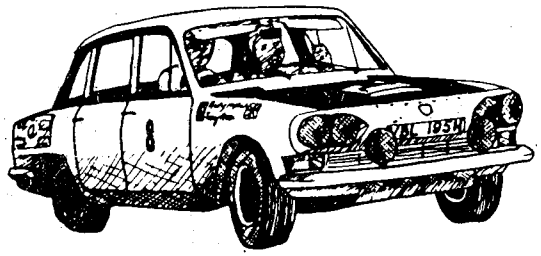
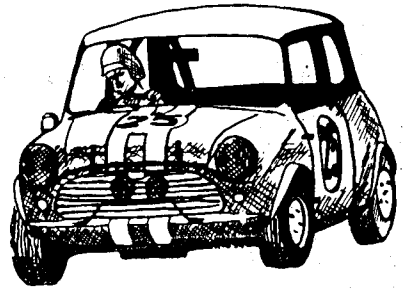
INFORMATION FROM THE BILL STEVENSON COLLECTION
IT WAS IN THE DOOR POCKET OF ONE OF THE BRITISH LEYLAND CARS THAT COMPETED IN THIS 1970 EVENT, A LOT STILL APPLIES TODAY!

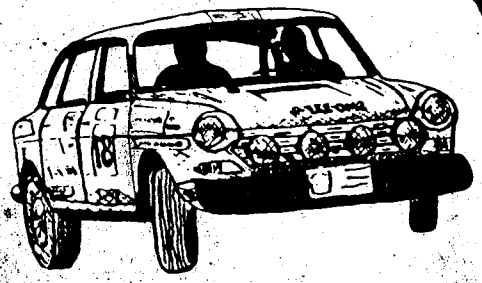


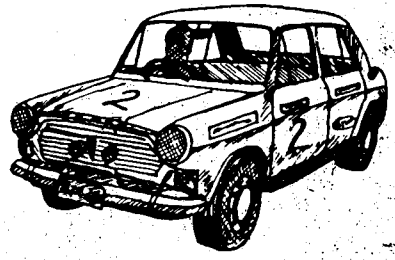


BRITISH LEYLAND MOTOR CORPORATION OF AUSTRALIA LIMITED

COMPETITIONS DIVISION

AMPOL TRIAL 20th JUNE - 5th JULY 1970





AMPOL TRIAL - "NAVIGATION HINTS"

By GUS B. STAUNTON
Director of State Championships &
National Open Rallies, including
the series of Mini Monte Rallies.

The Age Old question must surely come to mind at the outset of this bulletin, as to who is the most important in the crew, the Driver or the long suffering and often publicity shunned Navigator!!

Since the "Ampol" is to be a long, rough, and tedious event I would suggest you do not start with any strong or outspoken opinions on the subject. Rather, approach it as a team effort and be prepared to make errors yourself and forgive those of others. Any long marathon type event will allow no place for the so called specialist. Each crew member will be required to do his (or her)stint of driving, navigating, and riding in the back.

Shrewd appraisal of the intended route will indicate difficult driving terrain to be encountered. This may be seen where the road is shown traversing a mountain range, or over stretches of desert, etc. On the other hand, the route may be criss-crossed by tracks and other roads and will indicate the need for keen navigation.

In these cases, the section should be planned so that when the rough or tricky going starts, each crew member should be doing what he does best.

To sit along side a truly great driver and leave the business of the day to him can be one of the most rewarding of experiences. Good drivers generate confidence and you will agree with this by reflecting on the number of times you have felt quite safe at comparatively high speeds with some drivers, and yet on other occasions have had some qualms about being present with someone who is backing out of the driveway.

Don't get swept along with the sheer magic of competing in the "Ampol" with a driver or crew member who otherwise would not be considered as a fit partner for a game of marbles. Be fair to yourself, and others, recognise your own shortcomings or the otherwise innocent habits that may have a grating effect upon the harmony of the crew. I once knew an otherwise excellent fellow who insisted on smoking with all the windows up. Still others will talk without pause, and then there is the silent type who will only grunt instructions and never raise his voice above the noise of the car. All of these little idiosyncrasies can annoy over a long period of time, particularly if things start to go wrong.

Most professionals can team together and do so fairly well, but, there are even exceptions here, and this is amongst people who make their living at rallying. How much more difficult would it be therefore for the novice crew possibly coming together for the first time.

Part of the answer lays in taking part in a number of conditioning "Shake down" drives where there is an assimilation of rally conditions.

These should be of at least 24 hours duration, but not necessarily over rough roads.

For a Sydney team, a non stop run via the Princes Highway to Melbourne and then return via sections of Mid Victoria and N.S.W. would be a suggestion. Crews should practise eating in the car, speedy but thorough refuel procedures can be worked out including a check list to be called off by one crew member. I would suggest at these stops everyone have a specific task and be thoroughly responsible for their execution.

These "shake down" runs also have the advantage of allowing for final distribution of weight in the car of gear and equipment, and thus obtain the best handling combination.

I well remember in the first of the "Redex" Trials a very close friend of mine was intending to compete, and a three man crew was planned. It was not until the evening before the start of the event that the car was fully packed and all the crew went on board for a trial run of some 20 or 30 miles. The outcome was disastrous, the car would not handle and it was grossly overloaded. The final result was most unsatisfactory in so far as one crew member had to be left behind and much of the equipment had to be jettisoned and because of the shortness of time proper planning could not be undertaken to overcome the various shortages.

Navigation on these runs can be practised in many ways. Take accurate odometer (speedo) readings at towns and junctions and calculate readings for the next town, junction, river or bridge, etc.

I suspect a great deal of the "Ampol" is going to be conducted on the Military Maps probably the 1:250,000 series.

These do not have mileages shown as such but rather will have to be calculated from the scale at the base of the map. Estimate the distance to the next major junction, plot the position of high tension power lines and learn the differences on the map of fenced and unfenced roads.

Many times if you are lost you will need these features to assist you to locate yourself.

Many features are shown on the maps and you can greatly assist the driver by giving him advice or warning of sharp curves, cattle grids, etc.

On one occasion I was given warning of a swamp across the road and we slowed only just in time. The two following cars were not so careful and entered the area too fast and became solidly bogged.

I would mention at this point that there will be little effect in purchasing full set of Military Maps for the whole anticipated route because it would be both costly and at least half of the maps will never be used. One cardinal rule to remember is to use the official maps supplied for a particular section since Directors have been known to even "Doctor" a map to suit some instructi By using your own map you may miss these features or your map may be later or earlier than the Director's and not show the same roads or features.

It is great to have more detailed maps for reference and you can even follow two maps simultaniously. However, when they differ always take the official map as "Gospel".

With this general preamble over, I suspect the reader will feel it is high time to become more specific and this I will now attempt to do.

"JARGON".

The Rally scene does have its own expressions and terms that may not mean a great deal to the novice crew. Each one of the States have a set of Rally rules known as a Code, and these differ slightly from State to State. Remember, the "Ampol" will not be conducted under any State Code but under its own regulations and the National Competition Rules (N.C.R). I commend each crew to make themselves conversant with the code of at least their own State and these Codes can be obtained from your local Confederation of Australian Motor Sport office. Terms such as "Control", "Main Control", "Route Check", etc., will all mean much the same in the "Ampol" as in your State events.

If you are fortunate enough to live in a State where Rallies are currently conducted (in N.S.W. they are not), it will be good practice to include a few events in your training. Don't try too hard to win, you may bend the car and not make the "Ampol". Just drive to finish and practise your procedures.

CONTROL OFFICIALS.

An event of the size and scope of the "Ampol" will make great demands upon Control officials, and in fact there simply will not be enough to go around. Consequently inexperienced personnel will have to be used.

It is therefore most important that you check that everything i correctly written your route card or route book especially figures relating to time. The best method is to tell the official what time you require entered and provided the time has not already passed, make sure of what he writes.

If now route instructions are to be given out at a certain point do not budge without them. You will be given warning of this by either the instructions advising that additional instructions are to be given out at such or such a point, or alternately you will simply run out of instructions and not know where to go from there. In the excitement, and especially amongst the first few cars, before the Control has really settled down, competitors are sometimes sent on their way devoid of necessary instructions.

Where a Control appears to be in some form of chaos, you may expect delay in being booked in or out. If you are delayed in the Control more than the normal two minutes, ensure that the Official allows you this time and makes an accurate time out entry in your route card.

When dealing with Control officials, I suggest you be the professional and know exactly what you want, where you want it entered, and in all ways being in command of the situation. Always be pleasant, because Control officials can if they feel disposed be most helpful in the event of any problems.

MAPS.
As stated previously the "Ampol" will probably in part be conducted on the Military Maps of the 1:250,000 series. Also the State Touring Maps will probably be used for the "Transport" stages.

These "Transport" stages will be when you are instructed to proceed long distances on a comparatively main road, etc., and are obviously the easier sections between special stages.

The inaccuracies on the large scale State Maps will suddenly become important and, a road junction shown in a town may in reality be before, in the centre, or even after the town in question. Valuable time can be saved by being aware of these problems and keeping your eyes open. I feel, the most difficult sections can be encountered when passing through major towns with the number of intersections often quite major ones leading off to other areas.

State Map mileages are often inaccurate, and have a certain "give or take" attitude of a mile or two.

An excellent reference map for this event would be "Readers Digest Complete Atlas of Australia" which is based upon maps supplied by the Commonwealth National Mapping Office. The hard cover will make it robust, and the scale of 1 inch to 20 miles is small enough for most applications. Full features including roads, tracks, etc., are shown. The expense of buying the Atlas may not be justified but most certainly if you have one in the home library take it along.

If the Trial Director is to use Military Maps it is possible that he may even make reference points as part of the instructions.

I will attempt to explain "reference points" as quickly as possible and leave it to you to practise yourself into a greater accuracy.

Each map has a series of numbers appearing across the bottom or top of the map and lines running vertically from them. A similar situation exists on the sides of the maps with horizontal lines. A map reference may be given of "338335" and this point can be found by locating the "33" reference point along the bottom of the map and then proceed left (towards "34") until you have covered 8/10ths of the distance towards "34". Then imagine a vertical line proceeding upwards.

Locate the "33" line on the side of the map and then go upwards towards "34" or 5/10ths of the distance. Then imagine a horizontal line intersecting the vertical line and where they intersect will be the reference point "338335".

On my exercise map (Melbourne 1:250,000) the point is fairly close to the Mount Dandenong T.V. Tower.

Remember always go across first before going up.

It is extremely unlikely, but if any eight letter references are used, an example could be "33853355". This would simply mean that the 1/10th space between 8 and 9 (going across) should be broken into ten equal faces and the fourth digit "5" would indicate 5/10ths of that smaller division. The same thing would apply to the horizontal lines.

In theory this can go on and on and become increasingly accurate in pinpointi features, intersections, etc., but for the novice I would not worry a great deal as I consider it unlikely that map references will be used at all in the above examples, but if they are you will be prepared.

If I had to guess I would say you will be given a map or maps at regular intervals and be told to proceed via certain points to the next Control. You will then have to plot your way from the starting point to the places mention

Alternately, you may be given detailed route charts such as:

Mileage	Instruction
0.00	Straight on.
0.17	Turn left.
10.14	Bear left at fork.

This second method will be immeasurably easier, and providing you stay on the obvious road and ignore the multitude of side tracks, etc., till the next instruction comes up, you should be fairly right. However, the whole thing looks and sounds a lot easier than it is.

Undoubtedly, map reading will be broken into two categories:
(a) Applying instructions to the map -
(b) Applying the map information to the actual roads before and around you.

However, rumors are fairly ripe that navigation in the Ampol will be basicall very simple and I suspect the main task of the crew will be to nurse the vehicle and go fast where you can, and "back off" where necessary. In this nursing of the vehicle the navigator can assist the driver to hold the car together by keeping him informed of the conditions to be encountered, and also exercising some restraint on the driver when you have ample time to make the next Control.

It is an unfortunate fact that most vehicles that come to grief in rallies do so on the incorrect route.

TIMING.
Probably the most basic piece of equipment will be an accurate watch with a further reserve time piece fully wound and I suggest keeping duel time.

Minutes should be clearly shown and if you intend to take notice of the swee hand make sure it is synchronised into the minute hand.

On shorter stages I have found a good "egg timer" clock invaluable and, if the time allows to complete a section in 50 minutes, you simply set the time to 50 minutes and at a glance you can always see how much time you have left since the clock works in reverse. Most timers have a limit of 1 hour and may not have split second accuracy, but it can save you time with calculatio in answering the constant question "How much time left"?

Each major Control should display what is known as "Official time". This should be the time piece you are booked in and out of the Control with. If you find "Official time" at a particular Control varies greatly from your own time piece, and if this variation results in the potential loss of point for alleged late arrival, I suggest you ask the Control official to make a notation to his own records and yours, that you claimed the time displayed was inaccurate, and by how many minutes.

If in fact the situation is as you see it, then there will be other cre. similarly complaining and the Director should in all probability adjust any point losses when compiling the results.

The competitor will also have to contend with the variations in time between the Central and Eastern States. Broken Hill is on the South Australian and Northern Territory time sequence, and these States are a half hour behind the Eastern Standard Times. i.e. when it is 7.00 p.m. in Sydney it is 6.30 p.m. in Adelaide.

Going back to the "guessing department", I feel the competitors will be given a road book which will show the expected arrival and departure times for your own vehicle. This system was used in the London/Sydney Marathon and appeared to work quite well despite the fact of a number of alleged errors in the Road books which in reality gave inconsistent times between one car and another. However, you are protected by your own road book of what time you are to leave and arrive.

NAVIGATION INSTRUMENTS.

There are a number of Speed Shops or Instrument Companies who carry an excellent range of navigation aids. I do not wish to deal with this subject in too much detail since most items are related to the ever present question of cost. However, in some cases you almost have no choice because of the importance of the assistance to navigation from some of these aids. The "Halda Tripmaster" is coupled into speedo cable and will record distance into 1/100 of a mile. This aid can be obtained in a single or twin model, and I strongly urge the twin as the most suitable.

The habits of navigators vary greatly but, I find it most satisfactory when using the Halda Twin to always let the lower meter run uninterrupted in recording the total mileage for a section and use the top meter for calculating the intermediate distances between features.

Zero the whole instrument at a Control and then for example you may say "Intersection 4 miles ahead". The intersection may come up at 3 miles or even at 5 but provided you are sure it is the correct place to turn, then zero the top meter and repeat the operation over and over again. Remember, always record an accurate mileage at each Control Point.

It is also a wise precaution to record the total mileage (from the last Control) at various intersections, towns, etc., then if a wrong turn is taken, you have some basis to calculate the exact mileage you have done, and make adjustments.

There is a further Halda instrument available, known as the "Speed Pilot" which is suitable for average speed work. It also has a mileage meter but is not as versatile as the Halda Twin. It is not anticipated you will encounter any average speed instructions from the Director of the "Ampol", but I have found the Speed Pilot an assistance in normal instructions when used in the following manner:

Example: The route instructions may call for a distance of 60 miles to be covered in 1 hour thus giving a target average from your point of view of 60 m.p.h. If the pilot is set on 60 average the driver and navigator may see at a glance if they are meeting the target average time.

The system requires the distance to the next time check to be known, also of course the time allowed. It may cause some worrying moments if you initially encounter rough going where an average of 60 is not possible, but if the Director's time for the section is realistic you should expect smoother and faster going at a later part of the section.

Not many cars carry both instruments, and the best service will undoubtedly come from the Tripmaster.

FLEXIBLE LIGHT.

A flexible light will also be an essential part, and should be modified if the light reflects into the driver's eyes. It is not the light that generally offends, rather the reflection from the map or book surface.

Accordingly, some shielding screen may be required on the navigator's table.

MAP BOARD.
There are quite a few excellent map boards available, but if you are the "do it yourself" type, remember to construct it from a material that will fold or crumble in the case of a severe accident. Never use a metal or heavy timber base.

Depending upon your own tastes, the board may be made to perform many chores. I once had a board that had its own flexible light, three clips for maps and papers, three power points, a complete plastic overlay, and a multitude of pen clips and even a compass.

For the "Ampol" I would not recommend anything so cumbersome, and indeed something quite light and small will probably be the most serviceable. A large board can become annoying over a long period of time and it is not as easily tossed into the back seat as its smaller counterpart.

I have always liked the idea of plastic overlays providing the section of the map being used can be clamped flat and the plastic hold in place. The plastic has a tendency to keep the maps clean and to save excessive wear. When used in conjunction with Chinagraph pencils it is quite simple to mark the route ahead, jot down references, and then erase with the wipe of a cloth.

Chinagraph pencils have an enormous wearing rate and if you intend using them be sure to carry an ample supply. Also they require fairly constant sharpening.

Any power lead to a fixed light on the map board should be long enough to allow the board to be moved around inside the car, but far better is the idea of a flexible light fixed to the Dash or even the pillar above the seat belt anchor point. It provides all the light required and should be positioned in such a way so that the light head can be used within a few inches of the surface of the map.

STORAGE OF DOCUMENTS.
It is essential that a regular place be kept and used, for the storage of the road book and other official cards.

Valuable time can, and will be lost at a Control looking for the route card and if you train yourself to always return them to their "cubby hole", you will minimise the chance of driving away and leaving them in the hands of some equally confused Control official.

Nets are available or can be made to fit into the roof lining and are quite excellent for storage of light items including the route cards. The net runs the whole width of the roof and can be positioned in the front over the driver or navigator's head or in the back, head clearance will dictate the best position. Again, the clear plastic comes into its own and the suggestion of a good quality plastic bag for the road book and attachments has much to commend it.

COMPASS.
The fitting of a reliable compass will, I feel, also be an essential for an event such as the "Ampol." If you cannot afford one of the excellent models which can be mounted inside the car, at least one of the hand held type will suffice in an emergency.

If you are in doubt of being on the correct route, it is reassuring to know that at least you are heading in the right direction, or alternately a check with the compass may indicate some basic error in your navigation, and can save you going further out of your way.

With the car mounted type you can check these directions as you drive, whereas with the smaller hand type it will be necessary to stop the car and walk some distance away.

The fixed type is probably the most suitable if mounted near the floor and

in some models it is possible to have it fitted between the bucket seats or under the navigator's legs.

Be careful in its final placement since it will not want to be in a position where it is prone to being kicked or becomes a potential danger in the event of an accident.

SEATING.
I will say little on the matter of seating, apart from the suggestion that you work out the arrangement carefully and leave ample leg room for the tallest crew member.

Head rests have a great safety potential but are largely a matter of personal taste. At least one of the seats should be set up in such a fashion so that it can be made into a bed and allow some rotation of "off duty" crew members.

We are probably encroaching into the field of general equipment rather than navigation hints. However, I have been motivated by all problems that will beset the navigator and a comfortable seating arrangement will most certainly be high on this list.

MAP INDEX.
If you intend carrying a number of reference maps it will be necessary to have them packed or even tabbed for quick location. Keep to the habit of folding maps in the same fashion and thus do away with unnecessary creases and folds.

The theme of replacing maps and documents back into their own places could well be expanded to all items in the car.

A NAVIGATOR'S TOOLS OF TRADE.
We have covered the most basic items in our previous discussion, but one final thought for the navigator will be to endeavour to keep all his "Tools of trade" together. In this respect I would suggest a small brief case or some similar carrying appliance where papers, etc., may be stowed in safety.

My basic list of some essential equipment is as under:-

(a) Set of screw drivers (small to medium).
(b) Spare parts for Halda (enquire from your supplier which parts are most likely to need replacement).
(c) Spare cable junction piece.
(d) Pencils including chinagraph.
(e) Pencil sharpeners.
(f) Small pliers
(g) Small magnifying glass.
(h) Hand torch.
(i) Car sickness tablets (even the best navigators may succumb.)
(j) Reference maps.
(k) Bag of small change for emergency phone calls or even "coin pump petrol.
(l) Note pad.
(m) Spare g obes for light.
(n) Spare power lead plugs, etc, (if applicable).

SUMMARY.
Most of the comments preceding have been made with the Ampol Trial especially in mind. We could have undoubtedly gone into more detail but this bulletin was intended to be a very basic one for the novice navigator.

It is the intention of British Leyland to supply additional assistance and information to competitors using their products.

If the demand is present, I am sure a meeting of intending competitors could be held to discuss further navigation or driving problems in greater detail.

You will receive a list of British Leyland Dealers on the anticipated route, and we trust also basic maps of the towns showing the location of Dealers.

Good Luck in the 1970 Ampol Trial!!

BRITISH LEYLAND TEAM INFORMATION.

EMERGENCY HINTS.

The following "emergency hints" are taken from a number of official publications suggesting procedures etc., when touring the "outback" or, in the event of a major breakdown. The hints are not written especially for the Ampol Trial, but their message is applicable.

CLOTHING.

Casual clothes are usually worn. Any good clothes should be packed in plastic bags and, if possible, kept in a well sealed case. Keep night attire and toilet accessories in an overnight bag.

Shorts, unlike slacks and jeans, are not comfortable to wear when driving. Crew necked T shirts or square necked blouses are preferable. Avoid wearing collars during day travel and if possible choose khaki colouring for preference. Wool or silk jersey make ideal travelling dresses. Nylon or drip dry underwear, a woollen jacket or coat for cool evenings. Cravat or tie, sports coat to wear with collared shirts at evening stops. Paper table napkins make ideal handkerchiefs. Golf or heavy walking shoes are more practical, but it is wise to keep flatties, slippers or sandals in the car for travelling comfort. Women should include a scarf for the hair. A rubber cushion makes long driving distances less tiring. Other travel accessories should include several cakes of salt water soap, razor, torch and alarm clock. Plastic bottles for carrying liquid make-up. Liquid detergent (Teepol) is a good water softener.

HELPFUL HINTS FOR PACKING.

Pack first what is required last. Pack nightwear on top. Use luggage leaves (plastic sheets) to separate types of clothing.

Before commencing to pack, fit suitcases, etc., into car and decide which are most suitable. If new luggage is required, cloth or soft plastic lids are preferable to stiff cases and select dark colours.

Tape caps of bottles holding liquid with cellulose tape and carry in plastic bags.

MONEY.

Payment by cheque is not generally acceptable in the outback. Carry adequate small change and notes of small denomination.

PHOTOGRAPHY.

Keep camera and film in a plastic bag in a cool place, not the glove box or back window shelf.

Make a note of where each shot is taken. Forward spool to processing laboratory as soon as possible after exposure.

Reasonable photographs can be taken straight ahead from a moving vehicle at 30 m.p.h. at 1/100 sec. - from side windows at 1/200-1/500 sec. Do not attempt to take colour photographs through tinted windows.

FIREARMS.

Pistols - prohibited in Victoria. Permit required in all other States.
.22 Calibre or Small Bore Shot Guns - Permits only required in Western Australia and South Australia.
Other Shot Guns and Rifles - Permits required in all States except Queensland.
Permits and further information can be obtained from the Police Department in the States concerned.

EMERGENCY TIPS.

In the event of breakdown stay with your vehicle and under no circumstances try to walk anywhere.

A vehicle can always be located by other passers-by or from an aircraft. If you are in easy walking distance from help (according to your Speedo note-book), leave a note in your car stating your whereabouts and do not walk in the sun without wearing a hat. Carry water with you.

Where possible always park your vehicle in the shade of a tree and tip the front seats forward to keep them cool. If they don't tip cover them with towels.

Conserve your water supply and do not over drink during the heat of the day as this can cause stomach upset and loss of strength.

In emergency drain water from the radiator and let it settle before drinking in small doses. Almost all surface water in the outback is drinkable, however muddy. If very dirty let it stand in a container until the sediment settles.

Rush grass growing in dry creek beds usually indicates shallow, easy to reach water. In a grassless creek chances of digging down to water are slim. White river gums indicate creeks and watch the flights of top-knot pigeons, Java sparrows, wax bills and budgerigars who fly to water at either sunrise, noon or sundown.

Boiled tea or coffee allowed to cool is more refreshing than plain water.

With a little time, patience, something to dig with, some plants, a plastic sheet and a container, there is another method by which thirst can be beaten in the Outback.

By day, dig a square hole approximately one yard across by 18" deep. Insert fairly flat container to catch water. Heap newly-picked leaves (mulga, saltbush, acacia) or roots about the container. Completely cover hole with plastic sheet roughened on underside with sand. Hold firmly in place at corners by stones. Put small stone at centre on top of sheet so plastic will sag over mouth of container.

The amount of water you will get from condensation due to day-time heat and fall of air temperature over-night will depend on wetness of the soil and succulence of leaves, but overnight in reasonable conditions should produce enough water to keep you alive.

Dig a hole under your vehicle to keep water and provisions cool and if there is no shade make a hole large enough to accommodate yourself.

If in scrub or saltbush country build a fire and add green growth to cause a thick black smoke. An experienced bushman or stockman will always investigate smoke, or it could attract attention of other motorists or aeroplanes.

If wood is unavailable to make a fire, ignite clothing soaked in oil or burn the spare tyre if the position is really serious.

At all events - do not panic. Stockmen mustering cattle are usually around and if you are on a track it means that others use the track too.

Death can be avoided if common sense is used and you follow the Golden Rule to stay with your vehicle.

HAZARDS.

Shattered windscreens. First bring the car to a stop. If vision is completely obscured it is quite safe to punch a hole with the closed fist and before proceeding remove all particles of glass likely to blow back on passengers. An unbreakable windshield can be part of your equipment.

Bushfires. If caught in a bushfire and it is too late to go back, close all windows, put on the headlights and drive at moderate speed. Don't stop unless forced to. Hard driving will cause engine overheating.

Bogging in sand or mud. Most outback roads have gravel or dirt surfaces which may become covered with shifting sand during the "dry" season, or turn to quagmires of mud during the "wet". In sand or mud keep wheels in straight-ahead position and when free of the bog keep driving until firm ground is reached.

Hessian bags have many uses on an outback trip, one of them as sand mats. Coir matting is also useful in sand, but for desired effect, at least 30 feet is necessary to enable the vehicle to gain traction over the loose surface. Tie the ends of mats to the rear of the vehicle and when the vehicle stalls in sand, force the mat under the front and rear wheels and then out in front.

Alternatively, deflate tyres to approx. 80% of normal pressure. Before so doing ensure you have a tyre pump. Don't forget to inflate tyres again. If you are still bogged, raise the vehicle with a jack, using house brick as solid base, and pack material such as stones, small logs, grasses, anthills, etc., under wheel to provide a gripping surface.

Driving through water. Keep to the middle of the road and do not put one set of wheels on the edge unless it is firm and dry. Travel at low speed. High speeds enable the fan to pick up water and throw it back on the plugs or ignition system. Follow well defined short detours away from muddy patches. Before making your own detours, first test the hardness of the ground, particularly in flat country where drainage could be poor.

Always test the depth of water in a creek or river crossing, and unless a permanent stream, it is advisable to wait until the water level drops, which can be anything up to 48 hours. In cases of a permanent stream without a concrete crossing, after testing the depth, indicate path with a tree branch or cairn of stones.

If the water is deep enough to reach the engine, throw a sack over the radiator to keep water away from the fan. It may be advisable to disconnect the fan to protect the ignition system.

Animals. Most outback roads and highways run through pastoral properties, and wandering cattle are likely to be encountered. Take particular care at warning signs where cattle cross the road, stream crossings and bore sites. At night and early morning this hazard is particularly bad, and watch should be kept as well for kangaroos, horses, donkeys and buffalo. Noise of cars and headlights tend to frighten and freeze animals, and hitting them can not only wreck a vehicle but also endanger a life; exercise extreme caution and reduce speed, especially for night driving.

Dust. Take particular caution of dust clouds ahead which hang across the road and stop visibility.

Wait for a car ahead to travel out of range or, in the case of oncoming traffic, pull well over to the side, stop the vehicle and wait until the vehicle passes and the dust settles.

YOUR HEALTH.
Motorists accustomed to a temperate climate should take precautions against heat exhaustion during the hot months. Avoid drinking excessive amounts of water during the heat of the day and avoid over fatigue. Carry a bottle of salt tablets and take as directed. Even a teaspoon of table salt in a glass of water will replace salt lost from the body through excessive perspiration.

Keep your face and head shaded by a hat and avoid exposing skin to direct sunlight until you have acquired a protective tan. Carry sunburn lotion and apply it to exposed areas, particularly the right arm which when travelling catches many hours of direct sunlight.

Carry a protective cream for the face and lips. Sun glasses should be worn to ease eye strain, and a few drops of eye lotion at night provides a soothing lubrication.

HEAT RASH.
Heat rash is a small red rash, usually worse on moist areas of skin and under the armpits. It tends to occur where the skin is not tanned and when excessive clothing is worn.
Treatment: Avoid excessive bathing and cut down washing of the skin to a minimum. Sprinkle dusting powder over the affected areas often enough to keep dry. Calamine lotion may be applied to the skin to allay itch.

HEAT EXHAUSTION.
Heat exhaustion is due to sustained exposure to heat, and is more likely to occur as a result of working in the heat. The symptoms are weakness, dizzine headaches, possibly followed by collapse.

Prevention: Seek shade as often as possible on hot days. Avoid sustained periods of hard effort in the heat.
Treatment: 1. Rest in a cool, shady place; 2. Elevate feet and massage le 3. Drink 2-4 pints of salt water (1 teaspoonful of salt to about a pint of water, i.e. a normal saline solution).

HEAT CRAMPS.
Heat cramps are painful muscular spasms due to loss of salt from the body due to sweating.

Treatment: As for heat exhaustion (1) and (3); in addition a salt tablet may be given every half to one hour while cramps are present.

HEAT STROKE.
Heat stroke is rare, and is characterised by some loss of consciousness due to failure of the sweating mechanism. The skin is therefore dry. This is a dangerous condition, requiring urgent medical attention.

Emergency treatment: Place the patient in a cool place and remove clothing. Keep the patient cool by fanning, or sprinkling with water. Massage the legs and arms. If the patient regains consciousness, give him salt and water by mouth (as above). A doctor must be called as soon as possible.

SNAKE BITE.
Treatment: The bite is usually on an arm or leg.

1. Put a tourniquet on the upper arm or the thigh (limbs containing only one bone) between the bite and the heart.
   The tourniquet must be so tight as to stop the circulation to the limb, s when possible, it is put over clothing.
2. Wash the surface of the bite with clean fluid. If none is readily availa use saliva or urine.
3. Incision, if it is to be of value, must be performed within a few minutes of the bite. Cut through the puncture marks to a depth of $\frac{1}{4}$ inch. Suck the wound vigorously and expectorate. This is safe if there is no open cut or sore on the lips or the mouth.
4. The patient must be made to rest.
5. He should be given plenty of fluid. The best stimulant is hot black coff Alcohol is undesirable.
6. Not later than 20 minutes after the ligature is put on, loosen the ligatu for 30 seconds or a little more, and from then on, every 10 minutes. The ligature may be left in position for two hours.
7. If possible identify the type of snake and seek medical attention, as specific antivenene may be required.

Symptoms of snake bite: These are usually nausea, vomiting, faintness, rapidly followed by drowsiness; usually experienced within 12 minutes to two hours after the bite.

There may be pain in the chest or abdomen. Later the patient may be prostra with a rapid thready pulse. His breathing may become shallow, paralysis of swallowing, slurring of speech may occur. The patient may lose consciousnes Blood may be passed in the urine or through the bowel.

DIARRHOEA, DYSENTERY.
The definition of dysentery is diarrhoea with blood and mucous slime in the stools. Both may be prevented by boiling all water and protecting from flie food and drink.
Treatment: Both may be treated by drinking large quantities of water with salt. In the case of dysentery, seek medical advice as soon as possible. I this is not available, take Sulphamerazine, 4 tablets at once, followed by 2 tablets every 6 hours for 2 days, then 1 tablet every 6 hours for 1 day. Ke up a high fluid intake while taking sulphamerazine. Avoid solid foods until 24 HOURS AFTER SYMPTOMS HAVE SUBSIDED.

Eyes.
Foreign Body in the eye. Pieces of grit often lodge in the eye. They may be loose and easily seen, when they can be removed with the corner of a clean handkerchief. They may be under the upper lid, and then this must be everted, that is, rolled over, using generally a matchstick or very thin pencil, before they can be seen and removed. They may be stuck on the cornea (the clear part covering the iris) and may be difficult to remove, as this part of the eye is extremely sensitive. Sit the person in a good light and gently rub the foreign body with a wick of moist cotton wool and it may become detached. If it does not, assistance must be sought as soon as a doctor is available, as a serious ulcer may result if the foreign body is not removed.

A black eye: This is best left alone, though a firmly applied cold compress will relieve much of the swelling if applied at once.

Any penetrating injury to the eyeball is a surgical emergency, and medical aid should be sought as soon as possible.

Don'ts:
Do not rub an eye with a foreign body in it.
Do not put a bandage or an eye shade on an inflamed, red or discharging eye or on an eye with a stye.
Do not neglect to consult an ophthalmic surgeon as soon as possible after any injury or other condition which has impaired the sight of an eye.
Do not neglect the frequent cleaning of a discharging eye and the frequent bathing of it with salt solution.
Do not touch the eyes with dirty fingers.
Do not wash the face in water used by anyone else or use anyone else's towel.
Do not allow flies to settle on the eyelids.

ACCIDENTS.
Use commonsense treatment until medical help is obtained. Avoid moving the patient. Keep spectators back, employ them in calling medical help, Police, or slowing down oncoming traffic (if on a highway). Warn people not to smoke where petrol is spilled. Cover open wounds with a clean cloth to reduce risk of infection. Do not allow anyone to breathe, cough or sneeze over an open wound. Cover burns to exclude air and germs. Do not give the injured anything to drink.

How to stop bleeding: Lie the patient down and, provided there is no foreign object in the wound or a bone broken, apply clean pad to wound and press firmly. Persistent bleeding will either stem from a vein or artery. If a vein has been injured, dark red blood will flow evenly and strongly. If an artery has been severed, bright red blood will spurt in jets to match the heart beat.

To control these two severe forms of bleeding, direct pressure should be applied, and in addition for arterial bleeding, block off the flow of blood in the vein or artery before it reaches the wound.

This is done by applying pressure -
1. on the inside of the upper arm
2. in the groin
3. on the throat beside the windpipe
4. in the hollow behind the collar bone.

Pressure points can be located by feeling the pulse beat with the finger tips. You will know when you have the right pressure point as bleeding will cease. Maintain pressure at pressure point for some minutes then relax to see if bleeding has ceased. In very severe cases of limb injury, a constrictive bandage should be applied, but should be released briefly every 10 to 20 minutes and should be only tight enough to stop flow of blood.

VEHICLE PREPARATION.

SUMP GUARDS:

In most cases the standard sump guard as provided, is sufficient if suitably strengthened. Extend the guard rearward approximately 18" to provide protection to the gear change cables and in the case of a North/South located engine the gearbox and the exhaust pipe. Add metal to all mounting points making them double thickness and adding gussets if possible. We have found that by making five or six angle iron pieces bent to run from front to rear and welded on their edges to form a triangular section makes the plate of the sump guard almost indestructible. Use rubber engine mounts with through bolts to secure the rear of sump guard to the floor panel. Always glue a piece of rubber approximately one inch thick and the same dimensions as the outside of the gearbox case or the sump onto the guard. This will act as a buffer when the guard is hit by a large heavy object, and it also allows the engine to be supported in the case of an engine mount failure.

1500 OWNERS PLEASE NOTE:

The original 1500 sump guard has been superseded by a later type that should be used in preference to the original one. This sump guard with the strengthening by-angle iron as previously described is very satisfactory.

HYDROLASTIC SUSPENSION:

Fit 1" x 3/16" angle iron over all lines with plates welded at intervals to bolt to the floor. Regulations prevent these covers running the full length of the car, butt join or overlap two lengths of angle for each line. Make sure that they do not foul the lines and cause friction and thereby in time cause a leak. Make sure rubber Hydrolastic hoses are not chafing and cover with a plastic hose. This can be done by splitting a suitable piece of hose lengthways locating over the existing rubber pipe and binding with tape. We have also found that on odd occasions, Hydrolastic units fail through stones entering into the top of the Hydrolastic Unit container and becoming aggravated and rubbing through the top of the Hydrolastic Unit. To prevent this fill the top area between the Hydrolastic Unit and the case with foam rubber pushing it into all gaps. This will prevent any stones from entering.

BRAKE HOSES:

Brake hoses can be protected by a metal spring surrounding the flexible rubber pipes. The flexible pipe must be disconnected from the back plate to

enable this to be done. The spring should be of the equal length to the flexible rubber pipe and be approximately 1/8 bigger in diameter. It will follow the natural contours of the flexible pipe and acts as a very good protection and deflects stones etc. The bleed nipple of the rear of the back plate should also be protected by a small plate located with the bolts that hold on the slave cylinder.

Petrol tanks can either be protected by sheet metal bolted to the chassis or sub-frame or rubber of at least 1/4" diameter being glued over the exposed surfaces. It will prevent stones damaging the tank, but in the case of a major obstacle it may be punctured right through the rubber. Any of the forgoing protective items, if manufactured in a suitable aluminium alloy will weigh a lot less, and therefore be an advantage. Bear in mind the cost though will be very high. At all times try and prevent excessive weights being loaded in the vehicle.

EXHAUST SYSTEMS:

Exhausts should be secured and protected as well as possible, make sure all standard fittings are in good condition. If the muffler is exposed, weld a half conical skid plate on the leading bottom edge of it. Add additional straps at regular intervals along the pipe and muffler, to hold them in place in the event of an exhaust mounting failing. It has been found that old battery earth straps (Platted flat types) are excellent.

FUEL TANKS:

In fitting additional fuel tanks ensure that they are securely mounted and that the straps and surfaces on which the tank is located are suitably protected. Use either body felt or rubber. Tanks mounted directly onto a steel surface will wear through with friction in a few thousand miles.

Thoroughly test run all additional tanks and fittings, as it has been found that when one is empty, that a wrongly designed fuel system will only suck air from the empty tank rather than fuel from the full one. This can be prevented in all cases by either correctly plumbing the pipes or a simpler method is fitting a three way tap and turning the tap to which ever tank is required. If there is no fuel gauge fitted to the additional tank always use this fuel first then the driver knows after switching to the normal tank what fuel is remaining.

HINTS IN GENERAL RUNNING

Do not use road-side water for batteries.

Use only clean water for engine.

Engine oil can be drained if necessary into a clean plastic sheet or bag.

Rubber rings cut from inner tubes make ideal securing means for temporary pipes - wiring - holding maps to sun visors etc.,

Use any grade oil in engine if the correct grade is not available.

If spare tyres are all used, car will travel best with tyre off the rim and fit rim to rear of car in the case of front wheel drive and front of car in case of rear wheel drive.

In case of hydrolastic unit failure, pack up area of bump stop with rubber.

A gallon can fitted with a tap is handy to use for emergency graviation in case of fuel supply failure.

Fit a net just below roof lining to hold clothing, maps etc.,

Fit a box between bucket seats, if fitted, and over brake handle to hold odds and ends.

Flat black all forward viewing chrome surfaces e.g. wipers, instrument surrounds, steering wheel.

Liberally use Silicone grease around all electric connections - distributor coil - pipes - leads etc.,