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BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS.

1960/20

TRAVERSES DOWN THE HAY AND PLENTY RIVERS, N.T.

by

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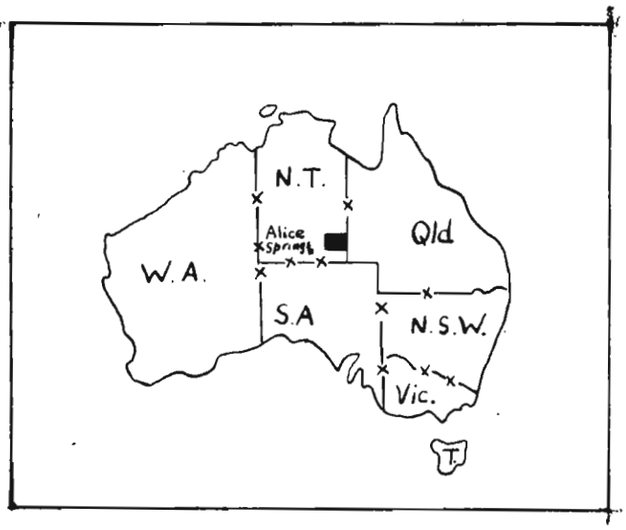
Contents

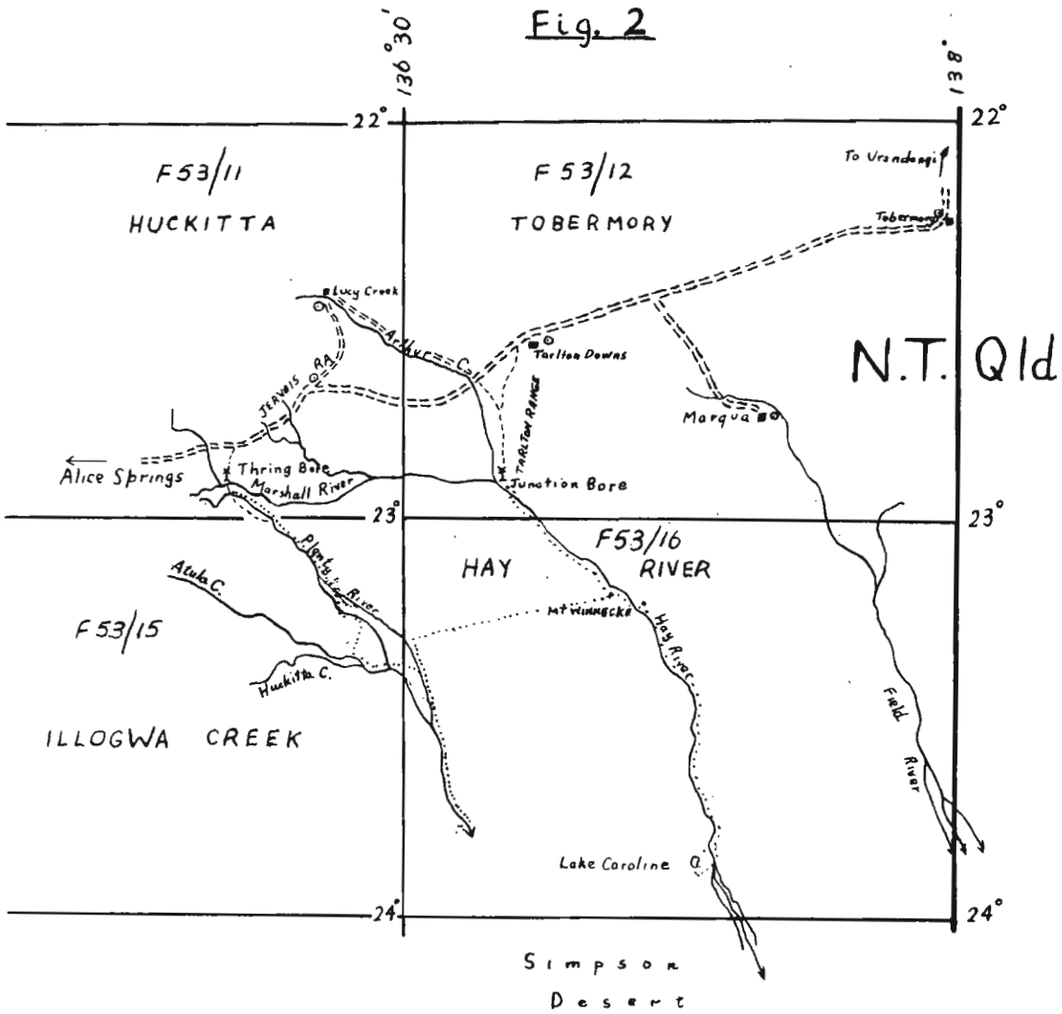
PLATES

Fig. 1



Locality Map

Fig. 2



Locality Map

Scale: 32 Miles to 1 inch

Reference:

=== Road

---- Vehicle Track

■ Homestead

⊙ Licenced Landing Ground

..... Traverse Routes

ABSTRACT

During 1959 members of a field party from the Geological Branch of the Bureau of Mineral Resources, Geology and Geophysics made traverses to examine outcrops in the Lake Caroline area and in the flood-out area of the Plenty River. Both localities are in the Northern Territory and lie within the confines of the Simpson Desert as defined by Madigan (1929). Geological results and matters of general interest in both areas are discussed.

INTRODUCTION

Object of Reconnaissance

Low mesas are visible on aerial photographs of the Lake Caroline area. Examination of photographs of the Plenty River flood-out area suggested the presence of outcrops there. Between 30th June, 1959, and 1st July, 1959, the authors made aerial reconnaissances over both areas and confirmed the presence of outcrops in them. The traverses described in this report were made to determine the geology of the outcrops.

History of Investigations

The Lake Caroline area was first visited by Charles Winnecke in 1883. He named Lake Caroline and the Hay River and travelled extensively up and down this stream from Lake Caroline (Winnecke, 1884). His map of the area shows "stone mounds" along the eastern and southern sides of Lake Caroline but he did not refer to the geology of these outcrops.

The next man to journey to Lake Caroline was F. Rogers, who is at present living on Lucy Creek Station, Northern Territory. Rogers (personal communication) made two visits, with horses; one trip was made in 1926 and the second in 1936. His purpose was to seek grazing land. Both trips were made after periods of unusually heavy rainfall.

Madigan (1938) makes no reference to Roger's journeys but states (p.516): "There is now a dogger's camp on the Hay one mile below the junction of the Arthur and Marshall, on the right bank, with a good soakage well and garden. This water is permanent. The man has lived there for over ten years." That man was Rogers. In 1959 he made the diary of his journeys available to the authors and one striking feature was the accuracy with which he estimated distance travelled on horse-back, e.g. his distances to various points between his camp and Mt. Winnecke were within $\frac{1}{4}$ mile of those measured on vehicle speedometers, and a distance of 72 miles between two points was measured as 71 miles on the speedometers.

In 1929 Madigan made an aerial reconnaissance of much of the Simpson Desert. One of his flights was over Lake Caroline but he did not record outcrops there (Madigan, 1929).

The flood-out area of the Plenty River was not included in the travels of the early explorers because all attempts to cross the Simpson Desert from west to east and vice versa had failed at points many miles distant. Madigan in 1929 (loc. cit.) had flown over two channels of this stream but did not recognize it as the Plenty. Official maps published as late as 1953 show the course of the Plenty River ending many miles north of its actual flood-out area. In 1955 aerial photography of the Hay River 4-mile sheet was completed and the course of the Plenty was then evident. It

offers an easy access route towards the heart of the Simpson Desert.

There are unconfirmed reports that a small number of pastoralists have inspected country along the lower course of the Plenty River and that they may have flown over the Lake Caroline area. These trips were probably undertaken within the past four years.

During 1959 several Commonwealth officers journeyed to both Lake Caroline and the Plenty River flood-out area. The first was made by Surveyor Seton, of the Division of National Mapping, who led a party along both the Hay and Plenty Rivers in June 1959. He reached latitude 24°S. on the Hay but did not visit Lake Caroline. His journey down the Plenty was to latitude 23°23'S./ before travelling west and south to near the south-west corner of the Hay River sheet area at 136°29'E., 23°56'S. Vine's investigation of the lower course of the Plenty was the only other one to that area, but Surveyors Lees and Lynch, of the Department of Interior, and Geophysicists Vale and Barlow, of the Geophysical Branch of the Bureau of Mineral Resources, were others who visited the Lake Caroline area. All journeys were made in four-wheel drive vehicles.

/Seaton (pers. comm.)

THE TRAVERSES

(a) Lake Caroline (by K.G. Smith)

The Lake Caroline traverse was made by the author, accompanied by Survey Hands B. Diederich and H. Rutledge. Two Landrovers were used for the trip, which was made between 10th and 13th August, 1959.

Route

The Hay River was crossed at the B.M.R. party's old campsite, located on the eastern bank of the stream and 1 mile downstream from Junction Bore. The crossing is not suitable for trucks. The route then followed the western bank as far as Mt. Winnecke where the river was recrossed to take advantage of easy going over alluvial flats on the eastern bank. From Mt. Winnecke, Seton's tracks were followed to a point 71.5 miles from the B.M.R. old campsite and 3.0 miles south of Survey Peg No. 18 which was later emplaced by Surveyor Lynch. At this point the river was crossed and the short distance to Lake Caroline was negotiated easily. Total driving time from Junction Bore was nine hours. On the return journey this time was decreased by about one hour. The only difficulty during the traverse was in the two crossings of the Hay River in the Lake Caroline area. Here the stream is about 100 yards wide, with banks between 6 and 10 feet high, and the bed is sandy. The sand is much finer-grained than that in the bed farther north and this grain size caused some difficulty in getting the first vehicle across. The crossing was made without resorting to the use of a winch, and the second vehicle, following in the other's tracks, had no difficulty.

The Hay River

This is a well-defined stream between Junction Bore and the point where the traverse ended, some six miles south-east of Lake Caroline. Its course is fairly straight and its direction is controlled by the sand dunes which, from Mt. Winnecke southwards, closely border the western bank in most

places. The river is usually between 75 and 100 yards wide, with well-defined, steep banks; there are some large islands in the river to the north of Mt. Winnecke. No water was observed in the Hay River but the debris of previous floods may be seen piled against the gum trees which grow abundantly in the stream bed.

Vegetation

The river is lined with gum trees. These become generally thinner and more spindly as one proceeds downstream but there are numerous trees of diameter 3 feet in the Lake Caroline area. Polygonum grows profusely on some parts of the river banks. Saltbush and parakelya were abundant in the Lake Caroline area and parakelya was observed intermittently between Lake Caroline and Mt. Winnecke. Its abundance was due to heavy rains in March, 1959, and additional rains in June of the same year. Some parakelya had been blackened by frost action. Short herbage grasses grow on the narrow alluvial flats bordering the river and these were very green at the time of the traverse. Spinifex abounds in the dune and interdune areas at the edge of the river flats. No gidyea trees were seen but there were numerous stunted shrubs and one clump of ?conifer trees.

Animal and Bird Life

Near Lake Caroline, flocks of finches were numerous and 2 cats, 1 turkey and 3 kangaroos were observed. Thirty-three head of cattle were counted near Lake Caroline and 35 head in the Mt. Winnecke area. Others were heard at night, some 20 miles south-east of Mt. Winnecke but they were not sighted. Well-defined cattle pads were numerous near Lake Caroline and the pads of camels were also seen. The cattle had no supply of water; they were living on parakelya and were in excellent condition. Most were branded and the majority of these bore the brands of the closer stations to the north and north-west. The farthest-travelled brand recognized was that of Lake Nash station but some of the brands were not identified by the author. The cattle at Lake Caroline seemed to have been in that area for a considerable time, e.g. all of the young bulls were segregated into a separate mob. No carcases or bones of cattle were seen along the river flats and if the cattle in this area ultimately perish because of lack of both parakelya and water they do so either farther downstream or in the sand hills.

Native Life

Winnecki (loc. cit.) reported bands of natives at various localities along the Hay River and he obtained water from their wells. It is almost certain that no natives live in the area now. During the geological reconnaissance, quartz chips were found on the eastern bank of a large lake some two miles south of Lake Caroline and grinding stones of quartz-biotite schist were collected in the bed of a stream which drains into Lake Caroline from the east.

Water Supplies

In normal (dry) seasons there appears to be no reliable supply of water south of Junction Bore. This lack of water necessitates caution on the part of anyone travelling by vehicle in the area, e.g. if (or when) radiators boil they must be replinished by water from the drinking supplies.

After heavy rains a soakage in the river some 5 miles north of Mt. Winnecke is replenished. At the end of May, 1959, this soakage dried up; presumably it had lasted since the rains in March of the same year. Two inches of rain fell in June, 1959, but the soakage was not replenished. It is believed that this soakage is in the area of many native wells mentioned by Winnecke (loc. cit.).

Winnecke estimated that Yarracurracoo Native Well, near Lake Caroline, yielded 1,000 gallons per day in a good season. This well was not located during 1959, but little time was spent in search for it. The author dug several holes in the bed of the Hay River, at various localities, but no water was obtained in them. Their average depth was 3 feet. South of Mt. Winnecke, no moist sand was encountered in the holes.

The lakes in the Lake Caroline area are filled after moderately heavy rain, and it is believed that the run-off is a high percentage of the rain which falls in the area. Recent watermarks at Lake Caroline indicated that the rains of March, 1959, had filled that lake to an average depth of 3 feet. Loss by evaporation would be high and the lake was dry when the aerial reconnaissance was made on 1st July, 1959.

Prospects of obtaining permanent supplies of water by boring in the alluvial flats of the Hay River are reasonably good. Semi-permanent supplies might be obtained by excavation and damming of some meanders and tributaries of the Hay near Lake Caroline. Another method would be to cut deep trenches in the clay floor of Lake Caroline and to cover them to decrease loss by evaporation.

Winds

The prevailing wind is from the south-east. In normal circumstances, the journey to Lake Caroline is undertaken with the wind cooling the engine of the vehicle; this helpful effect is lost on the return journey.

Airstrip

During the reconnaissance, the site of an excellent dry-weather, one-way airstrip was chosen and delineated by vehicle tracks and one prominent stone marker painted white. This airstrip is located 1½ miles south of Lake Caroline, on the floor of a hard claypan. The details are as follows:

Length: 2,800 feet
Width: 300 feet
Bearing: 340 degrees magnetic.
Marker: L shaped, 9' x 6' x 1', placed on the north-east corner of the strip. The long arm of the L bears 160 degrees magnetic.
Approaches: 1,000 feet of clear approaches at the north-western end (over an undulating surface of the claypan); low shrub-covered slightly undulating country at the south-eastern end. The nearest hill is a low mesa ½ mile south of the south-eastern end. The airstrip has a sandhill 35 feet high parallel to the whole of the western boundary and 50 feet from it.
Surface: Flat, and free of stones, and debris. Maximum speed of a Landrover, in top gear, was 55 m.p.h.

It is almost certain that the vehicle tracks will be obliterated by rain, but the marker has been placed on a low rise, above the level of any watermarks and it should be clearly visible whilst the paint lasts.

Geology

Between Mt. Winnecke and Lake Caroline no outcrops were observed. In the Lake Caroline area numerous small mesas of sedimentary rock crop out. The height of the mesas is usually less than 50 feet. Similar types of sedimentary rock crop out in the bed of the Hay River for a distance of at least 6 miles south-east of Lake Caroline but no outcrops were seen in the bed of the stream north of this lake.

At the north-eastern end of Lake Caroline 20 feet of variegated red, yellow and brown shale is overlain by 5 feet of khaki-coloured, medium-grained, cross-bedded greywacke containing laminae and lenses of shale. Specimens of the shale in the lower 20 feet of this section have been examined for micro-fossils and they contain Radiolaria (Irene Crespin, personal communication). In this area the beds form shallow basin and dome structures.

Another section was measured in a mesa which forms one of a large group of outcrops at the south-eastern end of a large lake some two miles south of Lake Caroline. At this locality 11 feet of sandy siltstone is overlain by 40 feet of medium-grained, finely cross-laminated greywacke which contains some siltstone lenses. In a mesa in the same area some gypsiferous, blue (when fresh) siltstone was observed. Specimens of this were examined for micro-fossils but none were found (Irene Crespin, pers. comm.)

Irene Crespin considers that the beds in the Lake Caroline area are of Cretaceous age, and that probably they are upper Lower Cretaceous. The beds were examined by Dr. A.A. Opik, who accompanied the author on a second visit to the area. In Opik's opinion, the sediments are similar in lithology to the Rumbalara Beds of Cretaceous age.

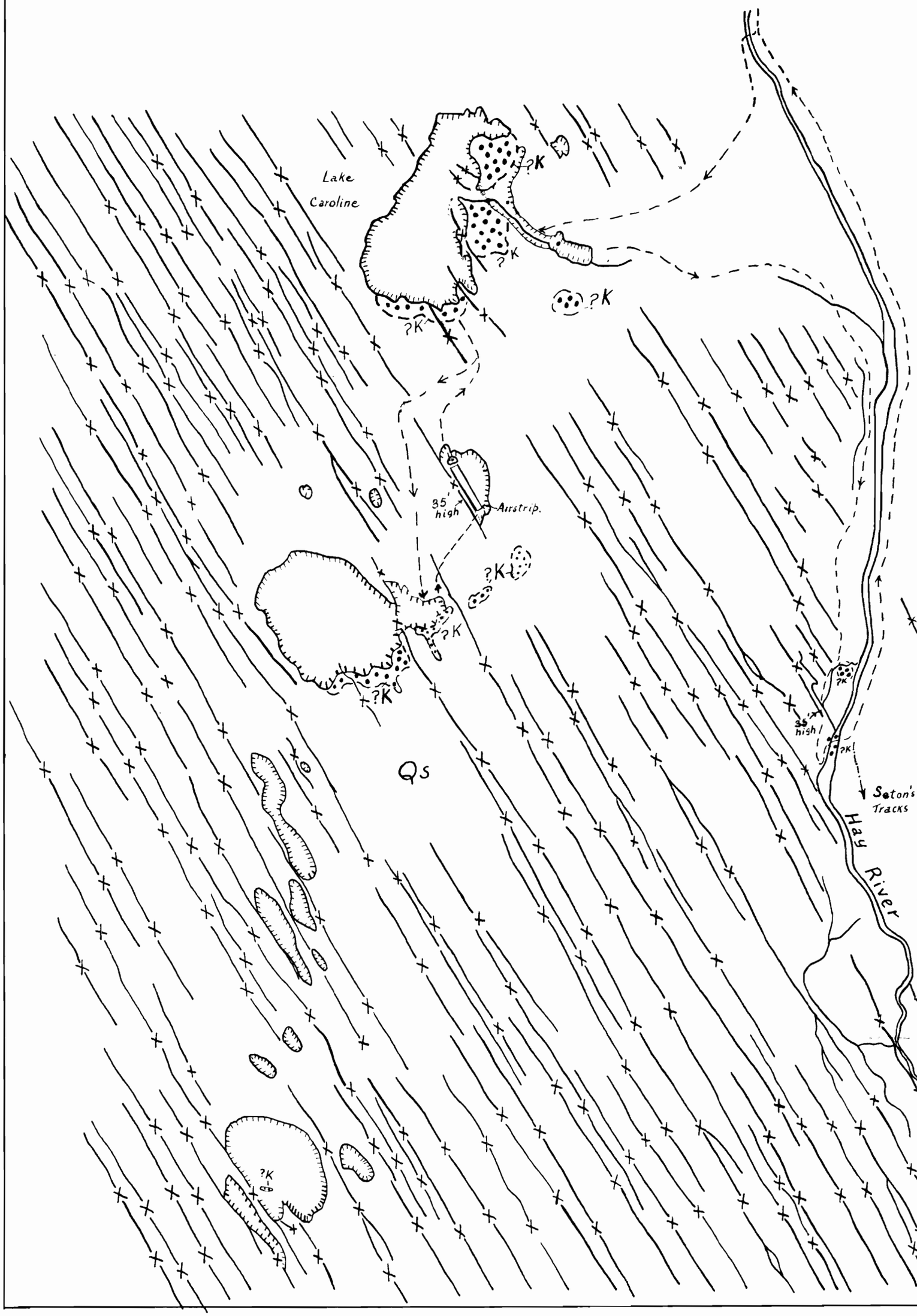
(b) Plenty River (by R.R. Vine)

This traverse was made by the author accompanied by Mechanic A. White and Survey Hand H. Rutledge. Two Landrovers were used for the trip which was made between 21st and 23rd September, 1959.

Route

Initially the route followed was that of Smith's traverse along the western bank of the Hay River as far as Mt. Winnecke and thence on the tracks of Surveyor Seton in a direction approximately 20° south of west across to the Plenty River at about longitude 136°30'E. From there the Plenty was followed down along its eastern bank to near its main flood-out at approximately 23°50'S. latitude. From Mt. Winnecke to the Plenty the route was across a flat sand and spinifex plain. This leg of the traverse took five hours driving time. Along the Plenty the travelling is much easier, and, including stops to examine outcrops, took only another five hours.

MAP of LAKE CAROLINE AREA, N.T.



REFERENCE.

- Approximate edge of claypan
- Sand Ridge.
- Reconnaissance Route.
- ?K ?Cretaceous sediments.

APPROXIMATE SCALE.

MILES 1 0 1 2 3 4 5 6 7 8 9 MILES

The return journey was made up the Plenty to near its junction with Huckitta Creek, westwards for 15 miles along the north banks of Huckitta and Atula Creeks to some quartzite ridges, north to the Plenty once more and then up first the south bank and then the north bank of the river to the Thring Bore.

No delays were encountered anywhere along the traverse except at the crossing near the junction of the Plenty River and Huckitta Creek. Here the banks are generally steep, about eight feet high, and the sand in the river bed in incoherent. Backing and filling by the lead vehicle was necessary to pack down a track across the river, but the second vehicle was able to cross on this track in four wheel drive without difficulty.

The Plenty River

From near the Thring Bore to its flood-out the Plenty River is a well defined stream with a width in excess of 200 yards at its maximum. It is mainly between 50 and 100 yards wide, narrowing to an average 30 yards width towards its flood-out. Over a distance of approximately 35 miles it is split into two anabranches which, at the junction with Huckitta Creek, are more than four miles apart. The banks may be steep and well marked, but in many places one or both edges of the main channels are shown only by change of sand colour and incoming of vegetation. South of the main flood-out the Plenty has no well-defined channels but consists of a few discontinuous tree lined depressions between the sand dunes.

The course of the river is meandering, but regionally it forms two straight stretches. It flows south-eastwards from near the Thring Bore to Huckitta Creek, where it meets the south-south-east trending sand dunes which thereafter control its course down to the flood-out. Several dunes have, however, been cut by the river.

Vegetation

The river is lines with gum trees for its whole length. Along the upper reaches these are mainly large river or ghost gums, but southwards they give way to spindly and stunted box. Many of the trees near the flood-out are bare, but there are few fallen trunks. Polygonum and saltbush are common along the lower reaches of the river. Parakelya, blackened by frost, was only seen in one small area just north of the flood-out at about latitude 23°45'S. Extensive grass flats are present along the sides of the river for much of its length, and grass and mulga grow in some of the inter-dune areas near the river. On the dunes and in most of the interdune areas spinifex and low scrub form the dominant vegetation.

Animal and Bird Life

No cattle were seen on the traverse, and the only fresh traces were near Mt. Winnecke and in the vicinity of the Thring Bore. Old camel pads were crossed in many places between Mt. Winnecke and the Plenty and very fresh remains and pads were seen near the flood-out of the Plenty. An old camel skeleton was found in this area. Over a large grass plain at about latitude 23°45'S. budgerigars, finches, galahs and crows were common and about 15 kangaroos were seen.

Three herds of camels, totalling 31 beasts were seen on the return journey at about latitude 23°10'S. All were in good condition.

Native Life

No evidence of native life was seen.

Water Supplies

The most southerly reliable source of water near the Plenty is at Thring Bore on the Marshall River. From there an ill-defined track crosses both rivers and runs along the southern bank of the Plenty for nine miles to an old camp where a soak had once been dug.

West of the Thring Bore plentiful supplies of water have been obtained along the course of the Plenty from numerous shallow wells and bores in the alluvium and it is probable that at least adequate supplies will be found for a considerable distance down the river. Sand in the river just south of the junction with Huckitta Creek looked damp, but neither there nor further south was it tested.

At the flood-out, part of the river bed has a coating of silt derived from the adjacent outcrops, and markings on the surface indicate that water lies there after rain. Damming is possible at this locality. The rapidity with which the Plenty floods out in that area suggests that the water enters an underground aquifer.

Geology

The outcrops are in two groups, a northerly one at about latitude 23°40'S. and a southerly one around the main flood-out of the Plenty (Plate 2).

The best exposures are found in the southerly group, in river cliffs and in a low horseshoe-shaped mesa ½ mile west of the river. At the thickest exposure a section 23 feet thick was measured consisting of medium to coarse grained, sub-angular, fairly well sorted sandstone, with siltstone pellets and stringers of micaceous sandstone. Interlaminated is lenticular sandy siltstone. The rocks are laminated to thin bedded at the base, becoming a little thicker bedded upwards. Cross lamination is present in the sandstone of the mesa. A sample was examined for micro-fossils but none was found (D.J. Belford, pers. comm.). No definite structure was observed. The beds appear to be generally flat-lying, but rolling with dips up to 3°.

The northerly group consists of several patches of rubble with some small rubbly outcrops. The rocks are deeply weathered (leached and ferruginized) with some billy. Although badly altered they appear to have been very silty sandstone, poorly sorted, medium to coarse-grained and sub-rounded, with some siltstone. The general similarity with the rocks of the southern group make it likely that they belong to the same formation. The age of the sediments is unknown.

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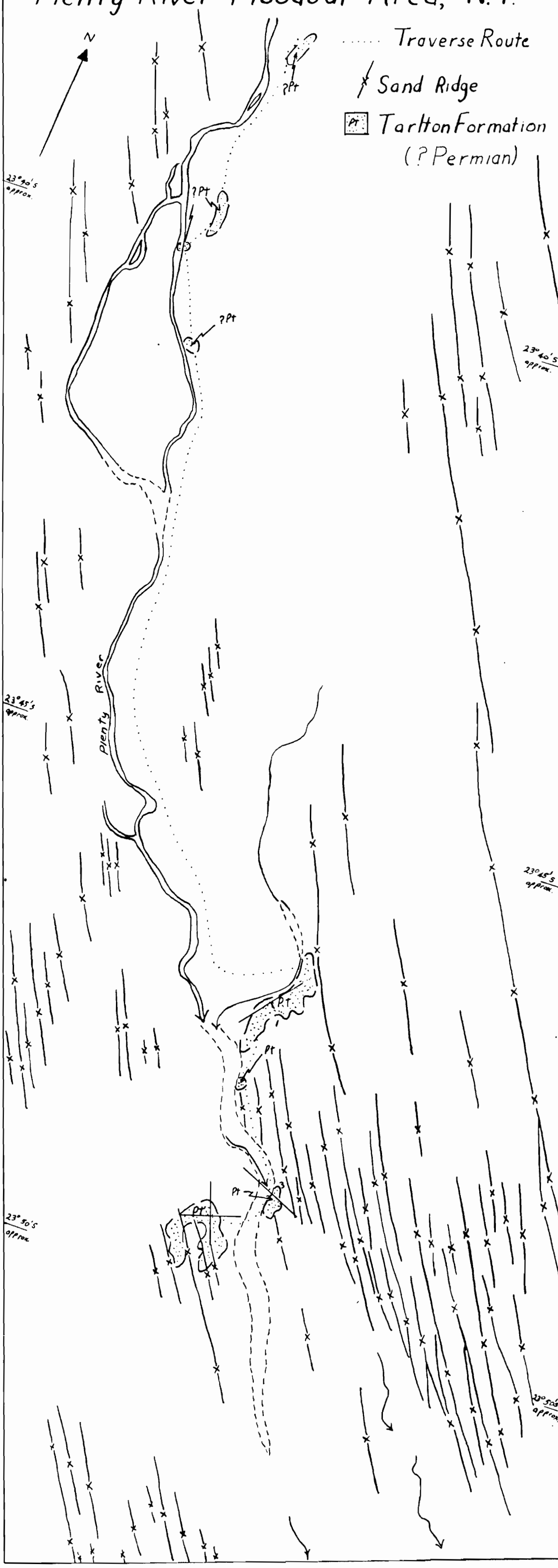
Canberra,
A.C.T.

21/3/60.

Plenty River Floodout Area, N.T.



Miles

1 0 1 2 3 4 5

Approximate Scale