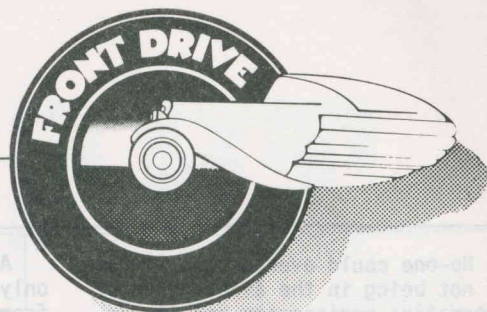




AUS TRAC TION 81

Bendigo • January '81
CCOCA's
big event of the year



You will notice two things about this issue of Front Drive,

1. It's late
2. It's different

Both are results of my having changed jobs. Type-setting facilities are no longer available - the magazine is now "set" on the typewriter. And while on typing, it would make things much easier, and faster, if contributors are able to submit their articles typed in 3inch wide column, preferably (but not essential) on carbon ribbon typewriter.

President Navin has taken on the additional task of Publicity Officer - to co-ordinate and initiate club P.R. Any suggestions appreciated.

And, talking of masochists, our Canberra member Rod Greschke is now editor of the Canberra club's excellent mag. "Spheres & Gears".

Austraction '81 has been moved forward to Australia Day weekend, (January) and will be in Bendigo - which means that you will have to book now - deadline end of September - for Australia's only classic traction rally.

Import quotas are expected to be increased soon - distributors are reported to be considering adding the 602cc Visa, and 5-speed CX (not GTI) to range. GSA would not be "overpriced" at about \$12,000.

CCOCA Committee:

President Mark Navin,
1 Alexander Street,
Box Hill, 3128
Phone 878 2410
Secretary: Roger Brundle,
12 Barkly Avenue,
Armadale, 3143
Phone 509 0441
Treasurer: Gerry Propsting,
18 Bellara Drive,
Mooroolbark, 3138
Spare Parts Officer:
John Couche,
15 Mitchell Ave, Boronia 3155
Phone 762 6856
Editor: Kym Harding,
26 Tyrrell Avenue,
Blackburn, 3130
Phone 877 4853

Activities Officer (Acting)

Peter Fitzgerald, 34/55A Coorrigic
Road, Carnegie. 3161.

Librarian: Peter Simmenauer,
6 Rubens Grove,
Canterbury, 3126
Phone 82 6539

CCOCA Membership:

Joining fee (new members and
late subscriptions) \$5.00
Annual Subscriptions:
Full member \$15.00
Associate member \$10.00
Joint membership available to
spouse of full member, no cost
Overseas postage rate \$5.00

CCOCA meetings are held on the
last Wednesday of every month
at the Coffee Shop meeting
room of the Nunawading Civic
Centre, Nunawading, east of
Springvale Road.

Coming Events

Wed. 27th August:

General meeting, Nunawading

Sunday 31st August:

Annual Parts Auction and BBQ
Couches'.

Wed. 24th September:

General Meeting, Nunawading

Australia Day Weekend '81:

Austraction '81, Bendigo.

M35

No-one could ever accuse Citroen of not being in the avant-garde of automotive engineering and it was only natural that they were interested in the Wankel engine at an early stage.

Unlike other manufacturers which took out licences to develop and manufacture the engine in their own right, Citroen found a different way of gaining market expertise. Citroen and NSU set up a joint venture - Societe d'Etude Comobil - in 1964, to design and market a NSU-Wankel powered car. The original intention was that the engine would be supplied by NSU and the car assembled by Citroen.

In 1967 a further joint subsidiary known as Comotor SA was set up in Luxembourg with the brief to supply Wankel engines and accessories for all applications.

Citroen obviously gained a great deal of engineering data from these joint ventures, but as their prime interest in the engine was as a vehicle power plant, a decision was taken to test the market and early in 1970 Citroen announced that they were to build 500 Wankel-engined cars for sale to the public, as a large scale field trial.

The car, code-named M-35, was never intended to become a production car and was not for sale outside France. The intention was that the cars would be run in all conditions by drivers of varying degrees of skill and the results evaluated after 3 to 4 years. The engine was warranted for 2 years and the rest of the car 1 year. In the event, it is reputed that only 260 M-35 were delivered although a total of 18.5 million miles were accumulated throughout the test.

As the body and running gear were only intended to keep the engine from falling onto the pavement and the whole thing was really a prototype anyhow, Citroen reached deep into their spare parts bin when designing the M-35. In effect, it was a cut and shut Ami-8 avec NSU-Citroen Wankel.

The body was built by Carrosserie Heuliez (who incidentally built some interesting variations on the SM theme later on) and sent to the La Janais plant near Rennes for final assembly. The engine was supplied by NSU in Neckarsulm and the cars were initially built at the rate of two a day.

The single rotor peripheral port engine benefited from many lessons learnt during the first years of R0-80 production and featured a very hard nickel-silicon coating for the trochoid housing, copper sleeves for the spark plug holes to prevent cracking of the housing, and cast iron seals in a new configuration. Drawing on 2CV experience, Citroen developed an effective oil cooling system but in stark contrast to the 2CV the engine was water cooled. Chamber displacement was 497.5c.c. giving an equivalent total displacement of 995c.c and on a compression ratio of 9:1 the engine developed 55 horsepower.

The rather cobbled-up 2 door "fast-back" body shell used Ami 8 doors, front guards and bonnet, with the front panelling being extended forward to allow room for a radiator. Oh, the shame of it!

The interior was contemporary Ami 8 although the seats appear to have been upgraded and were reclining.

However, it was the bits underneath the sheet metal and PVC that started to get interesting. The platform frame and suspension arms were based on Ami 8 design but the actual suspension medium was new (for 2CV variants, anyway). Since the dawn of history 2CV's had, and still

have, leading arms at the front and trailing arms at the rear interconnected on each side by tension rods and coil/volute springs. Damping was by inertial units on the early 2CV's and hydraulic on later variants. The M-35 used leading and trailing suspension arms in combination with a full hydraulic-gas system similar to the D series. The suspension units were mounted horizontally each side of the centre of the car and connected to the suspension arms through bell-cranks and rods. A high pressure hydraulic system provided automatic levelling and manual height adjustment capability (refer diagram). Apart from these obvious advantages the system is supposed to have eliminated the dreaded 2CV pitching motion.

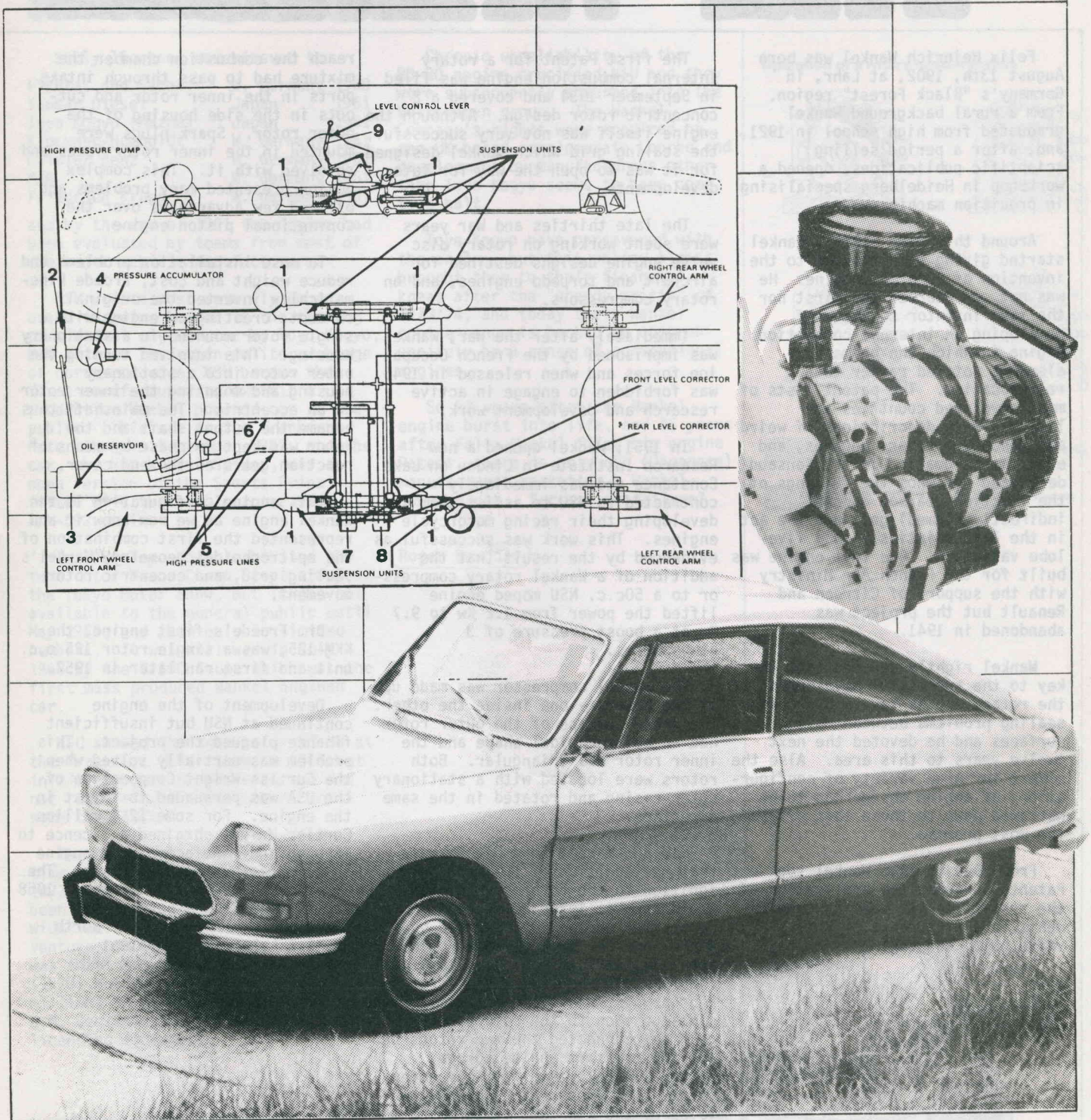
The 4 speed gearbox was all new and possibly the forerunner of the GS, and GS-size inboard disc brakes were fitted at the front. To cope with the increased loading on the front wheels due to the extra weight of the engine, cooling and hydraulic systems, the steering ratio was increased, but the tyre size remained at 135 x 15 ZX.

The M-35 was claimed to have had a top speed of around 90 mph with third gear good for at least 80. Certainly the engine was high revving unit with a buzzer set to frighten the uninitiated at 7500 rpm. Contemporary reports quote top speeds in excess of 90 given a good run up, but complain of lack of torque, poor low speed acceleration and some snatching on the over run.

The M-35 was a brave experiment, executed in a fashion and scale probably only Citroen could conceive and follow through. The development program of which the M-35 was an integral part was to culminate in the release in 1974 of Citroen's first (and only) Wankel-engined production car - the GS Birotor.

Roger Brundle.

THE



GREAT EXPERIMENT

THE WANKEL

Felix Heinrich Wankel was born August 13th, 1902, at Lahr, in Germany's "Black Forest" region. From a rural background Wankel graduated from high school in 1921, and, after a period selling scientific publications, opened a workshop in Heidelberg specialising in precision machinery.

Around this time (1924), Wankel started giving some thought to the invention of a rotary engine. He was not, of course, the first nor the last inventor to dream of developing an internal combustion engine in which the primary elements rotated rather than reciprocating. The patent lists of most developed countries are littered with descriptions of weird and wonderful rotary engines, and even the enigmatic Dimitri Sensaud de Lavaud (on whom the failings of the Traction gearbox can be indirectly blamed) got into the act in the late thirties with a five-lobe variation. One test engine was built for the French Air Ministry with the support of Citroen and Renault but the project was abandoned in 1941.

Wankel rightly deduced that the key to the successful development of the rotary engine lay in overcoming sealing problems between moving surfaces and he devoted the next twelve years to this area. Also the almost infinite variety of configurations of engine design had to be narrowed down to those that offered the most promise.

From 1934 to 1936 Wankel took out Patents covering the application of the results of his sealing developments to a wide range of rotary valve pumps and engines.

The first Patent for a rotary internal combustion engine was filed in September 1934 and covered a 2 concentric rotor design. Although the engine itself was not very successful, the sealing grid which Wankel designed for it was to open the way for later developments.

The late thirties and War years were spent working on rotary disc valve engine designs destined for aircraft and torpedo engines, and on rotary compressors.

Immediately after the War, Wankel was imprisoned by the French Occupation forces and when released in 1946 was forbidden to engage in active research and development work.

In 1951, Wankel opened a new Research Institute in Lindau on Lake Constance and was immediately contracted to NSU to assist them in developing their racing motorcycle engines. This work was successful as evidenced by the result that the addition of a Wankel rotary compressor to a 50c.c. NSU moped engine lifted the power from 1.2 Kw to 9.7 Kw at a boost pressure of 3 atmospheres.

The Wankel compressor was made up of two rotors - one inside the other. The inner surface of the outer rotor had an epitrochoidal shape and the inner rotor was triangular. Both rotors were located with a stationary outer casing and rotated in the same direction.

NSU and Wankel were not unaware that the addition of fuel and ignition to the compressor design would turn it into an internal combustion engine. A team led by Wankel and Dr. Walter Froede of NSU spent 3½ years in achieving this goal. The first engine (the DKM-54) ran on February 1st, 1957 and was similar in configuration to the compressor. A gear set connected the two rotors but did not transmit engine torque. Torque was delivered from the outer rotor. The inner rotor was hollow to carry the air fuel mixture and to

reach the combustion chamber the mixture had to pass through intake ports in the inner rotor and cut-outs in the side housing of the outer rotor. Spark plugs were mounted in the inner rotor faces and revolved with it. This complex design presented many problems and offered few advantages over the conventional piston engine.

To ease installation problems and reduce weight and cost, Froede kinematically inverted the original concept, creating an engine with a single rotor mounted in a stationary housing. This involved turning the outer rotor into a stationary housing and mounting the inner rotor on an eccentric. The mainshaft thus became the output shaft and the rotor was kept in phase by means of reaction gears on the end cover.

This engine configuration is the Wankel engine as we now know it and represented the first combination of the epitrochoidal geometry, Wankel's sealing grid, and eccentric rotor movement.

Dr. Froede's first engine, the KKM-125, was a single rotor 125 c.c. unit and first ran later in 1957.

Development of the engine continued at NSU but insufficient finance plagued the project. This problem was partially solved when the Curtiss-Wright Corporation of the USA was persuaded to invest in the engine. For some \$2.1 million Curtiss-Wright obtained a licence to develop and manufacture the engine in all sizes and for all uses. The agreement was signed in October 1958 and Curtiss-Wright became the exclusive sub-licensor for North America, sharing the patent royalties with Wankel and NSU.

STORY

Early licences were issued to:

Fichtel and Sachs	W. Germany	1960
Yanmar Diesel	Japan	1961
Toyo Kogyo (Mazda)	Japan	1961
Klockner-Humboldt	W. Germany	1961
Daimler Benz	W. Germany	1961
MAN	W. Germany	1961
Friedrich Krupp	W. Germany	1961

and by the end of 1961 the engine had been evaluated by teams from most of the major vehicle manufacturers.

NSU were almost severely embarrassed in being beaten to the showing of a Wankel engine car by Toyo Kogyo, but after a less-than-polite exchange of correspondence, NSU became the first manufacturer to exhibit a production Wankel powered car to the public. This was at the Frankfurt Motor Show in September 1963, and the car, the NSU Wankel Spider, was an open version of the Sports Prinz fitted with the single rotor 996c.c. KKM-502 engine.

In 1964 Toyo Kogyo exhibited the twin rotor Mazda Cosmo Sport 110-S at the Tokyo Motor Show, but it was not available to the general public until May 1967, and then only in limited numbers. It was followed in July 1968 by the R-100 Coupe which was the first mass produced Wankel engine car.

NSU showed the twin rotor R0-80 at the Frankfurt Motor Show in 1967 but initial production was slow and did not reach significant numbers until some time later.

The story of the Wankel from that time is one of ups and downs. By 1973 more than 26 Wankel licences had been issued to manufacturers worldwide including the Citroen/NSU joint venture COMOTOR. The crucial licence was that issued to General Motors (1970) but after spending untold millions in development and tooling, G.M. declined to continue the licensing agreement.

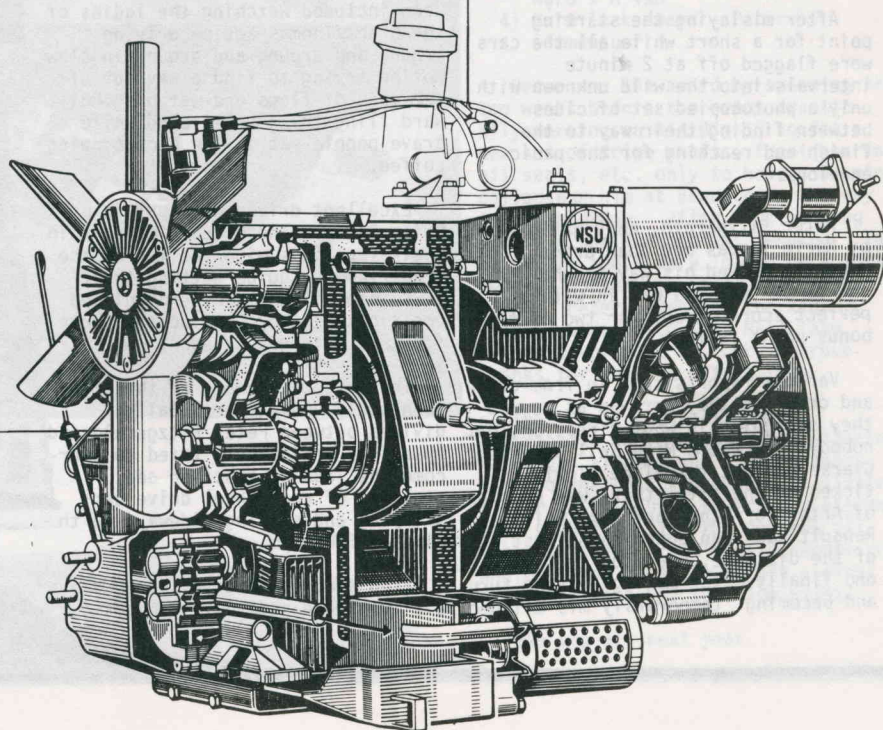
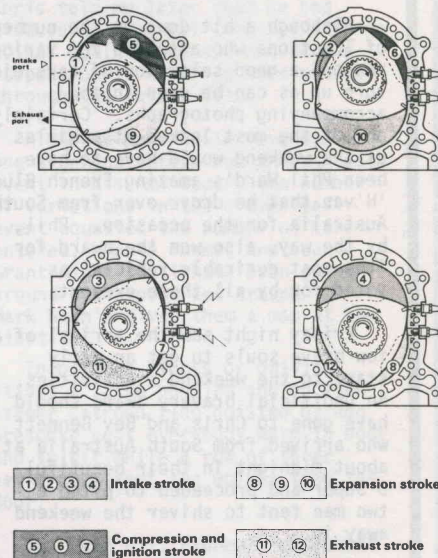
Chronic unreliability of the R0-80 engine crucified NSU and they were subsequently absorbed into the Volkswagen group. The Wankel Company's rights were acquired by the UK-based conglomerate Lonrho and development by manufacturers other than Toyo Kogyo seems to have come to a halt.

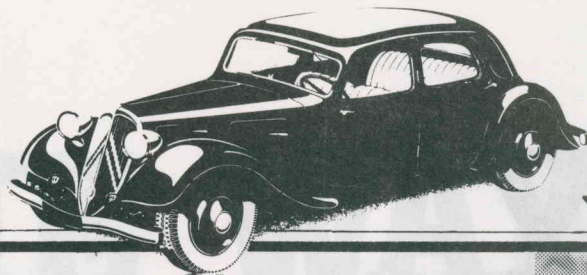
Toyo Kogyo have persevered with the engine, but this policy almost brought them to their financial knees after the "energy crisis" of 1973/74; and today their Wankel engine range is backed up comprehensively by a range of conventional engines.

So 23 years after the Wankel engine burst into life, and 46 years after Felix Wankel filed his engine Patent, there is only one (Japanese) manufacturer marketing a Wankel-powered car. Success or failure?

Roger Brundle

Operation of a rotary-piston engine





AUS

Austraction '80 was a great success. That short sentence just about sums up the overall feeling of the 47 or so adults and children who attended this year at Swan Hill.

Although a bit down on the number of Tractioners who attended for various reasons a good selection of cars did turn up as can be seen in the accompanying photographs. Certainly one of the most looked-at vehicles of the weekend would have to have been Phil Ward's amazing French Blue 'H' van that he drove over from South Australia for the occasion. Phil, by the way, also won the award for 'the most desirable vehicle' as voted for by all those present.

Friday night saw the arrival of a few brave souls to get an early start to the weekend's activities. An unofficial bravery award should have gone to Chris and Bev Bennett who arrived from South Australia at about midnight in their beautiful D Super and proceeded to pitch a two man tent to shiver the weekend away in.

Saturday morning heralded a layer of ice over everything - it was that cold. (Chris and Bev had given up on the tent and had finally spent the night in the car.)

Elbows well lubricated and palates well primed CCOCA set off in convoy for a tour and tasting session at Best's Winery. Rumour has it that Arthur Clarke was overheard asking for a beer!

Well oiled and wide awake after lunch all minds were clicked into gear for a 25 mile run around the countryside on an observation run.

After mislaying the starting point for a short while all the cars were flagged off at 2 minute intervals into the wild unknown with only a photocopied set of clues between finding their way to the finish and reaching for the panic envelope.

Peter Fitzgerald, ably navigated by Marie Thomas and Joan Grant, expertly weaved his way around the course to lead the way in with a perfect score except for two of the bonus point items.

Various reports came in from drivers and crews as they arrived as to who they saw going in what direction, but nobody knew where Mike Neil or Arthur Clarke had got to. Time slowly ticked by and still there was no sign of Arthur or Nance but Mike Neil's Renault was seen approaching fast out of the distance. He made it to the end finally after making a wrong turn and becoming 'temporarily mis-aligned'.

Just as we were about to send out a search party Arthur and Nance arrived to a flurry of applause and cheers. They too had got lost.

Tyntyndyer Homestead was the finishing place for the run so a number of people decided to tour the premises while others allegedly returned to the caravan park (actually I think that certain people may have gone back along the course to make sure there really were only 8 blades on that windmill!!!!).

Saturday night activities consisted of a great bar-b-que followed by films and general socialising.

Following the films several well earned sessions were organised in various caravans to consume the products of the morning's tours and to discuss ways of disposing of the observation run organisers.

Sunday morning was free so a number of people trotted off to add a bit of class to the Jaguar Car Club's concours being held at the show grounds.

At 11.30 the convoy set off again for Murrawee Reserve for a motorkhana - under threatening skies. Five events were staged during the afternoon and although it drizzled most of the day everybody thoroughly enjoyed trying to blow their cars up. Much to his surprise, Rod Greschke

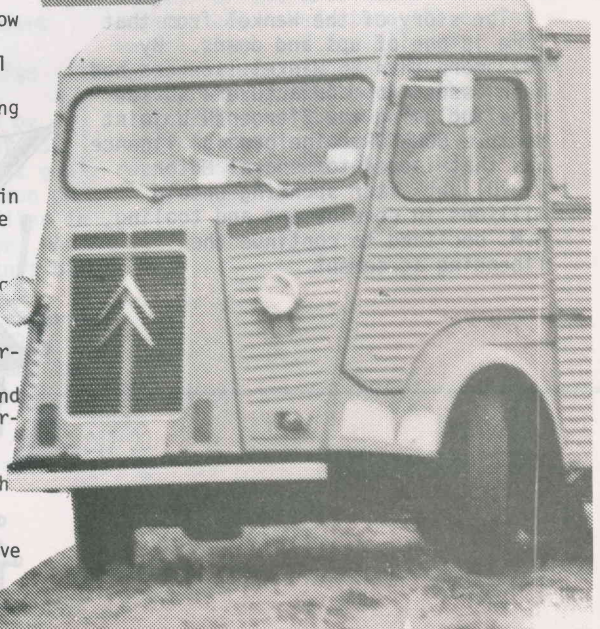
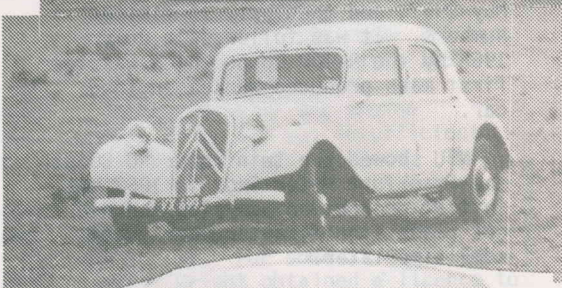
was the winner of the event with Tractioners magically taking the first four placings. It seems the Mark Navin system of scoring was a little biased towards front wheel drive cars manufactured before 1957. Hmm!!

Interesting aspects of the afternoon included watching the ladies of the Grant/Thomas Equipe driving around and around and around in slow motion trying to find a way out of the mass of flags and watching Phil Ward fling the H van around while brave people sat in the back sipping coffee.

Excellent drives were put in by Brian Paulusz and Claud Zimmerman in their Tractioners with the men of the Grant/Thomas Equipe getting their 11BL into all sorts of undignified positions as they confidently flung it around with gay abandon.

The desperate award of the afternoon would have to be equally divided between Peter Fitzgerald and myself as we insanely tried to overcome the lack of traction and steering of rear wheel drive cars slipping and sliding sideways in the dirt at 6000 rpm.

Fred Kidd and Arthur Clarke drove a little more sedately than most,



TRACTION '80

John and Robyn Couche



but with cars like theirs I would have also. Not quite doing the job it was designed for, Chris Bennett's 5 speed D Super nevertheless powered its way around the circuit. Chris told me later that he had discovered that all sorts of strange noises could be coaxied out of the suspension if he tried hard enough through the twisty bits.

Although Mark Navin gave everyone a demonstration run through each event in his Ami Super, the number of variations in the cloverleaf event equalled the number of cars entered. Marie Thomas and Joan Grant might still have been going around and around and around if Mark hadn't given them a map at the start.

In between events or driving stints a large bonfire and an even larger Citroen flag hoisted by Rod Greschke kept everybody warm in body and spirit while a row of three bar-b-ques kept the wolves from the door.

The Swan Hill Pioneer Settlement was invaded en masse on Sunday night for a journey back to pre-Citroen times on a sound and light tour.

Monday morning was the last scheduled event for Austraction '80 and consisted of a chicken and champagne breakfast on the banks of the mighty Murray. A stirring speech was made by the honourable President and trophies were presented to those who had won them. The winners were:

- 1) Longest distance travelled in a Traction - Rod Greschke.
- 2) Winner of the motorkhana - Rod Greschke (again!!)
- 3) Most desirable vehicle - Phil Ward's H van
- 4) Hard luck award - Peter Simmenauer.

Peter won the award by spending the two weeks before the event frantically working on his Big 15 to fit a new set of drive shafts, front bearings, oil seals, etc. only to have a bearing collapse on him at Bendigo on the way up on Saturday. After much hunting around a replacement was located. The necessary tools were loaned by a local Bendigo doctor who is also a Citroen Freak. Peter, Anne and the kids finally made it to Swan Hill late Sunday arvo about 24 hours overdue. Thanks for the big effort Pete.

That, in a nut shell, was Austraction '80. Next year's planning has begun already and it is planned to hold the event at a venue a little closer to Melbourne to try and attract more people to wipe the cobwebs off their Tractions, 2CV's, Kingswoods or whatever and make the effort - after all isn't that why the Club exists.

See you all next year.



Eric Kirby talks on

THE SOLEX

Bi-Starter Carburettor

Another of our articles on common carburettors by a well-known English expert.

THE Solex carburettor is well known for simplicity and accessibility. In common with all other makes it has two duties to perform. One is to deliver the mixture in an atomised form. The other is to ensure that the two ingredients, petrol and air, are mixed in their correct proportions.

The first is not hard to understand when we realise a liquid can only burn when it is in contact with the oxygen in the air. So the mixture when entering the cylinders must consist of a very large number of exceedingly small drops carried in the air stream.

The second is the carburettor's ability to supply the correct ratio of fuel to air at variable engine speeds. In general, maximum power is secured from air fuel ratios of

14 to 1 (by weight) and maximum economy with ratios of about 15½ to 1. For cold morning starts this ratio is increased to something like 7 to 1.

To get this low ratio, the Solex carburettor employs what is known as a bi-starter. This is in effect a separate carburettor on its own, although attached to the main carburettor and is operative only during the starting and warming up period of the engine.

The starting device is brought into use by the means of a dashboard control which is connected to the starter lever (see [7] Fig. 1). This lever has two adjustable positions. To start the engine when cold, pull out fully the dashboard control. In this position it will give a very rich mixture which is essential for cold

starting. The engine begins to warm up almost immediately after starting and the dash control can then be pushed in approximately halfway to the "bi-starter" position, when a resistance will be felt, determined by the location of the spring ball (9) in a notch in the rotating valve disc (5).

At this stage, the mixture strength is considerably reduced, but quite sufficient to enable get-away without risk of the engine stalling when the accelerator pedal is depressed.

As soon as the engine is warm enough, the dashboard control must be fully pushed home, thus putting the starting device out of action.

The bi-starter has two units for gauging the correct supply of petrol and air; the air jet (2) meters the

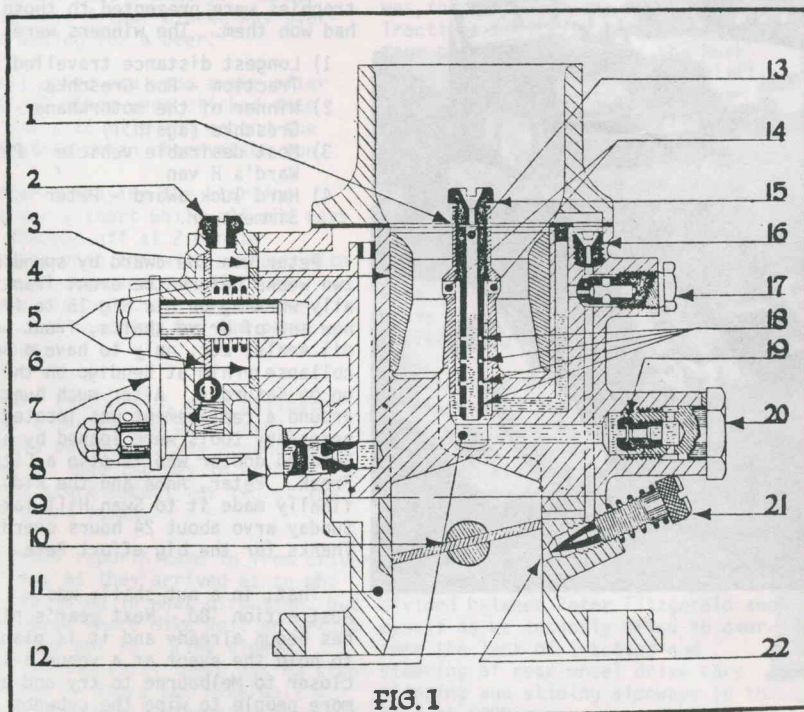
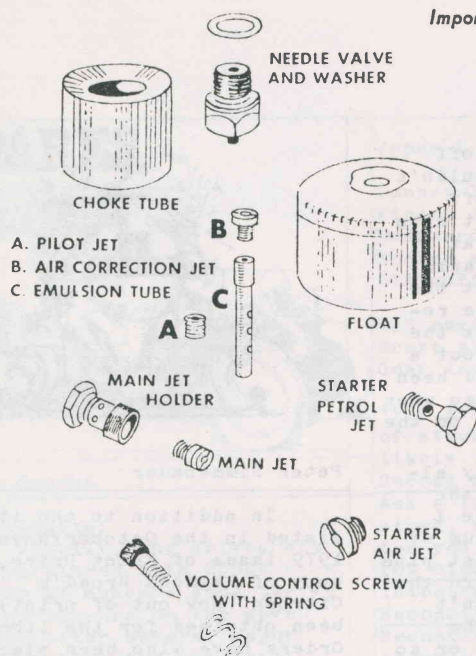


FIG. 1

The various parts are identified in the key below. For an explanation of how they work, see the text.

1. Spraying Well; 2. Starter Air Jet; 3. Starter Valve Duct; 4. Choke Tube (Venturi); 5. Spring Loaded Disc Valves; 6. Starter Valve Exit Duct; 7. Starter Lever; 8. Starter Petrol Jet; 9. Spring Ball (Bi-Starter Position); 10. Throttle Butterfly; 11. Starter Mixture Delivery Duct; 12. Reserve Well; 13. Emulsion Tube; 14. Spraying Orifices; 15. Air Correction Jet; 16. Pilot Jet Air Bleed; 17. Pilot Jet; 18. Emulsion Holes; 19. Main Jet; 20. Main Jet Holder; 21. Volume Control Screw; 22. Idling Mixture Delivery Duct.



Important parts are drawn separately (left). External view of carburettor (right) shows where to look for them.

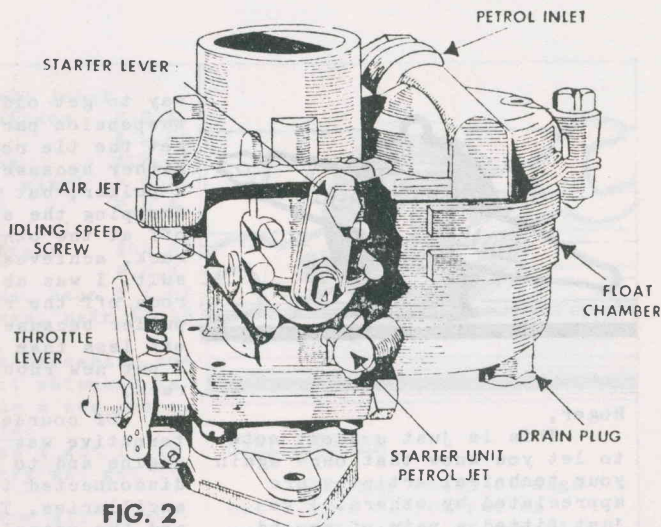


FIG. 2

air supply and the petrol jet (8) meters the petrol.

IDLING

When the engine is idling, the mixture is provided by the pilot jet (17), the air bleed (16) and the volume control screw (21), the mixture strength being weakened by turning the screw (21) in a *clockwise* direction and vice versa.

IDLING SYSTEM

Petrol drawn from the reserve well (12) is fed through a series of channels and eventually passes through the pilot jet (17), then into the downward tract where it is partly broken up with a metered amount of air which has passed through the pilot jet air bleed (16). On reaching the idling orifice (or opening) (22), the flow is controlled by the tapered volume control screw (21).

It will be noted that the idle orifice (22) is on the engine side of the throttle and, therefore, open to depression when the throttle butterfly (10) is at the closed position. When the throttle is opened, it will be seen that the orifice just above the throttle plate will come into action. This is a by-pass or progression outlet and is used to provide an easy move over from idling to general running.

GENERAL RUNNING

For general running above idling speed, the fuel is drawn from the float chamber (not illustrated, but is of conventional design carrying a float which closes off a needle valve when petrol in the float chamber and channels has reached the right level) through the main jet (19), which is housed in the main jet holder (20), then into the spraying well (1) via the reserve well (12), where it meets air drawn down via the air correction jet (15). This air passes out through the emulsion holes (18) where an

emulsion is formed with the petrol. The resultant mixture rises and is drawn out of the spraying orifices (14) by a vacuum created by air rushing through the choke tube (4). The mixture is then carried past the throttle butterfly and on into the firing chamber of the engine.

DISMANTLING THE CARBURETTOR

The main construction of the carburettor illustrated comprises of three die-castings, namely (A) the throttle body, (B) the float chamber and the main carburettor body to which is attached the bi-starter unit. (C) the float chamber cover and air intake. (On some of the smaller Solex models there are only two die-castings. On these the throttle body and main carburettor are cast as one piece.)

A study of Figure 1 will show that the main jet (19), the pilot jet (17), and the starter air jet (2) are all accessible from the exterior without dismantling the carburettor. With removal of the air cleaner, if fitted, access to the interior of the carburettor is quite easy. To get to the float chamber it is necessary to remove the screws holding the cover in position, together with the petrol pipe union, when the cover may then be lifted off, exposing the float chamber, float, air correction jet (15), and pilot jet air bleed (16).

GENERAL NOTES

On warm days, if the engine is not stone cold, it is usually possible to start up with the dashboard control pulled out only to the half way position. If an instant start is not forthcoming and the carburettor is suspect, remove and clean the starter petrol jet (8). Blow through it with compressed air. Do not probe with a pin or wire.

Before adjusting the carburettor it is important that the ignition system be in good condition and that the compression is equal in all cylinders. It is also important that there be no leaks in the intake mani-

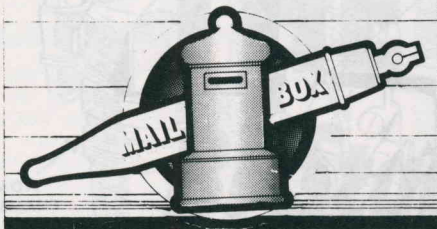
fold and that the engine is at operating temperature. The carburettor must be clean internally, in good mechanical condition, and the float level must be correctly set. The float level can be adjusted if necessary by using different thicknesses of washers under the needle and seat. An extra or thicker washer will reduce the petrol level. A high float level can generally be determined by looking down through the throat of the carburettor with a flashlight while the engine is idling. If the spraying holes flush alternately wet and dry, it is a true indication of a high fuel level in the float bowl which must be corrected before the engine will idle smoothly.

Normal adjustment is carried out as follows:

Wait until the engine is hot and set the idling speed screw (Fig. 2) so the engine is running a little on the high side. Next slacken the volume control screw (21) until the engine begins to hunt, then screw it in until the hunting just disappears. If the engine speed is still too high, set the idling speed screw until a nice even idle is obtained. Should this cause a resumption of hunting, turn the volume control screw in a *clockwise* direction until the idling is perfect. When removing the volume control screw for cleaning, care should be taken to see that the tapered point is not bent or worn. If this is the case, then a new screw should be obtained immediately.

AIR FILTERS

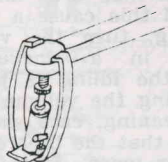
An air filter with too small an area of filtering medium will raise fuel consumption owing to the increased vacuum imposed upon the jets. If this is suspected, make a comparative test with the air filter removed. Should the cause be located here, first clean carefully the filtering medium then try again. If after this, the consumption is still bad, it is probably the result of the filter itself being too small.



Roger,

This is just a short note to let you know that once again your technical articles are appreciated by others. I've just fitted a pair of second-hand drive shafts to our Light 15 and successfully completed the job with the aid of your last article, and despite your warning, didn't find it necessary to refer to the workshop manuel. Having never had a drive shaft out before, I found little points like which were right hand and which were left hand threads, a great help. The exploded diagram was worth a thousand words too.

I did run into one problem that no workshop manual could have helped with though. The lower ball joint on one side side refused to relinquish its grip of its mated tapered shaft. I didn't have the factory designed separating tool but even if I had I suspect that it wouldn't have been any match for the obstinance of that particular ball. I made a type of pressing tool which might be of interest to others who aren't close enough to borrow the Club's tools. It was made to work in conjunction with a small hydraulic jack and rather than explain it, perhaps I could draw it.



I haven't drawn the swivel hub in because my artistic talent was exhausted before getting that far. I found that there was just enough room for the 'teeth' of this device to fit beneath the rubber boot and the hub. The only disadvantage with this idea is that you can't use a hammer to jar the bolt, and this is probably the reason that I finally had to give up. Even heating the ball with an oxy torch didn't help although I did discover that an oxy flame is a great

way to get old grease off suspension parts. I couldn't get the tie rod ends off either because I didn't have a puller, but found that dropping the steering arms off at the other end, at the rack, achieves the same result. I was able to get the rods off the rack without a puller because they had been off less than a year ago when I put new rubber boots on the rack.

Of course the only alternative was to lift the engine and to save time I disconnected the minimum of ancillaries. The exhaust pipe and the petrol line were the only things that wouldn't 'give' enough to let the engine be raised the 4 or so inches that was necessary to get the shafts out beneath the gear box. In the end I lifted it higher than anticipated and discovered that a properly fitted high tension lead between the coil and the distributor is almost capable of lifting the front of the car. The choke cable thought all its Christmases had come at once too and insisted that I spend some time straightening it before it would consider going back to work again.

All's well that ends well though, and even though the shafts aren't perfect, they are quite and improvement on the old ones.

Having taken over the job of editor in ou locla club I've learnt that you get little feed-back for your efforts so, as I said at the start, I thought you might like to know that your efforts have been a great help to some one. Thanks for your trouble, Rod (Greschke).



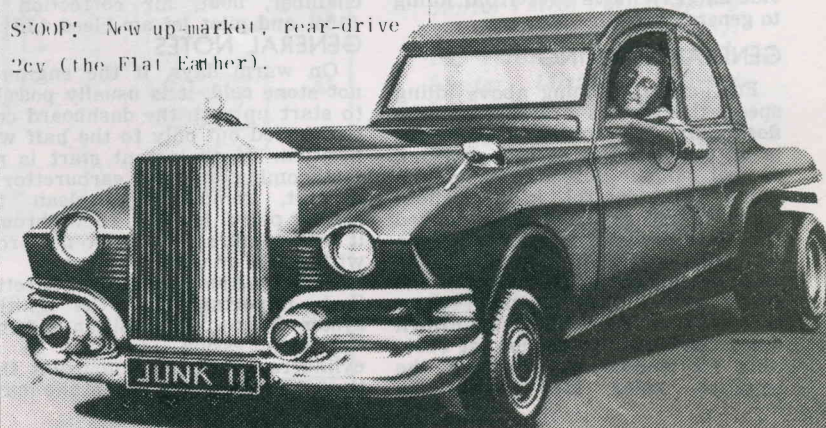
Peter Simmenauer

In addition to the items listed in the October/November 1979 issue of Front Drive, a copy of Raymond Broad's Citroen (now out of print) has been obtained for the library. Orders have also been placed for the second volume of Pierre Dumont's Quai de Javel, Quai Andre Citroen, L'Album de la Traction and (drool, drool) Toutes les Citroens. A full set of Front Drive has been placed in the library to satisfy photocopying requests, and copies of Double Chevron have been requested from Citroen public relations.

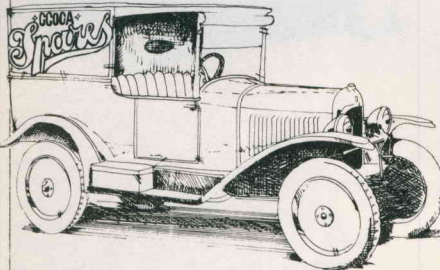
All items will be circulated and available for loan at meetings or on request (A.H.82 6539). Any postage costs are payable by the borrower. Loans are for one month (negotiable) unless required by another member - when speedy return is expected. Manuals are not for loan, but can be photocopied at 5c per page on bond paper.

Suggestions for purchase, with indication of price and availability, are welcome. If You have any precious pamphlets, photos or articles that others might be interested in seeing, but that you don't feel like risking, consider allowing the Librarian to copy and return them. Donations are always welcome.

SHOOT! New up-market, rear-drive 2cv (the Flat Earther).



SPARES



John Couche

Driveshafts:

Finally, the driveshaft orders placed with COCCA by a number of members some twelve months ago are on the move again. After several major hassles with the original order in Holland it has now been cancelled, and a new order placed with a local company.

The new expected delivery date is September or November, 1980. Two extra pairs have been ordered for sale to members, and should cost about \$105.00 each on a changeover basis.

The club presently has one pair of reconditioned Big 15 driveshafts for sale at \$101.17.

New parts in stock:

Bearings:

L15 Front wheel outer	\$11.61
L15 Front wheel inner	\$ 6.21
L15 Rear wheel	\$ 8.14
Gearbox bearing type 1	\$17.18
Gearbox bearing type 2	\$17.63

Gaskets:

B6 Exhaust - 2 hole	\$ 0.75
L15 head gasket	\$22.59
Solex 32PBIC carby set	\$ 2.87

Rubberware:

L15 Fan belt	\$ 5.98
Big boot weather seal	\$ 7.37
Steering rack boots	\$ 9.45
Windscreen rubber - wide frame	\$ 4.94

Pedal rubber P.O.A.

L15 radiator hose, upper \$7.18

L15 radiator hose, lower \$8.25

Fuel filler neck grommets

- big boot \$ 2.57

Door & bonnet grommets \$ 0.57

Heating system rubbers P.O.A.

Headlight, door handle

& boot handle protectors \$8.74

Scuttle vent rubbers \$13.00

Door seal rubber \$ 8.00

Gearbox and clutch:

Gearbox out-put seals \$ 6.95

Gearbox bushes, set of 4 \$26.52

Gearbox locktabs \$ 3.36

Clutch friction plate,

re-co changeover only \$30.00

Clutch bearing springs \$ 0.50

Crank handle pins \$ 1.15

Miscellaneous:

Bumper irons - pair \$43.20

Upper & lower ball joint

leathers	P.O.A.
Bonnet lacing	\$ 4.60
Window channeling	\$18.75
Mudguard piping, vinyl	P.O.A.
Rocker shaft L15	P.O.A.
L15 muffler, original pattern	\$64.28
L15 engine pipe	P.O.A.
Brake shoe bushes, each	\$ 1.07
Gear lever springs, pair	\$3.58

*P.O.A - part is presently out of stock and next shipment is likely to include a new price.

Second hand parts:

Ask - if we haven't got it in stock, we will try and get it for you.

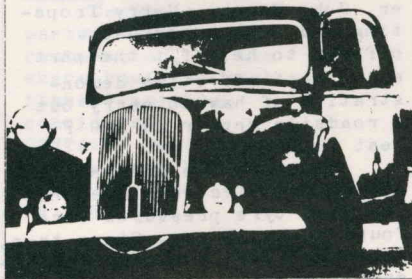
10% Discount - for all participants in the parts loan.

Reconditioning service:

Reconditioning service is available on the following:- Radiators, brake shoes, brake wheel cylinders, master cylinders.

Price of these services depends on condition of item submitted for reco, but will be at trade prices.

CLUB EVENTS



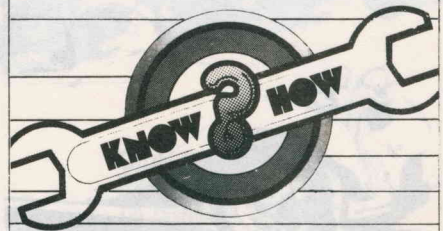
CLUB BAR-B-Q AND PARTS AUCTION

August 31st, at Couche's 15 Mitchell Ave, Boronia. BYO food and drink. Come and buy the bargains of the year, and bring your own treasures to sell. Rumour has it that Tor Shaun Barr will be there with some La 22 parts for sale.

AUSTRACTION 81 - BENDIGO

Citroens and warm weather too. We have decided to move Austraction to the Australia Day weekend, January 24 - 26, to take advantage of the warmer weather. (The real reason is the 2CV owners want to go topless) Details of booking will be out soon, as we will have to book early to get caravans.

Peter Fitzgerald



RUST REMOVAL

This may sound strange but I have discovered an excellent method of removing even the most advanced cases of tin worm, by the use of molasses.

The method was shown to me recently by a vintage car freak, with before and after examples - and it really does work.

METHOD: Mix one part of molasses with four parts warm water (to melt the molasses) and place the offending part in the mixture.

Depending on the amount of rust to be removed the part should be left in the soup for two - four weeks. When it is removed the rust has gone and the part should be washed in cold water.

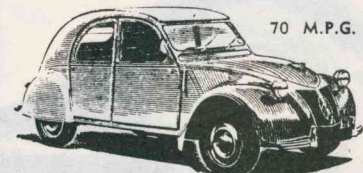
Do not use containers or parts made of zinc or aluminium, as the mixture tends to dissolve these also. Do not immerse springs for more than one - two weeks or they will no longer spring.

An ideal container for small parts is a large plastic rubbish bin, or an old bath with a brass plughole for large parts.

Sufficient molasses for a 4:1 mixture in a plastic rubbish bin can be purchased from stock feed agents for approx. \$5.00 - \$6.00.

John Couche.

MAYBE IT'S NO BEAUTY



BUT FOR MIRACLE-RIDE COMFORT, EASE AND ECONOMY OF MAINTENANCE, AND ADAPTABILITY OF PURPOSE, 2CV CITROEN IS THE WORLD'S OUTSTANDING LIGHT CAR.

Let Us Demonstrate!

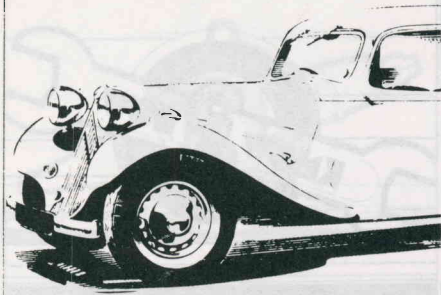
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111-125 c Beckett Street, Melbourne.

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and members thereof nor the authors accept any liability.

Members' Cars



Peter Simmenauer,
1953 Slough Big 15 GDT-317

A visit to the Simmenauer residence would reveal a 1953 Big 15 resplendent (?) in two-tone blue duco with original GDT-317 plates.

I try hard to believe that I am only the second real owner, but have to admit to two brief intermissions since Wal Parker, the original owner, sold it in August 1977 to Daniel de Speville. The new owner 'improved' the appearance of the well-worn but original green duco by a re-spray in two shades of familiar Ford paint. A Cortina back bumper was attached, headlight reflectors and lenses of unknown but venerable ancestry were inserted and the parking lights were persuaded to double as turn indicators. This arrangement included an extra bonus - when headlights were switched on, front and rear parkers extinguished automatically! A new piston and sleeve set were reputed to be fitted at this stage and partial re-upholstering in leather took place. Fortunately the car was

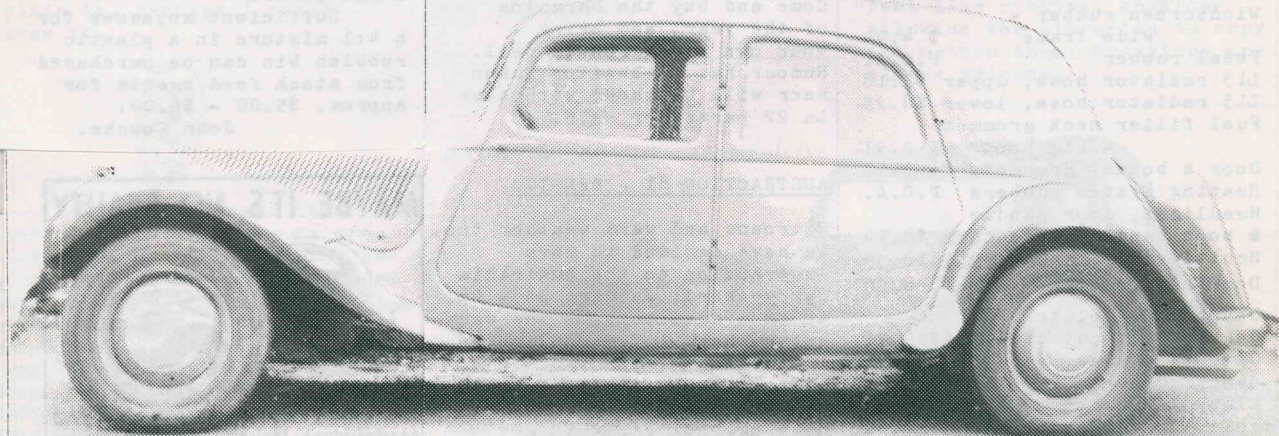
sold to Steve Bates in September 1978 and treated to a brake master cylinder overhaul. Parking in a busy street for six months had the usual consequences, but it was still fairly presentable and had 98,000 on the clock when Steve advertised it for sale. Almost before I had noticed that it was somewhat larger than the average Light 15, it became immobile by courtesy of a broken cardan shaft. This lowered the price, but raised certain problems. Guess who had a spare? Wrong, it was the Spare Parts Officer, John Couche. Gerry Prossing and John generously offered to help fit the part and a most effective demonstration of how to carry out a roadside repair in 100 F heat followed.

Strange ride and handling characteristics were accounted for when tyre pressures were found to be 35 psi. Since then, February 1979, the car, christened Florence, has been driven almost daily and has given much enjoyment to Simmenauers young and very young. The wiring remains a tangled mess (only one fire so far), a real

bumper bar awaits re-chroming, but minor work has been done and much learnt in the process.

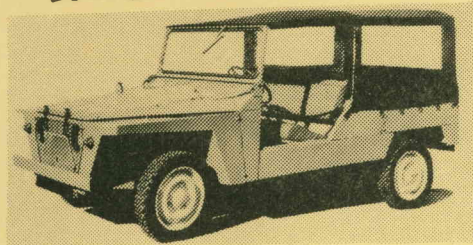
I intend to keep her registered, running and relatively rust-free until a recently acquired older cousin(e?) 11BL can be restored and then give Florence the restoration she deserves. There is a strong possibility, however, that this step will be carried out by the next generation, who are currently saving their pocket money. Keep saving, Paul and Matthew!

Peter Simmenauer



TWIN POTS

Dirk Sherwo.



Avid readers of recent F.D.'s will notice the welcome absence of one T.S. Barr whose lunatic ravings have crept into the occasional issue. It has been some time since he emerged from the woodwork. One is left to assume that he made good use of the 'Free Oz from the 2CV Fund' and rather than waste good money on us 'long-haired Marxist malcontents', used it to depart himself.

Which is all good riddance as Brute has been chafing to run over some more toes since the remark about his resemblance outside amenities. So if you're out there still T.S. Barr, Brute and I will design to blow you into the weeds anytime, anywhere. Tractionists rule! With gearboxes like theirs, they've trouble ruling an empty driveway, much less compete on the open road!

On the subject of Tractionists. Where are yesterday's men of iron? Used to be Brute and I could spend a pleasant Saturday afternoon cruising the streets putting Tractionists in their place (i.e. behind 2CV's) in the green light drag stakes. Nowadays on a good day, we'll pass one and that is usually stopped with the bonnet up. What's the matter Tractionists, crown wheel and pinion got your bank balance? Need some running repairs? 'Boxes just what they're cracked up to be?

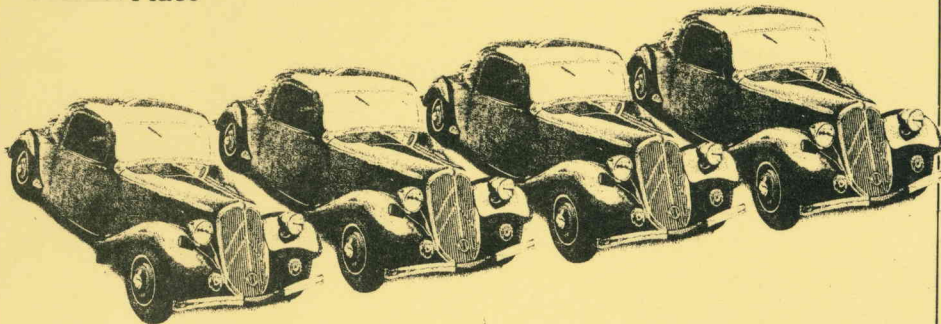
Considerable numbers have disappeared into garages in the past few years. They must like it in there, as very few have re-emerged. 'Tis sad really, they weren't bad pieces of iron in their own way. Guess the 2CV will inherit the earth as Tractionists aren't giving much competition.

2CV's also managed a mention in the latest issue of that August magazine 'Restored Cars'. Seems the editor in reply to one slightly peeved correspondent suggested a put up or shut up. Put up included an article on 2CV's, so looks like Brute is all set to make the big time.

Have you ever noticed how often the 2CV creeps into motoring magazines? Quite surprising really, as most writers seem to consider them the best joke since a Holden handbrake, but one way or another, the 2CV is certainly not ignored. The following excerpt comes from a recent English motoring magazine:

"....., to simply cocking an outrageous snook at a new age of austerity that threatens to have us all driving detuned Citroën 2CV's by the decade's end" The obvious reply is "SO!!?" Given the general automotive trend to small capacity engined genuine 4 seater vehicles, it must be galling to the motoring 'intellectuals' to have the answer already on the roads with a history going back over 40 years since design. Submit, you fools, the battle is lost!

Market Place



FOR SALE:

11BL and Light 15 parts including complete 11BL car less engine and gear box. Suitable for wrecking - guards, doors, bonnet, grille, bumpers, seats, instruments, front end, glass handles etc. all usable.

Other parts include several engines, guards, wheels (including 185/400;s), doors, bonnet, front end, and a selection of various mechanical and electrical components.

The parts will be sold separately or as a lot.
CONTACT: Robert Bonner
PH: 308 1532.

WANTED: 2CV

Complete car or parts suitable for restoration, or the whereabouts of such items - anything considered.
CONTACT: Paul Chapman,
60 Strabane Street,
Box Hill Nth.
Ph: 89 3882.

WANTED:

One oval interior light glass and rim to suit '49 Light 15 (above rear window type)
One 'teardrop' rear door ashtray.
One original lucas rear stop and tail light to suit '49 Light 15.
CONTACT: David Giddings
Ph: 836 6038

FOR SALE: 1951 Maroon Light 15, sunroof; registered original plates WA-440, \$3,000 O.N.O.
Jeremy Graham, 8/7 Denbigh Rd, Armadale. Ph: (03) 509 3249

WANTED: Big 6 gearbox housing or complete gearbox.

1 - DS21 hub cap preferably not marked inside with David Gries' name.
Roger Brundle, Ph: 509 0441.

Club Shop

Pat Propsting
18 Bellara Drive
Mooroobark

Metal Badges

A new order has been placed, and these will cost \$12 each. Place your orders now.

Lubrication charts are still available, at \$1.00 each, including postage if applicable.

Contact Times

To ease the workload on the Spare Parts Committee, the following times have been set aside as the ONLY times that spare parts can be ordered or picked up, except in emergencies (which means the need to obtain a part to keep a registered and road-going car on the road following a break-down. Cars undergoing restoration do not qualify for emergency handouts.) To make this system work, your co-operation is requested.

The order times are 5pm to 9pm weekdays and 10am to 9pm weekends. John's phone number is listed in Front Drive.

Pickup Times

Parts may be picked up on the first and third Saturday of each month, except in emergencies.

Whilst every effort is made to ensure the accuracy of information and advice in this magazine, and in replies to readers queries, neither the Citroën Classic Owners Club of Australia nor the officers and members thereof nor the authors accept any liability.

