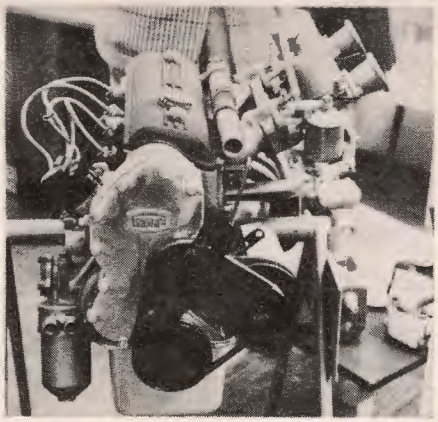
The new Bond Formula Junior is unusual in that it mounts the engine in front and is also front wheel driven.



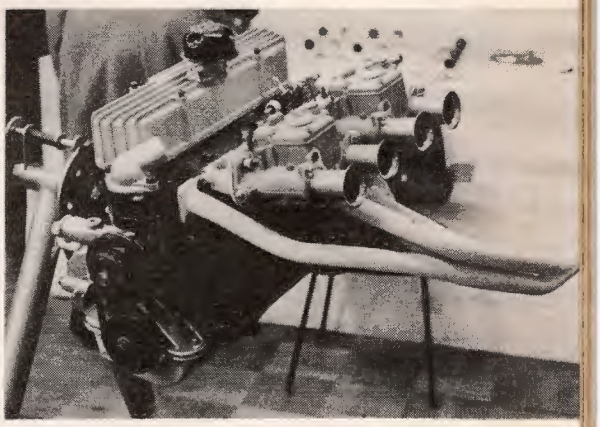
Speedwell Sprite features an aluminum body, a longer hood with faired-in headlights, a newly designed top, a curved windshield and an 1100 cc stroked engine.



The Triumph Herald shown by Jack Brabham Motors, Ltd., looks stock but it has a hot 1216 cc Climax engine.



HRG came up with an overhead cam conversion for the Ford 105E mill, used in so many Formula Junior cars.



The highly successful Cosworth-Ford 105E engine has both tuned exhaust and intake and uses a dry oil sump.



ROAD TEST/4

Mercedes-Benz 220 Seb

FUEL INJECTED LUXURY

AN IMPRESSIVE BLENDING of classic and modern, the styling of the Mercedes-Benz 220 sedan makes it about as neat and functional a design as ever came off a drawing board. While our test revealed a few items we were critical of, there was no doubt at any time about the pure luxury we were riding in. The "SE" series, fuel-injected and possessing ten more horses than the dual-carbureted "S," was the subject of our scrutiny and we were more than impressed with the performance that the meager 2.2 liters could boot out of a 3000-lb. vehicle. But this was only the beginning.

Deciding there was no better way to test a Mercedes than on a trip, we headed out of Los Angeles for Las Vegas in the wee hours of the morning, racking up an average speed that won't be printed for fear of legal reprisals. Gas mileage on this high-velocity jaunt was over 19 mpg! More important to the potential owner was the lack of fatigue on completion of the trip and the feeling of security, regardless of what the speedometer read.

To begin determining WHY the 220 carries an over-$5000 price tag requires only a slow walk around it. The fit, the finish, the attention to detail, and the obvious richness of materials used, all add up to what you'd expect from a luxury car. Opening and closing the doors (which has become a shopping criterion) will net a sound similar to that emanating from a well-built safe and the sealing quality is about the same. The glasswork is flawless and gimmicks like the exhaust louvers behind the rear quarter-windows, providing air circulation through the headliner and under the roof, demonstrate the thoroughness with which comfort has been designed into the car.

The optional leather upholstery on our test car made it more luxurious, but the same seat and trim design is embodied in the normal cloth interior. The well-padded buckets in front have a small package shelf between them and an accessory pad may be purchased to fit this, so that three persons can be comfortably carried up front. Fully adjustable, including a crank-down back-rest, these seats still don't fit the average person's dimensions too well, as they're quite high and legroom under the steering wheel is minimal.

Safety considerations almost approach a fetish; like they dare you to go out and crash it. The dash is padded top and bottom, the horn button is padded, the rear-view mirror has a spring-loaded breakaway hinge, all inner door handles are flush-mounted, and there are no unnecessary protrusions. All these items we agreed with, but the foam-rubber insets in the window-regulator handles seemed to be carrying things pretty far. Even the tri-cornered star atop the grille has a spring socket so that pedestrians won't be impaled when draped across the hood. If the car should roll over, you can grab for the support rails that run above the doors on both sides, though we believe they're primarily to assist in entry and exit. All in all, considering the high degree of controllability, structural strength, and the padded-cell bit, the 220 is about the safest package we ever rode in.

Until this particular test, it was thought that any prizes for heating-defrosting-ventilation systems would have to go

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Controls and instruments are well-located. Heater-ventilation knobs are above radio in center, key-starter to left.



The interior and door openings are very large for maximum comfort. Note the pin-type door latch, inset handle forward.



Elegance of classic design is retained in the pseudo radiator shell, but overall lines are functional and modern. Vertical twin headlights replace distinctive single lens on export cars, as only sealed-beam units meet U.S. vehicle requirements. Slots in full wheel discs aid in circulation of cooling air over the Alfin brake drums. Note the excellent, all-around visibility.





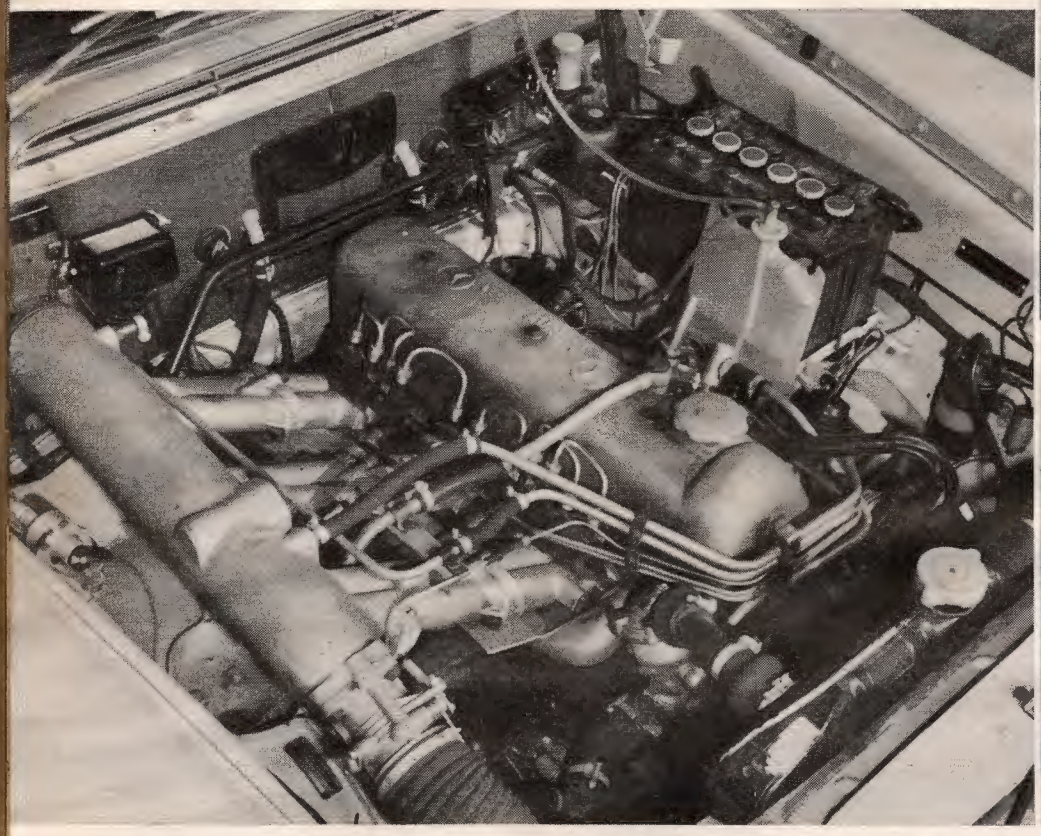
Photos by AL PALOCZY

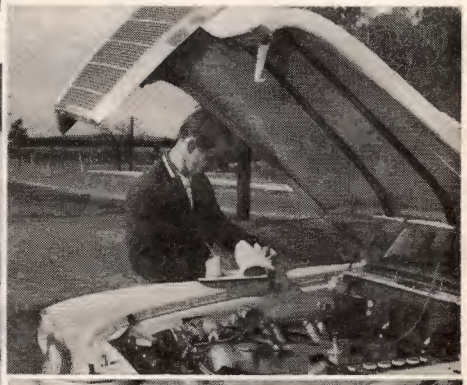


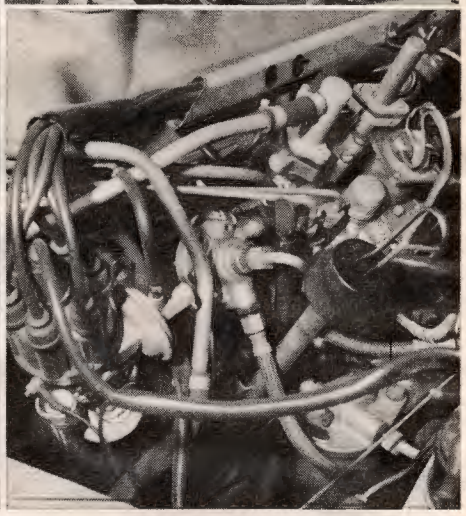


Trunk, at left, is cavernous. Deep well at left would allow carrying an additional spare tire. Domes are shock wells.

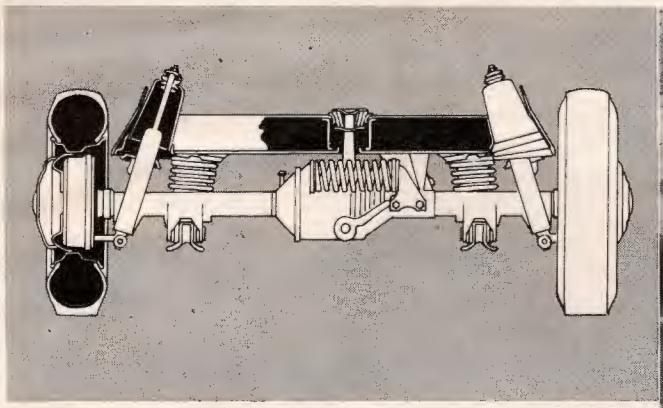
Spring-hinged hood emblem won't bust when you prang peasants and also frustrates souvenir-hunters snapping it off.







Engine compartment had tech editor busy taking notes. Intake manifold and injectors are visible at left, mechanical pump in right photo. This system differs from other port-types in that injections are timed by a rack, rather than constant flow. Every effort is made to compensate for ambient conditions, provide quick starts, smooth idling and even acceleration.



Drawing shows how differential housing is suspended and splits to form swing axles. Compensating spring is the laterally-mounted coil. Trailing arms provide stabilization.



FUEL INJECTED LUXURY

continued

strictly to U.S.-built cars, but the Merc has one equal to the best. It's an elaborate system that starts with a fresh-air scoop in the cowl (with an under-hood bypass should snow clog the outer one) which ducts into a high-capacity, blower-and-core unit that occupies the majority of the firewall. The controls are located in the center of the dash and are well-designed and simple to operate. The defroster system, which includes direct ducts in the dash aimed at the door vents, will de-mist the windshield in a matter of seconds but it takes quite a bit longer to clear the remaining glass in the car.

Instrumentation is contained in a tower-like enclosure directly in front of the steering wheel. The ribbon-type speedo (which is actually a rotating drum) moves vertically and small red lines on the sides indicate maximum shift points. Water temperature, oil pressure, and fuel gauges fit neatly and legibly on both sides, with small indicator lights completing the panel.

The column-mounted gearshift is a bit on the tricky side and takes some practice before you're sure which gear it's going into. It's positive and well-located, however, so developing a "feel" is all that's required. The hanging pedals are properly spaced and it's no trick to be able to heel-and-toe for combination braking and downshifts. Though over 1500 miles were logged during our test, one item we had to constantly watch was shift-points. The engine has such healthy torque that it just didn't seem logical to wind it as tight as the red lines unless maximum acceleration was desired. With no fuss, no muss, the quiet powerplant will pull in high gear from 25 mph, so it's quite a temptation to lug it. A good deal of this is due to the very efficient fuel injection system.

Acceleration for a large sedan with an "undersized" engine is strictly amazing, but it's roughly comparable to the average Detroit "six." Here it's easy to start considering how much more marketable the car would be with a four-liter engine and *real* performance, but we must rationalize that the firm is dealing with a world market and not just catering to U.S. power-happy types. Taxes based on engine output and fuel costs are still extremely high in many other countries, making them primary considerations in even a luxury automobile. There is certainly *adequate* power for both safety and enjoyment, so performance is far from a detriment. As compared to the 180D, in fact, it's a full-blown race car.

Cornering ability of this big sedan is so good that initial attempts to find the loss-of-adhesion point were amusing. We barrelled into turns at it-can't-be-this-good speeds, prepared for panic corrections that would keep us from either loosing it or dumping it, then felt foolish when the need never occurred. Characteristics start with a slight bit of understeer, then go dead neutral. When break-away does finally arrive, it's even and predictable.

The front suspension consists of stamped-steel, unequal upper-and-lower control arms, with conventional coil springs and tubular shock absorbers. This is a sub-frame assembly that, complete with engine, is bolted into the unitized body. The shocks connect to towers at their upper ends, enabling an angular, outboard mounting that, combined with a torsional anti-sway bar, allows maximum control of the soft springing.

The swing-axle rear suspension is especially unique. Basically, it's a conventional live-axle housing with the right axle split and jointed at its inner end. The differential case, pinned to a vertical, rubber-mounted bracket, actually pivots with the left axle. Working within the deflection angle set up by the two axles is a lateral, coil, compensating spring. Trailing arms anchor into the chassis

(continued on page 76)

ROAD TEST/4

TEST DATA

VEHICLE	Mercedes-Benz	MODEL	220SEb
PRICE (as tested)	$5520 POE LA	OPTIONS	Radio, upholstery, WW tires

ENGINE:

Type:	6-cyl., in-line, water-cooled, four-cycle, gasoline
Head:	Alloy, removable, wedge chamber, 6-port
Valves:	Sohc, rocker-actuated
Max. bhp	134 @ 5000 rpm
Max. Torque	152.6 lb.-ft. @ 4100 rpm
Bore	3.15 in. 80 mm
Stroke	2.86 in. 72.8 mm
Displacement	133.9 cu. in. 2195 cc.
Compression Ratio	8.7 to 1
Induction System:	Timed, mechanical, port injection
Exhaust System:	6-into-2 cast manifolds, 2-into-resonator
Electrical System:	12v Bosch single, distributor ignition

CLUTCH:	Mechanical, single disc	**DIFFERENTIAL:**	Hypoid, semi-sprung
Diameter:	n.a.	Ratio:	4.10 to 1
Actuation	hydraulic	Drive Axles (type):	Swing, enclosed
TRANSMISSION:	4-speed, full-synchro	**STEERING:**	Recirculating ball
Ratios: 1st	3.64 to 1	Turns Lock to Lock:	3½
2nd	2.31 to 1	Turn Circle:	36 ft.
3rd	1.53 to 1	**BRAKES:**	ATE Servo-booster, self-adjusting, Alfin drums.
4th	1.0 to 1	Drum or disc diameter	9 in.
		Swept Area	157.4 sq. in.

CHASSIS: Integral

Frame:	Sub-frame assemblies, front and rear
Body:	Unitized box-section, steel
Front Suspension:	Unequal A-members, coil springs, tube shocks
Rear Suspension:	Swing, trailing arms, coils and compensating spring
Tire Size & Type:	6.70 x 13 tubeless Dunlop RS

WEIGHTS AND MEASURES

Wheelbase	108.2 in.	Ground Clearance	7.87 in.
Front Track:	57.87 in.	Curb Weight	2980 lbs.
Rear Track:	58.46 in.	Test Weight	3290 lbs.
Overall Height	59.5 in.	Crankcase	6.4 qts.
Overall Width	70.76 in.	Cooling System	12 qts.
Overall Length	192.2 in.	Gas Tank	17.2 gals.

PERFORMANCE

0-30	3.7 sec.	0-70	16.2 sec.
0-40	5.8 sec.	0-80	21.8 sec.
0-50	9.0 sec.	0-90	27.5 sec.
0-60	12.5 sec.	0-100	36.6 sec.

Standing ¼ mile 18.8 sec. @ 77 mph. Top Speed (av. two-way run) 107 mph

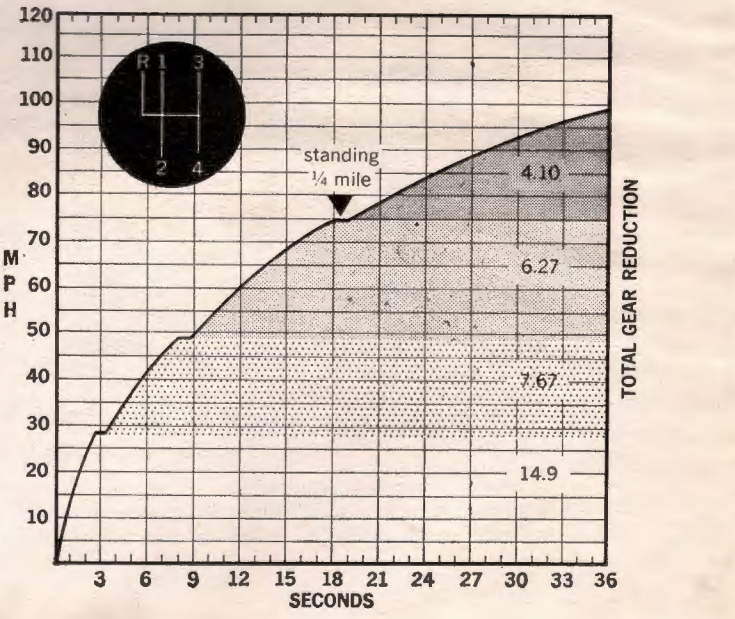
Speed	30	40	50	60	70	80	90
Error							
Actual	28	38	49	57	70	79	87

Fuel Consumption Test:	15 mpg	RPM Red-line	6000 rpm
Average	22 mpg	Speed Ranges in gears:	
Recommended Shift Points		1st	0 to 30 mph
Max. 1st	28 mph	2nd	10 to 46 mph
Max. 2nd	47 mph	3rd	22 to 75 mph
Max. 3rd	74 mph	4th	40 to top mph

Brake Test: 70% G Average, over 10 stops.
Fade encountered on 7th stop.

REFERENCE FACTORS

BHP per Cubic Inch	1.0
Gross Weight per bhp	22.2 lb.
Piston Speed @ Peak rpm	2385 ft./sec.
Swept Brake area per lb.	.053 Sq. in.



LIGHT THE FUSE ON YOUR PORSCHE

BY OCEE RITCH

WHEN THE PORSCHE SUPER 90, described elsewhere in this issue, was brought around for inspection and appraisal by staff and management, many complimentary remarks were passed and there was a general air of intense appreciation. One comment however, floated on the soft Spring air to fall with a dull thud that could be heard all the way to Stuttgart. Admittedly, the remark came from the lips of an unbeliever, a refugee from the dank confines of a speed shop, but it gave off the silvery ring of truth and set in motion another survey on just how the Porsche owner can keep abreast of the factory.

This individual said, "It looks like the factory is catching on to what the guys around here have been doing for years."

Heresy?

Of course! But, if a man is going to protect himself in the clinches he'd better keep an eye on everything including the referee.

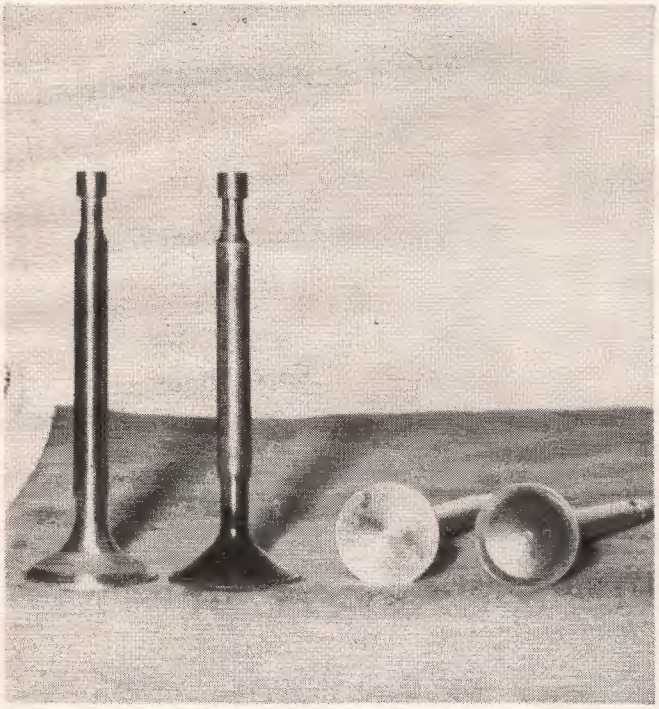
The Super 90, ultimate development of one of the most successful pushrod engine designs ever laid down, is a hopped up car in the familiar sense of the term. Unlike the hot rods that so many of us know intimately, it retains an aura of reliability, seeming to sacrifice nothing of the Porsche reputation for strength that has characterized it from its inception.

That the 90 will carry on the legend and add confirming evidence to the truism that, "If you want to beat a Porsche you get a newer Porsche," goes without saying. But, it also confirms another known but not universally accepted premise: *You can beat another Porsche by hopping up your Porsche.*

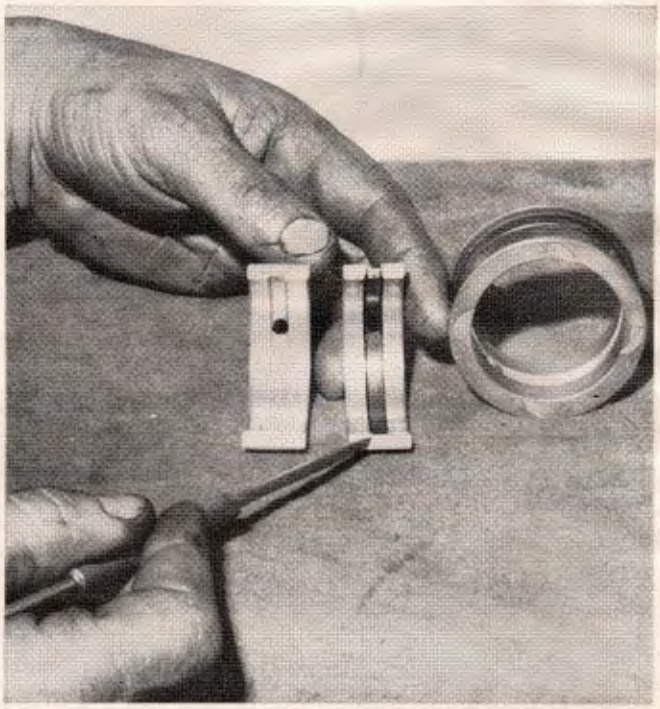
The reiteration that the factory looks with disfavor on alterations to their products is so tired by now that it is hardly worth mentioning. Let's face it, *no* factory will stand behind any article of manufacture which has been tampered with. When you skid off the fine print in the guarantee you are in the weeds whether it's a Univac or a Unicycle. However, in the past ten years a big reservoir of Porsche know-how and know-why has been built up in this country, and the probability that you will do irreparable harm from taking a mechanically illiterate approach to increasing the performance of one of these cars is practically nil. There is no greater mystery in souping a Porsche than there is in hopping up a Model T ... if you follow the advice of those who have made and paid for early mistakes.

The question then becomes, "Is it worth while?"

The answer lies with the individual. There are those to whom modifying even the windshield wipers smacks of sacrilege. Others feel that the car is to



Both exhaust and intake valves can be lightened and streamlined to aid in smoother air flow in and out of the engine.



Grooving main bearings 0.020 of an inch gives better oil distribution and increases overall reliability of the engine.

be enjoyed and if super performance gives super kicks, well, anything is legitimate. Short of dumping in a big V8 or adding tailfins and a continental kit, we subscribe to the latter approach.

It is a challenge to make the blood warm when Ferry Porsche and his cohorts allow some new and more powerful beetle out of the shop (and one that you just can't afford at the moment). But this has been going on now, intermittently, for so long that we are anticipating him . . . with the notable exception of the Carrera. (Factory prepared double knockers are tough, man!) So, if you want to up-date your pushrod beetle, some or much of the appended data can be used as a firm guide.

First, make a decision: What object do you have in mind when you say, "Let me hop up my Porsche?" Is it for overcoming what you feel is a power deficiency for ordinary touring, for participation in organized drag racing, or perhaps to compete on more equal terms with others who happen to occupy the same race course at the same time? (Remember Finagle's Law: *"There is no such thing as a stock sports car."*)

If you merely want power for power's sake, there are only mechanical limits to inhibit you. If you intend to compete for prizes under the rules of amateur sporting events, there are cunningly devised regulations to block you here and there.

The Sports Car Club of America, largest sanctioning body concerned with sports car racing in the U.S., has revised its rule book this year to allow a more liberal interpretation of what has been common practice anyway. The California Sports Car Club, an independent group on the West Coast of great strength and membership, is next largest and is even more liberal. On the assumption that most of our readership will be followers of one or the other organization, we will detail the modifications permissible to the Porsche under each set of specifications, then proceed to the possibilities where you are not in any danger of running afoul of a Technical Committee.

SCCA says: You must retain the manufacturer's specifications for that make, year and model designation. These are given in a comprehensive book available from Tech Committees of each Region. And if your car is protested, chapter and verse can be cited from this bible. Listed are Models 356: 1300, 1300S, 1500, 1500S; Models 356/A: 1300, 1300S, 1600, 1600S, 1500 GS, 1500GT; Models 356/B: 1600, 1600S and 1600 Super 90.

To this basic "stock" automobile you can add factory listed optional equipment for that model. In addition, you may modify:

a) make of brake and clutch linings
b) make and size of tires (but front and rear must be the same)
c) jets and chokes (venturis) of carburetors provided inlet flange diameter is the same as that provided by mfgr. Ports may be matched and polished.
e) gear ratios, provided they are listed in mfgr's. catalog.

In addition, the engine may be balanced and the clutch can be improved.

Porsches, because of the port layout, can have straight pipes installed as exhaust collectors.

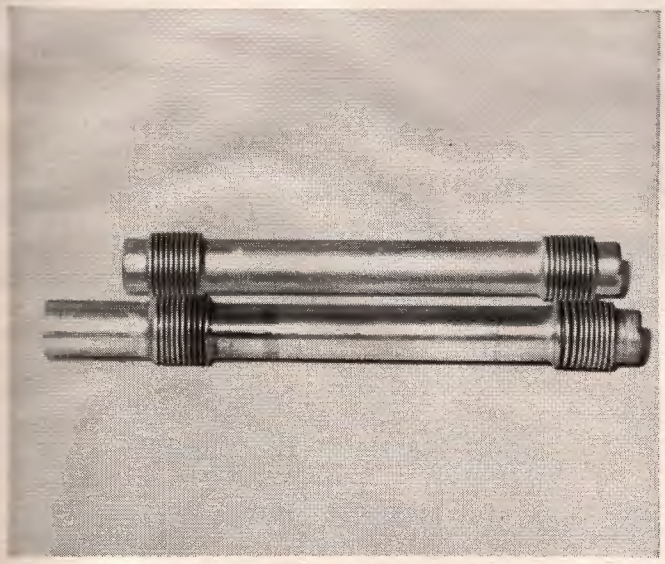
Not referred to, but allowable within tuning limits, is distributor spark advance. Keeping valve springs up to maximum strength, as new, and establishing factory listed maximum compression ratio is also expected.

Category classifications for 1961 result in these designations: *Carreras*, including 1600 & Weber carburetors-Class B. *Super 90*-Class C. *1500S, 1600S*-Class D. *1500N, 1600N*-Class F. *1300N, 1300S*-Class G.

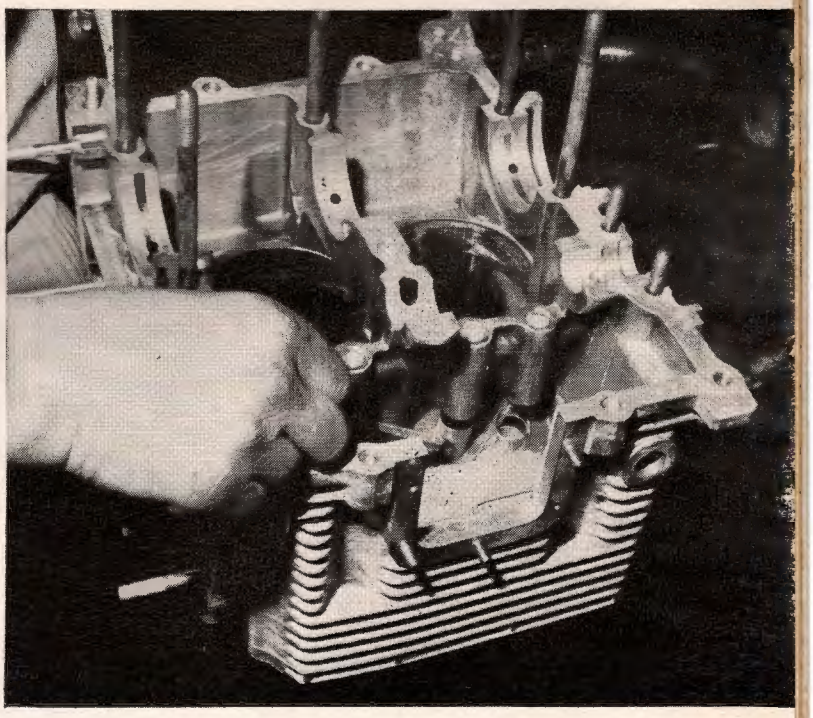
At first glance these classifications may seem unrealistic, but in practice there is not such a disparity between 1500S and 1600S as might be expected. The newer car's extra displacement is somewhat balanced by the additional weight of the Convertible D over the older Speedster. Furthermore, there are so few *Damen* in competition that to lump 1500N and 1600N together is also hardly calculated to wreak universal hardship.

The 1600N comes off fairly well by SCCA inasmuch as it contends in a class largely dominated by the MGA, which always makes for a good show. Considering the optional equipment now available for the Porsche, the *Damen* owner may take heart and get into competition. We will go into the "extras" later, but consider the other vehicles in SCCA Class F for a moment: Denzel 1300S,

(continued on following page)



Extended pushrod tube, compared with standard component, is part of baffling system to reduce oil surge on corners.



Lengthened tube brings shrouding close to lifter guides. Length of extension is important and ½-inch is optimum.

LIGHT THE FUSE ON YOUR PORSCHE

continued

Fiat Abarth 850S, Turner 950 Stage II, Sunbeam Alpine, DB 850 & 950, plus the MGA as mentioned. The lineup looks quite sporting on paper. MGA modifications are many and ubiquitous, of course, but a sharp Porsche should be adequate.

The Cal Club segregation runs like this: *1500N, 1500S* and *1600N* all together in Class F. *1600S:* Class E. *Carreras* (all) in Class D.

The 1600N still has to compete with the MGA under these classifications and, in addition, has the older Super, the Alfa Super, Elva Courier, and Lotus Elite (single carb) for competition. The 1600S goes out against: Arnolt Bristol, Austin Healey 100, 100M, and 100-6, MGA Twin Cam, Morgan Plus 4, and Triumphs.

Class D in Cal Club seems to be all in favor of the Carrera inasmuch as the Healey 3000 and Morgan 'Competition' are alone with it and, on the West Coast, few of the latter have been extensively campaigned.

The CSCC began re-classifying according to observed performance back in 1957 and as James Crow, editor of *CSCC NOTES*, club house organ, says; "these came out as an almost exact power-to-weight ratio classes. The rules in effect at this time, also permitted a single well-defined amount of breed improvement that any backyard mechanic with any pretensions to mechanical know-how could accomplish by himself or with a minimum of expensive equipment or assistance. You could not use speed or performance options and you could not bring your car up to the latest specs within the model. Now, effective January 1, 1961, you can still make the improvements to the breed but factory options will be permitted, and you can also up-date to the latest specs within the model of your particular marque."

Under "improvements to the breed", CSCC acknowledges that the power-seeker is bound to prefer more radical valve timing, stiffer valve springs, lighter pistons and pushrods, higher capacity fuel pump and some combustion chamber alterations. With the exception of the components listed above (and valves) all engine parts must be *derived* from the manufacturer's original equipment. This means you must use a Porsche cam, for instance, although it may be reground to any valve timing you desire, but a billet cam is *verboten.*

Special rulings applicable solely to the Porsche include permitting the use of the Hirth roller bearing crankshaft and the Carrera clutch diaphragm with any engine. The 1958 and later Carrera V-drive for distributors can be installed on earlier Carreras if desired.

The SCCA, in effect, also allows the Carrera clutch in pushrod models inasmuch as their concern is that the diameter remain unchanged. The Carrera plate ("692" stamped on plate) is of steel rather than cast iron and is thus safer as well as lighter.

As to optional equipment offered by the factory, the past year has seen a veritable revolution in this department. Previously, the factory, when asked for pushrod engine racing "extras", has replied, "Get a Carrera." Now, although they insist that none of the models, barring the OHC engine jobs, are sports racing machines, the Stuttgart *Werke* is providing a number of keen adjuncts up to and including a roll-bar!

Here are factory options approved for use by the SCCA and Cal Club, all applicable to 1600's.

1) Limited slip differential
2) Knock-off wheels
3) Bucket sport seats
4) Velocity stacks
5) Compensating spring (rear axle)

In addition, the Super 90 options include GT front brakes (60mm wide shoes and vented backing plates), high-lift camshaft, light alloy wheels, aluminum doors, hood and deck lids, enlarged cooling louvres in deck lid, sound-proofing omitted and plexiglas side windows.

The SCCA spec book also notes that certain cars in the 1600 series have aluminum doors, hood and deck lids, so it may be presumed that any 1600 could be so equipped without protest.

We have dwelt at some length on the legal alterations, since they are of interest not only to the potential hero driver, but to the man on the street, as they provide a jumping-in point for the modifier. Strangely enough, even the wildest hop up techniques applied to Porsches will fail to produce a car which is unpleasant to drive on the street. It may be noisier, you may have to keep the revs up somewhat, but the vehicle remains far and away more tractable than a full-house dealer-originated Corvette, for instance. If you can overcome your squeamishness about piston clatter when the engine is cold, the grabbingest Cal Club model is still suitable for going marketing. Both George Follmer, CSCC Class E Champion in 1960 and Jay Hills, victor in Class C (Carrera), drive their cars to work through Los Angeles traffic. So, you can cancel another reservation, if you have had it, as to the detrimental effects of modifying.

The biggest bomb as far as the racer types have been concerned, although its effects have yet to be fully observed, is the availability of the limited slip differential. This piece, expensive though it may be, (approximately $140) seems almost mandatory in track competition and drag racing. For the street, the value is questionable and many drivers will not like the feel of the car with this device installed, anyway. Other competition items such as the aluminum body parts, might well be passed up by the casual enthusiast in favor of additional engine modifications not legal for racing. Actually, the most invigorating single piece (really, two pieces) of new equipment that can come into the non-racer's hands can be designated by the letters and numbers 40 PII-4.

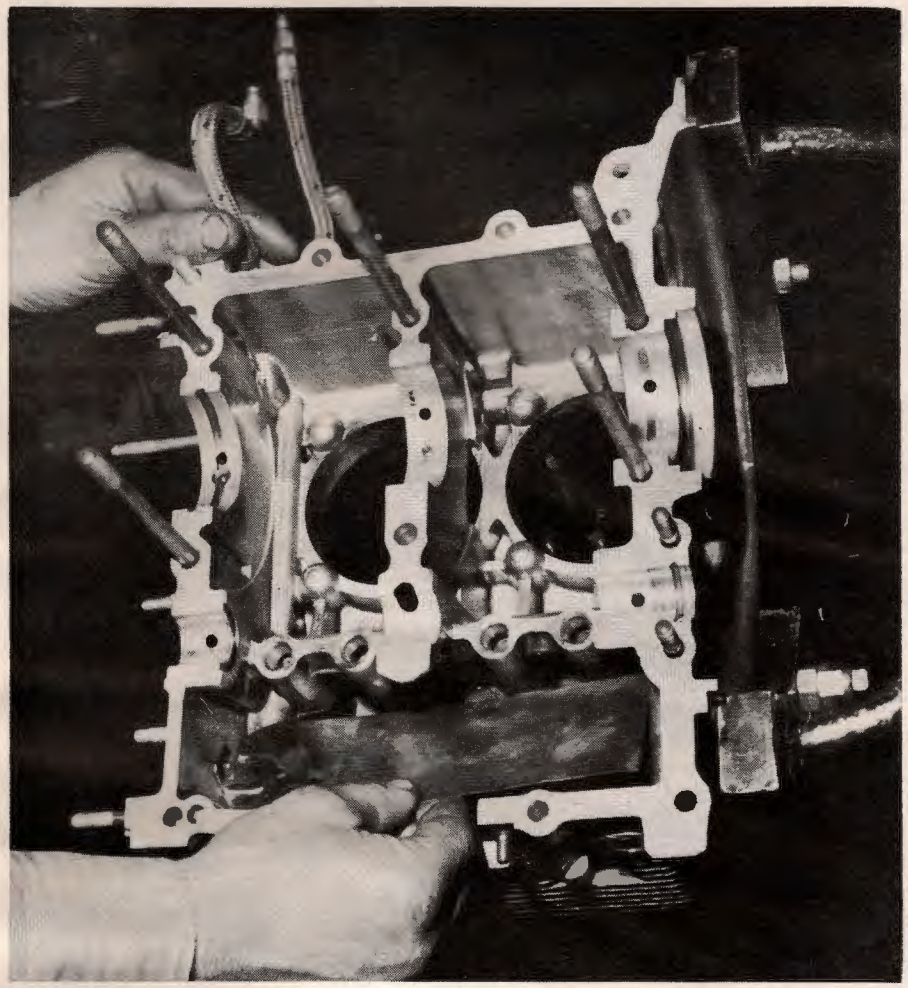
The new Solex carburetor is an improved version of the original Carrera *dopplefallstromvergaser* with a low-speed circuit that makes it as smooth as a silk clad thigh. This good thing, along with the mating dual manifold, represents about $135 (for a pair) well invested. And, unless you intend to race with the SCCA, you can affix it to any 1600 with equanimity. Its potential will take care of any camshaft you may desire to incorporate too.

This discussion may be running ahead of logical progression. We should examine the many possibilities inherent in Porsches; possibilities which continue to mount as the years pile up and new models are released from the barn.

Incidentally, the 1100 and 1300 models are so rare in this country that they will not be treated specifically. If you should happen to own one, it is easy to pick out the modifications which are applicable.

To begin, if a quote from the author's PORSCHE OWNER'S HANDBOOK (Floyd Clymer Pub., $4.00) can be permitted: "... tuning the stock engine to its peak is the first step," and it is surprising how many owners who complain that they want improved performance have never explored the possibilities of operations which can be performed without going beneath the cooling shrouds. This would include adding spark advance, enrichening the fuel-air mixture and generally power-tuning the engine on a dynamometer. Stock carburetor jets are a compromise between power and fuel economy. If you intend to stand on it and you want something to happen, go a step or two rich with main and air correction jets, set static advance to 6½° or 7° and alter the distributor weights so that peak advance occurs at about 2,200; 35° to 37° maximum lead is agreed upon by most Porsche tuners. The static advance setting will vary on individual cars, but the timing mark on the pulley rim will be about 1⅜₂ of an inch ahead of the split in the crankcase. Both Supers and Normals may be timed in this fashion, but if you have access to a chassis dyno, spend the money and

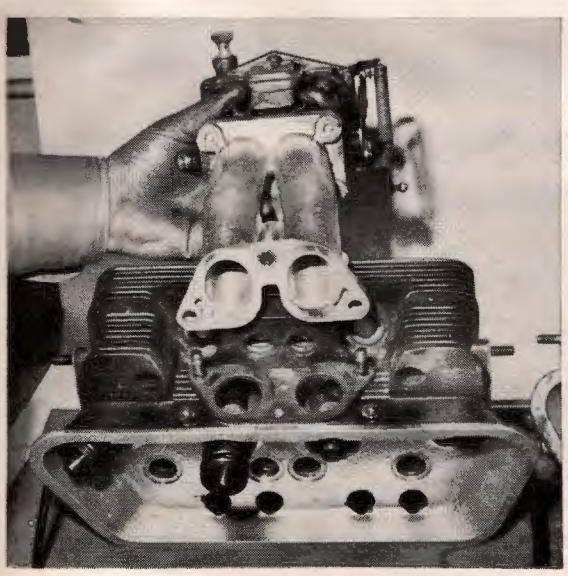
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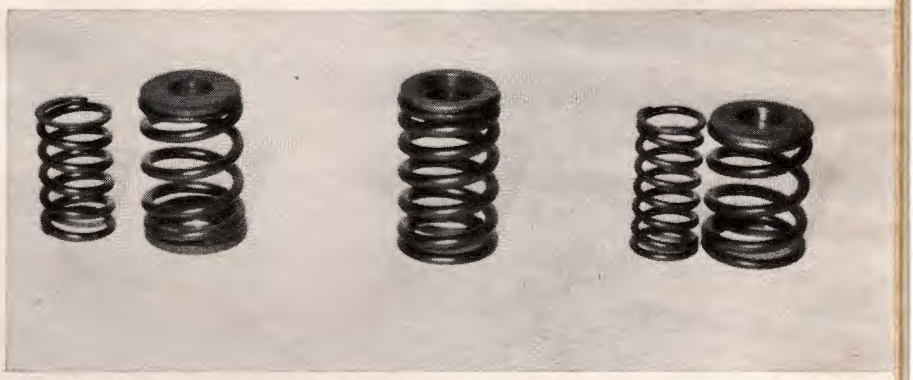


Horizontal baffle plates are used in the sump to help keep down oil surge on corners when oil is apt to end up in the rocker covers, not on bearings.



Lightened flywheel (right) in profile shows how much metal can be easily machined from stock component. Seven or eight pounds can be removed without impairing strength of flywheel and will improve the acceleration of any model Porshe.





Stiffer valve springs are vitally important for higher rpm. Early Porsche dual springs are shown at right, later 1600 springs center and Webco progressively wound spring left.

The eighth of an inch showing inside the gasket is the limit of intake porting done by West Coast Porsche tuner Al Cadrobbi. Manifold should be polished and matched.

1ST CARRERA CIUDAD DE MEXICO

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That omni-present problem of practice time never even became a topic of discussion. If you had chosen to take your entry in as early as the Monday before the race, the track would have been available. Some small problems did occur but they were quickly resolved.

The organizers, in order to make the course more interesting to both driver and spectator, blocked off a very tight hairpin at the rear of the circuit. This shortened the normal 3.2 mile course to 2.49 miles (4 kilometers). Jim Hall, never having driven the course before, experienced his own "moment of truth" when he got to the poorly marked junction that separated the two sections and suddenly decided he didn't know which way to go. But as I said, these insignificant problems were resolved immediately.

Crowd control, always a problem amongst the enthusiastic Latins, was adequate but not oppressive considering the three different types of police and fully armed troops that were stationed around the entire course. (All of them polite!) It seems impossible that the entire organization was not staging races every week. Results were posted and copies issued on the press deck, generally before the next race had started, and lunches appeared promptly at noon. There were times when my lack of Spanish was a definite handicap, but there was always someone more than willing to explain the fine points (of anything).

On the deck above us, in the three-tiered glass and concrete timers' stand, the ebulient George Montezuma was supplying the crowd with a rapid fire commentary on racing, noted visitors, the weather and maybe even a short word on lovely girls of which Mexican racing has its share.

The first race was scheduled for 10 a.m. and Luis Zalce, who by this time had traded his business suit for a jaunty cap and a set of flags, was a very busy man.

Starters to the North take note (overworked starters, of course): Zalce formed the pre-grid, moved the cars to their track positions, flagged the race and supervised the lap scorers at the finish line. Coordinating these moves with the timers and the announcer by a radio, small enough to fit in his pocket, he accomplished a lot with a minimum of chiefs and a very few Indians.

Jurgen Mening of Germany demolished the competition in the smallest category, Turismo "C." In the first race of the day he finished his prepared DKW about 50 seconds ahead of the second place car, also a Deke. He left even the most casual spectator with the impression that he had just witnessed something unusual. The little sedan had a very businesslike bellow not generally associated with three cylinder, two cycle engines. His eighth lap in the 10-lap preliminary was the fastest at 2:57.6.

Pedro and Ricardo Rodriguez finished fourth and fifth in their Gordini Dauphines, 1.7 seconds apart. This was the only time they finished out of the money that day.

The Rootes Group had requested that they be allowed to run the cars in both their class and the next higher class, but were turned down. Given the choice of running in one or the other, they prudently stuck to the class assigned. The decision was further affected by Ricardo who was already committed to drive another car in the next race. Pedro and Ricardo spun the ten laps of the second race in a formation that would have done credit to the Blue Angels. Finishing two-tenths of a second apart, they sat and waited for the third place car, a Citroen, nearly a full lap behind.

There is one gentleman, Quintanilla by name, who is probably still shaking his fist at the Rootes store as he tootles by in *his* Sunbeam, ostensibly the same type of car the brothers finished six places and quite a few minutes ahead of him.

We shall attempt to keep track of the Rodriguez take as it grows, and grows, and grows. There are now 10,000 pesos in the sock for placing the Sunbeam Rapiers first and second. Pedro is busy counting while Ricardo is out for the third race with the thought in mind of adding another substantial chunk to the kitty.

Since most of the ten lappers had an average of 12 to 13 cars entered, they spread out rapidly and a tight dice was rare. The third event for the Turismo "A" cars, such as the Volvo, Valiant, and very rapid Alfa T. I.s proved to be another walk-away. It is often impossible to check on machinery that is factory prepared, but comparative performance is usually the giveaway, if there is one. Ricardo's Alfa T.I. was going faster than the small boxy sedan should ever go in the hands of the casual purchaser, or even a Rodriguez.

There was talk about Conrero engines, and what have you, and Ricardo won, of course. The total was now 16,000 pesos with quite a few pesos left in the till. His fastest lap in the Alfa, the next class higher than the Sunbeam, was a 2:44.6, as compared to 2:39.4 in the Sunbeam. The second race average was recorded at 112.9 khp, (70.1 mph).

One Ricardo Narvaez finished fifth in this event in a Volvo. This, however, was not his particular claim to fame. In the previous day's practice, he had entered a turn too hot and gone on his lid with the Volvo. With nothing more than a bruised shoulder to show for his trouble, he pounded out the roof, removed the broken glass and went right back at it. A small item, you might say.

Not more than an hour before, in the same practice session, he was in the middle of the high speed banked turn in his Corvette. Hearing a loud and ominous grinding sound, he pulled into the pits, the entrance to which lies at the end of the banked turn. As the Corvette slowed down we watched in what is commonly called horrified fascination, as the knock off (yes, Virginia, they were wire wheels) rolled gaily down the pit ahead of the car. The hub of the wheel, between the outer and inner spoke lacing points, had crystalized, the wheel collapsing as he came to a stop. A very lucky gentleman.

The friendly, familiar face of expatriate Fred Van Beuren appeared on the grid for the next event which included the Grand Turismo "C" and "D" classifications. Fred, a resident in Mexico for nearly 20 years, has been a successful competitor at Sebring with Javier Valasquez in the Alfa Veloce, for several of those years. Still with Alfa, he was to take home the "C" Touring class boodle. TV-film notable Armando Silvestre, in the Fiat Abarth Monza Record, cheerfully accepted the "D" money. It's rather interesting to note that the elapsed time for most of the ten lap events were quite close, indicating among other things that the course design is quite good. The first really significant drop in elapsed time came with Van Beuren's 26:59.9.

Carlos Braniff, a member of the committee of organizers, not only works but races and does a fair job of it, finishing third in the "C" class in a Veloce.

Unfortunately, the Corvette race turned into a parade, as Ricardo, in a fuel injected model, planted his foot very firmly in the radiator and finished the 10 laps before his sock had time to get properly soaked. The Kitty now stood at 22,000 pesos for the brothers Rodriguez.

Exactly 10 seconds faster in the Corvette than in the Sunbeam Rapier, Ricardo achieved his fast time, 2:29.4 in the second lap. Narvaez, of broken wheel fame, finished a creditable, if not inspired, second some 35.4 seconds in arrears.

To say the first Formula Junior race at the Autodromo was an ambitious undertaking would not be wholly accurate. It was just short of unbelievable!

When you consider that a few months ago a field of cars just did not exist and now there were 32 Juniors on the entry list. Twenty-eight of these sur-

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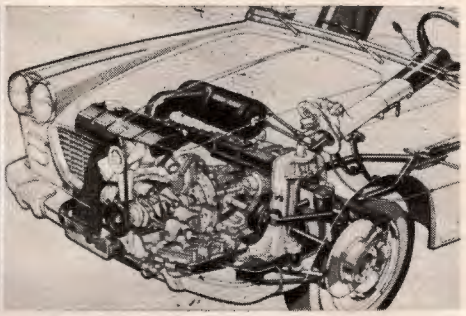
LANCIA'S FLAVIA



Under the Americanized hood, a front wheel drive



Front engined, front drive car is complete break with Lancia tradition.



Power unit and front suspension are on removable portion of car's frame.

VISITORS to the New York International Automobile Show this month could take their choice of a number of unusual combinations of styling and mechanical innovations, but one of the most noteworthy would certainly be the new Lancia Flavia. To guess that a front wheel drive package lurks behind a grille and front elevation so completely attuned to the present trends in conservative design takes more extrasensory perception than most of us possess. In addition to the front drive, its squared off lines, dual headlights, high roof and lots of window area belie a number of features ordinarily only associated with high-performance racing cars.

The Flavia, whose 1500 cc (91.5 cubic inch) four cylinder horizontally opposed engine develops 90 hp at 5,200 rpm, is certainly not a high speed machine, rather, it is intended as a fairly luxurious family sedan, but the 11 inch disc brakes (front and rear) coupled to a vacuum servo unit, are capable of providing more stopping power than is generally encountered on cars of much greater potential. Top speed is given as 92 mph by the factory. The car weighs 2,689 lbs., unladen.

As the first front wheel drive car to come out of Italy in some years, and the first entry into the 'luxury' class with this engine-drive train configuration, the Flavia is an interesting addition to the well-known Lancia line. Calculated to fit in beween the Appia and Flaminia models (1100 cc and 2500 cc engines) the new sedan lists for $3,715. (P.O.E. Los Angeles) and is clearly designed for silent, comfortable touring. The body is of pressed-steel integral with the frame with a removable front sub-frame which mounts the power package. Wheelbase is 104 inches, tread 51 inches front, 50 inches rear, which makes it a 'Compact' in our terminology.

The water cooled flat four engine has a bore and stroke combination of 82 x 71 millimeters (3.2 x 2.7 inches) and employs two camshafts to operate the overhead valves. The valves are inclined laterally and are actuated by bell-crank type rocker arms. The engine block is cast aluminum with removable cast iron wet liners. Drive is taken by a conventional clutch with Lancia's patented hub, mechanically operated and sent through a quill shaft to the four speed gearbox behind the differential unit.

Front suspension is by double wishbones and a transverse leaf spring, rear suspension by semi-elliptics and a rigid axle. This marks a clean break with Lancia's traditional independent suspension which has also included deDion rear end designs on a great number of its products. Anti-sway bars connect the rear wheels and a similar arrangement is used at the front, all of which is aimed at adding stability to what might otherwise be an extremely soft suspension.

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vived practice, and an earlier race at Pueblo, to start. Only five of the cars that were to appear had been brought from the States by U.S. drivers.

The largest Junior field to start in the U.S. was the 1960 Vanderbilt Cup race with 33 cars. It took a full season of racing in the U.S. to build up this field and there hasn't been one like it since.

Two major problems were to hound the entrants. At the speeds involved, tire wear was an unknown factor. Tuning at an altitude of 7,347 feet can present some unique problems, especially with machinery that had never been run before, such as Jim Hall's Cooper and Pedro's Stanguellini.

Jim Hall had just made a clean cut and coasted down the pit apron to a stop. He had number 1-61 in the new Cooper Junior series. Mechanic Frank Lantz fished out the lean plug for a look.

"What do you see, Frank?" asked Jim.

"Darned if I know," says Frank, "I never looked at a plug a mile and a half in the air before."

The sea level boys weren't the only ones with problems. Ray Heppenstall and the Momo-assigned mechanic were doing a lot of skull scratching over Pedro's blue and silver machine before it started to behave.

No incidents marred the practice sessions and Ken Miles garnered himself quite an audience as he practiced ALL the lines through the 180 degree, high banked turn.

Hap Sharp of Midlands, Texas, Hall's partner in everything from the old Texas sport of necktie cutting to parlor magic, was out in Jim's 1960 Cooper Junior while Jim wrung out Hap's new Cooper.

They had been practicing the parlor magic recently by getting John Cooper to deliver the new car about three months early. This should provide them with about three races and plenty of tuning time before the big Junior go at Sebring.

Ricardo and the ex-Hansgen Cooper were in good form and went faster and faster as driver, car and track got together.

No special requirements were placed as far as pump fuel is concerned, so most of the entrants ran on aviation gas during practice. Fuel factors weren't reliable by race day, but everyone seemed to have enough information to make at least an educated guess. Tire wear on the Coopers was not too severe. Early concern because of the unavailability of spare rubber for Ricardo's car disappeared.

Four homebuilt Juniors were entered. One was a Fiat-powered machine with bodywork that left the distinct impression of someone sitting upright in a coffin. Three rear engined Mitter-powered Juniors had a more sophisticated design, but their reliability was in doubt.

Lorenzo Bandini, of some stature in Italian Junior racing, was practicing in what is reputed to be a 1961 Stanguellini. For those who look for something besides beautiful coachwork in this machine, you may relax for another year. Aside from a few additional horsepower, it's the same rather antiquated design. Even with Alfred Momo's excellent preparation, and the aggressive driving displayed by Pedro Rodriguez, the car is not the equal of the average Lotus or Cooper. Pedro's car was also reputed to be one of the newer machines.

Just prior to race time a strange bulletin appeared on the press deck to the effect that Stirling Moss, Jack Brabham and Lance Reventlow were at the track, Moss and Brabham on their way to Venezuela. No one saw the famous ones and old friends expressed some surprise that they had not. Oh well, who's going to argue with an OFFICIAL bulletin at this point.

The Junior Race was scheduled to start at 4 p.m. and start it did. President Mateos agreed to act as official starter and was on hand early enough to talk to the crowd and tour the pits. Embracing both the Rodriguez boys and their father, the President set off down the pre-grid at a rapid clip, stopping to shake hands and talk with Ken Miles. A round of applause and friendly shouts greet Mateos during his rapid tour. One got the feeling that the people liked the man personally and not just the office for which he stood.

Qualifying times put Ricardo on the pole position, Adolpho Valasquez in the center and brother Javier on the outside. Crowd control broke down to the extend that the drivers were staring down a solid tunnel of photographers, mechanics and well wishers. A last minute attempt was made to get the crowd back but was only partially successful.

The President was given a short briefing. The noise became really deafening as he lifted his hand.

With a vigorous slash of the green flag, all 28 of the multicolored machines seemed to leap forward in a single mass. The narrowness of the track caused some confusion and as the pack grew smaller in the distance, it seemed to bulge at the seams and several cars squirted out the sides onto the dirt shoulder. No spins or mixups however, and everyone seemed to make it through the first turn in good order.

One machine stalled on the grid but willing hands got him on his way before the exhaust smoke cleared. It was one of the Mitter-tuned cars, driven by de Prevoisin. Three of the Mitter machines that were put together locally started, but none were to finish.

Even in the first lap the pack began to spread out and only one small clump of cars near the center was still intact as the race passed into the 5th and 6th lap.

Since this was to be the longest Junior race run in the Americas, one could expect a fair percentage of failures in the rough and tumble 100 miles to follow. Twenty of the 28 starters did finish, some in poor mechanical condition, but they finished nonetheless.

The early lead was taken by Javier Valasquez, and not too far behind came a flying blur. On closer examination it turned out to be Ricardo's low-slung Cooper, right on schedule. Nearly stalling on the grid, Ricardo caught and passed three-quarters of the field before he crossed the checkered stripe at the end of the first lap.

The Cooper semed to be making up the time in the corners. Our impression that the Valasquez Lotus was faster in the straight was later verified by Ricardo. The only way he was able to widen the gap so consistently was to get through the corners in the best shape possible and take advantage of the few extra mph then available.

In discussing tactics with Jim Hall prior to the race, he pointed out: "With the very small margin of horsepower available, you can never afford to get very far behind."

The fellow who finds himself with a car that he's not sure will go the distance and knows that he's keeping fast company is in a neat bind. He doesn't know whether to go like blazes and hope for the best, or sit back and lose ground he can't regain.

This race, on a course that had already proven itself to be very fast, would merely amplify the problem.

In the 12th lap, Ricardo passed Javier Valasquez while Adolpho, running third until the 5th lap, fell to fifth. A running gunfight developed between Pedro's blue and silver Stanguellini and Hall's British Racing green Cooper. Pedro was not beyond a little violent weaving when it became obvious that Hall was helping himself to a free ride on his slipstream.

The gap opened for a moment, but Hall recovered almost instantly, and in the 17th lap managed to muster enough suds to move the Cooper into third place.

The field then stabilized and Ken Miles' Dolphin, running 13th, started a bid at the halfway point. The move

was short-lived, and he was only able to pick up two places when he was sidelined in the 28th lap. The problem appeared to be a thrown rod, but a valve spring in the Ford 105 engine was found to be the actual culprit when the engine was torn down. Dolphin, a San Diego firm, is fielding a new design in 1961 which they claim will be even lower than the new Lotus. With Miles at the wheel and a good engine, this could be a pretty tough combination.

In the 24th lap, Pedro and Jim Hall once again swapped places for a single lap.

Never letting up, Ricardo opened a thirty second lead over Javier Valasquez, and in the 27th lap succeeded in lapping all but the first four places. Pedro took the lead again and Hall played the waiting game on a wheel to wheel basis.

During the earlier portions of the race, Javier Valasquez succeeded in driving the lap time as far down as it would go, with a 1:38.87 (90.6 mph).

Van Beuren went into the pits on the 28th lap with great growling noises from the gears or rear end.

Hap Sharp, in the older Cooper, was having a fine time for himself. Coming from 12th in the 5th lap, he eased around Gene Towle's Lotus in the 27th lap and Alvarez Murphy's in the 33rd, to settle down in sixth place. To strain the machine with the few laps remaining would have been poor tactics.

The day was overcast with the fog and mist hanging at treetop level. As the air got colder the battle for third place got hotter. Prize money was paid to tenth place in the Junior event and, except for Sharp's upsetting the applecart occasionally, these positions remained stabilized after the 25th lap.

That is, they were stabilized until Pedro got tangled up in traffic in the last lap. Places changed so rapidly that even the drivers weren't sure what had happened until the finish line was in sight. Ricardo was under the flag by nearly a full lap when Hall piled across the line with Pedro 1.8 seconds behind. Just a few miles more and the whole picture might have been a different one. A few of the well placed cars came in fishing for gears and perspiring over that nasty sound that metal makes when it's coming apart under stress.

Latin fans have a great way of showing their affection for their idols and Pedro was thrown up on the shoulders of a roaring mob and paraded the length of the pits, while the wily Ricardo stayed tangled up with interviewers.

The Rodriguez kitty stood at 79,000 pesos, roughly translated at $6172 U.S. Not a bad afternoon's work for a couple of young fellows. You might even say they had a future.

INTERNATIONAL CALENDAR

Races

April 1961

22 — *Aintree Meeting, England — Formula Libre.*
25 — *Syracuse Grand Prix, Italy — Formula Libre.*
29-30 — *Virginia Int'l Raceways — SCCA National.*
30 — *Targa Florio, Sicily — Sports & Grand Tourismo.*

May 1961

6 — *Silverstone Meeting, England — Intercontinental Formula.*
6-7 — *California SCC road races, tentative.*
13-14 — *Cumberland, Maryland — SCCA National.*
14 — **Monaco Grand Prix,** *Monte Carlo — Formula I points race.*
22 — **Dutch Grand Prix,** *Zandvoort — Formula I points race.*
27-28 — *Santa Barbara road races, California SCC — Sports, Formulas Jr & III.*
27-28 — *Bridgehampton road races, Long Island, N.Y., SCCA National — Sports, Formulas Jr & III.*
28 — *Nurburgring 1000 kilometer race, Germany — Sports & Grand Tourismo.*
30 — *Indianapolis "500," Indiana, FIA-USAC — Intercontinental & Indy cars.*

Rallies

April 1961

19-23 — *Geneva Rally, Switzerland*
30-May 6 — *Tulip Rally, Holland*

May 1961

1-6 — *Trans-Canada Rally*
18-21 — *Acropolis Rally, Greece*
20-21 — *Golden West National Rally, San Francisco, SCCA.*
27-28 — *Mille Miglia Rally, Italy*

Shows

April 1961

1-9 — *International Automobile Show, New York, N.Y.*
15-23 — *Philadelphia Auto Show.*

Next month's SPORTS CAR GRAPHIC will bring you

12-Hours of Sebring — 1961 by John Christy

Foreign Intervention at Indy by OCee Ritch

Hillclimb in the Gold Country by W. R. C. Shedenhelm

Slaloms — Racing on a Dime by Dennis McCosh

Road Tests of the Fiat Abarth 850, the Austin 850 and the Corvair Monza by Jerry Titus

A complete report on the new Mercedes-Benz 200 SE coupe and the E-Type GT Jaguar by Bernard Cahier

Plus many other top sports car features!

Watch for the June SPORTS CAR GRAPHIC!

POWER AT A PRICE

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sistently tighter revving than can the lesser varieties, thanks to a new cooling layout that hauls in far more air than is the case with 1600 and 1600-S. Other changes, unseen but nonetheless present, that allow harder usage are such niceties as nitrided bearing surfaces on both crank and cam, a lighter flywheel, stiffer valve springs, light alloy rockers, bearing diameters larger by five millimeters on three mains, an improved oil system, about which more in a moment, and last but by no means least, a new cylinder liner. Rather than the usual chrome used on the Supers, the walls of the S-90 cylinders are Ferral-treated which means that a steel coating sprayed over molybdenum is applied as a lining material. This is easier to break in than chrome plate and has less tendency to polish, behaving more like a normal steel liner.

Getting back to that oil system mentioned above, a new sump filter is used on the S-90. Similar in action to the magnetic filters used in the others, the S-90 filter has one important addition. This is a centrifugal valve that acts to trap oil in the filter compartment on long, hard or fast bends, thus assuring a constant supply of oil to the pick-up. This eliminates one source of trouble endemic with racing Porsches which tended to sling oil in the sump to one side on hard turns, thereby delivering a charge of air or foam to the oil pump and thence to hard working bearings, instead of lubricant. The result of a diet of foam in bearings need not be elaborated upon here.

Actually no description of a group of parts or attributes can give a picture of their sum total, especially in this case. A Porsche is and always has been much, much more than the sum of its parts; the Super-90 is no exception. Since the first production versions, Porsche cars have been a yardstick for quality and, more, have in most instances managed to instill in their owners a pride of possession almost amounting to fetishism. To achieve this stature, a car must be a cut above lesser machinery and this the Porsche is in virtually all its forms.

In the case of the Super-90, the pushrod Porsche has been given a new dimension even beyond the scope of the four-cam versions, a dimension of usable power at a price. Combining as it does the push of the Carrera DeLuxe with the ease of maintenance of the other pushrod models, the S-90 is worth the wait involved in getting delivery.

Jerry Titus and John Christy

THE BATTLE OF LITTLE INCHES

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are used, with alloy wheels. Steering is by rack and pinion, and both the oil and water radiators are in front. While the Emeryson has not yet been raced, promising tests have been carried out by Ron Flockhart and Happy Jack Fairman, who are very likely to be the regular Emeryson drivers during 1961. The good old Climax will supply the power through a Colotti-designed five-speed gear box. Both of these two new cars, the Elva and the Emeryson, were built over 100 pounds too light for the new Formula and, like many other British competitors, will have to face this unusual problem before the season begins. Both cars are too recent and too untried to foresee their possibilities, but their efforts will be interesting to watch.

Vanwall, the first British manufacturer to bring the World Championship title to England, at first did not seem to be interested at all in the new Formula, but it is almost certain that they are now working on a new engine which they would like to install in a modified Lotus chassis. It is doubtful, however, if they will be ready in time for the 1961 season, but, then, of course, Vanwall is always quite mysterious about their racing plans. Incidentally, Tony Vandervell, the patron of the Vanwall firm, was playing around last summer with a rear-engined Lotus in which he had installed his powerful 285 hp, four-cylinder, 2500 cc engine. The results were staggering and the acceleration was fantastic, but the car was quite undriveable. On several occasions, the engine parted company with the chassis and the rear axles broke. If this idea has not been abandoned, the Lotus-Vanwall combination should be quite a rocket in the Intercontinental Formula, providing the thing will stay together.

Ever since Mercedes abandoned Grand Prix racing, Porsche has felt that it was up to them to uphold German prestige on the various race circuits of the world. As we know, the results have been truly remarkable in sports car racing. It is true, however, that except for a few major events, sports car racing does not receive as much publicity and renown in Europe as does pure Grand Prix racing. In 1958 Porsche entered a modified 1500 cc sports car in a few Formula II races. Encouraged by the results, they ran several Formula II single-seaters in 1959 and 1960 with considerable success. Now, with the change in Formula I so favorable to them, Porsche is going all out to win the World's Championship in 1961. New cars are being built and a powerful 200 hp, flat eight cylinder engine has been developed with the Championship in mind. This new engine should be the most potent in Formula I racing this year, and it should be ready in May, just in time for the Grand Prix of Monaco. Jo Bonnier has signed up with Porsche as number one team driver and he will be assisted by Dan Gurney and Hans Hermann, making an extremely well-balanced and dangerous team. If the new engine proves to be as reliable as the old one, we don't see how Porsche can miss being the hottest team of the 1961 season.

Borgward was very successful in 1959 when Stirling Moss used one of their fuel-injected engines on his Cooper, but, due to financial reasons, they are not likely to be on the racing scene this year. This is most unfortunate, as they surely would have been capable of putting out a competitive racing car. They have been working since 1959 on their 155 hp d.o.h.c. fuel-injected engine, but just where this project stands today is not known.

Mercedes-Benz has officially said, time after time, that they are not interested in the new 1500 cc Formula, as this engine size does not correspond in any way with any of their production models. Meanwhile, Mercedes has been keeping up the spirits of their mechanics by entering, semi-officially, all the important rallies in Europe, and winning the 1960 Rally Championship in the process. Mercedes has always been racing and always will be, but I would imagine that they will be more tempted to go racing in a big way in Grand Tourismo events, which seem to be gaining increasing favor with the public and the race organizers. Meanwhile, of course, technical work and research is being done and there are rumors that they have been playing around with a 1500 cc engine, "just in case."

World Champion in 1952, 1953 and 1956, Ferrari seems to have lost its touch with the single-seater race cars since Fangio won the crown for them in 1956. In 1960 the Ferraris were regularly beaten by the British Formula I cars, with Monza (Phil Hill) the only exception, but, of course, none of the British teams ran at Monza. Enzo Ferrari's name, however, has remained highly respected and he has scored many victories in the sports car field, notably at Le Mans. Like Porsche, the Commendatore does not feel that sports car racing is everything and thorobred single seater racing cars remain very near to his heart. With the lack of success of his 2500 cc Formula I cars lately, Ferrari has taken the opportunity the new Formula offers to develop a brand new rear-engined car, which, in the two races it has entered so far, took one first and one third place. With independent suspension all around, the Ferrari uses a d.o.h.c. V-6 engine developing 175 hp, with possibilities of even more. Phil Hill and Wolfgang von Trips have signed with Ferrari again, and Richie Ginther will complete the team for some races. Once an all-Italian team, Ferrari now relies on two Americans and a German, showing an almost complete lack of top Italian drivers. Along with Porsche, Ferrari's prospects are very high and some tough competition can be expected from the Prancing Horse this season.

Ever since its "official" retirement from racing in 1958, Maserati has continued to develop new cars and engines. The Typo 61 "Birdcage" sports racing car, which has done so well both here and in Europe, proves that the Maserati engineers have not lost their touch. This year, again, Maserati will not race officially in either sports or Grand Prix events, but they are still very busy making a new rear-engined sports car, the 2.8 Typo 63 "Birdcage," and they have further developed their four-cylinder d.o.h.c. 1500 cc engine. This engine is said to develop close to 165 hp and will be used by several private Formula I teams this year. These include Scuderia Centro Sud, which will use Cooper and Lotus chassis, the newly formed Scuderia Serenissima, which will be managed by the famous Ugolini (previously with Maserati and Ferrari), the Tec-Mec team, the private Cooper of Gino Muraron, and perhaps the Camoradi Team, if they decide to go in for Formula I racing.

Burgess, Cabral (a coming new Portuguese driver) and perhaps Masten Gregory will be driving again for Scuderia Centro Sud. Trintignant is rumored to be going with Scuderia Serenissima, along with a new and fast Italian driver named Abate, but, then again, may drive for BRM or for himself. A new French driver, Schlesser, will be with the Tec-Mec team along with Tim Parnell, son of Reg Parnell. The Tec-Mec cars, by the way, have a chassis made in England by Brian Lister and a five-speed Colotti gear box, plus the Maserati engine. All of these teams should put on a good show, but the souped-up version of the Maserati engine has not yet been proved and had apparently just about reached its maximum output. Maserati realizes this and has been working on a d.o.h.c. V-6, actually half of the V-12 three-liter engine raced a few times during the 1957 season. This should give quite a bit more power than the present four barrel mill.

Around the busy racing town of Modena, the Argentian driver, De Tomaso, has been working secretly on a Formula I car using an air-cooled

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LIGHT THE FUSE ON YOUR PORSCHE

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power-tune the car. Such a guide to output will also enable you to select exactly the right jets for cruising and full throttle operation.

Basic? Certainly, but so often overlooked.

The most commonly asked question, when Porsche owners get together with some member of the tribe who has explored hop-up techniques, is, "What single thing would you do to improve performance when racing is not contemplated?"

Once the temptation to answer "Get a Carrera" is overcome, the problem can generally be dealt with under the heading, "Add cubic inches". The second part of Finagle's Law: *"There is no substitute for displacement"*, operates in direct inverse proportion to the size of the engine. You don't have too many cubes to work with in the 1500 cc vicinity, so an extra 100 or so is big, percentage-wise. If you can make the switch from a 1500 to 1600 by substituting barrels, do it. This is a simple matter of a parts exchange as far as engines with the three-piece crankcase are concerned. Older, two-piece case models will not accept the bigger barrels of the later type engine.

Your recourse, if you have a two-piece case, can be to stroke the crankshaft, also assuming that it is the plain metal bearing type. This is not too often done inasmuch as the majority of the older engines have beaucoup miles by now and owners would probably prefer to invest in newer equipment. For the record however, 0.080-inch stroke can be added by the welded method. Only a highly experienced crankshaft grinding concern should be entrusted with this operation, naturally, since the journals must be turned to take the first undersize bearing (a millimeter dimension) and hard chromed after the welding on of extra metal. In addition, it is necessary to notch the crankcase to allow clearance for rod caps and, in some engines, to grind the rods to avoid interference with cam lobes. Ordinarily, the extra 0.040-inch penetration of the piston into the combustion chamber will not bother the valves if stiff springs are employed, but it is wise to check the clearances by using modeling clay. With less than 0.060-inch over the valves, fly cut the pistons for relief.

The added two millimeters of stroke brings displacement up to 94.5 cubic inches or 1549 cc, compared with the 1582 cc of actual displacement of the 1600 engine.

Any plain metal crank can be stroked, of course, so there is nothing to bar you from adding cubic centimeters and torque by this method to your 1600 — as long as it is not intended for competition! Both SCCA and CSCC bar any alterations to the crankshaft other than balancing.

The wildest stroking job which has come to our attention is in the engine built by Norm Holtkamp, a Culver City, California, VW specialist. The additional stroke in this case is 0.250-inch, or 6 millimeters, and called for extensive re-working of the case and rods to obtain necessary clearances. This, in Norm's words, "was a hell of a job." Not satisfied with going this far, he also bored the cast iron barrels of a 1600 Porsche out to 85 millimeters — the same diameter as the 1500 Carrera — and installed Carrera pistons. These buckets, high-domed in stock form, were cut off, a new flat top heli-arc welded in place, then machined to conform with the pushrod head's combustion chamber.

Although no dyno tests have been run on the engine, the torque evident in street operation is somewhat fantastic and no matter what the theoretical or actual performance might be, this 1825 cc mill certainly qualifies as the world's biggest Porsche engine.

The cooling problems which resulted from this modification have taken away some of the glamour, however, and serve to point up a factor that not too many Porsche owners seem to be aware of: The disparity between tolerable compression ratios of air and water cooled engines. In adding displacement such as that mentioned above, if the combustion chamber is left near stock, the resulting compression ratio gets up in the 10.5:1, plus region. This is equivalent to nearly 12:1, theoretical, in a conventional powerplant. Such elevated pressures and concomitant temperatures are an invitation to scorched bits and pieces. The new Super 90, with its aluminum-muffed barrels and altered head design, is laid out to cope with the highest compression Porsche feels is advisable in the pushrod. Keep this factor in mind when seeking increased power through higher compression ratios.

It is true that compression is one of the "five paths to power" and most Porsche modifiers go this route almost automatically. But, there are highly successful tuners who abstain completely.

You are dead, of course, for club racing (other than where allowed to improve within the marque model) as fas as upping compression above manufacturer's specs. But, as given in the SCCA's book, ratios can vary from 7:1 to 8:1 in the 1500N, 8.2:1 to 8.7:1 in the 1500S, 7.5:1 to 8.5:1 in the 1600N and 8.5:1 to 9.5:1 in the 1600S. So, take advantage. Assuming that you have checked the combustion chamber capacity out and arrived at a figure over the 58 cc minimum, take steps to bring it up to allowable maximum ratio.

Some specialists, like Al Cadrobbi of Erhard's Porsche Service, Culver City, California, who has maintained two or three of the winningest cars in the L.A. area, advocate removing as much as 0.080-inch from the bottom landing of the barrels for cars intended for street use. This gets a good 8.5:1 in the 1600 Normal and 9.5:1 in the Super, but requires beveling the piston crown and a close inspection of over-valve clearance. Cadrobbi opines that he has not found it necessary to deepen the cut in the pistons after this operation when Webco progressively-wound valve springs are employed, however, the determination of the necessity for this flycutting will have to rest with the individual mechanic.

Others, including Roger Bursch, Scientific Automotive Service, Pasadena, who prepares George Follmer's Cal Club Class E winner, prefer to sacrifice some of the compression gained by increasing the clearance between valve head and the combustion chamber wall to enhance breathing characteristics. Roger routs out a few thousandths by eye based on experience gained in building up Pontiacs for drag strip competition (like 105 mph in the quarter with a Ventura sedan). It helps in Porsches, too. Bursch also takes a cut off the tops of the valves for lightening and lessening the possibility of piston interference.

Every mechanic will advise that the combustion chamber volumes be equalized as nearly as possible. (This is often referred to as "cc-ing the heads"). Do it or have it done. And, at the first opportunity, when it becomes necessary to split the case for some other reason, perhaps, have the engine statically and dynamically balanced. Porsche, although using the selective assembly method and striving for good balance, does not achieve 100% purity. The opposed layout of the engine contributes to smoothness inherently, but additional revs and longer life will be an extra reward to those who spend the twenty dollars commonly asked for the job.

Factory tolerances allow for a five gram differential in connecting rod weights but a balancer will bring this to between one half a gram and zero for piston and rod assembly by selecting the lightest unit and removing metal by filing the rest until they agree. The crankshaft and flywheel are balanced out in the same manner, then rotated at high speed in a fashion similar to a tire balancing operation to reveal minute vibrations.

Chopping the Porsche flywheel is safe and contributes greatly to acceleration. The stock component weighs about 18 pounds. By machining the outer (en-

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LIGHT THE FUSE ON YOUR PORSCHE

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gine) face, seven to eight pounds can be taken off. Further drilling between the bolt holes has been resorted to in order to lose another pound or so. The only failure of a butchered flywheel to come to our attention actually came apart at the inner flange where it matches the shaft diameter. As long as this operation is being performed, it is advisable that the clutch-mating area be surface-ground to assure complete plate contact. Newer diaphragm plates do not suffer as much from warpage as the older type, but have the disc checked for truth before installing. A 0.002 of an inch wobble is the maximum that can be accepted.

For competition or any hard driving, it is wise to replace the clutch cable with a heavy-duty type. Should you find yourself repeatedly losing the cable, (it generally occurs at the clevis) an almost indestructible unit can be made up from airplane control cable and "Unibal" rod ends. These are available at surplus stores and any aircraft parts supply house. Nobody will protest you for this modification.

Other modifications for racing that do not violate the SCCA "ok as long as it doesn't increase performance" edict include extending the push-rod tubes almost to the followers to help prevent loss of oil on tight turns. Baffling the sump, in the conventional manner that has been advocated, is helpful in avoiding a depletion of lubricant at the pick-up on long sweepers, but in extremely sharp curves the oil can literally be tossed into the rocker covers to the detriment of rod bearings. Roller cranks are less apt to seize than plain bearing models but it is not a sound scheme to try to get by without lubrication.

The street-only driver may not be so concerned with this problem but he will appreciate the added safety factor in upping oil pressure to something approximating the latest model standards. The newer (B series) oil pump can be fitted into older three-piece cases, by merely matching the ports, to obtain a greater volume delivery. Constant cooling can be assured by spacing the relief spring about ¼ of an inch, which permits flow through the cooler at 45 pounds pressure.

And, on the subject of pressure, a working pressure of three pounds from the fuel pump is an absolute necessity for top performance. The elevated fuel requirements of racing often demand actually more output than the average pump will maintain. The Cal Club allows the installation of a supplemental pump and the general choice is a Stewart Warner with the adjustable-pressure feature. In addition, to insure unrestricted delivery, most owners replace the early model shutoff-reserve cock (under the dash) with the 356/B type. Mysterious "starvation" untraceable to other sources can often be cured by changing this valve.

From the valve to the carburetors is but a short trip by tube, so let us consider carburetion.

If you haven't done so already, install the Super venturis in your Normal. This applies to any model. If Solex equipped, say the 1500N, use the 26 millimeter venturis from later 32PBIs or turn down the outer diameter of the 26 millimeter venturis from 40PBICs to fit. At the same time go the necessary steps richer in main and air correction jets (two steps, ordinarily). You may also have to go up a step in the idling jet and the pump jet (which is also a supplemental high speed circuit) depending on the readings you obtain from spark plug insulators.

In one experiment on a Super equipped with Solexes, the venturis were bored out three millimeters (to 32 millimeters), the carburetor re-jetted and a gain of three horsepower at the wheels was noted in before-and-after dyno testing. This, and the practice of leaving the venturis out of the Zenith 32 NDIX entirely, indicates that there is some distance to go before over-carburetion sets in.

It is extremely important that the air filter be absolutely clean and unrestricted on these jugs. If there is slight possibility of heavy air pollution (by dust, for example) the filters can be omitted entirely.

Inasmuch as the factory now provides velocity stacks, it is presumed that they have observed the same gain from intake tuning that independent experimenters discovered. If you want to try for yourself, the formula for determining the proper length of tube based on pulsations of columnar air is given in Colin Campbell's book, "The Sports Car, Its Design & Performance", but the factory-offered stacks probably assist the peak output at 5,000 to 5,500 rpm.

Matching intake ports and manifolds is taken for granted. Some Porsches come through with extremely smooth and mated ports, others can stand a little work. There is nothing against "porting" in the hot rod sense of the word (unless you feel that you might be on the receiving end of a protest). Smoothing out the passages and cutting around the valve guides will assist breathing but the limit imposed by the valve diameter need not be exceeded. You can fall back on the eight millimeter stem valves, if your car is equipped with the ten millimeter variety, to lessen flow restrictions.

If you are reasonably sure that you will never drastically over-rev the engine, as often occurs in the heat of battle on the course during down shifts and so forth, it is possible to give quite a bit of attention to lightening the valves and the valve train generally. The deletion of excess reciprocating weight will add revolutions to the top end and make swifter acceleration possible, but it carries the possible penalty of breakage.

The most drastic examples of this technique are to be found in engines built up by Rod Tasjian, a Porsche hobbyist in Hollywood, and his disciples. Valve heads are undercut and dished out ("tuliped"), rocker arms are ground and polished and even the adjusting nuts are split down the middle, thickness-wise, to eliminate a few grams. Rod turns his engines 7,000 rpm with no ill effects, but he is going *up*, not downshifting where a hasty glance at the tach could be wrong.

Many owners do substitute the older and lighter rocker arms for the new type and nearly everybody prefers the steel pushrods.

The object is to make it easier to attain peak power rpm quickly and to go above the former maximum safely. Stiffer valve springs, to control valve float at high speed, are marketed by several concerns, including Webco, Iskenderian and Art Sparks. The Webco setup is basically the same as Sparks'; progressively wound single spring giving about 85 lbs. pressure closed and 180 open, but with aluminum alloy washers and keepers in place of Sparks' steel components. The difference is between $37.00 per set for Webco and about $60.00 for the steel type. Ed Iskenderian, a well known camshaft grinder, supplies a set of inner springs to go with stock Porsche outer springs for $4.00 per set, which are preferred by some. This combination is good up to 6,000 and where there is not too much likelihood of going way above that, Webco-fitted engines, depending on the cam, are pretty handy to 6,500. Pulling the stock keepers through is the hazard in over-revving and the Sparks choice of tough steel in this department reflects the concern of racing drivers.

All of which brings us to the subject of camshafts.

For a long time, there was nothing on the market that was actually superior to the factory Super cam, regardless of claims. Most of the modified Porsches which ran with re-grinds a few years ago eventually returned to the original equipment because of lifter trouble or just plain lack of horsepower. Today, however, it is a different story, and there are a couple of sticks around which are universally accepted and proven by dyno comparison. It is still tough to beat the Super, no mistake,

and if the high-lift Super 90 option becomes readily available, the grinders may have to go back to the drawing boards. Meanwhile we have the Iskenderian 107 and 108, Weber's Competition and the Racer Brown (Camshaft Engineering) 22A.

Isky's 107 fits any three-piece case, is compatible with stock lifters and springs and can be counted on for a gain over the factory Super, especially if a modified exhaust system is installed. Valve timing is a symmetrical 35°-70°-70°-35° (referring to intake opening BTDC, closing ABDC and exhaust opening BBDC, closing ATDC), lift at the valve is 0.365 of an inch.

The 108 is a little noisier because of its more abrupt ramp, provides 0.400 of an inch lift with this timing: 40°-76°-76°-40°.

This model is often referred to as the "Cal Club Cam" since a big number of the top Cal Club Porsches over the years have used the 108. Top end is the big gain here and stiffer springs are mandatory.

Weber's stick is not so radical in paper timing but has a swift lift and good duration: 19°-54°-54°-19°. You can see 7,000 on the tach with this cam in a properly prepared engine according to Harry Weber, who has conducted extensive experiments on Porsche and VW engines in connection with his cam grinding activities.

Racer Brown's new cam is relatively unpublicized and the figures are not available but observation of a 22A equipped engine indicates that it is superb in the 2,500-5,500 rpm range where most drivers need the extra push.

It should go without saying, but to be on the safe side we'll say it: There is little to be gained by the mere installation of a substitute camshaft. It is necessary to take advantage of the increased breathing potential by freeing up the rest of the system. Go to the maximum in carburetion and inlet porting, lighten where possible and improve the exhaust extraction.

Relative to the latter, dynamometer tests run by Roger Bursch, comparing the stock muffler and an "equal length tube" system fabricated for his speedster, revealed a flat gain of 7 road horsepower at 5500 rpm for the home-brewed tubes. In racing, the importance of this type of collector cannot be overestimated. Most pushrod Porsches, as well as the Carreras, follow the factory's pattern for the Spyder exhaust, but it must be borne in mind that extraction tuning works here in the same manner that ram tuning does at the other end of the cycle. The length of the tubes and the tail pipe will not be identical for 1500 and 1600 engines or the Carrera. Ed Barker's top notch

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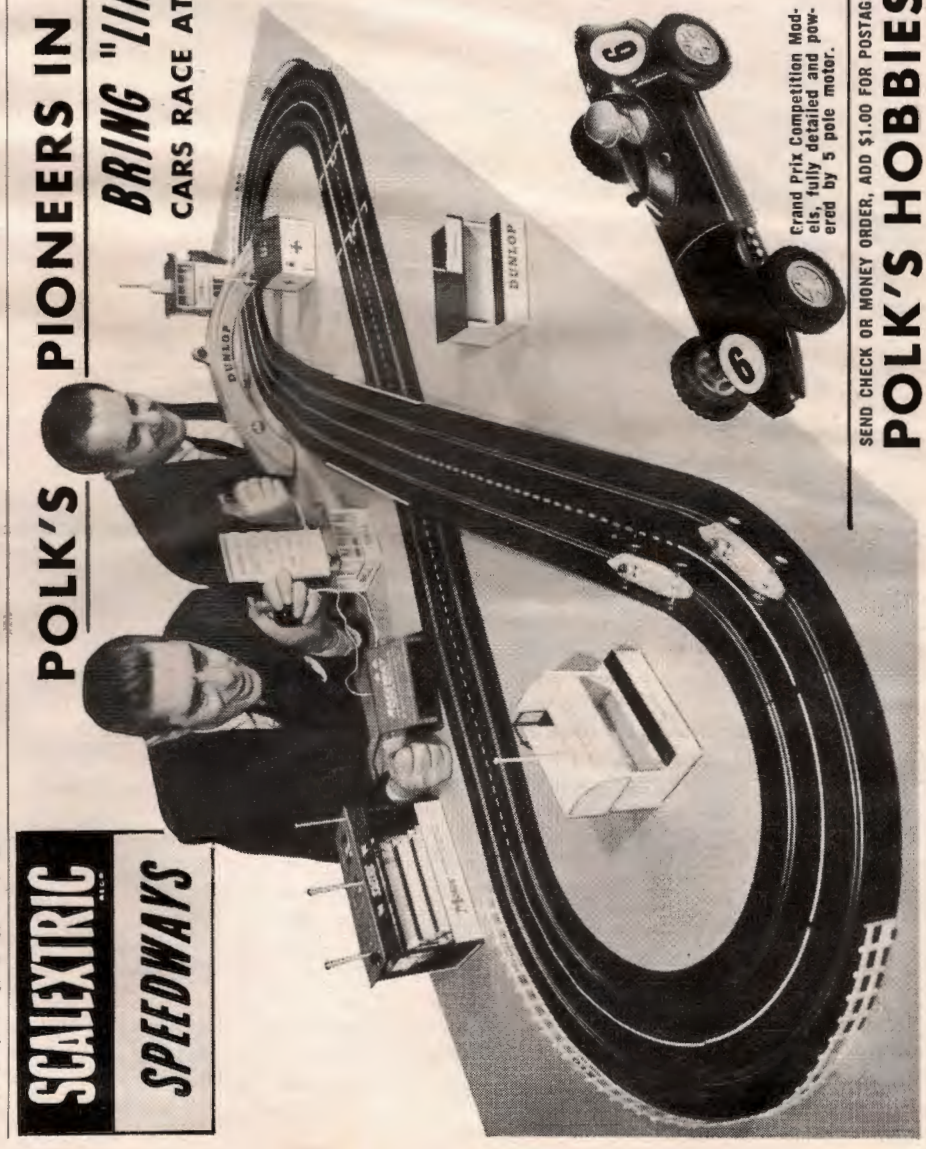
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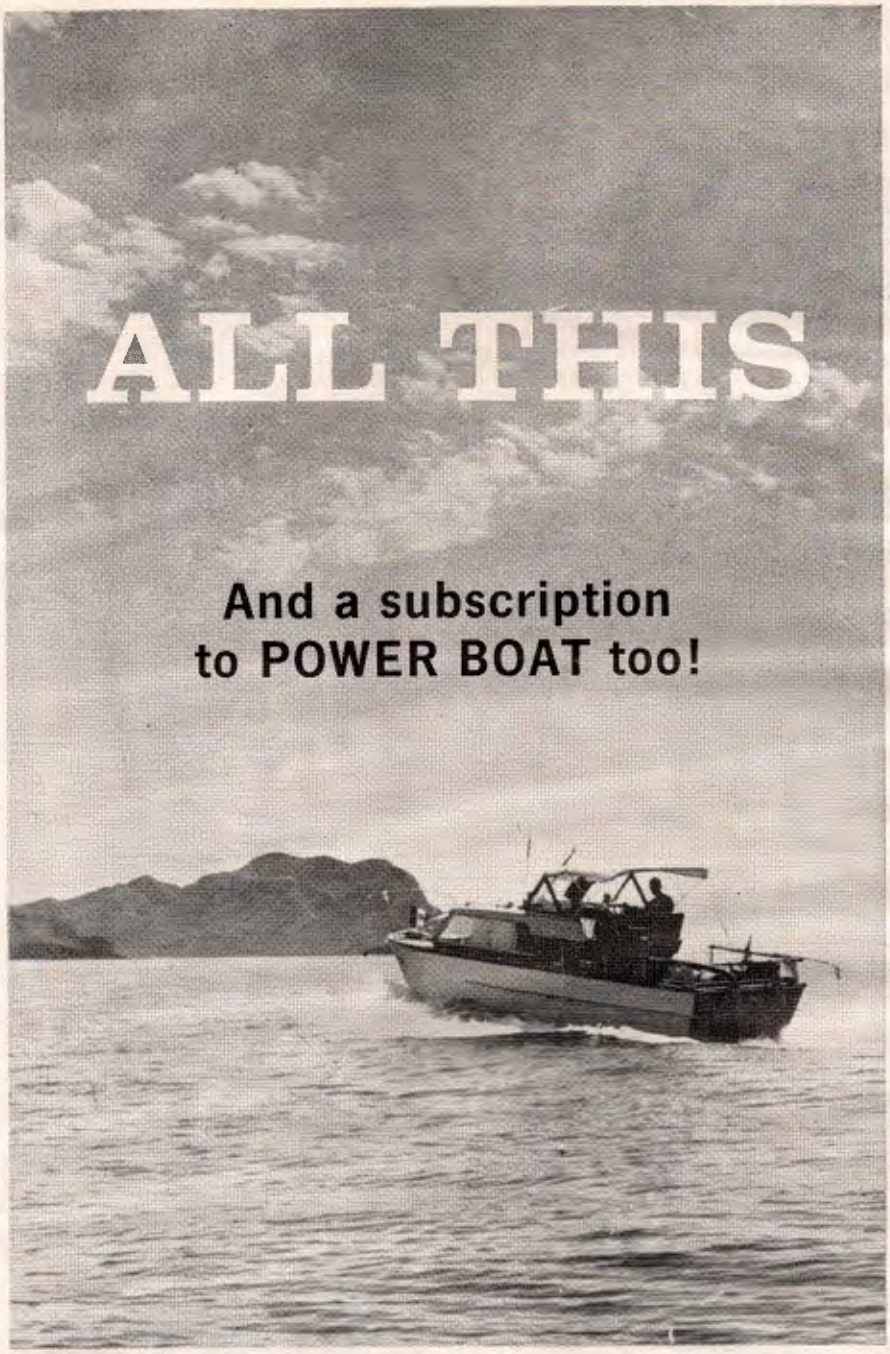
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FUEL INJECTED LUXURY

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and connect to each axle tube, also providing a mount-pad for the regular, vertical coils that are the suspension medium. As in front, tube shocks are fixed close to the wheels for best dampening control.

While foregoing the low-pivot features of the 300 series swing axle, this design manages an exceptionally long "arm" from pivot to wheel, holding camber changes to a minimum. The majority of weight remains in the "sprung" category, as well. In application, it's almost completely successful, providing the excellent handling we mentioned and a fantastically smooth ride.

All was not such sweetness in straight-line driving, however. While the front end of our test car might have been slightly out — we noticed some uneven tire-wear — there was an annoying tendency to swerve with every gust of side-wind and a sensitivity to linear road-surface deviations that demanded constant corrections at a steady cruising speed. Steering is cushioned by a hydraulic dampener and has a rubbery feel despite a fairly fast ratio. Thus, these slight corrections are delicate to make. Some of the drifting seemed to be the result of action in the rear suspension, too.

A-1 in all respects were the power-assisted brakes. Following normal Mercedes tendency to go small in diameter but big in width, the Alfin drums have large, angled fins for turbo-cooling. The car pulled down easily in above 100-mph stops. Some nose-dive was present, but stability was excellent. It passed our severe ten-consecutive-stops-from-60-mph with only slight fade and a little increase in pedal pressure coming in on the last three. This added another big feature to the super-safe design.

In all, the 220 SE is a successful, enjoyable, quality car. It may seem that we've carped a bit about its few objectionable points, but, it's just that the over-all excellence makes minor faults glare overly bright. We don't hesitate a bit to heartily recommend it as a valuable purchase.

Jerry Titus

THE WINNER THEY DIDN'T WANT TO BUILD

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The front wheels where slightly decambered, the rears sat almost neutral with unladen gas tanks. Heim joints at the outer ends of the rear arms allow adjustment of both camber and toe-in and goodly amounts of the latter were aiming the rear wheels inward. Goodyear sports-racing tires, with their diamond-shaped tread, are used with

satisfactory results: 5.20 x 15's in front, 6.40 x 15's in the rear. We weighed the front and rear segments of the car and discovered over 65% of the 1210 lbs. was rearward! Both gas tanks and driver are located centrally, so it's doubtful that percentage of distribution would vary much by filling the former and including the latter. The radiator, oil tank, spare tire and battery constitute the only major weights up front and two of us easily lifted the front end to set it on horses.

At this point, we would have liked very much to quiz Gurney concerning the handling traits, but Fowler was able to pass on his generalized comment... Dan considers it the best he's ever driven, almost dead neutral in terms of over-or-understeer and extremely high in adhesion under all circumstances.

In overall concept there's nothing too radical about the Mk XIX. While somewhat fragile, it is, as we mentioned, an extremely flexible machine, able to cope with any kind of competition on any kind of course or surface. It is every inch a racecar, built to do its job and be maintained with a minimum of wasted effort. There is some conjecture that the forthcoming rear-engined Maserati may offer it a challenge, but there seems to be nothing on the existing scene that is real competition.

Proof of its potential is that Arciero, in addition to his plans to campaign the little bear in "money" races this season, is also considering Formula Libre events. It is, after all, every bit as quick as the *average* F1 car and, as reliability is steadily increased, it may well be able to outlast the hottest ones. Not bad for a car conceived on a "let's see" basis.

— Jerry Titus.

BIG BATTLE OF LITTLE INCHES

continued from page 33

eight cylinder engine created by an Italian engineer who used to work for Maserati.

World champion in motorcycles for several years in a row, the famous Italian firm of M.V. has been working on a Formula I car they would like to have driven by John Surtees, three times Champion on their bikes. The four cylinder 500 cc engine used on their motorcycles was giving 65 hp. If they can successfully hook three of these together they should be able to get very close to 200 hp. This interesting project will be followed with great interest as it goes along.

This, then, is a good picture of the confusion and the possibilities as the 1961 Grand Prix season, and the new 1500 cc Formula I, begin. Who will establish an early superiority, the British, the Germans or the Italians? That is the question we will be able to answer in these columns throughout the coming months. Whichever racing color comes out on top, green, red or silver, we are sure to witness some extremely competitive and exciting racing on the Grand Prix circuits of the world.

Bernard Cahier

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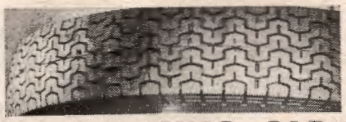
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BENCH RACING BY JERRY TITUS

SPRITE PUSHING

Q: With several thousands of miles on my Sprite, I am beginning to encounter considerable oil pressure drop after hard driving. I am told that bearing replacement will eliminate this problem. Also under hard usage, the brakes are unsatisfactory, but this condition has existed since the car was new. Would you recommend that Mintex lining be installed? Do you feel that bearing replacement will cure my oil-pressure problem?

D. Kirby
New Orleans, La.

A. While it is possible that your bearings have been pounded enough to require replacement, a rapid drop in oil pressure correlated with high oil temperature is a rather common problem with the Sprite engine when used in competition. The oil gallery feeds first to the cam, then to the crankshaft. The cam is un-bushed, rides directly against the cast-iron block, and high temperatures cause the block to expand, the oil viscosity to drop. Line-boring the block and installing heavy cam bushings will help considerably. Holding down the temperature via increased cooling is another remedial move. In extreme cases both will be required. BMC did have an optional oil cooler for the Sprite, but it's been discontinued. A larger sump is still available. The bushing job will have to be performed by a machine shop.

The standard brakes are a bit too small for "hard useage" so heat-buildup generally plays hob with both linings and drums the first time you "cook" them. Venting the backing plates on the front and allowing circulation of air will help to reduce the overheat — by drilling holes or fabricating a scoop — but once the damage has been done only replacement of drums and linings will eliminate difficulty. You can, of course, increase brake effectiveness by purchasing the disc-brake-and-wire-wheel option, but this goes for around $450. A more practical alternative is to install the front brakes from a late model A40.

EXHAUST PUZZLE

Q: There has been much discussion of late concerning the tuning of induction and exhaust systems. I understand, however, that this "tuning" is only effective within a narrow rpm range. There have also been comments to the effect that such a tuned system may actually be a detriment when the engine is not operating within this specific range. Could you set me straight on this confusing issue?

F. G. Gallagher
Long Island City, N.Y.

A. There are many aspects to intake and exhaust tuning and some of them are hard to fit into the pat little formulae we see kicking around which are mainly concerned with diameter and length of manifolds. The efficiency and cubic capacity of the cylinder, specific cam design, and engine load *are all of considerable importance since we are concerned with gas velocity. The latter, of course, is basically dependent on pressure, negative or positive. How well the cylinder develops these pressures is governed by the factors we just mentioned, plus a few more that would only obscure our point here. Engine revolutions become the all-important variable and should give you the clue as to why tuning is effective only in a specific range. As far as being a detriment elsewhere, this could only occur when a highly tuned design would provide less efficient flow except over a narrow range. Here, also, lies one of the fallacies of a "dyno-tuned" engine, where everything is directed toward that one, high peak. The question of range or how well the engine can climb to that peak is usually much more important in actual application. For this reason we see many varieties in competition pipe layouts that don't at first seem to make sense. In some cases a spoiler layout is used to destroy a strong resonance factor; in others, a design such as the classic four-cylinder, four-into-two, two-into-one system is used to give a lesser but still useable state of tune over a very wide range. Generally speaking, the shorter the piping, the higher the rpm at which the greatest scavenging effect takes place. Excessively long or short pipes can make a very noticeable difference in performance patterns and these differences can be used to offset certain undesirable engine characteristics, either inherent or induced by modifications. A case in point is the use of a very long pipe system in some of the D-type Jaguars where huge port sizes limited the range to very high engine speeds. The long piping enhanced performance at the lower speeds and so widened the range at little or no cost in top end power.*

THE RACING BUGATTIS

continued from page 23

a success. It was hard to hold at high speed. Engines designated for it were diverted to the Types 50 and 50T and made of them remarkable high-speed gentlemen's carriages.

At the beginning of his career M. Bugatti did not use type numbers, and when he did use them did not mean them in the same sense as in the years of his apogee; at the end of his career he often ignored them too: the G. P. car succeeding the Type 51 was first known simply as the 2.8-liter. (This was common factory practice, by the way; to this day, if one says to Rene Dreyfus, "I have a new Type 44," he will reply, "Oh, you have a 3-liter?")

The new car was designed to the 750 kilogram Formula and first appeared in 1933, finishing 4th and 6th in the Spanish G. P. It was bored out to 3.3 liters for the 1934 and '35 seasons and typed 59. It was a superior car, with a top speed around 170. It was notable, among other things, for the so-called piano-wire wheels with their almost invisible spokes. Type 59's won the Belgian, Algiers and Picardy G. P.'s in 1934 and in 1937 Jean-Pierre Wimille set a startling record by lapping Montlhery for 162 miles at 91.13 miles an hour, just a hair slower than the Mercedes-Benz record for a single lap.

The 3.3 was later bored out to 3.8 and it was ultimately replaced by the 3-liter supercharged single-seater. (The 59 carried two people, or one and a half.) The blown 4.7-liter car was also a single-seater (Bugatti stayed unnecessarily long with the two-seater form.) One of the 4.7's ran second in the 1936 Vanderbilt Cup. At the end there were 3.8-liter blown and 4½-liter unblown single-seat G. P. cars. The 4.7 with which Wimille won the 1939 *Coupe de Paris* just before the war and the *Coupe des Prisonniers* just after it was perhaps the fastest Bugatti that ever ran. Jean Bugatti probably had a good deal to do with the development of everything from Type 59 onward.

In 1946, when he had only a year to live, Ettore Bugatti designed a four-cylinder 1500 cc blown 220 horsepower G. P. car which was designated Type 73C. A series of 20 was projected, but none was built. Two have recently been assembled from original parts. The Type 251 was a post-war Grand Prix car designed by Colombo. Its 2.5-liter straight eight engine was mounted transversely in the rear. It showed some promise, but it was not developed.

(continued on page 84)



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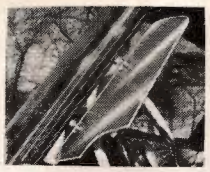
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LONDON CAR SHOW

continued from page 58

four cylinder 1500 cc Maserati engine with a five-speed Colotti gearbox.

The chassis of the Emeryson Junior is virtually identical to that of the Formula I car. The Junior mounts a Ford 105E engine, said to develop 95 hp, mated to a VW gearbox with five close ratio gears.

One of the most unusual Juniors was the new Bond, a front-engined, front-wheel-drive car with the unit body-frame made from Fiberglas.

Many of the cars of the Champions were on display. The center of attractions was the Formula I Cooper Climax with which Jack Braham won his second World's Championship last year. It was mounted on a central turntable where everyone could admire it.

The amazing Austin A-40 of Dock Shepard, which won the 1960 B. R. S.-C.C. Sedan Championship, was there. This extremely rapid sedan has startled the drivers of 3.8 Jags and throughout last season frequently finishing ahead of all but the fastest. Don Moore, who prepared the engine, has applied his considerable knowledge of tuning to obtain 80 hp at 7300 rpm. Maximum speed for the A-40 is claimed to be over 100 mph, which explains why Shepard could stay with the Jags on the straights.

Peter Ashdown and the Lola once again proved an unbeatable combination in 1960, winning the B. R. S. C. C. Sports Car Championship for the second consecutive year. With its very low weight, low frontal area and excellent roadholding, the car has proven unbeatable in the 1100 cc class for the last 3 years. Everyone is eagerly awaiting the arrival of the new rear-engined Lola Junior. Not much is known about the car except that it will have a Ford 105E engine and a VW gearbox with a special 5 speed close ratio conversion. Rumor has it, Eric Broadley has incorporated some interesting technical innovations into his latest brainchild. Only 12 Lola Juniors are to be produced during 1961 and testing of the prototype is planned for early February.

A past champion was the Mercedes Benz Formula I car that Fangio drove in 1954 and 1955 for his second and third World Championships. A comparison of this brute with the tiny, fragile Lotus shows how far racing car design has progressed during the seven-year reign of the 2.5 liter Formula.

The Marcos GT is still unchallenged as the world's ugliest coupe even though the body has been cleaned up for 1961. Besides its distinctive appearance, the car is unique as being the only GT car with a monococque "hull" of stressed plywood.

Three special GT Sprites put that junior Austin Healey in the 100 mph class. The fastest is the Gaston-modified Sprite with an Ashley Fiberglas hood and top. The model shown was a detuned version of RAM 35 with which Paddy Gaston won the 1000 cc class in the Autosport Championship for the second consecutive year. Zero-to-sixty time for the show car is 11.5 seconds while the 84bhp full-racing version does it in the amazing time of 8.8 seconds.

John Sprinzel's latest version of the successful Sebring Sprite features a lightweight body of composite aluminum-Fiberglas construction. The doors have Fiberglas frames and alloy exterior panels. The hood is all Fiberglas. The standard windshield has been removed and a new Fiberglas top, incorporating a more steeply raked windshield, is bonded permanently to the little that remains of the steel body.

The Speedwell GT Sprite is now in full production with its long hood and deluxe aluminum coupe body. The engine of this car has even been stretched to 1100cc. Speedwell also had a special version of the Mini-Minor with 60 hp on top.

Jack Brabham Motors, Ltd., displayed a quite ordinary looking Triumph Herald Coupe. Under the hood, however, it has a Coventry Climax 1216 cc engine, plus a stronger clutch and optional disc brakes.

Cosworth Engineering had two of their much-modified 105E Ford engines which powered the successful Lotus Juniors last year. The latest version has a special rocker arm assembly and a dry sump oil system. To be in the running this year, it looks as though your Junior engine will need dual ignition, special cam and valve gear, special crank and rods and a dry sump oil system. Everyone is predicting that by the end of the season it will produce 90 to 100 hp.

HRG has come up with an overhead-camshaft cylinder head conversion for the 105E Ford which almost turns it into a Coventry Climax.

During 1960 the cost of modifying a competitive Junior engine has skyrocketed. This year's versions, as supplied by the leading English specialists, will cost about $1500. It is apparent that today's Formula Junior cars bear little relationship to the inexpensive racing that the Formula was intended to provide.

With the outstanding success of the last two Racing Car Shows, the organizing B.R.S.C.C. is planning to make it an International Show next year. Already several famous Italian manufacturers have inquired about obtaining space. It looks as though, at long last, racing enthusiasts will have an international auto show of their own.

D STANDS FOR DELIGHTFUL

continued from page 37

option. The performance was adequate by small sports car standards, but we suspect that many owners will want to go the hop-up route, thus making the brakes an even more critical factor.

A 1600 Porsche engine is presently available in the finished car for $400.00 extra, bringing the total cost to $3350.00 and giving a price range that makes the Devin hard to equal in appearance, ride, handling *and* performance. There are plans in the works to adapt a Corvair Monza powerplant, possibly a hopped-up version, to the Devin "D" body-chassis.

There are two items we consider important that are left out of the "D"; a gas gauge and heater-defroster ducting. Both, however, would be simple to install. The stock VW gas tank is used and there are at least two gauges on the market that will bolt right in, needing only a hole in the dash. As far as the heater is concerned, the basic shrouding is, of course, still on the engine and Devin retains a center tunnel. A few holes in this and some flexible ducting would put you in the hot air business.

In short, we think the Devin "D" is a fine little car, with many advantages and few drawbacks. To be fully appreciated, it must be seen and driven. If enough cars appear around the country in dealers' hands to make this possible for potential buyers, Devin Enterprises will soon have a stampede on their hands.

R FOR RACING

continued from page 41

the gasoline after the oil has been added, to insure a consistent mixture.

Instrumentation is sparse, with only a Sun electric tachometer and a water temperature gauge.

The body is aluminum, with side panels of 30-thousandths sheet and the nose and tail sections of 60-thousandths sheet. Body contours were shaped from 18-gauge ½-inch flat steel strips and welded to the frame. The body paneling was then attached to these formers with aircraft fasteners. It was Dr. Powell's first experience with aluminum forming, having used Fibreglas in the construction of his other cars. The car was painted bright red and was ready for its first race. The car weighs 975 pounds, with 50/50 weight distribution.

The total investment was $2000 and about nine months work. The Powell car has won one race and has proven its ability to stay up with the factory jobs. But, like any special builder, Dr. Powell thinks he can build the next one even better. He has already started to do so.

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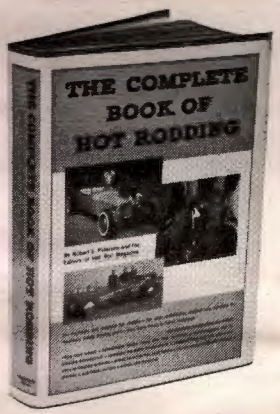
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PEUGEOT 404

continued from page 55

integral, the situation isn't quite as unhappy as it looks. Each of the four intake ports is faced on the outside of the inner manifold passage by a Welch plug that can be easily removed — *voila!* An intake passage per cylinder suddenly appears. What with four exhaust passages also per cylinder, it might seem that many good things can be done by those who would. Just thought we'd mention it in passing.

One other point of interest before taking leave of the engine is the exhaust system. This is given a strange sort of tuning entirely different from the usual concept. Basically the system consists of a normal, cast iron log manifold open at the rear to the exhaust pipe and muffler. The tuning lies in the fact that it is also open at the front end. This end empties into a fairly large closed resonance chamber that has no outlet whatever — just the inlet. The claim is made that this chamber added two to four horsepower to the engine's output. Requests for elucidation brought only Gallic shrugs and vague answers that only confused the issue. We can only venture an opinion and suggest that the action is entirely mechanical in that it would seem to lessen the pressure on the forward two cylinders and create a gas cushion that might tend to bounce the gas slugs rearward. This is just a guess, however, and we'd like to hear from any engineers on the subject.

The driveline of the 404 has also been changed in that the transmission has been given a change of gears. Where in the 403 the lower three gears were widely spaced with third gear direct and fourth an overdrive, the 404 transmission now has all three lower gears indirect and closer spaced with fourth a direct gear. To take advantage of this, the worm drive rear end has been raised to 4.2 to 1. The box is dead silent at all speeds and in all gears. We stood in a room where *every* box is taken for testing and saw several taken up to 7000 rpm in each gear with hardly an audible sound, scarcely moving the large sound meter on the wall.

The other major new aspect of the 404 is the front suspension set-up. The entire front assembly, as mentioned, forms a single unit. This includes the front crossmember, the steering gearbox, the engine and the suspension system. This last consists of a lower link with a locating control arm and a telescopic pillar topped by a coil spring. The action is somewhat similar to a sliding pillar suspension but differs in that the wheel and hub do not move up on a fixed pillar but are attached to a very large telescopic shock absorber that also acts as an upper locating member. The lower link is ball jointed and the hub, wheel and lower shock combination pivot on this. The result is almost nil wheel deflection on roll. The net effect is that it handles beautifully on the road with no tendency to plow out or to hop.

When all this is boiled down into what the 404 actually is, we find a car that, as mentioned, does exactly what it was intended it should do. It cruises at high speeds for mile after mile, silently and effortlessly on very little gas and without tiring the driver or passengers. It is, moreover, one of the very best looking medium sized cars on anybody's road today. All this, coupled with the quality of workmanship and material, make the Peugeot 404 about as much car as one could, in a moment of the most rash optimism, expect to get for the money involved. Or for $500 more for that matter.

—John Christy

THE RACING BUGATTIS

continued from page 81

The reason that no recital of the facts can convey the substance of the Bugatti legend, or destroy it, either, is that the legend is based on intangibles. It is not important that the claim of the Type 35 Bugatti to being the greatest racing car of all time is no longer valid. It still is one of the greatest and it will be when rubber-tired gasoline-engined race-cars seem as odd as four horse chariots seem now. More, it carries the mark, it moves with the aura of the strange, imperious man who conceived it; of the devoted, long-working men who made it, the Marcos and Friderichs and the hundreds of others; of the gallants who drove it, Brivio, Chiron, Dreyfus, Varzi, Nuvolari, Veyron, Lehoux, Howe, Czaykowsky, Divo, Constantini, Etancelin, Benoist, Sommer, Williams, Eyston, Campbell, Conneli, Goux, Trintignant, De Vizcaya, Baccoli, Itier, Juneck and so many others. Contained in it is some of the air of the unique little enclave in Bas-Rhin in which it was built, where, during the golden years, as Rene Dreyfus has said, one might feel that one was not a citizen of France, but of Bugatti's own small but enchanting domain. The car is precious because it proves the truth of the legend on which it feeds: these people did exist, they did move, in a time which can never be paralleled, in a place the like of which no one could hope to recreate today. And then there's the way the thing looks, and sounds, and moves . . . a Bugatti, after all, a Bugatti of Molsheim, and not anything less. — *Ken W. Purdy*

LIGHT THE FUSE ON YOUR PORSCHE

continued from page 75

car suffered from an unusual flat spot in the middle of the range after he installed a theoretically beautiful set of pipes and it would nearly come to a halt in certain turns. By adding small reverse cones to the tips, the condition was corrected and the car returned to winning form. So, experimentation is still in order in this department.

Having gone from the carburetors to the tailpipes, we find ourselves with this question: "How much shall I do?"

To answer, we have set up a few budget categories and obtained approximations of costs. These can, necessarily, be no more than pre-estimates (but not too far out in left field), because of the attitude taken by different mechanics. Some regard such tinkering as almost a hobby and tend to lower their shop time charges below straight repair work, others will make it pay, of course. If you can handle any portion of the work yourself, the savings will be obvious.

Assume that our subject is a late 1600 Super.

#1. For the beginner: Remove and refit engine, raise compression, re-jet carburetors, match and polish ports, power-tune $100

#2. Same as above but add: chop flywheel, touch up valves, install stiffer (Isky) springs, Carrera clutch.....$150

#3. Top this off with: Balance engine, raise oil pressure, new oil pump, new shut off cock, Webco springs....$200

#4. Install re-ground cam, plus above .....$250 to $275

If we had begun with a 1600 N (cast iron barrels) we could have spent a little more and had it bored out approximately 0.090 of an inch, fitted with J & E pistons and stuck on the Super carburetors and manifolds. This combination comes on nicely with about 75 road horsepower at 5500 rpm and does not run the bill up too much.

The combination of a 107 cam, porting, polishing, balancing, rejetting and power tuning will get the above-mentioned 75 road horsepower from nearly any 1600S. This represents a gain of 15 percent over stock output (most cars of this type register between 60 and 63 horsepower on this particular dyno) and is completely safe as far as any over-stressing might be concerned. Performance must, of course, be experienced to be believed, but such a Convertible D has turned the quarter mile at 85 mph in 15.60 sec.

Next time the hot rod boys hold a drag session, try your own beetle against this yardstick and then see if it wouldn't be eminently desirable to follow some of the tips incorporated here and light the fuse yourself.

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