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EDITOR'S FOREWORD

Hello again. Here's the latest in your bumper packed magazine, full of reports from club members and some technical data to chew over.

Once again articles are slow coming in so here's a renewed plea for some written reports. Enjoy what we have here.

ELCAR TROPHY RALLY

This event, promoted by David Brown Motor Club, is to be held on Saturday, 2nd October.

We are running a stage on the event so if you can help please contact John Beadle.

SCOTTISH 1982 - GEOFF WARCLIP AND IAN NORTH

We went to the Scottish with a four point Class lead in the Open Championship. A 2nd place would have clinched it, but this was not to be.

We left on the Friday afternoon with a car on a trailer and headed for Glasgow, where I had arranged favourable terms with the Rio Strakie Group. We arrived at 8.30 p.m. and, after checking in, went to Rally H.Q. at the Holiday Inn, where we had a pint with our Class opposition.

Next morning we were first into Scrutineering and Signing On and were soon out again after getting them organised. We then visited the service area to see Harry Gee of Goodyear for our supply of black round things.

Lunch was taken in a Chinese and, after an afternoon snooze, we left for the Start. This proved to be my most difficult navigational task of the Rally - find the assembly area. They had directed us the wrong way down a one way street and a good many oaths later we arrived - 15 minutes late. No wonder we had to be there an hour before the start.

As we arrived at the first stage we saw the Quattro following No. 9 to service - the start of an epic drive.

It was about the fourth stage that Geoff realised we were on a rally and we started hurrying just as dawn was breaking.

We saw a member of the Towse family in Dalbaattie at the service area - I cannot remember doing a home International without seeing one of them somewhere.

Breakfast was taken back at Glasgow after a long road section with me driving - the clutch takes getting used to and I haven't done it yet.

Next came Devilla, a sandy stage just north of the Firth of Forth. This was a 3 mile stage and after one mile we dug in on a 90 right and broke a half shaft. We crawled for the rest of the stage, being pushed by spectators up the inclines, and managed to take 18 min. 14 secs. Fastest was 3.08 - Slowest, except for ourselves, was 4.38.

We then progressed at great speed towards the next stage about 6ft. behind another competitor before meeting our service crew.

The half shaft was replaced, after removing the diff, and we arrived at Knockhill last on the road having incurred 16 minutes road penalties.

We spent the rest of the day fighting with the tailenders, but a stirring drive on Drummond Hill gave us 22nd fastest, all the advantage of this lost on the next stage where a puncture dropped us a few minutes.

Sunday night was spent in Avismore and we left there in 38th position on Monday morning out of 45 still in the event.

On the fourth stage we went flying, neither of us noticing a jump. The resultant landing gave us a whiff of Limited slip oil and at service the axle casing was found to be cracked. Derek sealed it with gas welding and we left to do two stages whilst they organised David Hardcastle's electric welder to be ready at Kiath.

There we put the car on its side and a good job done. On we went, with Geoff having horrible thoughts about Culbin. Last year it was the last stage and he retired there. Sure enough, half-way through, just as we were catching a Visa, we had horrible noises from underneath. We eased off and put in another bad time.

A radius arm had broken but Little and Large had organised a garage for service in Nairn and we spent three quarters of an hour on a ramp replacing the arm and also a shock absorber.

We then went on to Parc Femme in Inverness for a three hour break before the run back to Glasgow. The further south we were, the smoother the stages became and the scenery was terrific. During these stages Geoff put a spurt on but we had no chance of climbing higher in class.

Since our half shaft problems we had caught 10 - 15 seconds a stage on the next car in class, but needed 30 seconds a stage to get in front.

Rest and be Thankful was downhill, with Weatherley's Visa taking fastest time.

On the run into Glasgow we stopped for a pint as they opened at 11.30 a.m. and by 2.30 we were in bed in our hotel.

Our service crew - Paul Abbot of Huddersfield and Derek Parling of Bridlington - had worked energetically at times and thought they should have won the event. (If stories of their exploits in the barge are true, I can quite believe them).

We returned still with a Class lead in the Championship, but Geoff will have to go to the Isle of Man and a 2nd in Class is still needed to clinch it.

GERONIMO

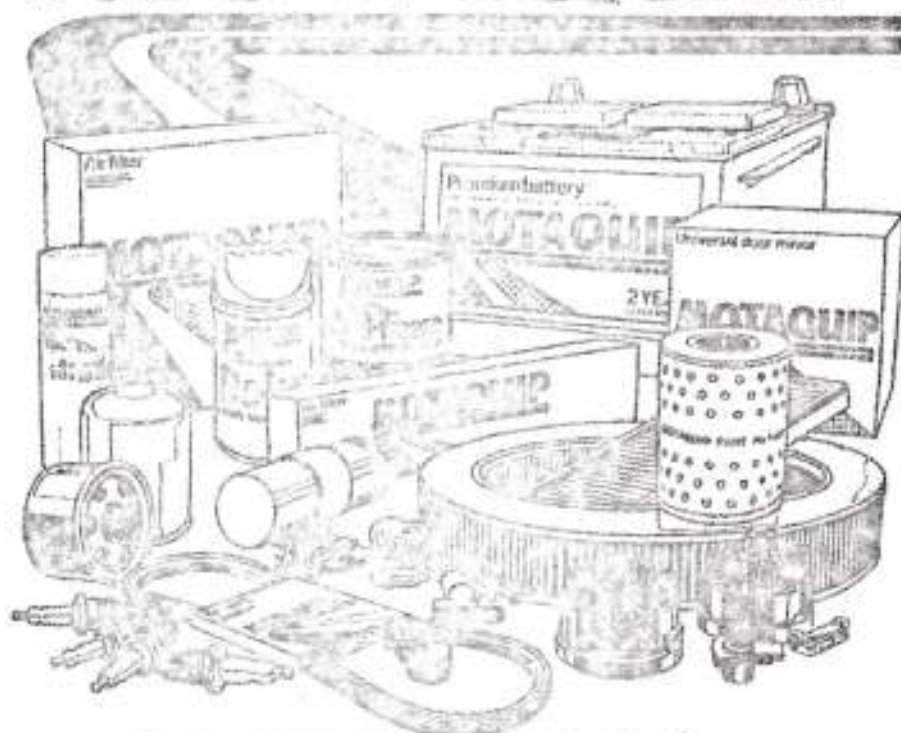
FOR SALE AND WANTED

Standard Imp bits for sale, and competition bits wanted, viz laminated screen, sumpguard, tyres, front roll cage and any other bits.

Contact Andy Hayhurst any club night or see the magazine eds.

Anybody got any arrows, boards, marker cones, etc. which belong to the Club please return them to the Chief Marshall as we are missing quite a few. If anyone can oblige with any of the above (new or used), please contact any club official.

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We seem to be missing a few faces at the club nowadays, so why not come down on Thursdays for a pint and a chat.

COMPETITION SECRETARY'S REPORT

Forthcoming Events

8th August Production Car Trial, organised by Grimsby Motor Club. They came and won all our awards - how about trying to get them back.

14/15th August Novice Road Rally, organised by Grimsby Motor Club.

22nd August Holderness Trophy Rally.

29th August Autotest, organised by Mick Blyth and Howard Paterson on grass. Contact them for more details.

4/5th September 62 Car Club Sunrise Road Rally.

12th September Lindholme Motorsports Club Alcan Stages Rally.

26th September Crystal Stages Rally

THE ALEX. E. CARR HOLDERNESS TROPHY RALLY

22nd AUGUST - A SINGLE VENUE STAGE EVENT ON ALAMEIN BARRACKS, GRIFFIELD.

We will need lots of help on this event. Please contact Harry Hannah. Remember, there will be no spectators so why not marshal?

I would like to thank John Butler and John Overend for organising the Autotest on Walton Street whilst I was on holiday. I understand everybody had a good day.

Production Car Trial

The weather was kind to us on the day of our annual Production Car Trial at Sledmere Grange. Mr. Robinson, the farmer, was very good and came down on the Sunday morning and raked all the hay out of our way. Although we had a good turn out of entries, a lot of the regulars were missing. There were 10 entries from North Humberside, with others from Grimsby, Southbank, Bridlington and Blackburn Welfare Motor Clubs, making a total of 24 entries in all.

Marshals were a bit thin on the ground but we managed, only just. Harry Hannah ran one test, Andy Dean and Steve Vasey another. Steve Young ran one on his own, and then we had to call in Geoff Alan, who was also the scrutineer, to marshal one of the other tests. We were also fortunate that some lads from Beverley & District turned up and we roped them in to marshal as well.

The event was a round of the Humberside County Council Motorsport Championship so we hoped to do well. Representing our club were several people we normally see marshalling and they seemed to enjoy themselves.

Adrian Mann was having a go in a front wheel drive Subaru. Dennis Robinson, John Law and Neil Hartley (who, incidentally, was representing Blackburn) were all sharing a little Fiat they had acquired from somewhere. Rob White was not finding the Colt hatchback as good as we thought it would be, with Myra Webster having the same sort of problems. Roy Webster, however, was doing well in the Colt Lancer Turbo, bringing cries of 'Don't they have a Limited Slip Diff' from the Southbank lads.

The weather continued to keep fine - it must have been good because even Tony Carmichael turned up in an X reg BFW no less.

An interesting visitor was a Mr. Fred Thompson, who used to be a member of an old East Riding car club before the formation of North Humberside. He remembered them having a similar event in the same field, although he said the actual event was not the main concern, but where they were going to get a pint afterwards!

Anyway, back to the event in hand, the lads from the Southbank seemed to be running away with the event. We ran 22 tests in all and then came the difficult part of working out the results. In production car trials, to make the overall results a fair assessment from all classes, we use an Index of performance. This system calculates an average for each class and then expresses the other competitors in that class's scores as a percentage of the average. Anyway, no matter how we did it, we couldn't stop G. Haxby from Grimsby Motor Club getting the best performance of the day. Class winners were M. Rende, Grimsby, C. Smith, Southbank. Best performance by a North Humberside member came from Roy Webster in the Colt Turbo, who finished 7th.

In the team championship, Southbank were the winners, North Humberside second, with Grimsby third.

So after this round, which was the second round in the H.C.C. Championship, we are still leading overall, with Southbank second and Blackburn Welfare third.

Many thanks to all competitors and marshals. I hope they enjoyed the day. A special thank you to Steve Young (he's the lad on the motor bike) who worked very hard in helping to set up the tests - after all the hay he raked up we can get him a job on a farm.

New RACMSA Regulations

I have just received the latest copy of the RAC Club News. In it are a few new organisational regulations for 1983, which may also be of interest to competitors.

Stage Diagrams	Although we clubs have fought against this rule, we will still have to supply competitors with diagrams of stages.
Red Cross/OK Boards.	Organisers will have to supply all stage rally competitors with these boards and give instruction on their use.
Stage Signs	From 1983 onwards, all stage rallies must use the internationally recognised signs at all times. Also, at the flying finish, the warning boards, flying finish boards and stop boards must be placed at both sides of the track.

SCLINTHORPE STAGES

After Howard had taken me half way round Britain to pick up a formula 3 car the other week, and taken 'til 1 a.m. to drop me off instead of 6 p.m., I was relieved to be driving this time.

After a late problem with the car showed itself on Cottingham Show Autotests the day before the rally, I was a little unsure of our chances. However, 6.05 the next morning, service crew, Howard and I met at Walfred Motors and set off for what was then Sunny Scunny.

After removing a load of equipment out of the boot of the rally car, we cleared scrutineering OK. At the start I was pleased to see a ramp at the front of documentation - a rare thing in this day and age of trying to help the likes of me. Free drinks (tea) were served in the foyer (a nice touch). Surveying the top 20 I felt Howard had made a wise decision, coming from 2nd reserve (late entry) we had a choice of No. 1 or No. 60 - he chose the latter.

Howard spent most of the time up to the start playing with his zip and putting his name on the door. 9.30 finally arrived and off we went. The first stage was our club's, a good stage just by a railway line. After covering everybody with dust, we went naturally to stage 2. About halfway in on this farm track by the M180 we passed the first casualty. Car 58 had rolled - they both gave us a wave so they were alright. Stage 3 was the quarry where the Rally Schools used to be. This was done a total of three times during the day. Two cars came off in this stage while we were waiting so this caused a long delay. Finally off we went. A great stage but Howard not too keen on my method of saving tyres. Apparently he likes more than two wheels on the ground at all times. Caenby Corner service saw us change to racers for some airfields. Just as we approached the first the sun was gone and it poured down, instantly flooding the roads and the stages. Undaunted we aquaplanned our way through the next few stages, only to find the engine oil had gone on holiday and we had done the stages with next to no oil pressure. This, added to the leak on the gearbox, saw us go through over 4 gallons of oil during the day.

Half way was at some stately home but it was raining, so spoiling the social bit. I still had a chance to talk to Chris (Fewless), who made rude comments about a straw bale chicane on one of the airfields - when I came across it there were no arrows at all as you approached, it just looked as though the runway was blocked off. Chris said they just demolished it and got stuck on a bale.

The first stage after half way was flooded, so cancelled. The rain had really been coming down, but yet back at the quarry it hadn't rained at all.

The service crew, Col, Pete and Mick and a friend of Howards (say no more) were by this time completely waterproofed, courtesy of all the oil under the bonnet. However, true to the sport, they greeted us at each service point smiling and keen. On the last lap of one of the airfields something found its way to the starter and broke the main cable from the starter to the solenoid. From then on Howard had to put on a thick leather industrial glove and hold the broken wire onto the solenoid while I fired the engine up.

As the stages clicked by we were losing more and more oil from the gearbox. Because of this we had the service crew meet us at every possible point. On one occasion we lost all drive from the box about 200 yards from service and had to be pushed to the Volvo to pour yet more oil in. By this point we had run out of transmission fluid and resorted to pouring engine oil in instead.

I think everyone expected it to go bang but not only did we finish, we drove it home - must say something for the Borg Warner gearbox.

The last two stages were cancelled, thanks to two cars rolling on the same corner.

The finish was at the stately home, which had a beer tent and a video of the day was played back through 3 TV's, which was quite entertaining. We all had a drink, everybody else having one more than me. Howard said he forgot me when it was his round. Our timing was perfect - back in Hedon for 10 o'clock, straight to the local for scampi and chips and a frantic few pints, and a full description of the day to anybody listening (nobody dare come near us cos we hadn't changed!).

All in all a grand day's sport. Shame about the rain and oil leaks. Provisional results were up but I never saw them so I'm not sure where we finished. I'll just give Bill Draper Haulage (Hull) a plug as my Entrant, since I somehow convinced him to sponsor me. Can't be bad, ah!

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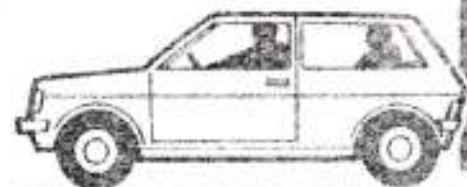
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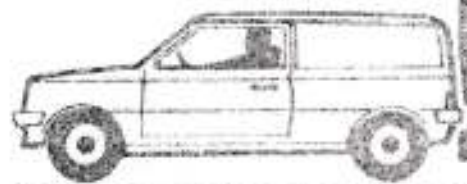


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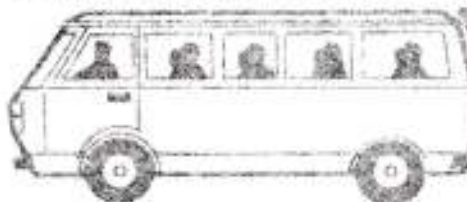
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WALTON STREET AUTOTEST

These were organised by John Overend and John Butler and attracted 18 entries (6 in one car!) Once again, the event was dominated by the usual people - Phil Cherry, Howard Paterson and Mick Wood in his 'modified' (I've taken the back door off) Escort pick-up.

The 6 gentlemen from the Police Motor Club once again hammered their car into the ground and unfortunately had to retire.

Many thanks to the marshals, the organisers and to Linda Colebourn and Ruth Bower for doing the results.

FTD		Phil Cherry
Class 1	1st	Steve Hawkins
	2nd	Mr. Wood (Mick's brother)
Class 2	1st	Rob White
	2nd	John Willson
Class 3	1st	Howard Paterson
	2nd	Mick Wood
Class 4	1st	Nick Reed
	2nd	Ken Hailstone

WELL DONE

You may or may not remember that last year I was hoping to have a bash at the RAC, it being the International Year of the Disabled. This was not to be, but, in the course of the organising leading up to our attempt, the local CB users took it into their heads to have a sponsored fancy dress football match, the proceeds of which were to be given to me to help me on my way. As I've already said, this was not to be, so there was left the problem of what to do with the money raised. It has taken 'til now to sort out the legalities and a few other problems.

It was eventually agreed that the money should be given to a good cause of my choice. The hospital where I recovered from my accident has just had a new social area built onto the gym by the efforts of various fund raising schemes. As an addition to this, they decided to buy a new multi gym for the gymnasium. For the 'thickies' a multi gym is a frame by which several pieces of apparatus can be fastened to it - a splendid idea - so the money raised by the CB fans is buying an item for this multi gym, that way the money raised is being put to a use that is going to be beneficial to a lot of people in the future.

I think the CB people deserve a round of applause.

THANK YOU BORG WARNER

As I mentioned in my account of the Sunny Scunny Stages Rally, the auto gearbox in the Escort was feeling the worse for wear so out it came with the engine for an overhaul (also to paint the engine bay to keep Mr. Beadle quiet). I took the advice of my service crew and rang Borg Warner to ask their advice and seek any assistance I could. Before I knew where I was they had arranged for their technical wizard to come from Letchworth in Herts. to see me. Well, they supplied most of the parts to rebuild my auto box free of charge, plus a wealth of information on the different aspects of the unit. Mike Lawrence was his name - a great chap. He gave me a list of people to ring about supplying a high stall converter. This means I can put the car in drive, hold it on the handbrake and take the revs up to what I need, which they can do by altering the guts on the converter. With one of these I could stop my 'abuse' of the gearbox, i.e. taking the revs up and just banging it into drive when the flag drops. Apparently

this is frowned on by Borg Warner, although he was surprised but pleased that I had never physically broken anything in the gearbox.

Mike has since sent me a better 1st-2nd unit and is trying to find a higher governor so it stays in each gear longer. At the moment it holds to 5,500 revs. I told him 7,000 would be ideal, since I only have 3 gears.

Also a little tip, unofficially, of course. Mike told me they ran an auto Jaguar on GTX instead of auto oil and it ran just the same for long enough, 30,000+, but found the oil emulsified easily and didn't lubricate the white metal bearings very well. But saw nothing wrong with putting engine oil in for a short spell just to get you home.

DAVE HAWKINS

CLUB TEAM LOTUS - PRESS ANNOUNCEMENT

When the Team Lotus part of John Player Team Lotus set up a Public Affairs department last year, it coincided with John Player's mid season return to motor racing. Since then the new department has been inundated with letters, telegrams, postcards, telephone calls and even telexes from enthusiasts worldwide requesting information, photographs, Team news, etc.

For 1982, Public Affairs Team Lotus is now providing a regular service that will keep such fans in touch with the inside story of the Team as the season progresses. Called Club Team Lotus, it will provide a monthly inside report of the preparation of cars and equipment leading up to each race and test and what happened at the event itself. It is not a duplication of the stories anyone can read in the motoring press each week, but the Team's own report to keep everyone in touch with the Team's current situation and plans. No doubt, it will answer the majority of enthusiasts questions.

Subscription also brings a decal, together with the opportunity to obtain copies of race records, lap charts, photographs, certified race parts from cars and engines, and depending on the amount of interest generated, exclusive Team clothing for all ages.

As an example, subscription cost is £15 to those living in Great Britain, the service catering for enthusiasts living anywhere in the world for £18.

If you're one of the monthly 400 letter writers to Team Lotus, write again to Club Team Lotus, Hethel, Norwich, NR14 8EZ, Norfolk, for more information.

(The Magazine Editors have three subscription forms - so if you would like to join see one of us).

COSSACK

After a very enjoyable rally, namely, the Southorpe Stages, I was looking forward to the Cossack, this would be my first run on this event.

In my usual efficient manner, the car was in working order well in advance of the event. The car now sporting an improved gearbox - wow.

It wasn't until the Thursday before the rally that I contracted a navigator to partner me - Sue Paterson said she would do the honours but insisted we should have 'in car music'.

After a hectic Saturday, off to Scrutineering I went - still merry from the wedding I had been attending (spectating!).

Scrutineering was delayed in starting and was a rather tedious affair. The scrutineers seemed to have no idea of what they were looking at. Documentation went smoothly enough so I arranged when to meet Sue in the morning and that was that.

Sunday morning arrived and I actually got up on time for a change. Col and Pete, who were servicing for me again, followed up in the Granada, which was loaded up with sandwiches, coffee, etc. and plenty of oil (just in case). The morning started off sunny but rain kept falling at regular intervals all morning and into the afternoon. This made Leconfield very greasy in all the wrong places - as we found out to our cost.

The start was in Beverley Market Place - no ramp this year though. Rod Leonard was at 63 and looked rather tired, having spent until gone 5 am Sunday getting a hastily rebuilt engine in his Sprint. Unfortunately, his debut in his reshelled car was short lived.

Poor Ollie and Linda were also out on the first stage, the gearbox having decided to stay in neutral for the duration.

It looked as though we were next in line for retirement cos on ss3 we had a bad spin whilst braking for a 90 left (must get the hang of bias brake), which left us backwards on the grass - the engine having gassed up and died. I feared it would not start again and, of course, you can't push an automatic off. Anyway, we fired it up eventually and off we jolly well went.

There then followed a 50 odd minute wait before doing the same three stages again. These were done with no moments worth mentioning, except we seemed to be developing a two wheel line round corners.

Servicing was next at the sports ground at Driffield. This was our first chance to compare figures with our rivals. This comparison showed us to be fairly well placed - a matter of minutes rather than hours behind the head men.

Ss7 was cancelled due to No. 34 going flying on the humps and demolishing his car. Everybody felt this was a shame and poor judgment by the organisers to cancel the stage, especially when they used the offending humps on ss8. Still, no accounting for some people.

By the way, halfway was the usual affair. I'm sure they do it to me on purpose. A bloody lorry park with a surface like the moon which, believe you me, is hard work to cross in a wheel chair.

Ss9 was back to Leconfield for two full laps, which we thoroughly enjoyed as it was quite dry now - we were still taking acrobatic lines on some of the corners, much to Sue's distress.

Hurray - the finish was on a smooth tarred car park. Much to my amazement we had come 21st O/A, 12th in class - my best result to date, and Ruth got a smashing photo of me doing my acrobatics.

Only a short event, but a great day's fun and well worth it.

DAVE HAWKINS

PHOENIX STAGES RALLY

OR How to get 3 days' board and lodging on the M15

OR How to get 7 weeks off work sick

Ollie had decided to do the Phoenix Stages Rally cos it was in our championship so, after a hasty gearbox rebuild following it sticking in neutral on the 1st stage on Cossack, we were looking forward to a good event on Fulbeck Airfield.

John Dixon had once again lent us his van and a borrowed trailer meant we didn't have to drive the car down. Ian 'volunteered' to drive us down in our car and we set off at 6.15 on the Sunday morning.

We were off at 22 and should have been there to scrutineer at 7.52 but when we arrived there weren't an awful lot of cars around so we had a wander and a look at what was going on while we waited for the service crew and the car to arrive.

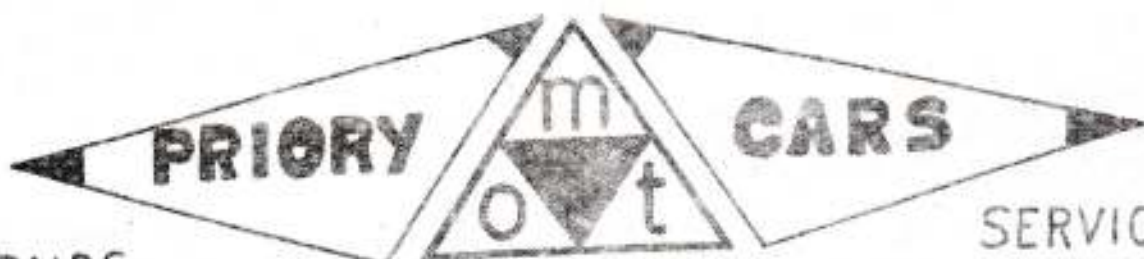
We got through noise check and scrutineering with no problems and then had a quick look over the car. My foot-operated windscreen washer wasn't working but we decided it wasn't going to be needed and anyway we had the control on the dash.

The event got under way at 9.30, we were off at 30 second intervals and were delayed about 5 minutes at the start when one car died and had to be towed off the stage - with the crops at the sides of the runways there was no where for them to park up. We eventually got underway and were going very well, the stage starting off with some very twisty bits, and then long straights with hairpins at the end and by the time we'd got halfway round the stage we'd caught up the Kadet in front. We'd done Fulbeck on Uniband and knew that one straight we were coming to was wide enough to get past him so we sat on his tail round a 90 left. It was very dusty and we couldn't see a thing, then there was a big bang and we stopped rather suddenly.

I was sitting with my left knee very near my nose, my clipboard and pen had flown towards Ollie, the roll cage and floor on my side had come up 2 ft, the chicken bar had come in 2 ft. and, when I looked behind me, the roll cage had moved back and punched out all of the wheel arches. The windscreen had popped out and my foot pump had been jammed on and decided to work and water was pissing through the non-existent windscreen all over us! The impact of hitting what we discovered was a 3 ft. boulder with a metal rod inside had broken my ankle and Ollie had lost one of the lenses from his glasses (this was later found by one of our eagle-eye service crew in the middle of the runway still in one piece!) I thought the pain in my ankle warranted a red cross so an ambulance and doctor came round as soon as the stage was closed (after we'd been showered with the dust from about 25 cars!) and they carted me off to hospital at Grantham - I do not recommend rallying an ambulance! They X-rayed me and decided that the bone needed screwing and I would have to have an operation! PANIC!! They put some support on the ankle and were going to book me in there and then but, fortunately, the consultant arrived and said I could travel home and go into Hull Royal. This saved Ian petrol money to come and see me! In the meantime Ian had gone back to Fulbeck to let everyone know what was going on and I ended up waiting 2½ hours for him to come back. As he thought I was staying there he'd helped to load the car on the trailer, etc. and brought back four service crew and Ollie to visit me in hospital! Fortunately they found me before they could get onto a ward!

We set off for home with me stuffed on the back seat of our car and I am now 'convalescing' for 6 weeks following a 3 day stay in Hull Royal and an operation on the ankle. The pot comes off (hopefully) on 19th August, so I can't do Holderness but if anyone wants a navigator for Crystal, give me a shout, as Ollie's car is a write off and unfortunately he won't be competing for some time (and it'll give me a chance to catch up Howard Paterson in the navigators championship!!!)

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MICRO DYNAMICS ELECTRONIC IGNITION

The first requirement for any electronic ignition system is to overcome the shortcomings of the contact breaker points, either by changing their mode of operation or by their removal altogether. All the research and testing carried out by the engineers in the laboratory and on the road shows conclusively that the contactless conversion of a contact breaker distributor creates timing, dwell angle and advance errors, all of which reduce engine performance. It cannot be stressed too strongly that the contact breaker points should be retained.

In standard form, the points switch an inductive load of about 5 Amps at approximately 350 volts, causing arcing, which removes metal from one contact face and deposits it on the other. The resultant change in the points gap alters both the dwell and static timing which, in turn, reduces performance and increases petrol consumption.

A statistical analysis has shown that because of arcing at the points, about 5% of all sparks are of such low energy that they do not burn the mixture in the cylinder. This is a random occurrence, not noticed as a regular misfire, which explains why an engine runs more smoothly with a small increase in power and about a 5% saving in fuel when a good ignition system is fitted.

As the distributor shaft rotates, the cam lobe falls away from the contact breaker heel, allowing the points to close, but at higher engine speeds the points sometimes bounce open again reducing the spark energy. Another problem also occurs with increasing engine speed, because the points are not closed long enough for the current in the primary of the coil to reach its maximum value. This prevents the spark from attaining its maximum energy level. The problem gets worse the greater the engine speed, the spark becoming weaker at a time when the engine is trying to develop maximum power.

By using contact breaker points purely as a triggering device to signal to the ignition system the exact moment when a spark is required, suitable circuitry can prevent arcing altogether and totally eliminate the effects of bounce. When using systems designed by Micro-Dynamics, the points switch a resistive load of about 1/3 of an Amp at 14 volts, just sufficient energy to keep the contact breaker points clean, but not enough to cause wear. All Micro-Dynamics inductive systems only use the opening of the points to signal to the electronics that a spark is required; all other movements of the points are ignored, because the circuitry determines the dwell time and therefore the spark energy.

Some other ignition systems have what are called dwell extension circuits which do something to improve the spark energy at higher speeds, but only the systems designed by Micro-Dynamics which incorporate the patented Frequency Controlled Dwell, F.C.D. circuitry guarantee that the coil current reaches its maximum value at all engine speeds. This in turn guarantees that the spark energy is the maximum possible from the particular coil being used. By an information feed-back system the unit continually monitors engine speed, engine load and supply voltage, so that the next spark has its current voltage and duration exactly matched to the prevailing conditions.

In deciding upon an electronic ignition system, a choice has to be made between 'inductive', 'capacitive', 'reactive' or 'multi-spark' systems - to quote the terms seen in today's advertising. The exact definitions of these somewhat inexact terms are of more interest to the electronics engineer than to the motorist, but put in simple terms the definitions are as follows:- A good inductive system has a spark with a high energy start which then gradually falls away to nothing. The capacitive system has a spark with a very high initial energy content, but which lasts for a much shorter time than the inductive system and quickly falls away to nothing. Reactive ignition is a combination of both a capacitive system and an inductive system. The concept is good, apparently producing a spark with a very high initial energy content, which then lasts for a long time. However, in practice there are problems, for as the capacitive part of the spark rises, the polarity of the spark is opposite in polarity to the inductive part of the spark. The capacitive part therefore fights the inductive part producing a hole in the energy curve or, put

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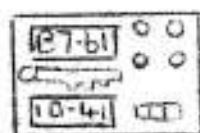
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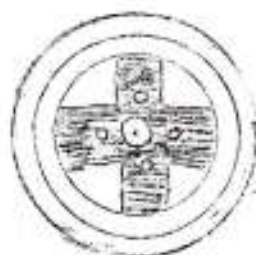
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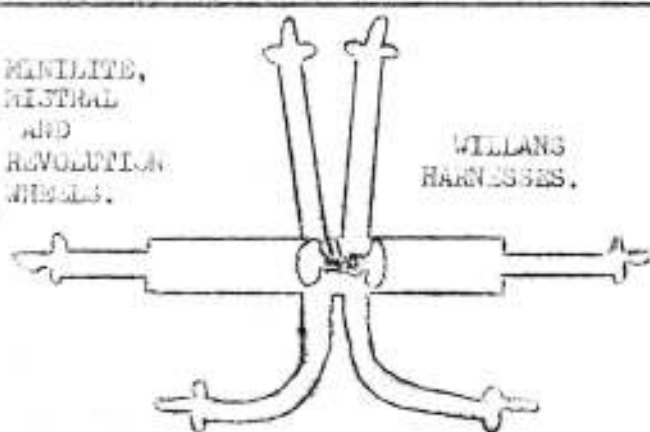
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another way, it produces a short period of low energy right at the start of the spark. This is not good for combustion because the energy level at this time is lower than it would be with an inductive system. It has been said before that for a spark to have a useful energy content, the current in the primary of the coil should reach its maximum value or very nearly its maximum value. Multiple spark systems are therefore only as good as the first spark for normal road cars.

The most powerful system in the Micro-Dynamics accessory range is the Formula 1 Exponential Discharge ignition. This system makes use of new ignition technology derived for full race applications and incorporates all the best features of present ignition knowledge as well as the benefits of the latest 'Plasma Discharge' units. A product information sheet is available on request.

For the competitive driver a range of specialised professional systems, of very advanced design, are obtainable which must not be confused with the road car bolt-on systems advertised in the motoring press and sold through high street accessory shops. The professional systems are tailor-made for each project, and application questionnaires are available on request.

It is now generally agreed among reputable ignition manufacturers, that with the exception of two-stroke engines, older engines, which suffer with fouled plugs, and specially built racing engines, there are few benefits to be gained by fitting capacitive discharge ignition. Today's engines with weaker mixture and tighter exhaust emission control systems do not run so smoothly with capacitive discharge ignition due to the short spark duration. For all road cars and even many rally, saloon and sports racing cars, the choice is therefore between the best inductive and reactive system, unless the budget extends to a system such as Formula 1.

At this stage it is perhaps a good idea to mention some of the technical terms which should really only be used by electronics and application engineers who fully understand their meaning and significance. These terms, however, do sometimes appear in advertising, although more often in magazine articles where the 'technical' journalist writes with apparent authority, but more often with a lack of real understanding giving information which is just not true.

Rise time has a mathematical definition, but for our purposes it can be taken as the time for the voltage at the spark plug to rise to a level where current flows between the plug electrodes initiating a spark. With the high speed switching transistors now available to the best ignition companies, the rise time of the most advanced inductive systems is many times faster than the rise time of any ignition coil, so whether a particular inductive system has a faster rise time than a particular capacitive system or vice-versa is irrelevant to engine performance.

Duration or Spark duration is the time during which a spark exists and has already been discussed in defining the differences between capacitive and inductive systems.

Open circuit HT voltages measured in a laboratory are also talked of as if the system with the highest quoted voltage must be the best. This is rubbish! All reputable systems coupled to the coil on the car will supply ample voltage to produce a spark at the plug. When in use in a car, the HT voltage is determined by the type of sparking plug used, the electrode gap, the engine load and the conditions within the cylinder. The voltage at the plug is usually about 10,000 to 12,000 volts.

In determining the quality of the design and performance of an ignition system THE SPARK CURRENT IS THE VITAL FACTOR not the voltage. It is the spark current which determines the spark temperature and therefore its ability to initiate combustion and establish a flame front to burn some or, with the best electronic ignition, all of the available petrol-air mixture. An electronic ignition system cannot provide more spark energy than a standard system unless it consumes more energy, which means more current, as the voltage is fixed by the alternator when running and the battery when starting. For an electronic ignition system to do more than maintain a near perfect state of ignition tune, it must consume more current than the standard system over and above the current required to power the system itself. The system must also optimise the use of that current during the spark duration, not producing one quick burst like capacitive systems and not with a low energy section at the beginning, like reactive systems.

Finally there is a parameter, not often mentioned, called delay time which does affect engine performance, although its effects should not be exaggerated. Every transistor in an ignition system takes a finite amount of time to perform its allotted function; therefore, the more transistors there are in the signal path of an ignition circuit the longer the time delay. Poor circuit design can also produce unnecessary time delays; one optical contactless system and one of the cheapest inductive systems in different ways being particularly bad in this respect. This time delay remains the same regardless of engine speed and so retards the ignition as the engine speed rises, at a time when the ignition should be advancing. Although the advertisements for optical contactless systems may talk of triggering at the speed of light, this ignores the fact that there are a considerable number of transistors in the circuit before the output transistor switches power to the coil, causing a significant delay before the spark begins. A well-designed contact breaker triggered electronic ignition system initiates a spark certainly as fast and in most cases faster than any optical or magnetic contactless system. Micro-Dynamics systems have been developed to a level of sophistication where only two transistors are required to produce the fastest acting system that we know of today. To put delay time into perspective, a contactless inductive or reactive system retards the ignition by about $1\frac{1}{2}^{\circ}$ at 4000 rpm more than the Micro-Dynamics' systems. The difference increases as the engine speed increases to about 2° at 6000 rpm. Only 2° , but it does affect performance.

During the years of electronic ignition development, reliability has sometimes proved a problem, bringing the product generally into disrepute. Therefore, when choosing an ignition system, consider both the electrical and mechanical construction as well as considering the complexity of the circuit. Bear in mind, too, that the smaller the number of components, solder joints and connections, the greater the reliability. For example, if an inductive system is built to exactly the same standard as the more complex reactive system, it is safe to assume that the inductive system will prove to be more reliable.

All systems designed and manufactured by Micro-Dynamics are housed in rugged cases suitable for the particular application and the electronic circuitry is fully encapsulated, producing a unit that is inherently reliable. Before being sold all the systems are run for several hours at full load and if one spark is missed in half a million, the unit is rejected!

The Micro-Dynamics Alpha-Plus system has engine overspeed limiting circuitry in addition to the high performance inductive FCD ignition. In operation, when the engine speed tries to rise above the factory pre-set, or customer-set, rev-limit, ignition sparks are progressively cut to produce a smooth reduction in power, maintaining the engine speed below or at the required limit. As the engine reaches the 'set limit', detection circuitry senses the contact breaker signals, but only feeds alternate signals to the power stage of the ignition system with a result that only alternate sparks are produced. If the engine speed continues to rise still further, for example 'a gross over-race', more sparks will be cut progressively to provide an even greater level of safety.

The unique Micro-Dynamics circuitry overcomes many of the problems previously encountered with ignition-cut devices. Such devices can damage exhaust systems due to exploding fuel in the manifold, or put strain on the engine when the ignition starts again at a lower speed. With Alpha-Plus the engine can be held smoothly in rev-limit as the softening effect eliminates the noise vibration and backfire found with other types of rpm limiting. Alpha-Plus makes driving pleasant and safe for the fast sporty driver who wants to protect his engine.

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