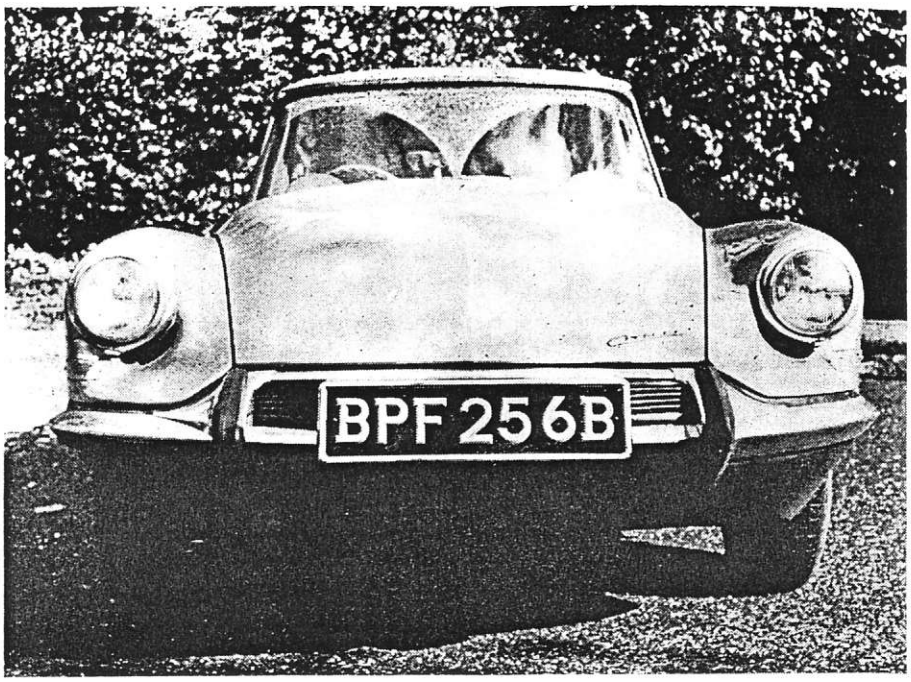
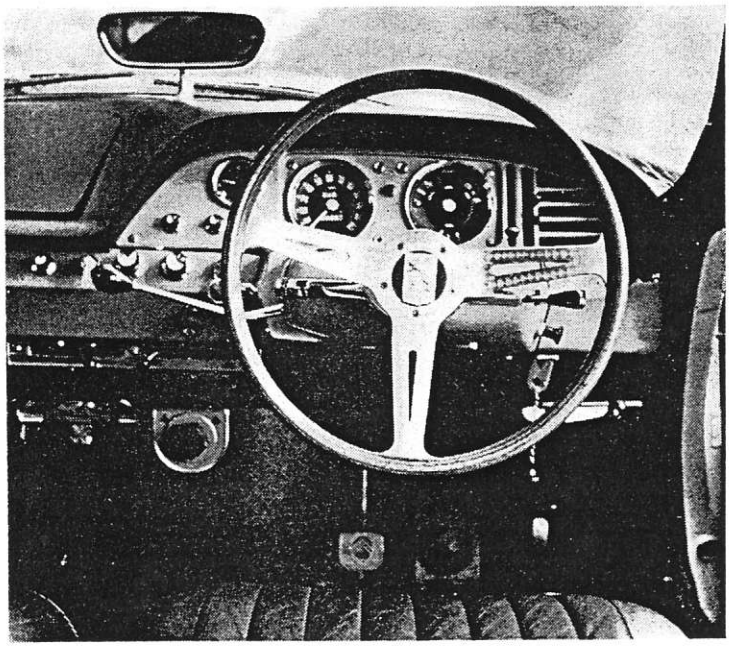


Aerodynamic front of the Citroen DW enables 100 mph cruising with a modest power output. Poor sweep of the wiper blades is apparent

Modified Car Series No.3

Connaught Citroen D.W.

The woodrim steering wheel fitted by Connaught improves the driving position. Brake 'pressure pad' can be seen



IF comfort and individuality are the two prime factors in choosing a new car at around £1,500 the two 'big' Citroens offer a style of motoring which advertisements correctly describe as "unique". Superb pneumatic suspension, power assisted steering and disc braking, and a comfortable and roomy interior give the sort of ride that one expects from a stately limousine—even at speed on cart tracks!

The car's shortcomings are heavily underlined in this country, where traffic conditions demand snappy performance if progress is to be made. High gearing and a modest output of horsepower from the two-litre engine provide serious limitations except on good, fast roads, but to overcome the problem Connaught Cars (1959) Ltd offer a good engine conversion which improves acceleration by some 10-15 per cent throughout the speed range.

Although the car is still not exactly a ball of fire when 'tweaked' it certainly has an acceptable level of performance which would make the standard version quite cool by comparison. Acceleration figures from a standing start suggest that the Connaught car is a brisk performer which indeed it is from the lights, but on a busy road the gear lever is in constant use to counteract the particularly high gearing.

When it was introduced in 1955 the daring lines of the Citroen and its advanced specification caused a furore akin to the topless dresses controversy last summer, and even now the ultra-steamlined shape could be considered modernistic. The suspension system copes admirably with most indifferent road surfaces however fast the car is travelling and the Citroen is very high geared so as to cover long distances without stress; first gear takes the car to 30 mph, second gear to 55 mph, third gear to 90 mph, and top gear enables the car to cruise at around 100 mph while the engine is revving at only 4,300 rpm.

Design of the four cylinder, long stroke engine now dates back 30 years. It has a bore and stroke of 78 x 100 mm, pushrod overhead valvegear, and an alloy head on a cast iron block; carburation in standard form is by a twin-choke Weber carburettor and the gross power output is 83 bhp with 105 lb ft of torque at the rather high engine speed of 3,500 rpm. The power unit is mounted well back, extending into the passenger compartment in fact, with the transmission forward into the car's nose driving the front wheels.

More power

Connaught engineers have raised the power output to nearly 100 bhp (although the figure is based on estimates

as the engine has not been run on a brake) by working on the cylinder head and fitting a twin Weber carburettor conversion. Mounting blocks are fitted into the water passages to carry the new induction manifold, ports have been polished and stronger valve springs fitted to increase the maximum engine speed from 5,500 rpm to 6,300 rpm. The exhaust system has not been modified, and the only other alteration is to the distributor which is mounted below the induction system and needed to be reduced in depth.

Cost of the work, including fitting charges, is £135, bringing the total tax-paid price of the DW (or the DS with its automatic clutch) to £1,724. In addition to this our test car had a lightened flywheel which helps the engine to accelerate more quickly and also assists gearchanging—weight is pared from 51 to 34 pounds and the cost is £20, including balancing and machining.

With the complications of a twin-Weber setup the luxury of a choke control has been dispensed with, but even in cold weather the engine starts immediately after the accelerator has been pumped two or three times to inject petrol into the combustion chambers. The engine does not warm up particularly quickly even when the radiator blind is fully closed, but when cold the power unit picks up well without hesitating, suggesting that the fuel mixture is on the rich side.

The two pancake air filters do not serve as intake silencers, unlike more elaborate (and restrictive) types, so there is naturally more induction noise from the engine noticed particularly on wide throttle openings. When accelerating hard the engine is quite coarse, and the tendency for it to rock on its mountings under full power is particularly noticed with the extra power available.

Maximum speeds in the lower gears are quoted as 40, 65 and 100 mph at 6,300 rpm and these speeds are no doubt attainable although out of kindness to hardworking machinery we changed up at 38, 62 and 95 mph as most owner-drivers would. In top gear, unfortunately, we were not able to see 100 mph in 700 miles of testing to the West Country and back and a very long stretch of road would be needed to achieve the claimed maximum speed of 110 mph although we do not discount the accuracy of the claim.

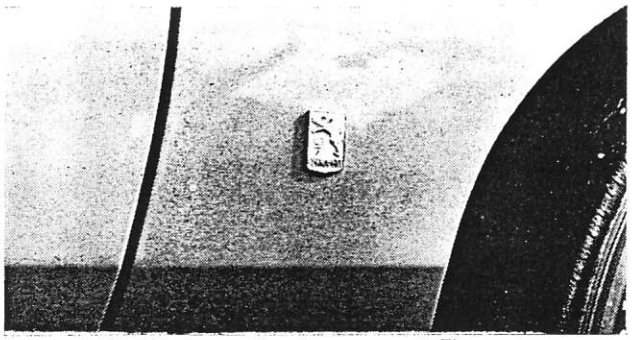
The gearlever, which is column mounted, has a long and quite deliberate movement but it is light in action; by reducing the weight of the flywheel it has been made difficult to select first gear at rest without selecting second beforehand, although all the gears are synchronised.

We were rather bothered by the lack of performance at around 50 mph, which seems to be the average speed of cars in medium traffic conditions, for with the Connaught conversion third gear is only just becoming useful at that speed. It is rather drastic to change down into second gear to overtake from that speed, but at 60 mph passing is much less of a problem and at still higher speeds the Citroen comes into its own. It is hardly our function or right to advise manufacturers, but we felt that the DW would be a far nicer car in this country with automatic transmission and a torque converter.

Braking is well up to the car's potential. There is no brake pedal as such but a rubber disc on the floor which directly controls a servo valve. The right foot can be transferred downwards from the accelerator very rapidly and the system has enough feel to make the brakes progressive and powerful when need be, although the front wheels lock up rather too easily on wet roads.

The steering is very good indeed, unusual in having a servo-assisted rack and pinion mechanism. Connaughts have substituted a nice woodrim steering wheel for the one-spoke factory wheel, and in so doing have moved the rim nearer the fascia. A very sporting driving posture can be adopted, and wheel shuffling is almost completely unnecessary as the steering requires less than three turns from lock to lock.

Despite the excellence of the Citroen's ride it is not unduly soft in handling, the roll factor remaining within reasonable proportions when the car is driven quickly around corners.



Embossed gilt GT badges on the wings are smart. There are no other outward distinguishing marks for this modified car

Petrol consumption varied from 21 mpg when the car was driven hard, and including performance tests, to around 27 mpg when driven in a more leisurely way, and it is likely that an overall consumption figure of 25 mpg would be representative in normal conditions.

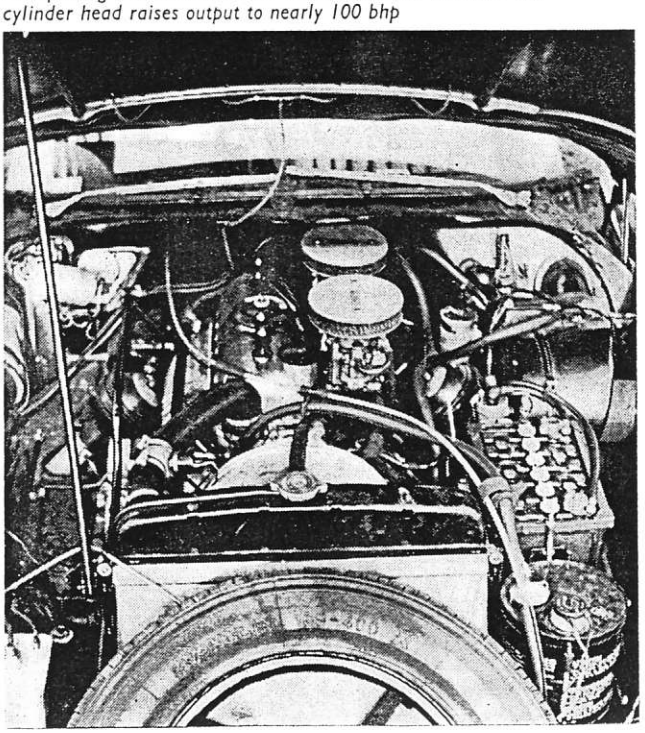
The Connaught conversion did not make the car difficult or intractible in any way, and would seem to be a very reasonable proposition for any Citroen owner who feels the need for more performance.

Performance

	Connaught DW	DW standard
mph	secs	secs
0-30	4.4	5.1
0-40	6.6	7.8
0-50	9.2	11.2
0-60	13.0	15.8
0-70	18.6	22.7
0-80	26.6	31.0
Maximum speed:	110 mph (4th)	100 mph
	100 mph (3rd)	90 mph
	65 mph (2nd)	55 mph
	40 mph (1st)	30 mph
Petrol consumption:	21-27 mpg	25-30 mpg

Conversion by Connaught Cars (1959) Ltd, Send, Surrey.

Two twin-choke Weber carburettors are mounted on special manifolding and the distributor is re-assembled. Work on the cylinder head raises output to nearly 100 bhp



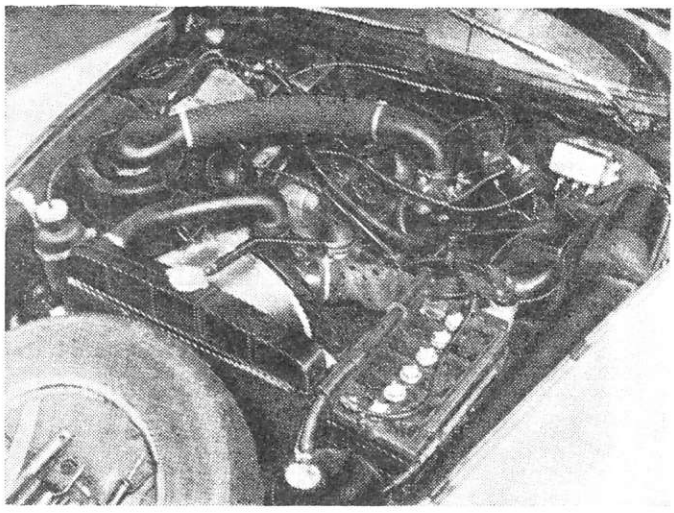
Improving the Performance of Popular Cars

CONNAUGHT CITROEN

RUNNING in the Improved Series Category, ID Citroens have won outright the Monte Carlo and Tulip Rallies, as well as being the make used by last year's European Rally Champion. It was, therefore, with particular interest that the loan of a modified ID was accepted from Connaught Engineering—a firm whose own name was famous in Grand Prix racing not many years ago. It had been obvious when the ID was first tested by *The Autocar* that further power and improved acceleration would do much to complement the comfortable ride and effortless cruising of this model.

Modifications carried out on the car are to Connaught's own design, and they market it as their II A Conversion. Changes include the fitting of a DS cylinder head of the eight-port type, but with the compression ratio raised from 7·5 to 8·5 to 1. Higher-rate valve springs are also used, and an inlet manifold of Connaught design. Inlet and exhaust ports are cleaned up and matched to their manifolds—the exhaust ones being enlarged slightly. A DS four-coil ignition system is fitted, and an l.t. distributor. A water thermometer is supplied, and the whole conversion costs £156 10s, which includes fitting charges; Connaught need a car for ten days to complete the work.

On the car loaned for test a brake servo conversion had been added; this unit is manufactured by the American concern, Midland High Power Servo Unit, and a price of £39 is quoted for supplying and fitting it. Four days are required for the work.



Under bonnet scene with the Connaught conversion

At slower speeds it is doubtful whether the average owner would be able to discern the improvement in performance, but higher in the range, the advantage of the increased power becomes very noticeable. Percentage increase in the 0-30 m.p.h. acceleration figure is only 8 per cent compared with the standard ID, and this is obtained with full throttle starts from standstill. To obtain full throttle it was found necessary to depress the pedal so that the ankle was turned to a very unnatural angle; considerable wheel tramp and front-end shudder occurred on dry roads, when a fast take-off was made.

All the performance figures listed were taken on a damp surface, and although no front wheel tramp occurred under these conditions it was replaced by wheelspin, unless power was fed in with great care. For this reason, our figures are not as good as those claimed by the manufacturers of the conversion, and probably the times could be improved slightly under ideal conditions.

As with the standard ID, considerable use has to be made of third gear for British road and traffic conditions, since top is deliberately high geared. This was well demonstrated on the maximum speed runs, for against the wind it was not possible to go any faster in top than in third gear. Top gear does come into its own on long straight roads, and the full length of M1 was covered with the speedometer indicating over 90 m.p.h. (this instrument was 4 per cent fast at 50 m.p.h. and 8 per cent at 100 m.p.h.) with effortless ease and little mechanical fuss.

Fuel consumption remains moderate and the overall figure of 23·4 m.p.g. included performance testing and some fairly hard driving in Wales, with a considerable amount of second gear work. There seems good reason to believe that the standard ID consumption can be equalled, and even bettered, if the modified car is driven within the usual capabilities of the standard one. Premium fuel was used for the test, and no oil had to be added to the engine.

Very light brake pedal pressures are called for in town work, and even quick stops from higher speeds require the minimum of effort. The system, however, is not as sensitive and progressive as one might hope for, and the front wheels could be locked on greasy roads, unless care were taken.

None of the tractability has been taken out of the engine—although none has been added—and it is still necessary to change gear rather more frequently than one would expect on a modern 2-litre car. Of importance is the fact that engine operation has not become more harsh than standard, such as has been experienced with some conversions which have passed through our hands.

As might be expected of an engineering firm of Connaught's reputation, the conversion is well made and assembled, and the car gave no trouble during the 750 miles of test. For those wanting a little more performance still, an even more extensive conversion is offered at further expense.

PERFORMANCE TABLE

Acceleration from rest through the gears:	m.p.h.	Connaught Conversion Sec.	Standard Saloon Sec.
	0—30	5·6	6·1
	0—40	9·1	9·9
	0—50	12·1	14·0
	0—60	17·9	21·1
	0—70	24·7	30·7
	0—80	34·0	42·7
Standing start quarter-mile		21·6	22·3
m.p.h.			
10—30 in first		4·4	—
20—40 in 2nd		6·0	7·0
20—40 in 3rd		9·6	10·4
30—50 in 2nd		6·5	8·0
30—50 in 3rd		9·2	10·9
40—60 in 2nd		8·8	—
40—60 in 3rd		10·6	11·8
40—60 in top		18·0	20·5
50—70 in 3rd		12·6	15·8
50—70 in top		20·2	22·4
60—80 in 3rd		16·1	21·5
60—80 in top		25·0	33·7
Maximum Speeds on gears:			
Gear		**m.p.h.**	
Top	(mean)	94	86·5
	(best)	97	88
3rd		92	87
2nd		65	60
1st		32	30
Overall fuel consumption m.p.g.		23·4	26·3

What it costs:
As tested: £195 10s, including brake servo and fitting charges.

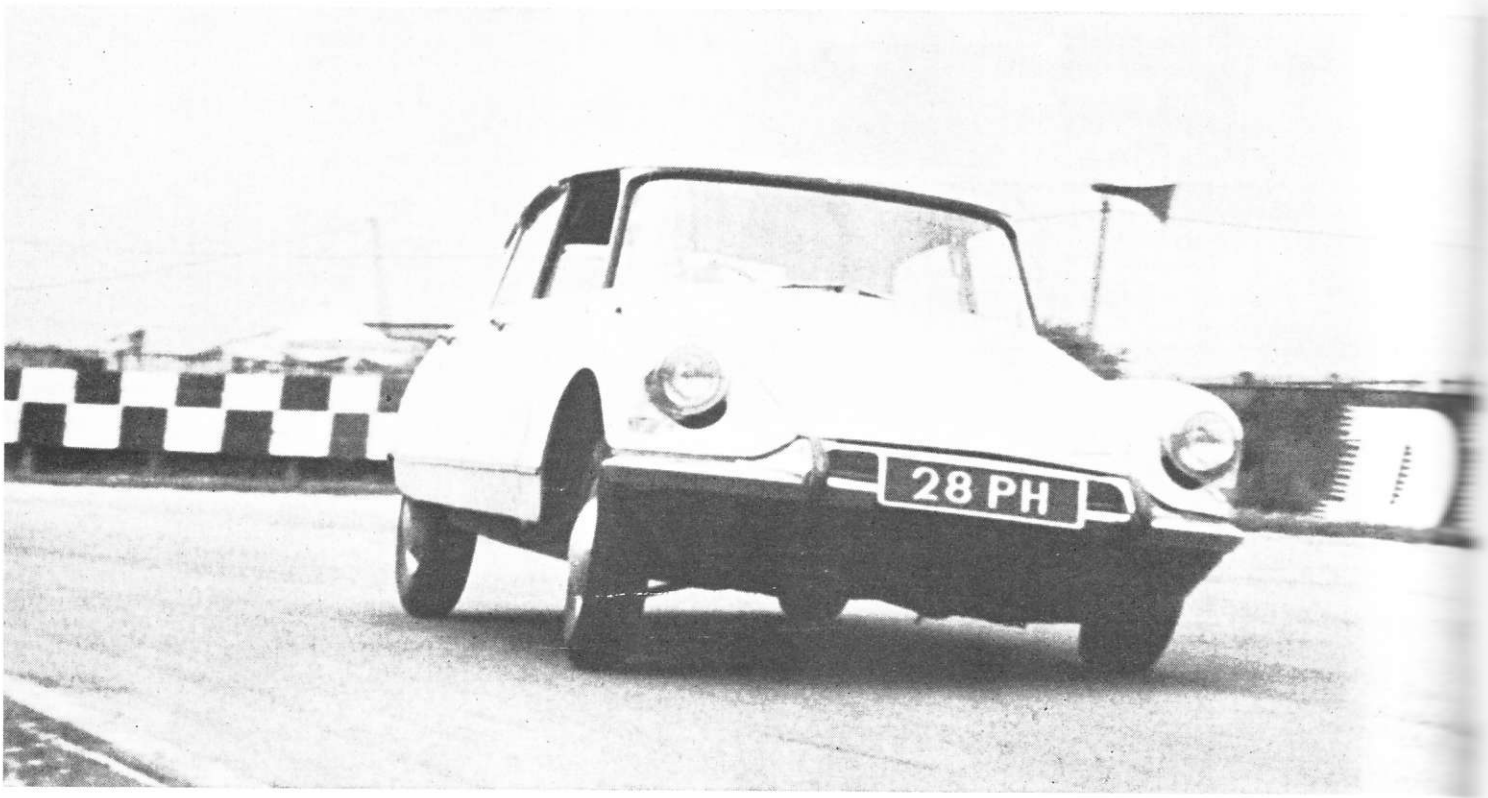
Connaught Cars (1959) Ltd., Portsmouth Road, Send, Surrey.

CONNAUGHT-CI

CITROEN'S 'SPACE SHIP' BODY LINES AND INTERIOR have always seemed strangely out of keeping on a car which relies on a very old-fashioned four-cylinder two-liter engine. Conversely, what a pity that an otherwise remarkably advanced motor car should be spoilt by an archaic power unit. It is probably this clash of ancient and modern which is responsible for the Citroen ID 19 and DS 19 being overlooked as a high-performance car — overlooked, that is, until the illusion is killed by a road journey through France.

There are few cars on Route Nationale 6 more difficult to pass when they are being driven with anything approaching enthusiasm, and few capacious sedans as capable of keeping up a 'sports car' average over the twisty stuff. Nevertheless, it has been left to key French rallymen, such as Rene Trautmann, to demonstrate the full potential of the big Citroens, and to plant in the minds of a handful of tuners the thought that here is a suitable subject on which to practice their art.

One of these is a British garage lying alongside the main London-to-Portsmouth road at Send, in Surrey. It is a garage from which, a few years ago, the exciting sound and smell of Grand Prix cars pervaded the atmosphere — the home of the Connaught. The GP car



A few years back Connaught was a name to conjour with on the Grand Prix circuits of the world – now they've brought the Citroen up to date.

-CITROEN GT

CONNAUGHT VERSION

is no more — a victim of financial strangulation — but Connaught Cars continues to thrive as, among other things, a Citroen agency. And one of the 'specialties of the house,' to coin a chef's phrase, is an ameliorated version of the less luxuriously equipped and lower-powered ID 19, and known as the Connaught Citroen GT.

The aim of Connaught, which is managed by one-time racing driver Alan Brown (a Formula 3 and early Formula 2 star) is to provide, for substantially the same price as a DS 19, a car packing more punch and being more attractive to drive, and lacking only a few of the frills which tend to detract from performance.

Although the Citroen is basically an understeering machine the Connaught GT handles easier due to power-assisted steering. Our Man in England, John Blunsden (above) has his Bell helmet secured before taking Connaught GT out at Brands Hatch.

This has been achieved, at a price in Britain of £1,598 ($4,477), which compares with £1,569 ($4,393) for a new DS 19 and £1,308 ($3,662) for a new ID 19 in production form.

The conversion falls into two distinct parts, one aimed at increasing performance, and the other at improving driving comfort and appreciation. The engine arrangements include fully modifying the cylinder head, raising the compression ratio from a modest 7.5 to 1 to 8.4 to 1, matching and flowing the inlet and exhaust ports, fitting a twin-carburetor manifold to take twin SUs or Solexes (as fitted to the car tested), matching the manifold to the head, fitting heavy-duty valve springs, a modified thermometer gauge and a different distributor. At the same time, some 16 pounds weight is skimmed off the flywheel.

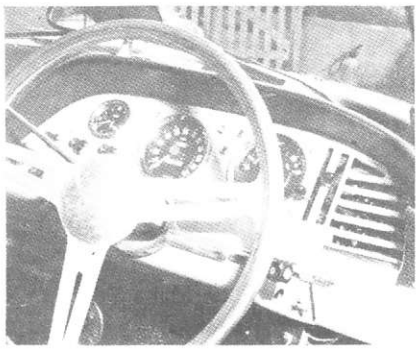
Other GT features are power steering (power brakes have now been standardized on the ID 19), a 'Stirling Moss' wood rim steering wheel, the more comprehensive DS 19 dashboard, fully reclining Microcell competition-type front seats, a Kenlowe thermomatic electric cooling fan, additional body sound proofing, extra stainless steel body rubbing strips along the sides, retractable reel safety belts and Connaught body motifs.

The transmission, with its all-synchromesh gearbox linked to the front wheels, and the tremendously effective hydropneumatic suspension, incorporating a self-levelling device, are unaltered from standard. The test car was equipped with Michelin 'X' tires.

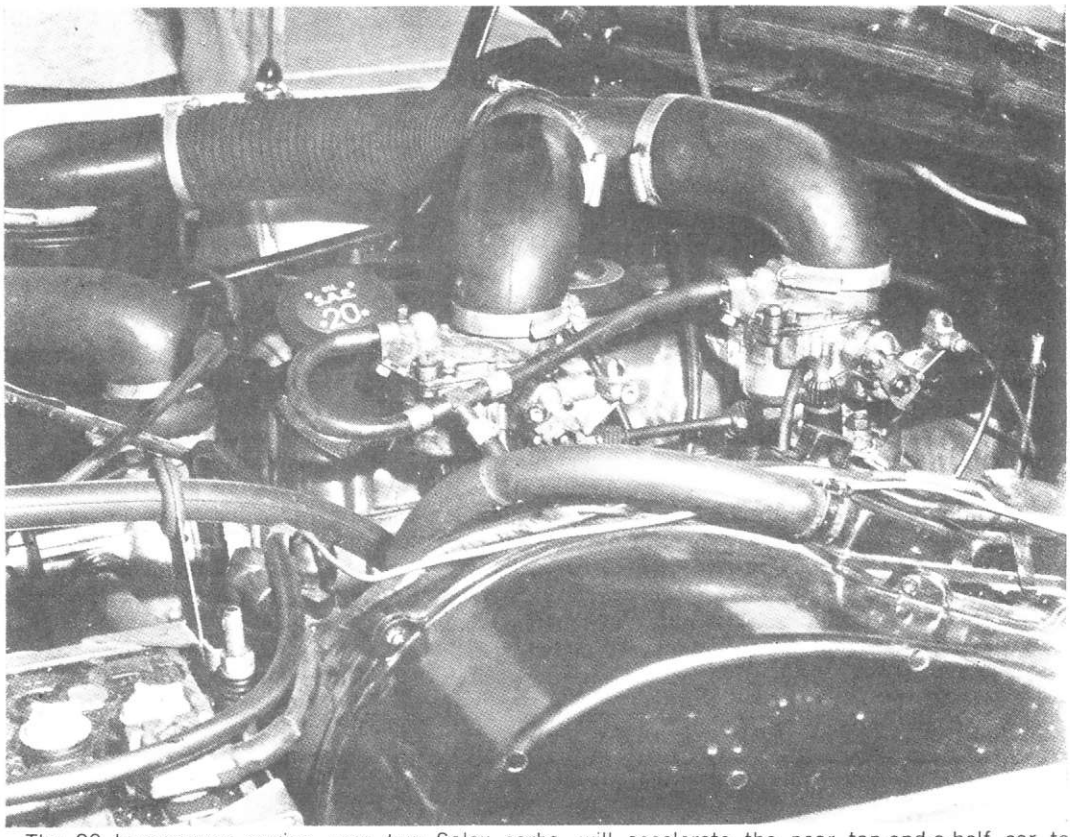
Like all big Citroens, this is a long-legged car, in fact the gearing is such that the overdrive top gear can only be used for effective acceleration above about 50 mph. There is minimal torque at the bottom of the rev range, but against this the lightened flywheel has not only helped to boost acceleration further up the scale, but also has speeded up crankshaft deceleration during gear shifts.

In its modified form the power unit, surprisingly, has not been bench tested for output figures, but I would estimate its maximum power as about 90 horsepower at 5,000 to 5,500 rpm. For a long-stroke 'four' it has a remarkable appetite for revs, and can be motored at 6,500 rpm without coming apart at the seams, not that such high revs are necessary in building up maximum acceleration. Third gear, for the most part, can be

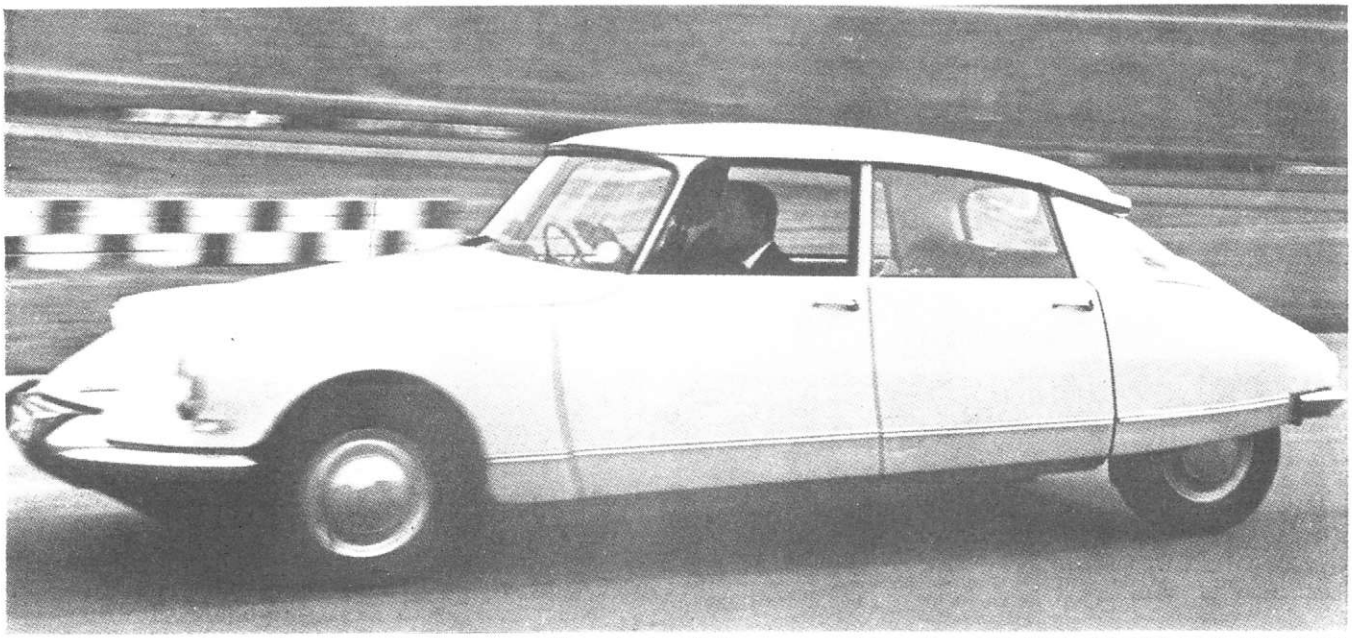
CONNAUGHT-CITROEN GT



The wood-rimmed wheel is dandy, even with an unimaginative center.



The 90 horsepower engine uses two Solex carbs, will accelerate the near ton-and-a-half car to 60 mph in 14.6 seconds, with a top speed of well over 100 mph. Price is about that of DS-19.



In the Connaught GT version of the ID-19 Citroen, the exterior of the car remains quite unchanged and extremely functiona

used as one would normally use top, and the modified Citroen must be one of the very few two-liter sedans in the world capable of holding over 100 mph in 'one below high.'

The steering column gearshift is a good example of its type, with positive, if quite long shift movements, and a strong spring protecting reverse. It rests just behind the lightweight wood-rim wheel, which is a great improvement on that diabolical one-spoke safety affair they fit on the production model. It has a thinner and smoother rim, and the only jarring note is the completely uninspired hub design. The DS 19-type instruments are clear to read and quite well laid out, but surely a rev counter should be standardized on this car instead of being a listed extra.

The power steering is as well conceived as any I have tried. There is still some feel from the front wheel, but that arm-wrecking steering of a non-assisted Citroen has been replaced by a delightfully light and positive control. The car can be swung from lock to lock in quick succession, and despite a certain amount of body sway, an accurate line can be held without much trouble. Obviously, the ID 19 is an understeerer, but the power assistance tends to minimize the effect of this at the wheel; in other words, the driver is encouraged to put on more lock a fraction sooner than if he had to put a lot of physical effort into it.

Although in no sense a racing car, I put the Connaught Citroen round Brands Hatch for a few fastish laps, and was surprised to find that, even with normal tire pressures, it understeered rather less than the average Mini, and could be cornered extremely fast, even to the extent of getting the back end moving.

No one who likes to feel his brakes would happily trade a normal pedal for the button control they provide on the Citroen, but after a while it becomes apparent that there are, after all, more than two positions — on and off! But the delicate foot action, coupled with the inevitable slight time delay of a booster, means that the disc brakes, although providing adequate stopping power for the engine performance, are the least attractive mechanical feature.

The seats give a moderate amount of lateral support, and a pleasantly firm ride with useful behind-the-knees padding. Full ranges of adjustment allow a very comfortable driving position to be chosen, but this is then marred by the lack of any space (on right-hand-drive models) for the left foot alongside the clutch. This criticism would not apply, of course, on left-hand drive cars.

Noise level is only a little higher than normal, and far below the point where it starts to become obtrusive. For this credit goes to careful body insulation, excellent aerodynamics, and the use of the thermomatic fan, which rarely came into use during the test. The aerodynamics also must play an important role in the achievement of such a favorable fuel consumption for a car of this size and weight, a figure which suggests that a lot of smaller cars on the roads today are a good deal thirstier than they have any right to be!

A car as unorthodox and advanced as the Citroen ID or DS is either liked or loathed; there are no half-measures. Its fundamental design is such that it must show up to maximum advantage in its native land, or in countries like the United States, where an ability for effortless sustained cruising over surfaces of varying quality is held to be important. For the more exacting needs of drivers with sporting instincts, in conditions when good acceleration and ease plus positiveness of control assume greater significance, Connought's offer of a 'GT' conversion becomes highly attractive.

—John Blunsden

SPORTS CAR GRAPHIC

CITROEN
ID 19 Connaught GT

PRICE (as tested) .....in U.K. £1,598 (approx. $4475)
OPTIONS .....Rev Counter, Radio

ENGINE:

Type .....Four-cylinder, in line water cooled
Head .....Aluminum alloy
Valves .....OHV pushrod operated
Max bhp. .....90 @ 5,000 rpm (estimated)
Max. Torque .....Not known
Bore .....3.07 in. 78 mm.
Stroke .....3.94 in. 100 mm.
Displacement .....111.6 cu. in. 1,911 cc.
Compression Ratio .....8.4 to 1
Induction System .....Twin Solex carburetors
Exhaust System .....Downpipe from manifold to front-mounted muffler
Electrical System .....12 Volt

CLUTCH:
Single dry plate
Diameter .....8½ in.
Actuation .....Hydraulic

BRAKES:
Drum or Disc Dia. .11½ in. discs (F)
10 in. drums (R)
Swept Area .....312 sq. in.

TRANSMISSION:
Four-speed FWD
Ratios: 1st .....3.54 to 1
2nd .....1.94 to 1
3rd .....1.23 to 1
4th .....0.85 to 1

DIFFERENTIAL:
Hypoid Bevel
Ratio .....3.88 to 1
Drive Axles (type) ..One-piece with double hooke-type UJ

STEERING:
Rack and pinion
Turns Lock to Lock 3
Turn Circle .....36 ft.

CHASSIS:

Frame .....Steel, unit construction with body
Body .....Steel
Front Suspension .....Hydropneumatic (oil and water) with leading arms
Rear Suspension .....Hydropneumatic (oil and water) with trailing arms
Tire Size & Type .....165 x 400 Michelin 'X' on 4½ in. rims

WEIGHTS AND MEASURES:
(Mean)

Wheelbase .....123 in.
Front Track .....59 in.
Rear Track .....51.3 in.
Overall Height .....58 in.
Overall Width .....70.5 in.
Overall Length .....189 in.
Ground Clearance .....6½ in.
Curb Weight .....2780 lbs.
Test Weight .....3130 lbs.
Crankcase .....4.2 qts.
Cooling System .....9.5 qts.
Gas Tank .....17 gals.

PERFORMANCE:

0-30 .....4.2 sec.
0-40 .....7.2 sec.
0-50 .....10.6 sec.
0-60 .....14.6 sec.
0-70 .....18.8 sec.
0-80 .....28.0 sec.
0-90 .....— sec.
0-100 .....— sec.
Standing ¼ mile .....19.2 sec. @ 71 mph
Top Speed (average two-way run) .....104 mph

Speed Error	30	40	50	60	70	80	90
Actual	28	38	48	58	68	76	85

Fuel Consumption: Test .....21 mpg (US) Average .....22/24 mpg
Recommended Shift Points:
Max. 1st .....36 mph
Max. 2nd .....66 mph
Max. 3rd .....101 mph
(6,300 rpm)
RPM Red-line .....6,500 rpm
Speed Ranges in gears:
1st .....0 to 36 mph
2nd .....20 to 66 mph
3rd .....35 to 101 mph
4th .....45 to 104 mph
Brake Test: 72 Average % G, over 10 stops. No Fade encountered.

REFERENCE FACTORS:

Bhp per Cubic Inch (est.) 0.78
Lbs. per bhp 31
Piston Speed @ Peak rpm .....3,290 ft./min. (est.)
Sq. In. Swept Brake area per Lb. 0.112