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1954/56

CONDITIONS IN THE CANNING BASIN DESERT.

by

D.M. Traves & J.N. Casey

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SUMMARY.

This record gives a brief account of the conditions encountered in a geological reconnaissance of the south-western portion of the Canning Basin - an area covered mostly by sand and seif dunes, interspersed by scattered low rock outcrops.

GENERAL.

The area surveyed in 1954 includes the Australian four-mile map sheets of Yarrie, Anketell, Paterson Range, Rudall, and Table Top. The western part of the area - the Nullagine-Oakover River System - is pastoral country with numerous tracks; the eastern part is uninhabited desert with no tracks, and sparse vegetation of spinifex clumps and low shrubs with a few eucalypts and many acacia trees. Most of the desert is covered by large steep-sided seif dunes which trend N-W to W-N-W for hundreds of miles and range from 50 ft. to 120 ft. high. The distance between dunes ranges from a few hundred yards to a mile or more. The inter-dune valleys are mostly sandy flats, but some contain low hills of rock outcrop.

The survey personnel consisted of three geologists, two cadet surveyors, a mechanic and two field assistants.

Three landrovers, one 3-ton four-wheel-drive Commer truck and one two-wheel trailer were used.

VEHICLES.

The following alterations were made to the standard Landrovers and Commer truck.

Landrovers.

Fitted with:

1. $\frac{1}{8}$" steel plating for protection underneath the oilsump, gear box, clutch and brake pedal connections, tie rod and steering linkages, and the main fuel tank.

2. Reinforced bumper bar; steel mesh from the bumper bar to the level of the top of the mudguard and tubular steel scrub deflectors and stays from the windscreen to the steel mesh.

3. Auxiliary petrol and water tanks at the sides of the interior of the vehicle and running fore and aft. The better design (as requested) placed them across the vehicle and behind the seats; this latter design gives a larger capacity (25 gals. as compared with 12 gals.) and enables the two spare tyres to fit on either side of the vehicles; the punctured tyres then can be changed without unloading the vehicle to gain access to the spares.

4. A Traeger Type 51MA transceiver was installed behind the passenger seat in one Landrover.

5. Oil and temperature gauges, rifle clips, speedos to read to 1/10 mile and fire extinguishers.

6. The Landrover trailer coupling was replaced by a jeep type coupling.

7. The tyres were sand track type 9.00 x 13, low pressure and were found suitable for normal sand and rock work. Tyre

pressure was 18-20 lb. per sq. inch for soft sand and 24-26 lb. per sq. inch for general travelling.

No provision was made to increase the cooling efficiency of the engine (although this was originallly intended) and only when the vehicles travelled in sand with a tail wind did the engines heat to near boiling.

All alterations to the Landrovers proved useful and the only recommended extra alterations for future trips are:-

1. Suitable position for two spare tyres so that they are readily accessible. (The position behind the front seats is not satisfactory because the whole load has to be taken out each time a spare tyre is needed.)

2. Puncture-proof tyres. (With the three landrovers five punctures a day was the maximum and one or two the average.)

3. Larger water and petrol tanks fitted behind the seats and not on the wings. Probably 25 gallon tanks would be the best.

4. Heavy type two-way shock absorbers. The standard shock absorbers lasted only one or two days before they became inefficient.

5. Heavier front springs. Five main front leaves were broken during the survey but no back springs were broken, although a heavily laden trailer was attached to one Landrover most of the time. Most of the front leaves broke at the forward anchor pin, probably because of the backward thrust on encountering numerous spinifex clumps.

6. Fitting a duralumin canopy with rear doors, rather than the present system of lace-up canvas, should prove easier for loading and unloading as well as being stronger and providing a more secure covering.

7. An extra petrol filter incorporated into the fuel line to prevent fine dust and sand from clogging the filter bowl and carburettor - main intake for this dust was via the cap on the main petrol tank.

The Landrovers averaged 20-22 m. p.g. on main roads
12-16 m.p.g. on tracks
8-10 m.p.g. back tracking in desert
6-8 m.p.g. breaking tracks in desert.

The landrovers performed very well and with large 9.00 x 13 sand-type tyres they were able to cross all dunes somewhere and some dunes anywhere.

Comer 3-ton 4 x 4 truck.

Fitted with:

1. Fuel tanks to hold 50 gals. and these were protected by shielding; a water tank of 130 gals. was mounted in the front of the tray.

2. A winch driven from the transfer case.

3. Tyres used were 11.00 x 20 plain (not Bartread) and it was felt that a wider tyre, 14.00 x 20, would have been more appropriate.

4. Fire extinguisher; if the truck, after a heavy haul, is brought to rest on a spinifex clump so that the exhaust is

on or close to the clump, fire in inevitable.

5. A motor generator for battery charging and this was incorporated with a centrifugal water pump mounted on the tray of the truck.

6. The canopy edges were reinforced with leather, cupboards were mounted on the tray for the storage of food, spares, etc. and wire mesh fastened from the tray to the top of the canopy frame to prevent items falling from the truck.

The Commer averaged 6-7 m.p.g. bitumen, or formed roads
3-4 m.p.g. sandy tracks.
2-3 m.p.g. traversing sandy country after track is broken
1.4 m.p.g. breaking new track over sand and dunes.

It was taken 120 miles into the desert, but it is very slow (averaging 2-3 m.p.h.) and uneconomical for trackless desert work in which loose sand and dunes are encountered. For future trips, the authors suggest that smaller vehicles with shorter wheel base, and smaller weight per sq. inch of tyre width be employed; such conditions are filled by a slightly modified Morris 4 x 4 1-ton truck or a Dodge 2 ton Power Waggon. Many of the supplies could possibly be brought in by aircraft to various small claypan strips that are scattered throughout the desert area.

TRAVELLING CONDITIONS.

Most of the travelling was done across uninhabited, trackless country; only the western side of the area has any tracks.

The average travelling rate per day, breaking new tracks, was 30 to 35 miles, although these figures varied greatly depending on the nature of the country.

Where the dunes are high, defined and persistent, and spaced about half a mile to a mile apart, the inter-dune travelling is fair, and distances up to 45 miles were covered per day. The closer the dunes, the rougher and slower the travelling. On recent fire burns, the hummocked sand around spinifex clumps has been dispersed and travelling is good.

Most of the lakes such as Lake Dora, Lake Blanche, Lake Auld, and Lake Wooloomber are salt pans, and although they contain no water on the surface, they are too soft for a vehicle except in places round the extreme edge. The area around the lakes provides the worst travelling conditions; the sand dunes are small and not defined, the sand is generally in hummocks and in many places recent travertine makes travelling very difficult. Daily milages through this type of country were as low as 20 miles; the best route here is around the extreme edge of the salt pan, but even then caution must be taken when rounding the ends of sand dunes that encroach onto the salt surface, because drainage from the dunes makes the salt pan very boggy. Where the edges of the salt pan are straight the travelling is relatively good, but where the edges are indented by encroaching sand dunes the extra milage and the concentrated drainage make conditions very bad. In other words, the west side of Lake Wooloomber and Lake Dora-Lake Blanche system is comparatively good travelling over fine, dry, unconsolidated, samphire covered, light coloured "caliche".

The landrovers fitted with the sand-type tyre proved a success for crossing the seif dunes. The crests of the dunes vary in height, and by choosing a low point in the crest or at a braid or junction of dunes, crossings were made without too much delay. In some cases levelling of the spinifex clumps

and putting spinifex in the tracks were necessary.

WATER.

Water is a necessity in the desert, but, particularly with a small party, it should not be one of the limiting factors. Each Landrover carried 12 gallons in a tank and an extra six and ten gallon drum were carried where necessary, but at no time during the survey did water prove a limiting factor. Water consumption while on traverse was a gallon a man per day. This included all kitchen use but did not allow for washing of either clothes or person. There is little, or no surface water in the desert but native rock holes, soaks, and wells can provide sufficient water for a small party. Unfortunately most of the native supplies are in bad condition and require cleaning out before using.

The three types of native water supplies are:-

1. Rock Holes.

These were found on the top of flat-topped hills in areas of Permian and Mesozoic outcrop. They have a small opening at the surface - about 6 ins. to 1 ft. in width and 2 ft. to 3 ft. long with a depth of 3 ft. to 4 ft. They generally contain only a small supply of water, varying from dry to about 40 gallons. The supply is obtained by natural catchment of rainwater.

2. Wells.

Native wells were found usually in the travertine country. They were filled with spinifex and leaves but contained a supply of water beneath the rubbish. No wells of this kind were cleaned out but they would provide a useful supply if necessary. The travertine country has a cover of stunted ti tree scrub - the contrasting tall ti tree is not a good guide for native wells, possibly because their roots have to extend to a greater depth to ground water.

3. Soaks.

A number of soaks were found which yielded a good supply of water when cleaned out. Dunn's Soak, 3 miles east of Lake Dora, when cleaned out and cased with a 44 gallon drum with the ends removed, yielded 60 gallons of good drinking water per hour. The soaks should be dug out in the evening and allowed to build up and settle overnight.

Probably the most difficult job at first is to locate the native supplies of water.

From air-photographs possible supplies are often located by the presence of numerous fire-burn patterns. On the ground, indications of the presence of water are animal pads, birds, fresh looking or flowering shrubs, remnants of native camping grounds, and stones lines up by aboriginal children at play. The last sign is the best indication that water is close by.

COMMUNICATIONS.

Two Traeger transceivers were used; a 43 Model was left in base camp and a portable 51MA Model was fitted in one Landrover. Both sets worked very well, and communication between traverse and base camp and the Flying Doctor Service at Pt. Hedland was a daily routine. The maximum transmission distance we had to use was 400 miles, and contact was made with the medium wave (4030 kcs) crystal at 1700 hours.

It is a definite advantage for the traverse party to be in touch with base camp and the Flying Doctor Service and it

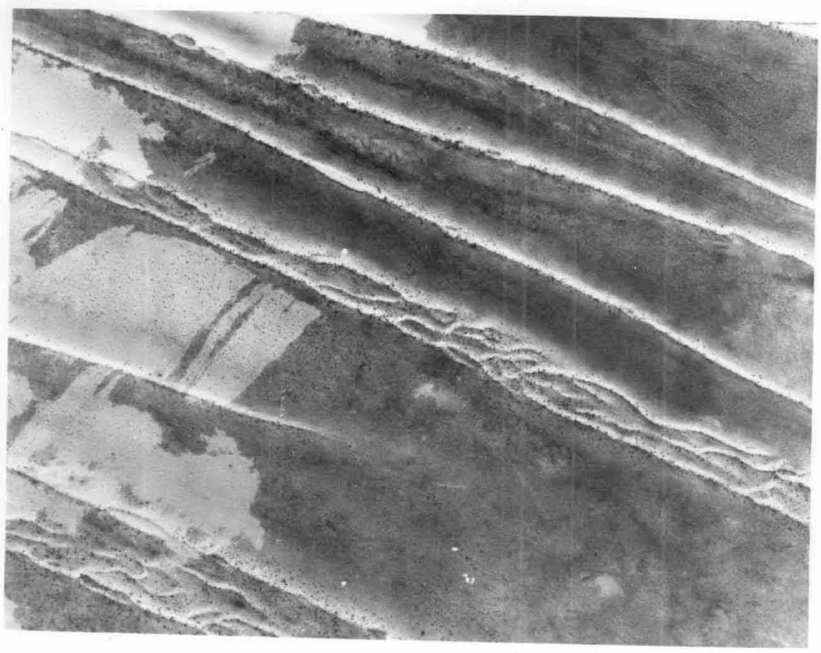
is strongly recommended that at least two portable transceivers be made available to any future geological party in the desert.

Conclusions.

Throughout the Survey it was most noticeable that a small party is desirable for work in the desert. This year's party, a combination of geologists and surveyors, was not a success as the whole party became unwieldy and it was impossible to combine the work of the two sciences. Also the added responsibility of two young inexperienced surveyors imposed extra work on the party leader.

The 3-ton Commer truck was not suitable as a base vehicle in the desert, therefore long trips had to be made in the Landrovers, in some cases for a period of three weeks. It is suggested that the most suitable arrangement for desert work would be a party of four, preferably two experienced geologists, a cook and a mechanic, and three Landrovers which would be supplied with petrol, food and water by aeroplane every week or two weeks. (clay pans would provide suitable landing grounds.) This would also enable the four in the desert to leave their vehicles and return to civilisation for a couple of days each month to break the monotony of desert work.

It might also be possible to replace a Landrover by such a vehicle as a Morris 4 x 4 1-ton, which would increase the carrying power of the party; a trailer drawn by a Landrover is a decided disadvantage and it often required two Landrovers to drag the Landrover and trailer over some of the dunes.



Aerial view of Sand dunes trending ESE; Scale $\frac{3}{4}$ mile = 1" Position: east of Lake Wooloomber, on Table Top 4 mile sheet. The white pattern represents native fire burns. The height of the dunes is 80-110 feet.

Sand dunes west of Mt. Crofton looking SSE. The summit is usually only partially fixed, and there is a tendency for the sand to move towards the west.

Sand dunes west of Mt. Crofton looking NW. Height of the dune here is 120 ft. The troughs between the dunes are flat and covered with spinifex and sand; after a fire the humps of sand are flattened and travelling becomes fair.

The Landrover descending a dune. There is a certain amount of "surface compaction" on the dune, but if this is broken, the sand is soft and slightly damp underneath. This is shown in this photo where the Commer truck had crossed leaving deep tracks of fine, soft, red sand.

East of Lake Wooloomber, showing typical Mesozoic outcrops of ferruginized sandstone 120 ft. high. The foreground is the end of a dune. There is a small rock hole on the top of the outcrop at right hand side of the photo.

At a small rock hole on the top of a flat topped Mesozoic hill, east of Lake Waukarlycarly.

Dunn's Soak, 5 miles east of Lake Dora. Surrounded by very green and large broad-leafed Acacia trees. Yield of 60 g.p.h. of excellent water. Soak is at the junction of the Permian sandstone and underlying shale.

Looking south from the north east end of Lake Dora. Permian wood-bearing sandstone in the foreground; "emergency landing ground" claypan in middle distance, separated by eight sand dunes from the white salt lake in the background.

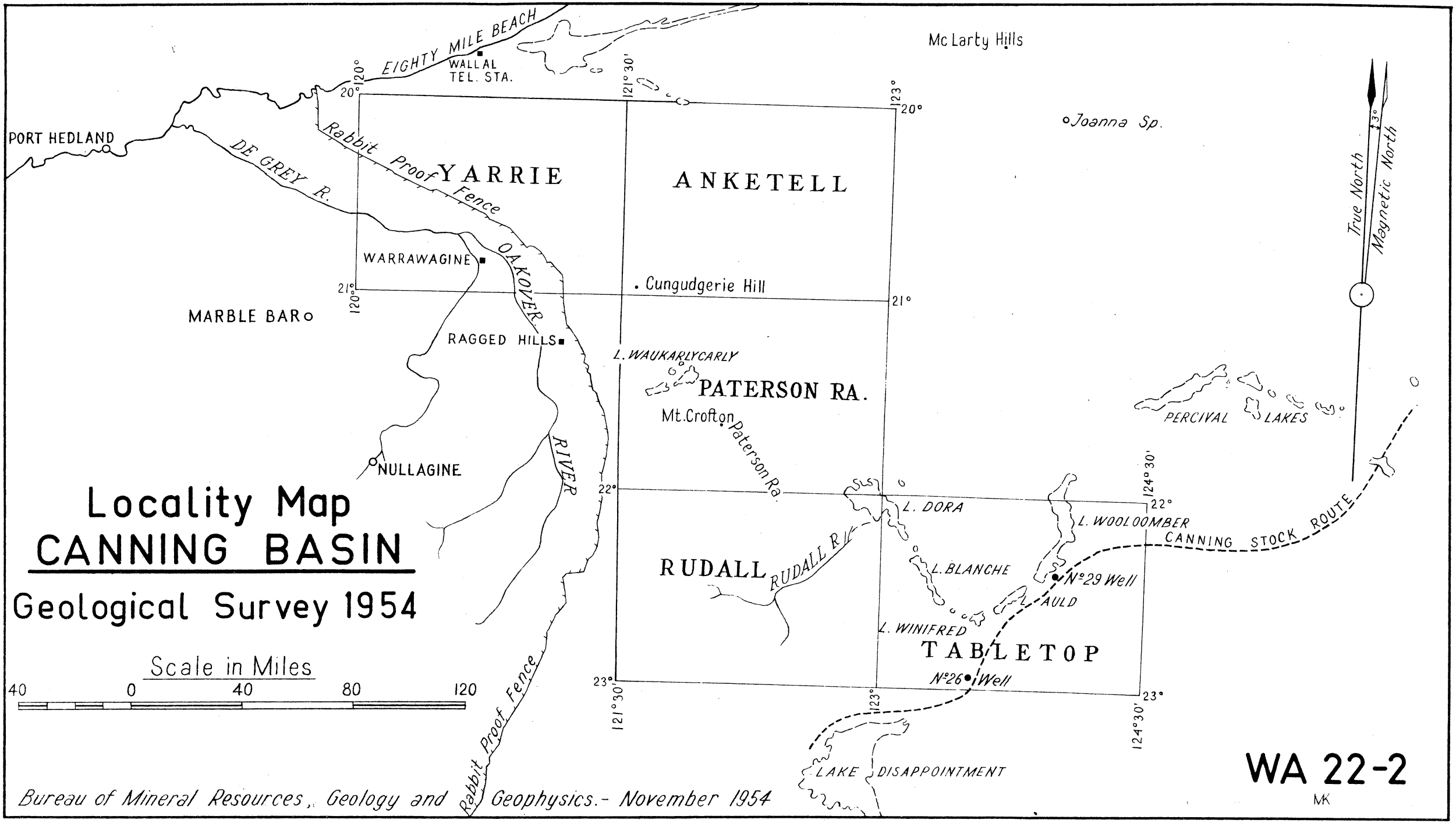
Lake Dora, showing the thin $\frac{1}{8}$" layer of salt on the surface, overlying 2 ft. of black mud containing Permian foraminifera. Once the surface is broken a vehicle will sink.

North-eastern edge of Lake Dora, with Permian shales outcropping on the margin; end of a sand dune on the right side of the photo.

The Commer truck broke through the surface salt crust on a small lake NW of Lake Dora. It is particularly treacherous at the point of a dune (shown on the left of the photo) where seepage adds to the softness of the salt crust.

Front of the modified landrover; tyres are sand type 900 x 13; front coarse mesh with scrub deflectors continuing to the hood; steel plate between the springs to protect the steering linkages; spare spring strapped across the front. The rolls of wire were never used.

The scientific party: Campbell (State Surveyor), Wells (Geologist), Traves (Party Leader, Geologist), Kirkby (State Surveyor), Casey (Geologist).



Locality Map
CANNING BASIN
Geological Survey 1954

Scale in Miles

40 0 40 80 120

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