MOTOR TREND

OCTOBER 1956 25c

DETROIT'S '57 CAR?...

...What Will Fuel Injection and 14-Inch Tires Do For It?

WIN A '57 PLYMOUTH! See Page 20

First Road Test

THE CAR THAT'S 5 YEARS AHEAD!

See page 34

Why Wax Your Car?

THE CAR THAT'S 5 YEARS AHEAD

ROAD TEST: citroën

an MT Research Report by Pete Molson

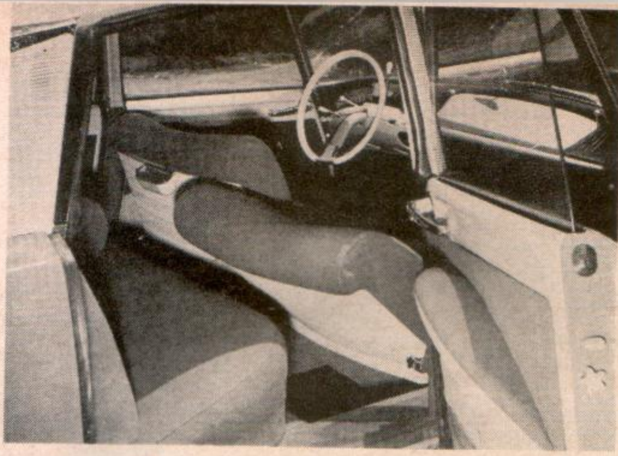
Lower the front seat back and there's a chaise

photos by Bob D'Olivo

AS MOTOR TREND'S long-term readers know, we do not lightly toss off phrases like "the car that's 5 years ahead." So let us assure you at once that it is not intended lightly here. Just ask yourself what you would like in a Detroit-built car: Would it be a suspension that let you hurl the car over jagged holes in the road with no sign whatever, even an audible one? Would it be unprecedented comfort, in seats whose super-softness somehow managed to support you without fatigue for hundreds of miles? With this, would you like flat, fast cornering? Brakes that showed no loss of ease or efficiency after a fade test 500 per cent as severe as that given to any '56 MT test car? Fuel economy averaging 25 mpg?

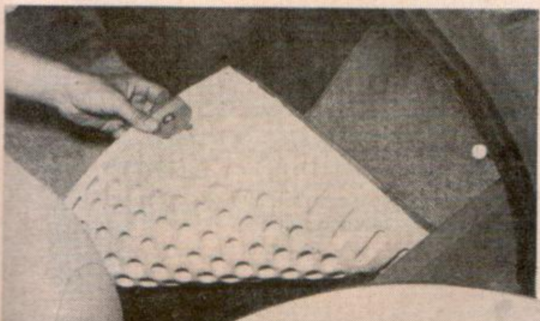
We thought you would be as interested as we were, and since the DS-19 is still extremely rare in the U.S., we want to take you for a ride in it. Let's pick up the test car from Armand Garnier, West Coast Factory Representative for Citroen Cars Corp. The outside appearance is much more startling than in photos; a very few people ask, "Is it a new Studebaker?" but the resemblance does not extend beyond the front view. From the side and rear, the DS-19 is its Gallic self. The feature that contributes most to this is the position of the rear wheels, as close as possible to the corners of the car and one of the rare characteristics shared with earlier models. But open the door with one of the few conventional controls, a pushbutton door latch. The glass is an uninterrupted expanse, with no vent pane (none is needed, as you'll see) and no frame; rubber bumpers around the door opening itself prevent breakage.

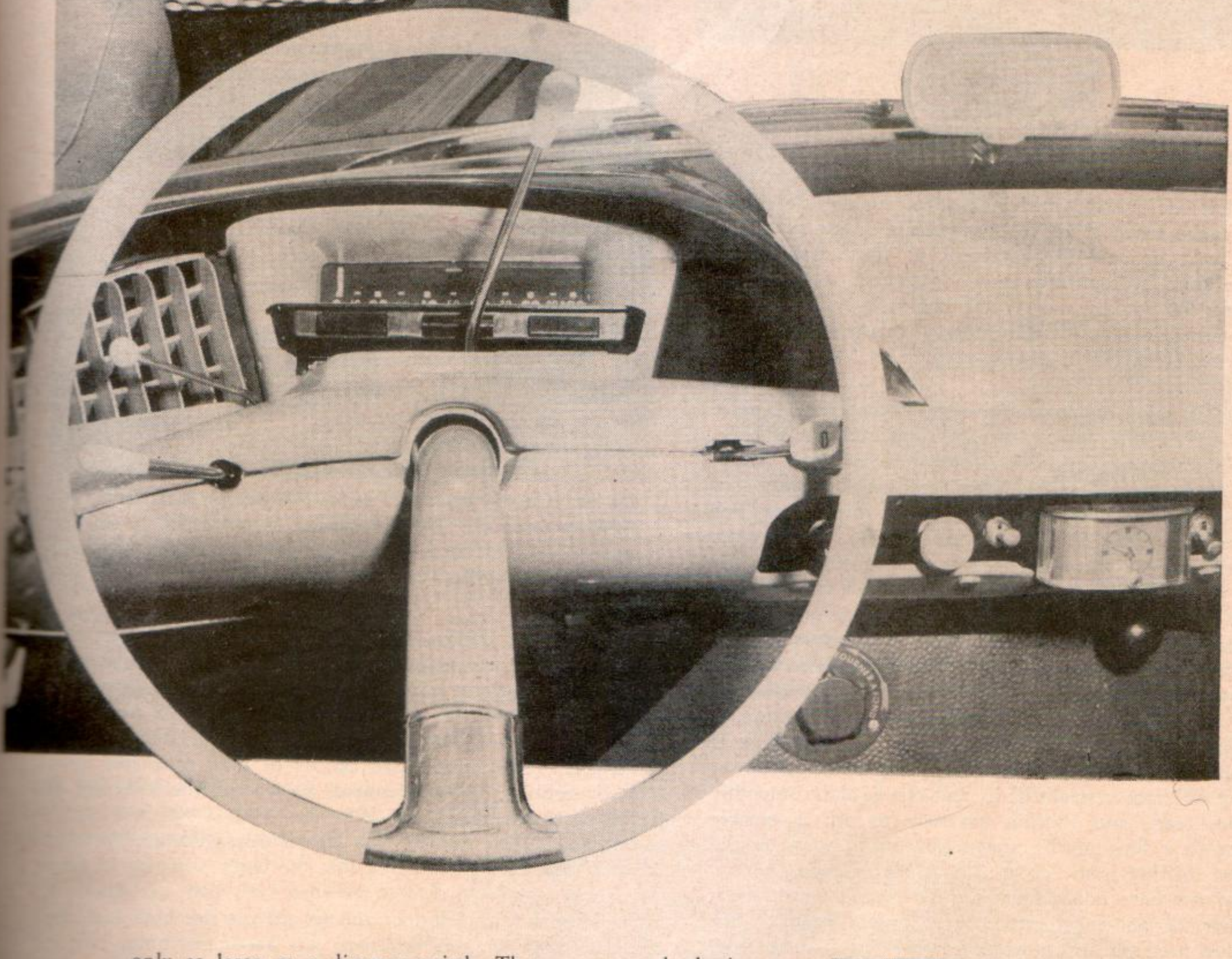
The steering wheel cannot be ignored. It has one spoke or none, depending on how you look at it; the column itself seems to emerge from the dash, then curve to meet the wheel rim at the 9 o'clock position (when you're going straight ahead). Where is the brake pedal? Unless the light is good, you may miss it altogether, for tho it's in the usual spot, it's



For even greater relaxation while riding, pick your favorite back angle

Secret of comfort underfoot: thick foam backing





only as large as a dimmer switch. There are several plastic-tipped levers that could be the gearshift (none is where you'd expect it), a large housing extends under the dash into the center of the front compartment, and we'll get to the array of switches later. Suffice it to say that one is for an electric shaver.

Over the 6-inch sill you go and down into foam-rubber-backed carpet. Adjust the seat to your liking, then do the same with the back. The former control is an ordinary one, conventionally placed; the latter requires a hand at each side of the seatback's base. You may choose from sitting bolt upright, lying supine, or myriad positions in between. Vision is vast, the cornerposts almost impossibly small. Switch on the ignition, reach over the weird wheel to the lever sticking straight up behind it (this one's the gearshift) and press it to the left. With this one movement, you have placed the gears in neutral and started the engine (there's a seldom-needed hand choke and manual spark as well). It idles quietly and without vibration even when cold.

continued

The very small button is the power brake control

The rear is perhaps the cleanest portion of a generally clean design. Rear lights are everywhere: inside the beautiful bumper, outside it, and even on the Fiberglas roof. An unexpected bonus showed up when we were toting some plants in the deep trunk: there's no blind spot when the lid is open

Now return the shift lever a little to the right and press it toward the horizontal speedometer. Hold your foot (we recommend the left one, possibly without a shoe) on the tiny brake pedal till you're ready to move, then release it and press the throttle. Clutch action—disengagement as the selector fork moved the gears hydraulically, and engagement afterwards—was handled for you by the central hydraulic system and 2 valves, connected in series, which carry out this work whenever the gear lever is moved or engine revolutions drop down to idling speed.

But what is going on now? The rear of the car is rapidly sinking as we take off, only to right itself again almost at once. To get to 2nd gear, pull the lever directly toward you (numbers guide early attempts); this one shift is a special problem for beginners, whose momentary release of the throttle may not coincide with the automatic clutch action. In short, you may get a sharp jerk. In experimenting, we even tried not releasing the gas pedal at all during the shift. This produced ultra-smooth action but embarrassing engine racing reminiscent of an early Hydra-Matic. From 2nd to 3rd and 4th (which is overdrive) the lever moves laterally in a single plane roughly parallel to the steering wheel's rim. These shifts are much less ticklish than that from low to 2nd. A definite gate marks each position.

Acceleration, you've found, is satisfactory if the engine is revving sufficiently. It's not near that of any 200-horsepower V8. Taking off from a standstill in 2nd can be done smoothly but without haste, and shifting too soon to 4th is quickly remedied with a flick of the finger; your hand stays on the wheel when shifting from 2nd to 3rd to 4th or back again.

You may not have noticed that the DS-19 has power steering. It's not the one-finger variety of Chrysler products, but has even less need for arm movement (there are 3 turns from lock to lock). A small resistance comes to your attention as you turn the wheel. You're feeling the spring-loaded cam which acts as an automatic pilot on straight roads. You can actually remove your hands from the wheel at high speeds, if you feel so inclined, and the car will proceed along a flat road without a waver, untroubled by road irregularities or side winds. Veering to the right is delayed somewhat on a crowned road. But a more practical use for this device is the elimination of constant correction when cruising. The quick ratio, the hydraulic boost and the fine ride, plus superlative roadability, do away—to a miraculous extent—with tiredness on curving roads as well.

The greatest surprise awaits you when you put this car's hydro-pneumatic suspension to the test. On good roads, nearly any car will transport you comfortably today. Here you may notice very little difference in the Citroen from conventional springing, tho choppiness is never present (the car is 2 inches shorter overall than a Rambler, yet its wheelbase is only 3 inches less than a Lincoln's). Hunt up the worst road available—one with big bumps, dips, or, as we did, a one-lane dirt track, rutted by mountain storms and totally unmaintained—and you can hurl the Citroen over it with only an occasional light thump from the underpinnings. Usually you will hear nothing. You won't feel anything, either, and neither will your passengers. Three consecutive carfuls of ours were left incoherently babbling in wonderment. So what is there to say? It has to be experienced.

What about no road at all? This is negotiable in either of 2 ways: Just take off, trusting that the holes won't be so deep that you'll scrape the car's streamlined belly pan; or pull up a white lever at your left foot and let the car rise high into the air. This will let you negotiate just about anything, but at slower speeds, for the insulated ride vanishes when the car is up on its tiptoes.

A gentle approach to this car's remarkable brakes is mandatory. We found that a sort of rolling motion over the pedal with the arch of our left foot (shoes off, as noted) gave us the best control. Braking is almost totally level, with no tendency at all to throw passengers forward in ordinary driving and very little even in panic stops. Feathering is automatic as you come to a normal standstill. You may have difficulty overcoming a tendency to grab, until you realize just how light your foot pressure should be. Panicking is easy on the 1st try—it's hard to learn to trust so insignificant a pedal. Just after you come to a stop, the front end rises gently and you realize that even the unnoticeable front-end dip was enough to work the levelizer.

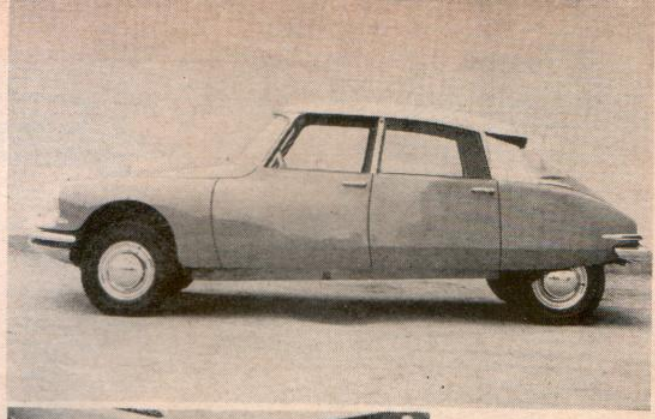
A car like this is a great temptation to horse around, and we were not immune. Noting the automatic jerk-free feathering and the light foot pressure required, we tried (on a clear road) a stop with constantly increasing pedal pressure. What was our

astonishment to find that the front end not only rose, as before, but that the whole car tended to float gently backward after stopping! (Our tactics here would ordinarily never be used, so don't be alarmed.)

The greatest fun for bystanders came when we raised the car high in the air, then let it sink to its knees. Not purely for amusement, this trick is useful in the unlikely event that one of the Michelin X tires (steel "cords" go under their treads) should fail. The DS-19 then requires only some manipulation of the lever at your feet after you place a tripod in position at the side. The actual jacking is automatic, and there's but one central lug bolt on each wheel!

Well, there's a taste. Now let's look more closely at what makes the Citroen behave in this remarkable way, and why it is so creative a contribution to international automobile history. The engine, tho with few faults, is unexciting. A largely conventional 4-cylinder, long-stroke unit (bore is 3.07 inches, stroke 3.94) develops only a modest 80 horsepower at 4500 rpm from its 117 cubic inches. This puts it well within the European 2-liter classification; to be exact, its metric displacement is 1911 cc. Various features help to explain why it feels as tho there might be a few more than 80 horses: an aluminum head has large, 60-degree-inclined valves and hemispherical combustion chambers (but its compression ratio of 7.5 to 1 makes premium fuel, at least on this side of the water, a pointless extravagance even with the dash-mounted spark control); a 2-barrel Weber carburetor cues in its reserve throttle only when the primary one has opened completely, and exhaust is released in a 2-stage operation involving an expansion chamber at the right of the radiator and a muffler that sits laterally near the front of the car; the flattened tailpipe itself then runs straight back, in the center, beneath the smooth belly pan. Ignition is via 2 coils (a spark plug connects to each end of each coil) and circuit breakers that require no adjustment and eliminate a distributor. A spark is provided at every revolution.

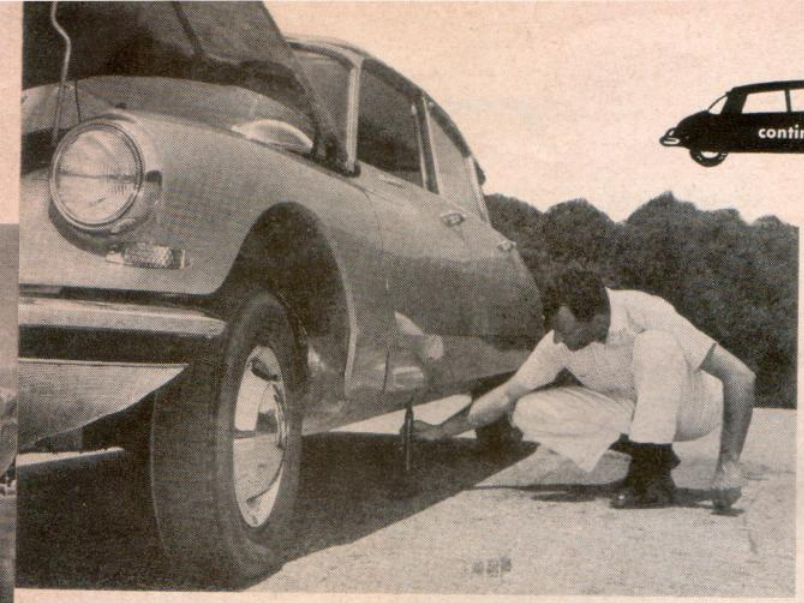
So the heart of this remarkable machine is evidently not its engine. Instead, it is the central hydraulic system, with its big reservoir (containing brake fluid), engine-driven 7-cylinder pump and central accumulator to maintain pressure, that has charge of almost all the strange things that go on around the DS-19. (The accumulator is a sphere whose top half, filled with an inert gas under pressure, is separated from the fluid by a rubber diaphragm.) The "brain's" most impressive and indispensable job is on the suspension, whose effect is so dramatic as to make it quite safe to predict that Detroit must come to this, and



Center photo shows the foot-operated mechanical emergency brake, which works on the inboard-mounted front discs. Release and lock are at top left, up under dash. Beneath them is a horizontal ring to release the hood, and below it the white lever that shoots the DS-19 into the air or lets it burrow into the sand

Amaze your friends! This actual double exposure shows the lengths, or rather heights, to which Citroen designers have gone. Feature is practical, permits travel over deep ruts

continued



continued

In the unlikely event that one of the Michelin X tires should fail, put this tripod in the socket under the doors. Then start the engine, push the white lever in the driver's compartment (page 37), and the side will rise

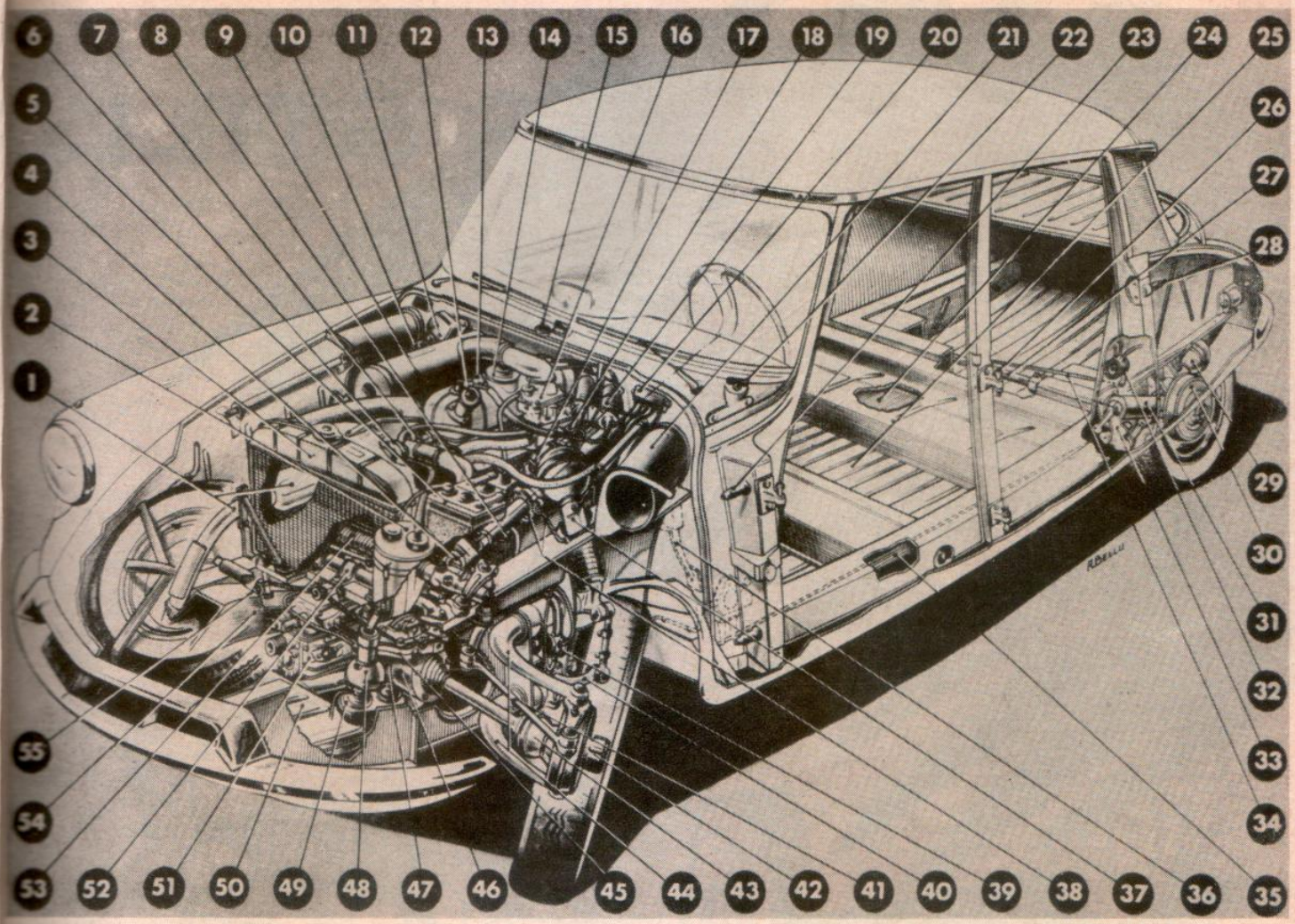
The actual work of removing the wheels is still for the owner, but it's not too rugged with only one lug bolt

before many years have passed. All 4 wheels are independent (remember that the Citroen has front drive, complicating matters somewhat). The front ones are mounted on 2 articulating arms each, the rear wheels on only one. The arms for each wheel are linked to a hydraulic cylinder (with a built-in shock absorber) which ends in a sphere similar to the main accumulator. Now let's see what happens when a wheel hits a bump: Vertical wheel movement affects the piston in the cylinder because the articulating arms are connected directly to both the wheel and the piston. The piston's movement thus compresses (or decompresses) the gas in the sphere for that wheel thru the medium of the hydraulic fluid. A damper valve between the cylinder and the sphere—in effect, the shock absorber—controls the flow of the hydraulic fluid in either direction, smoothing out high-frequency movements of the wheel and preventing rebound.

The 2 height correction valves (one front, one rear) adjust height variations at front or rear by automatically varying the amount of fluid in the 2 suspension units that each of the valves controls. Fluid is permitted to enter from the main accumulator, or to escape back to the reservoir. This is not merely an additional luxury touch to add to passengers' comfort or avoid the irritation of ill-focused headlights when the trunk is full of luggage. Instead, it lies at the very heart of the impressive combination of softness and astonishing control that characterize the DS-19's

When it's a rear tire that needs changing, you must remove the entire fender. This, too, is easier than it sounds: you remove a single bolt

CITROËN DS 19



COURTESY L' AUTO JOURNAL

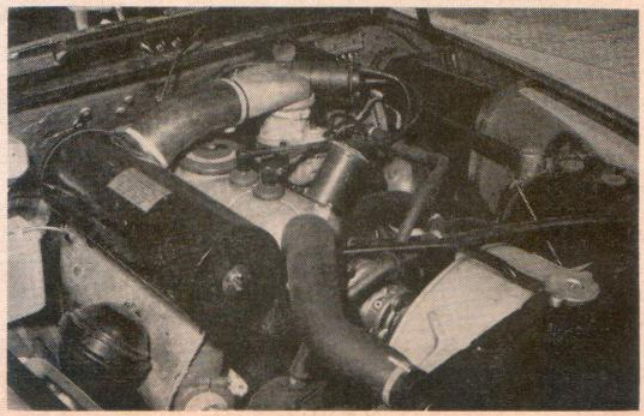
1. Exhaust pipe 2. Reservoir for hydraulic system 3. Radiator 4. Hydraulic steering distributor 5. Battery 6. Low-pressure hydraulic pump 7. Water pump 8. Fuel pump 9. Air filter 10. Windshield washer reservoir 11. Windshield wiper motor 12. Oil filler 13. Spark plug 14. Breather 15. Hole for access to 4th spark plug 16. Carburetor 17. Oil dipstick 18. Fluid gear selector and clutch unit 19. Coils 20. Wiring distribution unit 21. Left-hand air vent 22. Windshield mounting 23. Front fender mounting bolts 24. Fuel tank 25. Floor extending under entire car 26. Door hinges (ball) 27. Roll bar 28. Rear fender mounting bolts 29. Rear suspension unit 30. Drum brake 31. Rear suspension arm 32. Rear height equalizer 33. Rear suspension actuating arm 34. Operating bar for equalizer 35. Conduit for hydraulic lines and manual height control 36. Emergency brake pedal 37. Front suspension cylinder 38. Cam to hold steering in straight line 39. Front height stabilizer 40. Torsion bar 41. Tierod 42. Spindle 43. Universal joint 44. Front suspension arm 45. Line from brake to brake cylinder 46. Universal joint 47. Front disc brake 48. Accumulator and pressure regulator 49. Front and rear brake accumulators 50. Muffler 51. Gearbox 52. Gearbox mounting 53. Steering (rack and pinion) 54. Cooling tunnel for one front brake 55. Mounting for disc brake. Surprising as these features are, they don't prepare drivers for the results

ride. For in an ordinary car it is necessary to have a higher spring rate than comfort alone would dictate, in order to prevent total collapse of the suspension under an occasional heavy load. Since the "springing" stays the same on the Citroen regardless of how it is loaded, the spring rate can be lowered sharply.

Now let's take a look at those brakes, unquestionably as fine as any non-competition brakes we've used. That tiny foot pedal actually only controls the hydraulic pressure to be applied. You do none of the real work of braking when you gently nudge it. Pressure comes from the same source as it does for all the car's hydraulically operated components, with separate oil/gas spheres for the front discs and the rear drums. If one system should go out of whack, the other will continue to work. Front brakes, located inboard, are air cooled and they need no adjustment. Rear brakes are ordinary 10-inch drums.

Don Francisco's terse comment at the end of the most astonishing braking test in MOTOR TREND'S experience—"Brakes it's got"—must go down as one of history's masterful understatements. The feeling of confidence that your DS-19 will always stop safely, come what may, is the top benefit to any driver. Even if you don't customarily read our performance tables, compare the brake fade test results at the end of the text with those for any U.S. car—and you might remind your favorite manufacturer to do the same.

Braking force is distributed automatically between front and rear brakes according to rear-axle load so you'll never get that unnerving feeling of not being in control when you have a heavily loaded car. There is reserve pressure in both front and rear accumulators to stop the car if the engine should stall. And not the least aid to peace of mind is the foot emergency brake, at your left. It operates the front discs (*Continued on page 54*)



Front suspension sphere is at lower left, air cleaner above it, fan in white case

makers recommend waxing a car no less than 3 times a year. However, it should be underlined that paint coatings on most new cars will not stand more than 4 or 5 thoro cleanings with abrasive cleaner before you are down to the primer undercoat. For the greatest satisfaction (and least work) you might consider one good cleaning a year, followed by additional liquid or paste wax every other month.

Those Wonder Paints

Related to this subject of polish are new and highly durable automotive finishes which paint makers claim will not require waxing or polishing for a minimum period of 18 months. A large producer of auto polish has tested these new paints and says, "None of the new finishes, including lucite lacquers and mellomine resin enamels, have a resistance against the trapping of dirt, dust, and various other foreign matter which can rapidly discolor any finish."

There will be new ingredients and new physical phenomena in the future. Increased demands are being placed on makers of cleaners and waxes by the eye-irritating industrial fumes which are ruining new cars right and left. Even modern colors pose challenges of gloss preservation. Tomorrow may find a completely new group of cleaners and waxes to satisfy the ever-present urge for a new and even quicker means of keeping the family car bright and beautiful. —W.C.

CLEANERS
DU PONT No. "7" Auto Polish and Cleaner
DU PONT Speedy Cleaner
DU PONT "Seven-ite" Cleaner
SIMONIZ Bodysheen
SIMONIZ Liquid Kleener
SIMONIZ Paste Kleener
MAC'S Special Cleaner
JOHNSON'S Car-plate Cleaner
INSUL EASE Pre-Wax Cleaner
BARRIS KUSTOM Pre-Wax Cleaner
JOHNSON'S Heavy Duty Cleaner
TURTLE WAX Color-bak Heavy Duty Cleaner

LIQUID WAXES
SIMONIZ Bodygard
DU PONT "Seven-ite"
TURTLE WAX Auto Polish
TURTLE WAX Plastone
MEGUIAR'S Mirror Glaze Formula 1-16-C
JOHNSON'S Car-plate Wax

PASTE WAXES
MAC'S-IT Super Glaze
DU PONT Auto Wax
KARSEAL Professional Wax
JOHNSON'S Auto Wax
INSUL EASE Auto Wax
SIMONIZ
BARRIS KUSTOM KOLOR Wax

LIQUID CLEANER-WAX COMBINATIONS
SEAL PLATE Car Glaze (contains fluorocarbons)
KARSEAL Wax Seal
KARSEAL Car Cleaner
JOHNSON'S Deep Gloss Carnu
AUTOBRITE Silicone Car Cleaner

PASTE CLEANER-WAX COMBINATIONS
SEAL PLATE Waxene (contains fluorocarbons)
DU PONT New Car Wax (contains silicones)
JOHNSON'S J-Wax
SIMONIZ Vista
MAC'S IT New Car Finish

SPECIAL FINISHING TREATMENTS
BLUE CORAL Liquid (manually or machine applied)
BLUE CORAL Preservative Sealer
MEGUIAR'S Mirror Glaze Machine Cleaner
MEGUIAR'S Mirror Glaze Sealer and Reseal Glaze
CARJOY (combination car wash, cleaner, and wax)

This is a partial list of the major automotive paint finishing materials. All are available in local stores, with the exception of 2 new products which are not yet nationally distributed. CARJOY may be purchased from the Clinton Detergent Co., Inc., 307T N. Michigan Ave., Chicago 1; SEAL PLATE and KARSEAL may be ordered from the Karseal Corp., Dept. T-1, 915 N. Highland Ave., Los Angeles 38.

Citroen DS-19 Road Test

continued from page 39

with a strength unknown to any other emergency brake we've ever tried. We used it twice to halt the car—as usual, with no nose-down—from 60 mph. Driving all day using it alone would be no strain.

The DS-19's power steering is foolproof, too. The same rack and pinion system used on earlier models is complete and ready for instant substitution should the power fail. In power operation, there is no direct mechanical connection between the bizarre wheel and the rack itself. According to the direction in which you turn the wheel, one of a pair of valves admits fluid to one side or the other of a cylinder. The rack is operated directly from the cylinder via a connecting rod. The pinion only follows the rack in normal use. Should a hydraulic failure occur, the striking plate that ordinarily operates the valves simply hits the valve body and operates the steering mechanically.

Power control of the gearbox, tho complex, seems worthwhile to make possible the quick, all-in-the-same-line action among the 3 higher gears. Once you get onto it, which took MT's test drivers varying lengths of time apparently unrelated to the breadth of their experience, it seems natural. Hydraulic cylinders replace the conventional levers at each end of the selector fork shafts. When you move the selector lever, fluid is admitted under pressure into the proper cylinder, and the pressure moves selector shaft, fork, and gear until the gear is engaged. When you release pressure on the selector (as a preliminary to selecting another

gear), a return spring puts the shaft, fork, and gear in the neutral position.

Hydraulic operation of the gearbox is of course interconnected with that of the clutch (we'll come to it in a moment) but some of the secondary jobs which the gearbox control must handle are these: 1) engagement of a gear must wait till the clutch is disengaged; 2) no matter how fast the gear change, it must be done in the 2 stages of approach and engagement; 3) the clutch must re-engage when the change is complete, and 4) the gears must remain locked until the selector is moved again. This does not, due to the automatic clutch operation, give you automatic engine braking the instant you engage a lower gear; such deceleration awaits a tap on the throttle that raises rpms above the point of automatic clutch engagement. A corollary to this is that steep-hill parking goes without benefit of locking the drive wheels unless you switch on the manual clutch control under the dash. This releases pressure in the clutch-operating cylinder, allowing starting with the crank (it works on the gearbox), towing, and tappet adjustment.

Good sense shows up in the placement of the hydraulic controls for both clutch and gearbox adjacent to the steering column. Let's see what remains a mystery in control of the clutch: We have no objection to its arrangement, which seems simple enough, but the change from low to 2nd, as already noted, can be less than pleasant. What happens is that 2 control mechanisms, mounted in series, cause engagement or disengagement. One of these connects directly to the gear selector lever; it handles withdrawal of the clutch before gear engagement, and re-engagement of the clutch after the gear is engaged. The other automatically disengages the clutch whenever engine rpms drop to idling speed.

These 2 controls operate a valve which either admits fluid under pressure from the main accumulator to the clutch-operating cylinder (thus disengaging the clutch), or releases fluid back to the reservoir, letting the clutch re-engage under the action of the return spring.

Now let's snoop around some more, starting with the engine compartment. The aluminum hood is more securely locked than most (tho it shakes during driving), having that sadly-missed-from-our-cars feature of an interior release, plus 2 exterior latches. First to confront you is the spare tire, parked nearly horizontally in front of the low radiator but apparently no barrier to efficient cooling, except perhaps in 60-stop brake fade tests. It would be a fine bumper in case of collision. Shrouded behind it is an 8-bladed fan of flexible nylon; far to the rear (responsible for the curious protrusion into the front compartment) is the 4-banger powerplant with its oversized valve cover. The oil dipstick is not too easy to reach thru a maze of hydraulic tubing and foreign-looking components, and contains only notches to indicate how much oil is in the crankcase. Heater and vent apparatus take up a large amount of under-hood space, and noticeable with the hood up is the groove into which the wipers retire when thru with their work (more on them later, when we go inside).

Visible from the outside is a large quantity of rubber weather stripping, a potential annoyance that, tho its use is ingenious, might well have to be replaced rather soon. It surrounds the wraparound windshield and rear window, as well as the doors and their frameless windows. The Fiberglas roof makes possible corner and center posts that anyone can "see thru"; at the top rear corners of the roof are the powerfully flashing turn signals, thoughtfully located to prevent accidents to so low (58 inches) and compact a car as this.

All wiring, inside and out, being located below the top line of the windows, we investigated the method of attachment of the roof to its moorings. A few Phillips-head screws at each side alone are responsible, and it was only the advent of presstime that stopped us from turning

the test car into a convertible right there on the spot.

The rear quarter roof support is broad by current U.S. standards, and causes a slight blind spot in traffic. Behind the rear window is a deep rain-water groove, like that in which the wipers rest in front. The trunk lid, of aluminum like the hood, rises at the touch of a push-button and may be locked or not. It reveals an unorthodox luggage compartment, strangely bare looking. Of course, the spare is missing, but so is the gas tank. To lend depth to the trunk, which reaches all the way to the belly pan, the tank has moved up under the rear seat, where it is also safer in rear-end collisions. Holding 17 gallons and filling thru the right rear fender, it makes a 400-mile trip possible without refueling.

Should you need to change a rear tire, just remove the fender by loosening one nut over the tail light. The entire quarter panel, from trunk to door, then comes off. The hydraulic system does the work.

The interior is simply one surprise after another, almost all of the "Why didn't someone think of that before?" variety. Padding is everywhere: floor, seats, armrests (those on the doors and the central folding one in the rear seat appear to contain nothing *but* foam rubber), even on the quarter panels beside the rear seat and over windshield and windows. Even the doors have their peculiarities. Window regulators on the test car were too stiff; they require 5 full turns. Each one has as clever a piece of multi-purpose design as we've seen, in the form of a combination latch, lock, and grab handle. Only the latch and lock control move; the rest is stationary, as on a modern exterior door handle. As a safeguard against accidentally opening a door that has been locked, you must reverse the unlocking movement to unlatch the door.

If you wonder why a grab bar is needed in so flat-cornering a car, it is because even Citroen engineers have yet to do away with centrifugal force. With the astonishing ability of the DS-19 to change direction with aplomb, you may inadvertently throw your passengers around.

There are 4 interior lights, 2 by the rear seat and 2 on the center posts. Seats are washable matte-finish nylon jersey in a variety of brilliant colors, each obtainable only with certain exterior finishes. Not as long as a domestic bed, that in the Citroen should still hold no hardships; another pleasant use of the right side, when it's folded flat, is as a chaise longue. And the foam-backed floor carpet (held in place by gripper fasteners, as on long-ago classics) contributes to the plush feeling. Even if you're the proper type, we predict that you'll take your shoes off, too!

Let's complete our full circle with a return to the control center. Tho shrouded, the instrument panel did cast some

reflections on the windshield. In addition to the speedometer, odometer and a reset-table trip mileage indicator, there are a fuel gauge and an ammeter. The absence of an oil pressure or water temperature gauge is unexplained (said one impressed bystander, "Maybe they've just fixed it so nothing ever goes wrong!"). Warning lights advise you on bright lights and direction signals, the switch for the latter being a clickety-clack timing device handy to your left hand as it rests on the wheel. Equally handy to your right hand is a talented lever that you push lightly for the city horn, push harder for the country horn, turn for various headlight-parking light combinations, and pull toward you to dim highway lights for passing.

The world's largest glove compartment has a nearly flat plastic lid; it's in a corner of this cavernous space that a radio goes. Pull the clock under the dash, and it becomes an ashtray. Pull the LG (*lave glace*) knob and you get a clean windshield. A switch starts the electric wipers, but if you don't trust things mechanical, yank out the under-dash hand lever and work 'em yourself. There's a red rheostat knob for the defrosters, plus the choke, spark, and aforementioned plug for your electric shaver or coffee maker.

Multitudinous knobs and louvers control ventilation and heating. You can direct air on your face or over your head, and to your feet. Travel with all windows closed if you like, tho the streamlining is efficient enough to have done away with many drafts when they are open, and this without benefit of door vents. Conversation is easy even at high speed. Individual controls supply the preferred type of air to the driver, front passenger, and to those in the rear seat, for whom there is a separate outlet near their feet. Almost the entire dash, plus the steering wheel, is plastic, intended to give way at a properly cushioning rate in case of violent impact.

No one who considers himself well informed about automobiles should pass up a chance to see and ride in the DS-19; no one planning to buy a car in the $3000 range should sign an order blank before getting to know this astonishing car.—**P.M.**

PERFORMANCE

ACCELERATION
From Standing Start
0-45 mph 11.2 0-60 mph 18.4
Quarter-mile 21.4 and 64 mph
Passing Speeds
30-50 mph 6.9 45-60 mph 7.4

FUEL CONSUMPTION
Used Mobilgas R
Stop-and-Go Driving
25.1 mpg tank average
Steady Speeds (4th Gear)
35.0 mpg @ 30 34 mpg @ 45
29.4 mpg @ 60

STOPPING DISTANCE
168 feet from 60 mph

BRAKE FADE
Chattering noticed in front discs on 39th stop from 60 mph during last 10 feet before car came to standstill. Chattering became slightly more pronounced during subsequent stops but only affected last 10 feet. Ceased tests after 60th stop because of overheated engine; front discs were smoking slightly, but an additional panic stop locked all 4 wheels, was "easy and efficient as 1st panic stop." Odor of brake lining present from 3rd stop onward

TOP SPEED
90 mph

SPEEDOMETER ERROR
Read 32 at true 30, 48 at 45
63 at 60, and 74 at 75

SPECIFICATIONS

Engine: Ohv 4. Bore 3.07 in. Stroke 3.94 in. Stroke/bore ratio 1.28:1. Compression ratio 7.5:1. Displacement 116.6 cu. in. Advertised bhp 80 @ 4500 rpm. Bhp per cu. in. 0.686. Piston speed @ max. bhp 2955 ft. per min. Max. bmep 1303 psi. Max. torque 101 lbs.-ft.

TRANSMISSION: 4-speed synchromesh with hydraulic operation but complete manual control. RATIOS: 1st 3.55:1, 2nd 1.89:1, 3rd 1.23:1, 4th 0.85:1, reverse 3.80:1.

FRONT-AXLE RATIO (car is front drive): 3.89:1.

STEERING: Turning diameter 36 ft 1 in. Number of turns lock to lock 3. Type: rack and pinion. Power steering standard.

WEIGHT: 2475 lbs. Weight/bhp ratio 33:1.

TIRES: 6.50 x 15.75 Michelin X with steel mesh.

PRICE: (Including suggested retail price at port of entry, federal tax, and delivery and handling charges, but not additional freight.) $3295 with all equipment described in text, including fresh-air heater-defrosters. Radio and whitewall tires extra.

DIMENSIONS

A	FRONT OVERHANG	36
B	WHEELBASE	123.1
C	REAR OVERHANG	28
D	OVERALL HEIGHT	57.9
E	MINIMUM GROUND CLEARANCE	6.3
F	FRONT LEGROOM	45.5 max.
G	REAR LEGROOM	47.0 max.
H	FRONT HEADROOM	35.4
I	REAR HEADROOM	33.8
J	OVERALL LENGTH	189.1
K	OVERALL WIDTH	70.5
L	FRONT SHOULDER ROOM	51.2
M	REAR SHOULDER ROOM	47.3
N	TRUNK CAPACITY	17.5 cu. ft.