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Floating Power

Volume Three Number Four September Nineteen Hundred and Seventy Eight

By the time you receive this issue of Floating Power the summer season of rallies and outdoor social events will be drawing to a close. Therefore those of you who have been using your Traction continually will be preparing I suspect, for those inevitable jobs that have become manifest. Or like me, you are at last starting that long promised restoration, unless of course you are already in the middle of it. Anyway the point is if I keep you in touch with the way mine's progressing will you let me know about yours. Yes?

Well, the T.O.C. London section has now got off the ground, even if I did not help its inaugural meeting by printing the wrong date, got the day right though. I understand that the attendance was very encouraging and many ideas for the future were formulated. If you require any information about the London section then drop a line to Alan Sibley at 161 Mount View Road, Hornsey, London N.4.

Still on the subject of sections our Welsh correspondent has submitted an excellent article on Traction motoring, which shows just how intrepid some of our members are.

On June 18th last, I popped down to Salisbury for the Citroen Car Club annual rally, I don't know what arrangements they had with the weather Gods, but someone must have done a good deal as the weather was glorious, and so was the turnout of Traction, which later in the day did a parade merry-go-round fashion in the central arena, ending in one long side by side line up, a truly euphoric sight. In fact the officials of the C.C.C. were so impressed they asked me to extend a special thank you to all who took part, one ardent 'D' driver remarked that it was the best sight he had seen for years. Pride of place must go to Martin Lloyds immaculate C4G of 1931 vintage, a beautiful car in all respects having been painstakingly restored to concours condition over the last six years. In fact this car was the very worthy winner of the overall concours, beating such machinery as Bernie Shaws II Normale which incidentally won the Traction class. Well done to both Martin and Bernie for upholding T.O.C. honour. There should be some pics somewhere in this issue courtesy of Bernie.

As yet I have received no more details of the I.C.C.C.R. so its camping or book your own Hotel as far as I can see, Still if you have not booked with the T.O.C. reduced rate party you have missed the boat so to speak.

Look out for a future T.V. programme concerning Royalty in the mid thirties, as our Secretary informs me she has been plagued by calls for French Traction of this period. I hear the payment for such cars daily, is what the average man in the street earns weekly. Now if only you had sent us details of your car, perhaps you might have had a famous T.V. star in your garage. (That is if you live in the London area as anyone else was too far afield). It is hoped your October F.P. will contain a register up date slip so accept this as an early plea to complete it.

Keep November in mind for our A.G.M. it should be a Friday and will be held in the London area, full details in the October issue.

Don't forget, Traction have what others Avant.

G.B.

Whilst every effort is made to ensure the accuracy of the information and advice given in the technical articles in this magazine and the replies to readers enquiries, neither the Citroen Car Club, T.O.C nor the officers and members thereof nor the authors accept any liability whatsoever for such information and advice.

THE LONELINESS OF THE LONG-DISTANT TRACTIONIST

by Rhodri Prys Jones

Someone at last year's Traction Owners' Club A.G.M. raised the question of distances covered by today's tractions. Fred Annells claimed that most owners only covered a couple of thousand miles a year, and poor Mark Konieko was almost booed out of the meeting when he ventured to suggest that he covered at least fifteen hundred a month, I said very little. After all, for five years I've been trying to run a Traction, full time, and I reckon that by now I'm just about to succeed. My mileage these days is a high one, not in the Francois Lecot bracket to be sure, but it does necessitate thorough greasing every weekend and an oil change at least once a month. Say two thousand miles every four weeks, and you're not far out.

How do we set about all that motoring, then? Isn't it expensive? Well, yes and no. First of all you need a job that pays good travelling expenses. I'm Education Officer to the Gwynedd Archives Service, a traveller in Local History with a 'beat' of 250 schools in this vast and beautiful North Walian county, which contains only one running traction (mine) and two Light 15 wrecks (also mine). The car suits the image, and the travel expenses at 15p plus per mile keeps the car on the road. It's probably the best known old car in Gwynedd by now, always running and mentioned quite often on television, radio and in the newspapers. An old man walked out of a butcher's shop in Caemarfon one day, pointed to the Big '15', turned to his wife and said,

"That's that car that was on the radio last night!"

Well, the fee for the talk paid for four months' tax, so why not! Lesson One – capitalise on your car. It may be easier than you think. A smartly painted traction is a really swish motor car and people, even old ladies, are interested.

Right, having obtained a motor car, how do we set about its renovation and having done that, how do we keep it running reliably? It's quite easy to obtain a running Traction (and pay too much for it) but one always has to face problems. Usually these centre around the transmission and the exhaust system, but whatever they are, they can usually be sorted out by contacting any one member of the spares committee or John Austin, Fred Annells or Guy Isbell. I've received a great deal of help from John and Fred and I'd like to put my appreciation on record. I also admire the way Guy sets about manufacturing new spares; stick to it, boyo!

Once your car is running and has passed its MOT test, you'll need to stock up on some spares. Take it from me, you need to be on the lookout all the time, and be prepared to invest in some bits. Their numbers soon decrease. I bought a wreck in Bethesda for £30 – it was so bad I entered



Bethesda scrap car bought for £30 . . . or whats left of it.

through the door and went straight out through the floor again. It was in a dreadful condition but it was virtually all there mechanically. Most of those mechanical parts have now gone. Friends phone, needing bits, and you post them off knowing that your friends will help you in return if necessary, so you don't really begrudge them your spares. As with Archives, though you find spares in funny places. A chap invited me to his home to look for bits of his Big 15 in a place called Maeshafn near Mold. He'd abandoned the back half of the car in some bushes near his home twelve years ago. I waded into the foliage and pulled out the remains of the car, its body by now paper thin with rust. I knocked the body off the subframe with a light hammer and carted away the subframe which was in quite good condition. I don't suppose I shall ever need it, but fetching it was good fun!

My next buy is a whole load of spares from a chap in Aberaeron. This came about as a result of last year's Welsh Weekend. My first two visitors were Tom and Rosie Evans of Wisbech in Cambridgeshire with their well-known Big 15, JJF 6. Tom mentioned that his cousin lived in Aberaeron, exactly one hundred miles away from my home in Wannfawr and that the said cousin possessed a brace of Light 15's.



You need a large shed.

I wrote to Nick, Tom's cousin and had no reply for a long time, but when it came, Nick's letter offered me a whole car for parts plus half a ton of spares! At the moment, I think (!) I have about four engines, seven gearboxes (most of them bust but one or two are okay) and multitudinous bits. Sadly I shall have to scrap the car from Aberaeron, VPP 711, as the bodywork is too far gone to restore, but all those parts will certainly be put to good use. Don't bother writing to me for spares, (please!), as most of what you need can be obtained new if you set about it the right way, i.e. through official club channels.

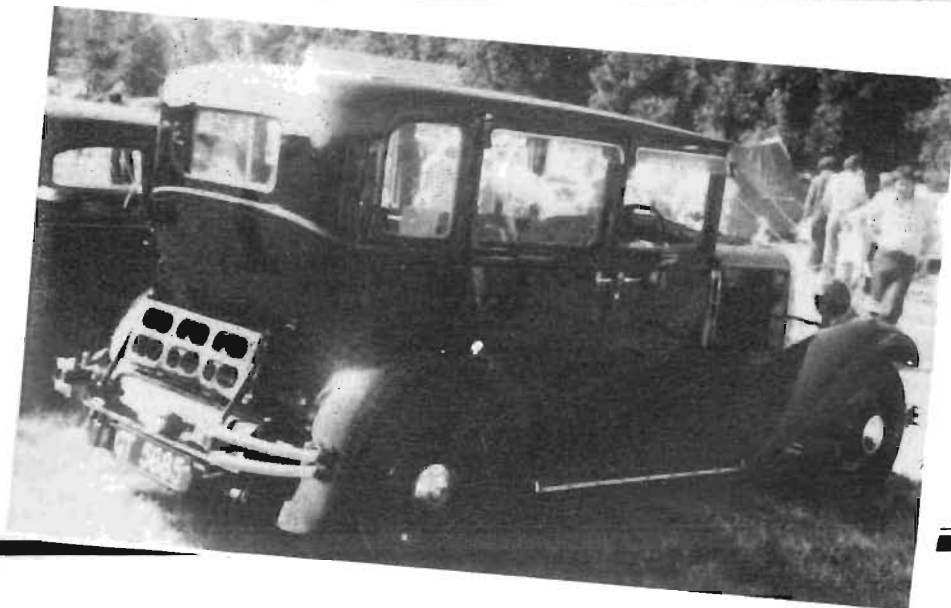
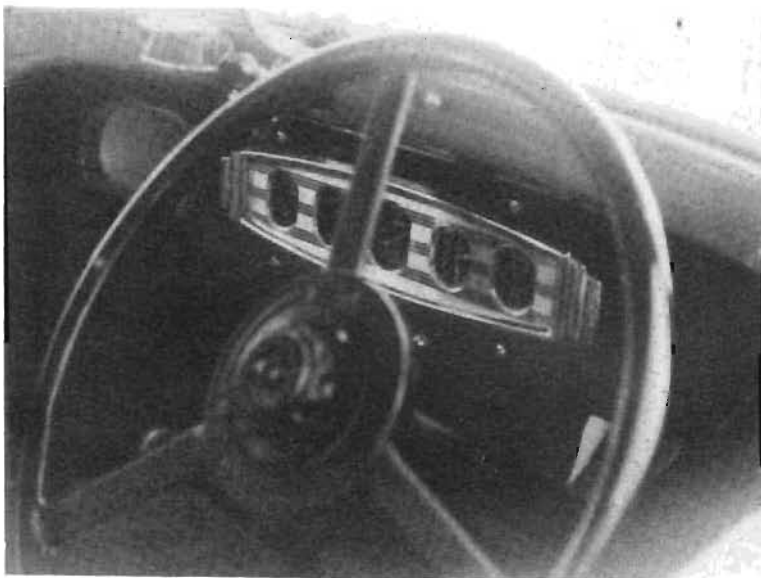
If you really depend on your car though, you must have everything available. Down in the depths of Groeslon near Caemarfon, there stands a shed, rented by me for the pricely sum of 25p a week. It holds two cars plus loads of bits, from a whole row of gearboxes to wings, doors (mostly 'orrible), boot lids, smashed radiators, cross-ply tyres, all sorts of gubbins. The two cars at the moment are my Singer Gazelle, 1964 and already defunct, and a 1946 Morris Eight, an incredible device which you have to drive with roof and windows wide open to avoid being overcome by fumes which rise like morning mist from 'neath the dashboard.

There we are then. All sorts of bits, a car in good condition and you should be able to keep going for years. Are there some things you should not do, though? Yes! From bitter experience, hearken unto my words! Do not, on any occasion, reverse a traction violently up hill. Such action uproots crown wheel and pinions and causes multitudinous groans the like of which you will never have heard before. In my case the cause of the trouble was a long-haired blonde late for work one morning. In future, long-haired blondes may walk; the car was off the road for four months that time. Another red-hot tip, literally! Make sure that the bonnet stays are in place. Do not on any account let the stays hang loose, as they can then drop down onto the battery terminal. This can cause a short-circuit which can weld your bonnet to the rest of the car and badly blister your paintwork. Be warned! And another thing, It's very tempting to screw the front end of your car back together fairly loosely if you're intending to dismantle it again within a few days. I did this – once. A day or two later, I was approaching the village of Parc near Y Bala. The road narrowed suddenly and I was

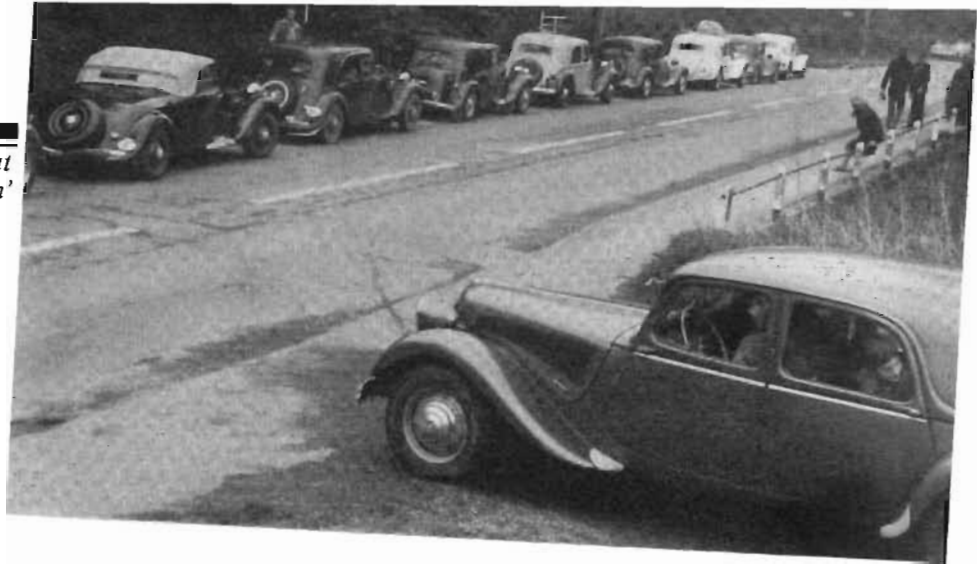
faced with the prospect of thumping the only-too-solid front end of a school bus. I slammed on the brakes and my car, SKB 588 now with John Howard, stopped very suddenly, the stopping thereof being accompanied by a great crash. The radiator, not being really tightly secured, had contrived to move backwards and had been well and truly smashed by the fan. No amount of molten solder could fix that one, though the local blacksmith had a good try and enabled me to get home.

My present mount, UTF 790, constitutes classic motoring at its very best. A thoroughly modern car clothed by old fashioned bodywork, it surprises and delights me every time I drive it. I don't really want to drive anything else. This car is what real motoring is all about and driving it gives me great satisfaction. A friend wrote to me recently, stating that his Light 15 had covered 275,000 miles. Mine's done some 62,000 in its 24 years' existence. See you on the road, folks – even in ten years' time!

Martin Lloyds immaculate C4G of 1931 vintage, a beautiful car in all respects having been painstakingly restored to concours condition over the last six years.



A translation of the report that appeared in a recent 'Tracksjon' magazine, of the T.A.N. trip that took in the T.O.C. rally, plus pictures, all supplied by Ernst Berends.



At Thursday 4 May started the trip to France and England, organised by T.A.N. section Arnhem. We left Nijmegen with 9 Traction, the weather was very good and soon we reached the border, then already with 12 cars. Just after Anvers another 3 joined us, so we drove with 15 Traction over the Belgian roads, it was a file of nearly 500 metres length, a nice view! At 16.00 hours we passed the French border, after 300 km driving. The target for the first day was reached at 17.15 hours, it was the square of Sainghin-en-Weppes (head-quarter of the A.C.A.). Our French friends welcomed us and served wine: Behind the house of the A.C.A.-secretary we installed our tents; then we went again in a long file to a hotel where we had a nice dinner, there was also dia-show and our friends offered champagne! When the bottles were empty we drove back through a dark France to our tents.

Friday – Reveille in the camp at 7.00 h. After pulled down our tents, back to the hotel for breakfast. With the II Normale-Cabriolet of Emile Gossart as leading car, we continued our voyage, now direction Calais. On the way we visited a friend of Emile with a nice collection antique cars. 12.00 h. – Calais, a lot of traffic in this town, we lost some tractions but everyone was present again at the ferry. 13.00 h, Adieu France; At sea its raining and foggy. After 1½ h we arrived Dover. English time 13.30 h. Two tractions of the T.O.C. are awaiting us, and along the coast-line we drove direction Hastings. We got rather quick used to the left-traffic. About -60 km from Dover is Rye situated, there in the neighbourhood is the campingsite behind an old pub, named Cock Inn. Some english tents and tractions were already standing there, we installed our tents. Some people had chosen for a hotel. That evening everybody was free to do what he or she wanted. During the night it was raining “cats and dogs” as they say here.

Saturday – The campingsite was very wet now, some tractions got problems to get away out of the mud! This problem was solved by putting a person on the frontbumper and than driving away in the second gear. 14.00 – Together with the english tractions we had a file of 35 cars, we visited the historical place Rye. In former day's it was an important harbour, but the sealevel became lower, so now the harbour is dry.

17.00 h. After a nice tour through the lovely surroundings we came back at the Cock Inn. Here the cars from the Continent were judged and during the pleasant evening in the pub, the prizes were handed over. At 23.30 h. we had to leave the pub, that's the rule here! But at the campingsite we continued. Our english friends made sausages and served wine. At 02.00 h. everybody went sleeping.



Sunday – Slipping in the mud the Traction left the campingsite. 10.00 h – Assembling in front of the Cock Inn. The english Traction started here for their Treasure Hunt. Unfortunately we couldn't join them, for we had to leave direction Dover. Some English traction gave us an escort back to the ferry. 13.00 – Leaving good old England. Hopely till a next time. 15.30 – Calais, here we said goodbye to our French tractionnists. Then the 15 Dutch tractions drove back vie Ostende–Anvers to Holland.

24.00 h – The most members were back home again after 1000 kilometres. Together also 15 X 1000 = 15.000 traction-kilometres within 4 days. Without problems! VIVE LA TRACTION!!!!!!!!!!!!!!!!!!!!

Ernst Berends, president section Arnhem



SUSPENSION UNDER SCRUTINY:

Technical Analysis of the Citroen System

WHATEVER other comments are made on the new Citroen suspension system, extraordinary must be the first. It is no ordinary system which hisses and as a result makes a garage mechanic ask if the tyres are going down, that causes the sprung mass to sink at the back and rise at the front with an almost ballet-like grace when a rear passenger climbs aboard, and that leaves the empty car to restore its own level as you walk away from it. And if you roll back and brake, the six stops with a clonk and the rear rises while the nose falls. These are the oddities associated with the suspension, though its behaviour on the road still calls for the unusual adjective.

The first impression is the close identity between the feel of the six-cylinder on its suspension and that of the 2 c.v., in spite of the differences of the systems. A blindfold driver of any perspicacity would have little difficulty in deciding that both cars came from the same factory. Both have made a virtue, it might be said, out of what used to be regarded as a vice of suspension—"float." For that is the predominant sensation, that of floating along at a certain height above the ground, only remotely affected by what is happening below. Float as a vice results in amplification of road irregularities.

The six-cylinder was given a very thorough test indeed. All aspects of normal motoring were covered, and in addition two special routines were imposed: one was the obvious one of taking the car over a rough stone track, deeply rutted and pot-holed, the other a fast late night drive over a minor road thoroughly known since childhood, the twelve miles of which ought not, in more normal circumstances, to find a car going at over 40 m.p.h., owing to the wave in the surface and the fairly abrupt ups and downs of the way. These tests were taken with four persons aboard, of rather less than average weight, and while the rough track provided a more or less expected performance following experience on the main road, causing little vertical movement of the body, the night drive was impressive. None of the passengers complained of anything untoward in the car's behaviour although they almost certainly would have done so had it been a comparable "normally" sprung car; they would, in fact, have been inclined to hang on and wonder if the driver was trustworthy.

Low speed surface unevenness gives about the same result as for any suspension, the slight pattering of the wheels over stone setts, say, being felt; this is neither surprising nor disappointing, for the tyres used in conjunction with the suspension are Michelin X, which is a tyre to pick up an uneven surface with its steel-reinforced tread; minor waves, however, are not felt, and major waves result in a slow, well-damped rise of the body and what seems to be an immensely leisurely restoration or rebound, so long drawn out as to result in the damping-out of the oscillation during the single rebound. The car, therefore, is deflected vertically and then restores its level; no more, it seems.

The sensation is one of airiness, akin to the feeling within a very softly sprung car with a high ratio of sprung to unsprung weight. So far, so good, though until the derestriction signs are reached a certain misgiving is felt in case the Citroen suspension should have the defects of this type of ride when it comes to fast, open road, motoring. Roll is the worst of them, but they sum up to a feeling of insecurity brought about by excessive movement of the sprung mass upon its unsprung basis.

There is no comparable reaction to the Citroen suspension. In the straight line, speed makes very little difference to the feel. Still the seats maintain their steady float in mid-air, apparently unrelated to the movement of the wheels over the road contour. Still it remains possible to read a newspaper or study the small type of a map without difficulty; for some minutes one of the passengers read a book. The driver gains confidence, for not only is there no intrusion of vagueness into the heavy—at low speeds, at least—and high-g geared steering of the six, but also he quickly becomes aware of the absence of any roll tendency on corners.

How far this is the system, and how far the front anti-roll bar, is analysed on the following pages. The importance lies in the result, and that is quite remarkable. In only one respect at speed does the new system seem as if it might compare unfavourably with its more metallic counterparts, and that is in the reaction to a rapidly taken hump-backed bridge. The sensation of "aircraft stomach" is a little prolonged as the restoration of ground clearance takes place. However, there are few suspensions that can cater properly for the really nasty hump-backed bridge. Even if the springing is nearly "solid," as in an old-fashioned sports car, all that happens is that solid objects in the vehicle which are unattached tend to hit the ceiling. Too much rebound damping, on the other hand, means that the wheels themselves easily leave the ground.

Cornering

Complete confidence having been gained on the straight, the driver begins to acquire the feel of fast corners. Of course, anyone who does not normally drive a front-wheel-drive car has a double task in this respect. He has first to overcome his diffidence at handling a vehicle with the power laid on at the wheels that steer, and secondly to go on up the speed curve as a suspension test.

This driver had had a certain amount of f.w.d. experience, enough for him to scoff at the "experts" who prophesy doom if a fast corner is taken on the over-run. When rear-driving engines were set about nine inches abaft the front axle the point could be made that an f.w.d. vehicle introduced a certain strangeness by its high concentration of weight forward and the fact that its front wheels were subject to the application of power, but now that rear-drive engines have gone ahead of the axle, so that we have become used to understeer characteristics, there is nothing in it. In fact, I would prefer to corner fast in a Citroen to many of the contemporary vehicles in which a six-cylinder engine overhangs the axle out front.

Lay on the power and Citroen cornering is almost phenomenal; yet one utters the warning that is necessary with a combination of design virtues and X tyres. At some speed, obviously, tyre adhesion must be lost, and the speed is very high indeed in terms of centrifugal force on this car. If, therefore, a driver does take the car beyond breakaway point, he will have quite a handful to contend with. The faster the cornering potentialities of a car, the more strictly should safety margins be maintained.

Anyway, on the six-cylinder corners were several times taken so fast that the X tyres squealed in protest, and still the car behaved itself admirably. It is not easy to make X tyres squeal. The car does take up an angle, as any car is bound to that has its roll centre below its centre of gravity, but the angle is very small indeed, and the only discomfort

The Citroen Hydraulic

to passengers is caused, not by roll but by the sheer intensity of the centrifugal force which the speed brings to bear upon their bodies.

The Citroen Six has a range of cruising speeds from about 45 m.p.h. to a recorded 80 on the speedometer. This suspension fully does its share in making them possible. If circumstances force one to cram on the brakes at a very high speed nothing untoward results.

Suspension is chiefly relevant, in terms of comfort, to the back seat. The driver was driven for some distance while he occupied the back seat, from which he navigated in spite of his normally queasy stomach. Citroens have always been numbered amongst those cars whose back seats are as good as those in the front—mostly because they have the wheels at the corners—and the six has almost improved upon that claim. In certain circumstances, notably for those who want forty winks, the back of the six-cylinder is almost better than the front, especially as the upholstery of the six is luxurious and the carpet has a sponge rubber underlay.

It is odd that this car should arouse so much enthusiasm 23 years after it was conceived. Back in 1932, André Citroën standardized on torsion bar independent front suspension, integral construction, rack and pinion steering, a gear change off the floor and front-wheel drive. In 1955 his products continue to earn approbation and to excite the keen motorist who comes in contact with them. The six-cylinder—known

as the Fifteen in France, but not to be confused with the Light Fifteen over here—is the biggest of the range and is a quite exceptional car. The merits of its design are reflected in the ability that the car has to make long, tearing journeys over the roads of its homeland and to do so with the minimum of mechanical trouble and attention.

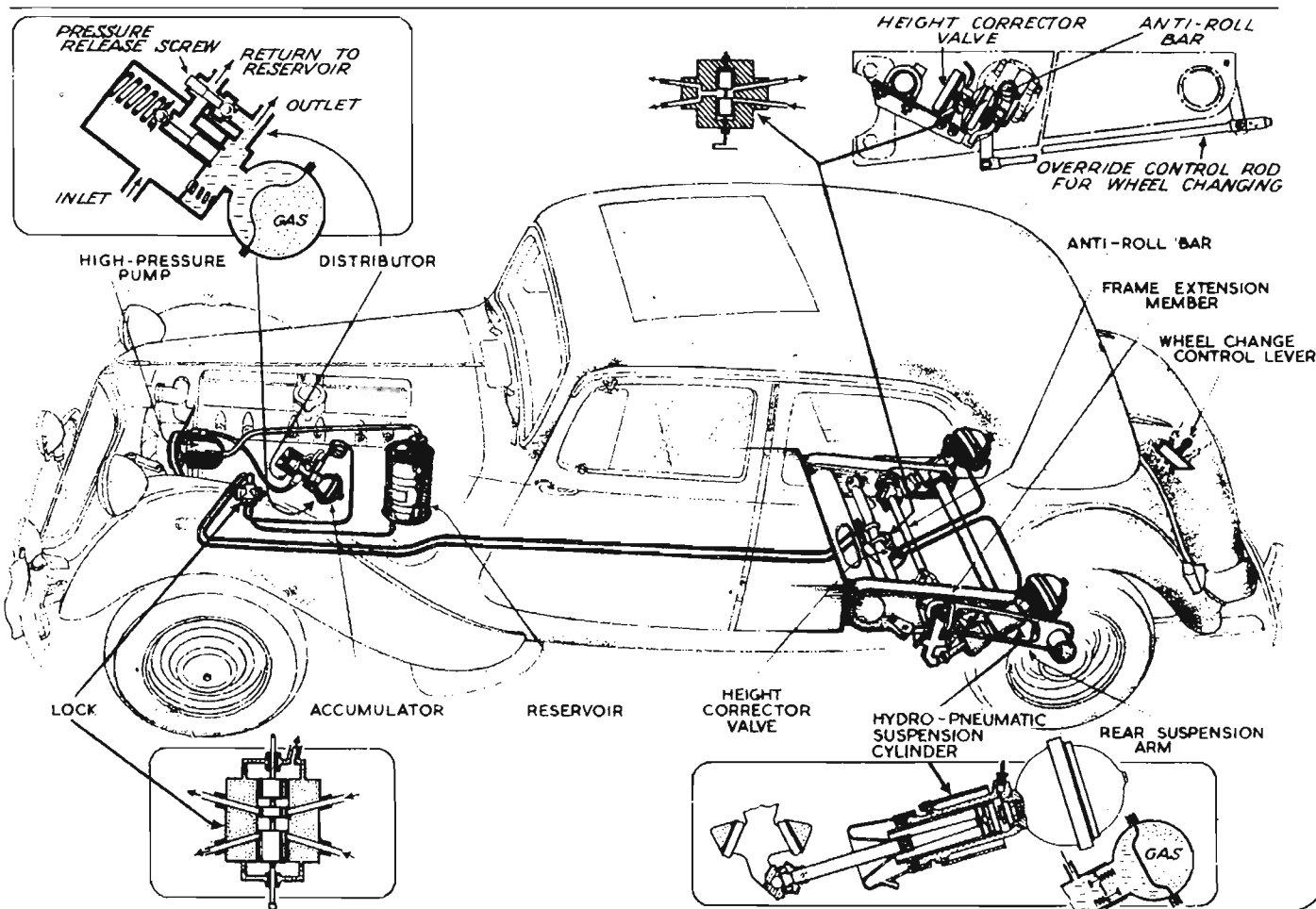
The design has a few disabilities (the steering lock is poor, for instance, owing to front-wheel drive and the very long wheelbase), but in the main it commands the respect of all who handle Citroens. Some of the incidentals are notable; the dipstick is a slender, flexible affair like a stay-bone, which weighs little and which can be threaded into its accessible hole at almost any angle. The sunshine roof, an optional fitting, is much appreciated by the now long boxed-in British, and the mere depositing of the spare wheel in the locker where the closing lid secures it is a masterly way of saving trouble for manufacturer and owner. As a corollary, the wheels can be changed without manual jacking effort, for the idling engine does the lifting hydraulically (as described later) when the necessary controls are operated, until the offending wheel is clear of the ground.

When Citroen ultimately produces a new car, the start on the rest of the world will still be considerable. If the contemporary virtues are held and just a few modern ones (mainly in passenger space and looks) are introduced, the result will make the motoring world sit up.

Citroen lines, virtually unchanged since the early 'thirties, are still such as to appeal for their rakishness. The car looks well in any surroundings



System on the Road



Layout of the Citroen hydro-pneumatic rear suspension system. The main functional components are the pressure pump, accumulator and distributor valve, isolation cock, height corrector valve and wheel suspension cylinders. The front suspension continues to employ torsion bars in conjunction with wishbones, but the bars have been lengthened to give a considerable reduction in rate

THE road-holding of the Citroen has always been good, due in no small measure to its basic features of long wheelbase (10ft 1½in), wide track (4ft 10½in) and a very low centre of gravity. Lack of fore and aft pitch indicates that the centre of oscillation of the car is forward of the front wheels, as the vertical movements experienced appear to be of less magnitude in the front seats than in the rear. The worst possible condition of ride, incidentally, is when the centre of oscillation lies within the wheelbase near to the car's centre of gravity, which, in most designs, occurs around the front seat position. With such a combination the occupants of the front seats are subjected to quite violent forward impulses, while the rear passengers receive a mixture of vertical movement and fore and aft motion, a most unpleasant combination.

Another feature which is of some importance in relation to the Citroen's road-holding is the high percentage of weight carried by the front wheels. Unladen, with five gallons of fuel in the tank, the weight distribution is 60 per cent front and 40 per cent rear. There is thus a high ratio of sprung to unsprung weight at the front, which gives a high inertia value against which the springs can react; similarly, with no axle the ratio is also high at the rear end.

This means that the wheels are in contact with the ground for longer periods than if the ratio of sprung to unsprung weight were of a lower order. The concentration of weight forward in combination with the inherent characteristics of front-wheel drive, give the car its uncanny directional stability and precision of handling.

The six has now been equipped with hydro-pneumatic suspension at the rear, which has enabled a softer ride to be provided; at the same time, the front suspension has been softened. The general arrangement of the front wishbones is retained but the torsion bars have been considerably lengthened and the rate reduced. In addition, an anti-roll bar, connected to the lower wishbone arms by drop links, has been added.

Air springing is not new and it has always attracted designers. Its property of a rapidly rising rate gives low flexibility at small deflections, with increasing resistance to bumps at high deflections. One application was seen in the suspension struts used for B.R.M. racing cars. Air suspension is also becoming popular on commercial vehicles in the U.S.A., the air being in rubber containers placed between the axle and frame. By using such containers the difficulty of preventing the escape of air under compression is overcome, and a rubber bag is also used in the Citroen system. But although an air spring has this desirable quality of increasing stiffness to load, it has been found necessary to supplement it with hydraulic damping.

The point of real importance in the Citroen rear suspension is that it incorporates a constant level device which returns the rear of the car to the same static position irrespective of the load carried. This is achieved by adjusting the length of the oil column forming the reaction member between the air spring and the piston of the hydraulic struts.

With the normal type of suspension system, using mechanical springs, it is necessary to have a spring rate

higher than is desirable for the best ride conditions, to avoid too much change in spring deflection between the laden and unladen conditions. If, as in the Citroen, the static position remains constant irrespective of load it permits a reduction of spring rate, thereby giving a softer ride. By present standards the Citroen rear suspension is very soft, having a frequency of approximately 40 oscillations per minute; an average figure for the equivalent modern British saloon would be in the region of 70 to 75 per minute. Soft springing can, of course, cause excessive roll, but, as explained above, the inherent roll resistance of the Citroen is high and the car is almost completely free of this undesirable feature.

The rear of the car has been modified by mounting the new suspension units on a sub-frame extending backwards from the main body sills. This extension piece is based on a steel tubular cross-member bolted to the main frame with end attachment plates. Two box-section side-members are welded to this cross-tube and terminate at another large-diameter tube welded between their rear ends. The trailing links of the suspension are each mounted on this extension with the aid of two opposed taper roller bearings; an anti-roll bar is connected between the pivot points. A further arm extends downwards from the pivot point of each trailing link to carry the reaction point of the hydro-pneumatic jack and the bump and rebound rubber stops.

The hydro-pneumatic spring unit is attached to the rear cross-member of the frame extension and the piston rod is actuated by the lower end of the trailing link drop arm.

The suspension unit consists essentially of a sphere screwed into the end of the hydraulic cylinder. The gaseous mixture (the nature of which is not revealed, but it is probably one of the inert gases) is separated from the hydraulic damper fluid by a rubber diaphragm. Two-way damper valves are carried in the neck of the spherical component where it is screwed into the cylinder.

Hydraulic pressure is supplied by a seven-cylinder pump driven by a V-belt from the crankshaft pulley and supplied from a reservoir mounted on the scuttle. The hydraulic fluid is delivered to a hydro-pneumatic accumulator incorporating a distributor valve which pressurizes the system from the accumulator when the pump is inoperative. With the pump delivering, this valve feeds the fluid under pressure to recharge the accumulator and to feed the suspension system. Thence the circuit passes through the isolation cock to an automatic height corrector valve, and from this a single

pipe connects to each hydro-pneumatic spring unit. This corrector valve regulates the pressure in the spring units and thus allows for variations in the load carried. The hydraulic fluid is the same as that used in the braking system.

The accumulator screwed into the end of the distributor valve body is, like the suspension units, a sphere containing gas on one side and the hydraulic fluid on the other, separated by a flexible rubber diaphragm, the gaseous mixture being the same as that in the suspension unit.

The isolation cock fitted between the accumulator and height corrector enables the rear portion of the circuit to be isolated from the front, so that the system is locked to maintain the suspension at its static height when the engine is stopped. This cock is opened automatically by the first application of the clutch pedal after it has been closed.

Height Correction

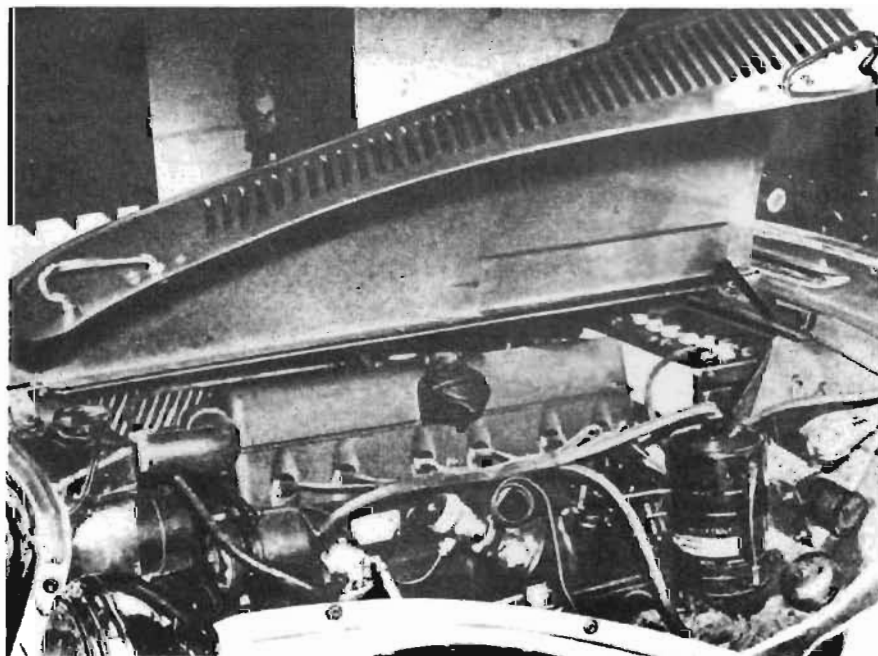
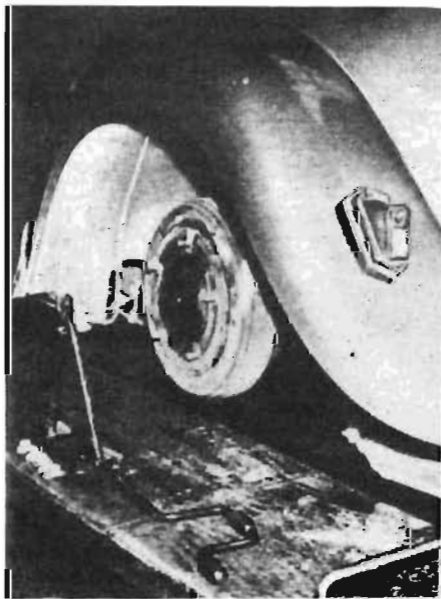
The automatic height corrector is a slide valve actuated by a tongue attached to the anti-roll bar. Thus, as the suspension arms rise and fall this slide is moved up and down. As the arms rise the slide uncovers the delivery port and allows hydraulic fluid to pass under pressure into the suspension cylinders. As the arms fall the delivery port is closed and the fluid passes from the springs back to the reservoir. So long as the suspension unit remains at normal height the delivery and return ports are closed.

An overriding control is attached to the slide valve so that it can be operated manually by a lever in the boot of the car, used when changing the rear wheels. This control has three positions—normal, high and low. A stand is inserted under the vehicle on one side or the other, immediately in front of the rear wheel. With the control placed in the low position the suspension arm is raised, bringing the wheel clear of the ground by action of the hydraulic fluid, and the weight of the car is taken on the stand so that the wheel can be removed.

Doubts may be raised as to the possibility of failure, or leaks, in the hydraulic system. The worst which could happen is the fracture of the fluid pipe, in which case the car could be driven home slowly with the suspension arms resting against the rubber bump stops.

Undoubtedly this system sets a new standard in ride comfort in an ingenious manner and may well promote a new line of thought for suspension systems of the future.

Left: With the aid of a stand provided in the tool kit the hydraulic system of the rear suspension can be utilized for easy wheel changing. Right: The hydraulic pressure pump is belt-driven from the crankshaft and, with the accumulator, is mounted on the cylinder block. A reservoir for the hydraulic fluid incorporates an external glass tube level gauge.



Correspondence

Dear John Gillard,

Seeing your name in the April V.S.C.C. Leaflet has spurred me to write. Enclosed are photos of the Arnott Blower resting where the dynamo should be — a pain, because I always carried two batteries, and was forever changing them at night, pouring down with rain.

The Blower is now off, and I have a cooking 32 Solex on. I went to France in the roadster late last year, and Dominique raced it at Cadwell Park — spun off twice and was in tears!! A difficult car to control! She enjoyed Prescott Hill Climb, 59: something seconds not bad, especially as it was wet. When I finished exams, and my Austin 7 — rolling chassis now — I will bung my big Blower on, perhaps on top of the gearbox with a camshaft extension drive, or belt drive from front of gearbox.

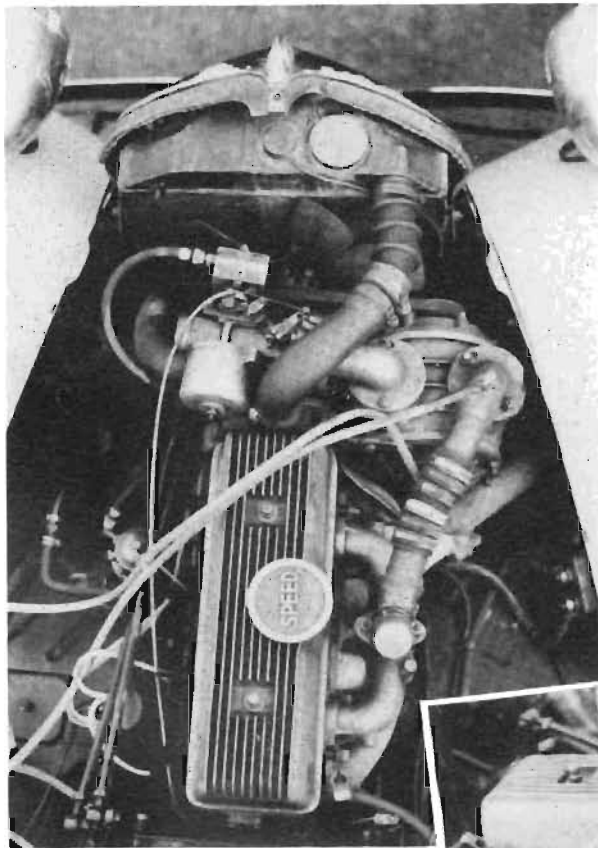
Paris-Match, 14th April 1978, had an article on Lt 15's etc. They reckon it is the 'thing' people do in the summer 'cherche la Traction' they suggest ways to do it, and proces! Coupes they say you can get for 1500F unrestored, Decapotables 9000F — but first find them — ordinary Lt 15's are 3000F. It's the addition Johnny (Halliday) et Sylvie (Vartan) on the front.

I'm off to France for the week-end soon via Cherbourg. I always try to buy a gearbox when I go over, they are £40 now, groan (I haven't a supplier I just go to scrapyards).

Cheers William Sellers.

P.S. Hope you like the photos of the Blower in situ.

(Phew!! it all looks very hairy I bet the fuel consumption's frightening, Ed.)



Dear Editor,

"Successful First London Social"

The London section of the TOC had their first meeting on Wednesday 21st June at the Bishop's Finger West Smithfield.

The idea was to contact as many people who live in the London area to attend this meeting, there are in fact in excess of 50 traction owners in London. We endeavoured to contact most people either by telephone or a personal call, we were only able to contact over half. This resulted in a total of 15 traction owners attending with 5 tractions present (1 French Lt 15, 1 French Big 15 and 3 Slough Lt 15's).

This was a very encouraging attendance, if only we could have contacted everyone. All TOC members in the London area will soon receive a news letter.

Everyone present thought that a regular pub meeting every month and activities, i.e. picnics, visits to specialist firms and motoring events etc. would be a very good idea (see dates below).

It was good to see 5 new faces and interesting to find that nearly everyone owned more than one Citroen or Traction. One new member was enrolled, money exchanged for TOC window stickers, gasket set and T-shirts.

A Mr. Bryden attended and I talked to him regarding his cars, he ordered a Slough Lt 15 in 1946, but was told there was a long waiting list so he ordered a French Lt 15 as delivery would be quicker, both cars were delivered in 1953 and he still owns them today. Ralph Druin owns a 1951 Slough Lt 15, this car has been in the family since new, first his father and now Ralph, and uses it everyday! this make an interesting comparison with my car of the same year also a Slough Lt 15, I am the 14th owner!

After closing time we all looked at the cars and said our farewells, I hope to see everyone at our next meeting and with many more tractions turning up.

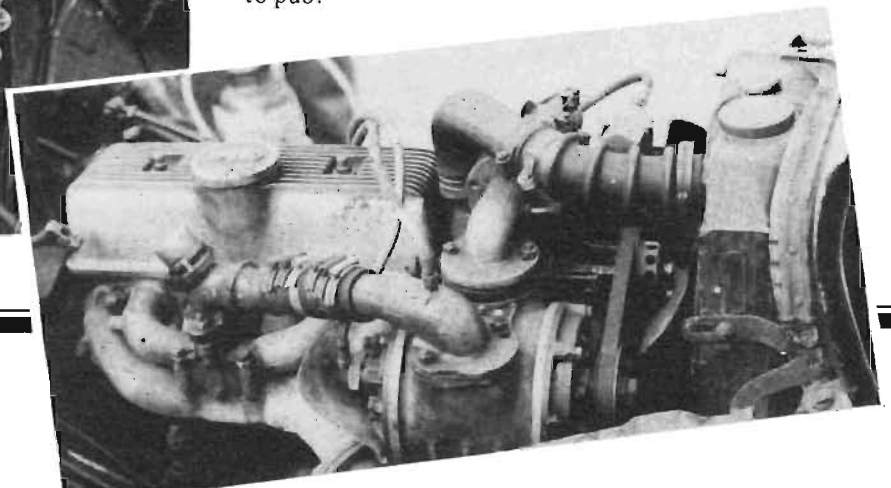
Happy tractioning,
Alan D. Sibley

Pub Meetings last Tuesday of each month 9 pm.

- 29th August — The Anchor, Bankside, Southwark.
- 26th September — The Windmill, Windmill Drive, Clapham Common.
- 24th October — Cannonbury Tavern, Cannonbury Place, Islington.
- 28th November — The Bishop's Finger, West Smithfield.
- 19th December — Jack Straws Castle, North End Way, Hampstead.

Sunday 3rd September, Syon Park & London Transport Collection

Meet 12 noon Car Park — Picnic in Park. Entrance fee 50p each. 2pm to 4pm Visit London Transport Collection Entrance fee 40p each. 4pm to 7pm Line-up of cars, spare & clubshop, visit garden and house. 7.30pm convoy drive to pub.



TOOLS OF THE TRADE

PART III FRONT AXLE UPPER SWIVEL BALL EXTRACTOR 1850.T.

Fig. 1 Shows ball extractor 1850.T

Fig. 2 Shows alternative tool to 1850.T made up from large screw and nut welded to old upper swivel adjusting cap and lock nut. Bottom face of screw must be concave.

Fig. 3 Shows spanners 1852.T for removing lock nut, and adjusting ring cap. (As you follow the text you will see that these tools 1852.T are supplemented by more conventional ones).

Fig. 4 Shows alternative tool to 1850.T in position.

Dismantling, method is as follows.

- 1) Remove road wheel and hub, see volume 3, no. 2.
- 2) Remove outer wheel bearing, ring nut and seal, vol 3, no 3.
- 3) Remove back plate complete with wheel cylinder and brake shoes, by undoing the six fixing screws and nuts, remove lock plates then give a firm pull to remove from swivel housing, support to one side away from the work.
- 4) Knock back locking tab on upper swivel housing.
- 5) Undo locking nut, nut size 64mm and remove locking tab.
- 6) Undo ring cap (suggest a steel bar between slots, a tyre lever may be suitable).
- 7) Remove fixing nut, nut size 26mm.
- 8) Remove upper cup and any shims behind it, noting the order and thickness in case they have to be reused, also remove spacer ring.
- 9) Use extractor tool 1850.T. See figure 1 and 4, to break the taper, taking great care not to lose the rectangular key in the swivel pin.
- 10) Lift suspension arm and remove ball and lower cup.
- 11) Remove leather boot spring and washers.
- 12) Clean all parts and remove all old grease from suspension arm eye.

With the cups and ball out and after cleaning you will be able to see how badly they have worn, usually due to lack of greasing and split gaiters, which allow water and grit to enter. As replacement ball and cups are difficult to obtain it is quite in order to lap the old ones in with valve grinding paste. The idea is to obtain a smooth surface on the ball and on the inside face of the cup, having done this, thoroughly wash off all traces of grinding paste with petrol. Now assemble in your hand the cups, ball, spacer and shims in the order you removed them, you will probably find that the ball will be quite loose inside the cups, if so remove the shims until the swivel moves freely with no play, it may be necessary to remove the shims altogether to achieve the required results, or even to make up new thinner shims. If the wear has been very bad it may even be necessary to reduce the spacer ring, but do not remove below the chamfer. Ideally the surface of the cup and ball should be re-case hardened when you have finished, if not you will reduce the life of these parts (in actual fact the average Traction mileage would not make the last point too critical. Once again don't forget to clean all parts thoroughly before refitting.

Reassembly, note:— insure taper is dry when refitting parts.

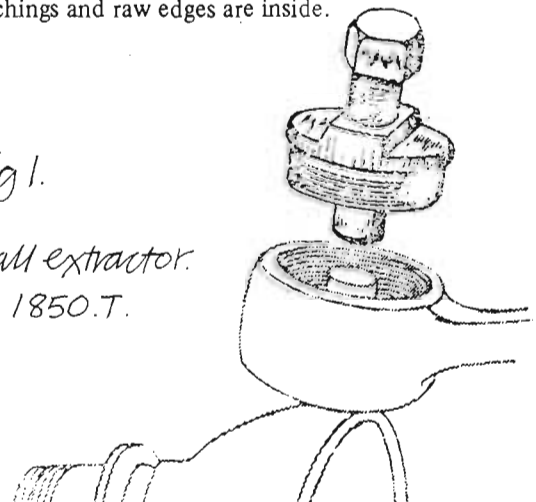
- 1) Replace gaiter, washer and springs.
- 2) Replace suspension arm and refit lower cup.
- 3) Place key in taper and fit swivel ball, grease on the outside.
- 4) Replace fixing nut and tighten to 50ft lbs. and lock by punching metal into swivel pin key-way.
- 5) Replace spacer and any shims plus top cup.
- 6) Pack with grease and refit ring cap 36ft lbs.
- 7) Refit tab washer and lock nut 57ft lbs. Turn back tab. (If you are worried about the last two torque settings just do them as tight as you can).
- 8) With grease gun refill with grease.
- 9) Refit back plate etc.
- 10) Refit front bearing, ring nut and seal, hub and wheel.

Chances are you will need to replace the leather gaiters on the swivels, well you would if only you could obtain some, so here are two possible solutions.

- 1) The older type of mini C.V. gaiter part no. B.L.M.C. 13H3101, most likely now hard to obtain as they have been replaced by a newer type. With sharp scissors cut round boot on the line shown in figure 5 and use the corrugated bits left in the middle. Fit the large end on the retaining ridge on the link arm, the small end is a snug fit around the swivel pin. Fix in place using boot retaining straps.
- 2) Acquire about one sq.ft. of all-way stretch imitation leather, this should be enough for the two upper and lower gaiters. Make up for each side four pieces of each pattern, see figures 6 and 7. Then double stitch about 1/8th from the edge as shown on all seams, make sure the ends of the line of stitching are firm otherwise they will come apart in use. Fix ends with locking wire or similar. Sew up inside out so that when fitted all stitchings and raw edges are inside.

Fig 1.

Ball extractor
1850.T.



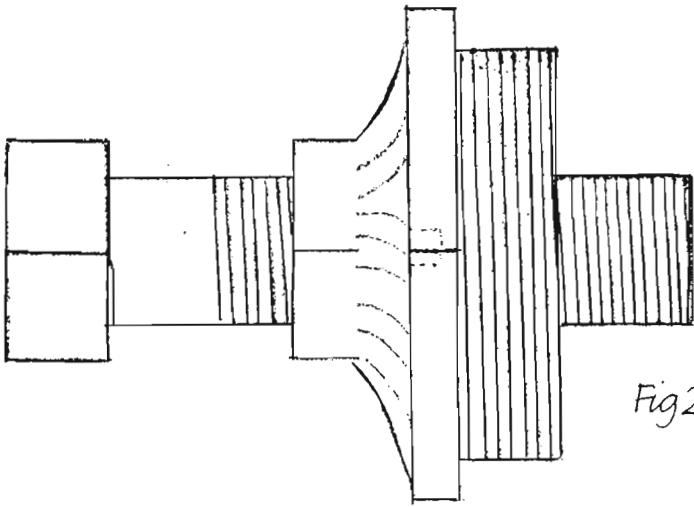


Fig 2.

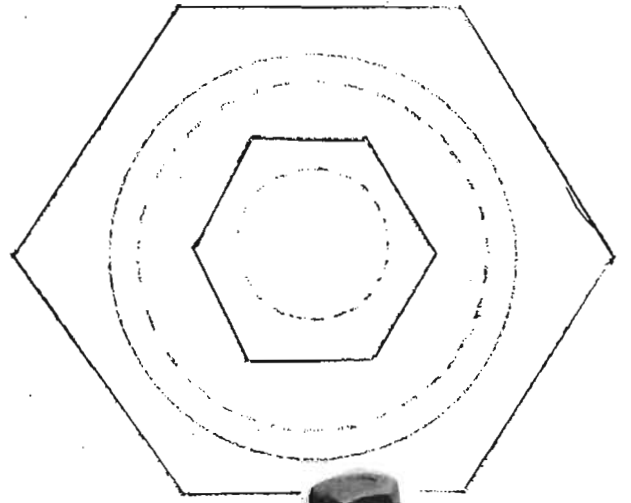


Fig 4.

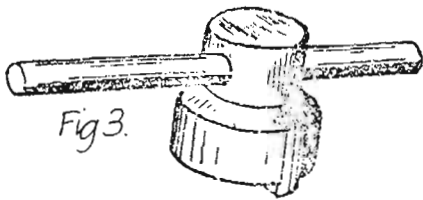
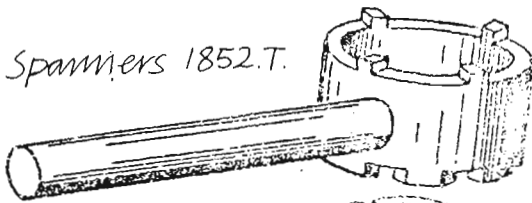
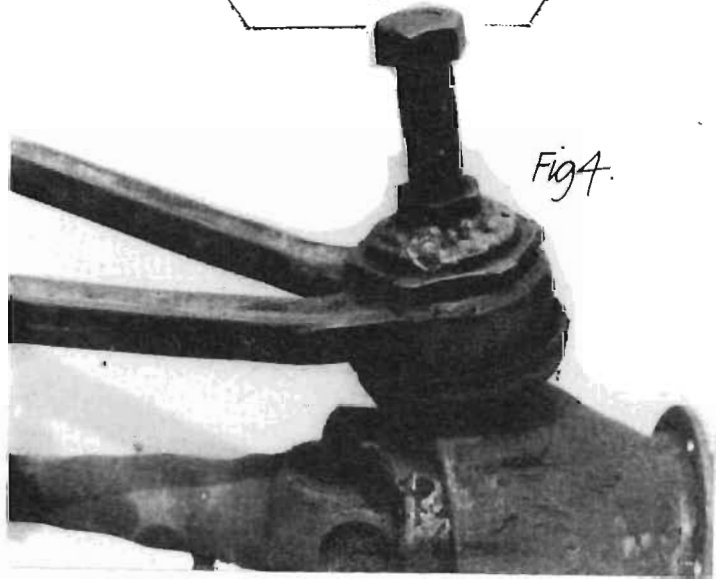


Fig 3.



Spanners 1852.T.

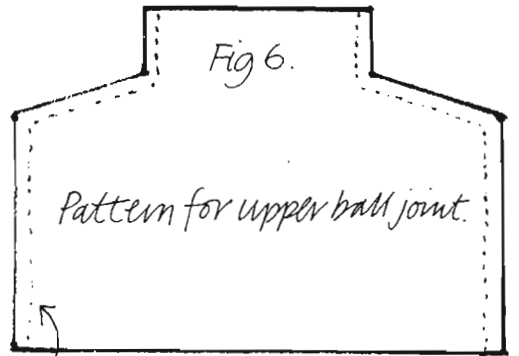
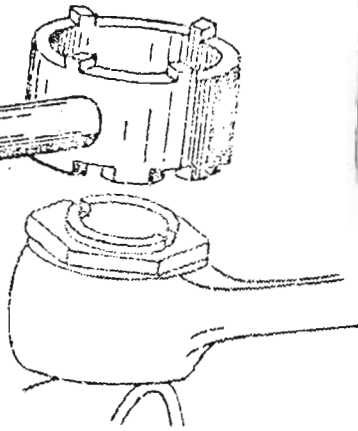


Fig 6.

Pattern for upper ball joint.

Stitch line

stitch line

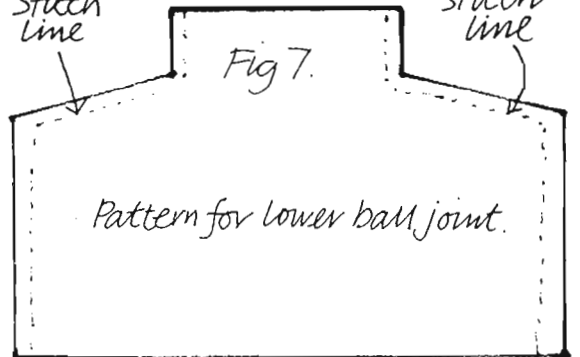
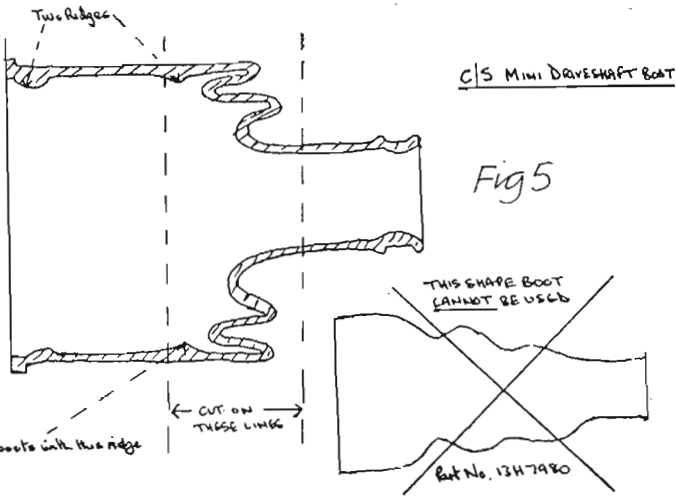


Fig 7.

Pattern for lower ball joint.



C/S MINI DAVEHAFPT BOAT

Fig 5

THIS SHAPE BOOT CANNOT BE USED

Part No. 13H7980

Two Ridges

CUT ON THESE LINES

Try to obtain boots with this ridge

Classified

Sales, Wants, Miscellaneous, Toys and Books.

Free to whoever will collect. Gearbox parts. Bits and pieces from Circa 1951-54. Does anybody know of my old car OYD 77. Contact Robert Vickery on Plymouth 822761.

T.O.C. Windscreen stickers, 40p each. Available from Dave Shepherd, Flat 2, Field House, Esplanade, Bognor, Sussex.

For sale Four Michelin 165 x 400 X.A.S. tyres with tubes on wheels, off a Citroen Safari, approx 1/3 worn. Please write to R. James, 2 Kinders Lane, Greenfield, Oldham, Lancs.

Wanted Floating Power copies to bring my collection up to date. Volume One No. 1—No. 2—No. 3 and Volume 2, No. 2 I will pay up to £5 each for the volume one copies and £3 for the Volume 2. Please write to R.J. Howarth, 184 Huxley Street, Christchurch, New Zealand.

T.O.C. Club Spares

Clutch thrust bearings £12.35 p&p 50p total price = £12.85
Outer Wheel Bearings £8.20 p&p 50p total price = £8.70
Master cylinder repair kit £2.65 p&p total price = £2.95
Flexible brake hoses for
" front £3.00 each p&p 40p total price = £3.40
" rear £2.60 each p&p 40p total price = £3.00

Coming shortly boots and rubbers for front and rear brake slave cylinders.

Send S.A.E. for price.

Available from John Gillard, 129b Camden Street, London, N.W.1. All cheques made payable to the Traction Owners Club.

Manual Hire Service

We have a full range of workshop manuals for loan. Please send details of your car, together with a deposit cheque for £20, plus a separate Postal Order for the postage of £1. Make the cheque payable to the T.O.C. and the postal order uncrossed payable to G. Brice.

Please enclose a S.A.E. for the return of your deposit. The manuals are available from the Editor.



Wanted Tyre(s) like the one in the photo? The wheel is all aluminium sort of Pilote style, I only have the one. Dr. W. Sellers, Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN.

For sale 1955, Slough built Citroen Lt 15. For spares or restoration. Runner with M.O.T. when bought, now dismantled, very good transmission offers invited. N. Fell, 33 Belvedere Street Aberdeen

The Club has for sale coloured 'T' shirts with a 'Viva La Traction' design available in small, medium and large. Colours: White, Blue, Brown, Red, Yellow, Green, please state all colours in order of preference. Price £1.95 small. £2.25 medium and large including p&p. Overseas members please add extra for postage. Available from John Gillard, 129b Camden Street, London NW1.

For Sale, models of Citroen Cars

Safir Champion 1/20th Metal

11 Legere Kit £8.35
11 Legere in Black £9.63
11 Legere 'F.F.I.' £9.95
11 Legere 'Lecot' £9.95
11 Legere 'Lyons Fire' £9.95

CLE 1/32nd Scale Plastic Traction Police 65p

Metal Kits 1/43rd Scale

Equipe Gallois, Post War Lt 15 small boot £3.95
Mikansue Lt 15 Roadster £4.95
Mikansue Lt 15 Coupe £4.95

Heller 15 C.V. 1/8 Scale Kit — 595mm long £49.99

Solido 1/43rd Scale Metal

1938 15 C.V. £3.89
15 C.V. 'F.F.I.' £3.89

ELIGOR 1/43rd Scale metal

1938 Roadster open 1923 5CV "Byrrh"
1938 Roadster closed 1938 Light 15
1933 Rosalie Saloon 1938 Light Fifteen F.F.I.
1923 5CV Van "Bebe Cadum" 1923 5CV 2 Seater
1923 5CV "Beneductube"

Retail price £4.50

ELIGOR 1/43rd Scale

1934 500kg Van "Dubonnet", "Essolube", "Vache qui rite"
"Nicolas", "Goodrich" and "Cinzano". — ALL £4.85

ALL MODELS ARE POST PAID AND PACKING FREE TO UK MEMBERS. WILL OVERSEAS MEMBERS PLEASE SEND APPROPRIATE SUM FOR POSTAGE. Cheques made payable to the Citroen Car Club, in sterling U.S. or Canadian dollars.

AVAILABLE FROM: Brian Seaton, 106 Marymead Drive, Stevenage, Herts SG2 8AF.

Traction Maintenance Enrolment 11–16th September for evening classes commencing 7 p.m. Tuesday 19th September at Highbury Manor Institute, Highbury Grove School, London N5. Although entitled Vintage Car Metalwork, the classes have been invaluable to London section members in providing use of good facilities at the amazing cost of £7.00 a year, and the excuse for a good noggin and natter afterwards at the Cannonbury Tavern.

For Hire Hydraulic engine hoist for use in London area. Hire fee £2.50. You collect and return. Contact John Gillard, Tel: 485 6488 or Bryn Hughes, 987 1664.

For Sale 1955 Slough built Big 15 for restoration. Car is complete but poor condition bodily. Engine overhauled and runs, spare wings and doors. Also workshop manual. Offers to Alan Sheldon, 75 Storrs Road, Brampton, Chesterfield, Derbyshire.

For Sale English Parts Book for Lt 15 in excellent condition £15 to include postage in UK only. c/o The Editor.

Lost My 1936 Slough Big 15, reg EEV 709. Has disappeared from its garage in Leeds and is reputed to have gone through a local scrap dealer's hands. Anyone able to furnish further information (or a suitable alternative project) will be suitably rewarded. Contact John Gillard, 129B Camden Street, London N.W.1.

For Sale Set of 4 new Hepolite Pistons complete with rings 68mm. for pre traction Citroen £10.00. John Gillard. Tel: 01-485 6488.

For sale A set of doors from a French Big 15 (Normale). Condition not bad. Offers. Buxted (082581) 2251.

Wanted 2 headlamp reflectors for 1953 11BL, and 2 interior sunvisors in good condition. This is all we need to get us on the road! Terry Sessions, 55 Field Road, Forest Gate, London E7. Tel: 01-534 3455. (Have heard of an 1927 B14 in excellent condition for sale at Chase Lane, Bronhills, for £4,500 – worth a look at?)

T.O.C. Do-it-yourself social section, or even more motoring events which may be of interest throughout the year.

August 28th Merton concours, Morden Park, Surrey. All classes plus auto-jumble.

September 2nd Mike Carter Auction auto-market and auto-jumble. Castle Ashby, Northants.

September 2nd, 3rd. The wonderful world of wheels, Motoring Extravaganza, Knebworth House, West of Stevenage.

September 2nd, 3rd Prescott Hill Climb. North of the A46, 6 miles N.E. Cheltenham.

September 2nd, 3rd Historical Vehicles and Steam Rally, auto-jumble, fairground, and real ale bar. Detling Showground, near Maidstone, Kent.

September 2nd, 3rd International 2CV Pop Cross meeting Great Leighs, North of Chelmsford.

September 9th Brighton Speed trials, Madeira Drive (Brighton Front).

September 15th, 16th, 17th Classic Collectors Car Show, Alexandra Palace, London, details Martin Wagner, 13 The Lawns, Hatch End, Middlesex.

September 23rd, 24th Doune (Scotland) on the A84, 8 miles N.W. of Stirling, Hill Climb, also superb motor museum.

ARTHUR SHAFT.SF.I.B.S.T. T.O.C.ret.

Correspondence c/o The Editor

Dear Arthur,

It has often been mentioned that the standard Lucas distributor is not very suitable for the Lt. 15. And that the Scintilla gives better results. Why should this be so?

Yours truly, Strongarm – Jones.

Dear Strongarm,

The standard Lucas distributor for the Lt. 15 is less satisfactory because the advance curve is not quite the same as that of the French distributor. Naturally in France, with the very large production, a special distributor was of course designed to suit the engine. It has been found however that the Scintilla is more suitable for the Lt 15 and one reason for this is that the Lucas unit has a very short life as far as spindle bushes are concerned and as soon as there is play at this point the precision of the timing is considerably upset. In the case of the Scintilla unit it is fitted with longer bushes, and the rotor head is lighter, and it is not subject to so much vibration and wear and it is for this reason that it gives better results.

Yours A.S.

Dear Sir,

Help! The sunshine roof on my Big 15 has stuck, it has not seized up. I think something has broken inside and is stopping movement. Could you tell me how to get at the "works" without spoiling the roof lining.

Yours faithfully, Big Alf.

Dear Big Alf,

Can't get out eh! Ever thought of using the doors. Seriously though, as with rain we get wiper problems, the sunshine brings the sliding roof defects to light, and many a member will need to remove the roof for routine servicing such as lubricating the runners, cleaning away the rust and painting or tidying up the trim. To remove, take out the two screws, one on each front corner of the roof, insert small spike through screw hole and push runner stop clips out towards the outside edge of roof. Lift front edge of roof slide forward and out. To replace, reverse procedure.

Yours Little Arthur

