DEPARTMENT OF MINES
SOUTH AUSTRALIA.

THE HYDROLOGY AND GEOLOGY OF THE GILES (4 MILE) MILITARY SHEET.

By

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DEPUTY DIRECTOR OF MINES, S. AUST.

TABLE OF CONTENTS.

Contents

Appendices

Plans to Accompany

Plan No.	Subject
1. 8653 A.B.	Locality Plan
2. 52-260 A.B.	Giles military sheet showing traverses
3. 8654 A.B.	Sketch plan showing details of Test Bores.

DEPARTMENT OF MINES - SOUTH AUSTRALIA

THE HYDROLOGY AND GEOLOGY OF THE GILES (4 M.) MILITARY SHEET.

Location of the Area.

The Giles military sheet is between Lat 28° and 29°S and Longitude 132°00, 133°30'E, and its position is shown on the Locality Plan (Plan No. 1).

Transport, Communication etc.

Road access is difficult and hard on men and vehicles alike. In dry weather the sand dunes present a formidable problem even to multi-wheel drive vehicles. Reconnaissance work off the very rare tracks necessitates breaking through the mulga scrub, which imposes a terrific strain on vehicles and drivers. Only specially designed and protected vehicles could last more than a few days under these conditions, and mishaps such as staked tyres are a common occurrence. To leave the few tracks in this trackless desert spells serious trouble and even tragedy for any but the most experienced bushmen.

Two-way wireless communication, both between vehicles of the party, and also a base headquarters, is essential. By contrast air reconnaissance at low altitudes and slow speed is the ideal method of covering the ground. Visibility was exceedingly good and any objects of interest could be readily located up to 10 miles either side of the line of flight. Such conditions would not, of course, prevail in the summer time.

Previous Investigations

(1) Australia Twice Traversed (Vol. II) by Ernest Giles. Fourth Expedition 1875 covered similar country within 50 miles west of area under consideration.

(2) Explorations by R.T. Maurice - Fowlers Bay to Rawlinson Ranges (1901) - Fowlers Ba to Cambridge Gulf (1902).

(3) Other scientific parties to approach the area without actually traversing it include the Elder Expedition, H.Y.L. Brown and R.L. Jack.

Present Investigations - Purpose and Scope

The object of the present investigation was to determine

the underground water possibilities of the area. During July - August 1952, a period of approximately ten days was spent in ground reconnaissance using as transport a special type Land Rover, followed in mid-August '52 by several days air reconnaissance. Ground and air traverses are plotted on the accompanying plan. (Plan No. 2).

Geography

1. Topography

The area is flat and generally featureless with S-E sand dunes regularly spaced at intervals of 200 - 400 yards. The dunes average 30 ft. in height, 200 - 250 ft. width at base, and are bright red in colour. The main topographic feature is a chain of salt lakes occupying the central-western portion of the sheet. Divided now into several separate lakes by very large sand dunes (60 ft. height) they represent the only defined drainage in the whole area.

2. Climate

The climate is arid with a long, very hot summer and a short, cool winter. Rainfall records are not available, but it is considered there is no regular and reliable wet season. Main precipitation is probably in summer thunder storms, with winter rains rare. During 1952, however, several winter rains up to 30 points have been noted.

3. Vegetation

The Giles military sheet is better wooded than anticipated. The dominant tree is mulga, spaced approximately 1 per 10 - 20 square yards and averaging 10 - 12 ft. height, though in favoured localities trees up to 25 ft. height were observed. Myall is also common, generally subordinate to mulga, but occasionally dominant.

Other trees noted include oaks (confined to well developed and on stony knolls) mallees, both Goldea mallee, 15 - 20 ft. high, and a smaller reddish-leafed mallee. Wild peach trees and wattle were fairly common, and an unknown spiky green tree was observed confined entirely to gypsum ridges.

Large numbers of dead mulga occur, standing and lying, but there is also a considerable regeneration indicated by the number of young mulga and myall.

Several types of mistletoe are firmly established.

Salt bush is the dominant herbage and small spinifex is common. Due undoubtedly to the abnormal winter rains, a variety of grasses and succulent herbage occurs widespread. A yellow flowering succulent predominates, together with pink, and white (yellow centred) daisies. "Silver" grass was fairly common and parakylia grass was observed well established around at least one clay pan together with several other unknown grasses.

The present abundance of feed would possibly support a sheep to the acre in some areas, but the normal conditions might be more akin to a sheep to the square mile.

General Geology

Rock exposures are limited to a few areas around clay pans and salt lakes and occasional stony knolls, the universal mantle of red sand effectively masking the remainder.

Good exposures were studied in detail around the margins of a clay pan in the west-central portion of the military sheet and a number of samples collected for further study.* (See Plan 2).

The stratigraphic succession here is (R.L. + 1000 ft.).

Photos 1, 2 and 3	0 - 15 ft.	Siliceous boulder bed containing numerous pebbles (mainly quartzites but some quartz and other rock types) ranging in size from 12 ins. diameter down.
	15 - 30 ft.	Sandy shale with some sandstone bars containing small pebbles and gravel, rounded and angular.
	30 - 50 ft.	Medium grained sandstone with some small pebbles.
Photos 4 and 5	50 - 55 ft.	Do - current bedded - no pebbles.
	45 - 145 ft.	Very fine grained silty sandstone.
	145 - 175 ft.	Shales and sandstones.

Some three miles further north where surface elevation is 70 ft. lower (i.e. R.L. 930 ft.) shales are more prominent. Section here approximates -

0 - 30 ft.	sandstone
30 - 40 ft.	sandy shales and sandstone bars
40 - 120+ ft.	red-brown shales with occasional sandstone bar.

* For petrological notes by Asst. Geologist G. Taylor and palaeontological notes by Dr. N. Ludbrook - see appendices.

Structure

The strata are all horizontal and except for two isolated areas no evidence of folding was seen.

In these two areas the strata are locally contorted into numerous minute domes and "pounds" thought due to cross folding. The fold axes do not apparently persist beyond the local confined areas which do not exceed 100 yards square.

With the exception of one fairly strong fault striking N50W and vertical, which is represented by up to 24 inches of crushed, yellow silicified rock standing out in prominent relief, (see Photo No. 6) no faulting was found.

The sandstones exhibit a fairly strong joint pattern, the major joints striking N30°E to 50°E and dipping very steeply, with a subsidiary system developed at right angles.

Origin of Boulder Bed

The boulder bed which makes prominent cliffs in the highest elevation visited is an interesting occurrence, and it is suggested this may be possibly originally of fluvo-glacial origin.

Points which support this origin are

(1) The diversity of rock types present - admittedly they are mainly quartzites, but of differing types and include also quartz, cherts, granite etc.

(2) The poor sorting of the boulders within the strata.

(3) The angle of deposition of many pebbles in contrast to the horizontal nature of the sediments.

(4) No striated pebbles were seen but a polish is indicated on some freshly exposed surfaces.

(5) Whilst most pebbles are rounded, a large number are angular and sub angular.

Age of the Strata

No macro fossils were observed, and an unsuccessful search has been made for micro fossils* to assist in determining the age of the rocks.

The undisturbed nature of the sediments affords no indication of age, and the rocks could be placed almostanywhere in the time scale.

* Appendix No.

The presence of micaceous sandstone, and a lithological resemblance to the Pimba sediments suggests they may be of similar age - possibly late Pre-Cambrian?.

Igneous Rocks

No sign of igneous activity was seen in the Giles military sheet and it is thought the nearest igneous rocks would be towards the Everard Ranges (approximately 40 miles north) and Mulgathing and Commonwealth Hill Station 100 miles S).

Economic Mineral Deposits

Apart from very small localised ironstones, no mineral occurrences were noted, and the undisturbed nature of the sediments makes the presence of ore minerals very unlikely.

The best prospects might be opal, as the rocks are universally silicified and several well defined, and extensive "reefs" of potch opal were observed, without any "colour" being noted.

Very extensive ridges of gypsum both "kopi" and crystal, occur along the margins of the salt lakes, and exceedingly large tonnages are available. The distance from markets and inaccessibility of the area precludes any possibility of these deposits being an economic proposition.

Two surface samples essayed by the Assay Dept., S.A. School of Mines resulted

(1) Rock gypsum 95.45% $CaSO_4$ $2H_2O$

(2) Kopi 87.2 % — Do —

Hydrology

(1) Existing Water Supplies - Native Water Holes

No permanent water supplies existed, although the remains of several native water holes were observed. These were all located in hollows surrounded by sand dunes and were readily spotted from the air - appearing as oases in the desert. In each case studied the original water hole has long since collapsed.

Re-opening of the holes to 10 - 15 feet depth would probably restore the water supply, but these can only be considered as small soakages, very limited in output, and with a very variable salinity governed by seasonal conditions and the draw-off. It would be unwise to assume any of these would provide a permanent and reliable source of potable water.

(2) Test Bores

The low rainfall and lack of satisfactory drainage systems such as fresh swamps and sandy creeks, suggested the presence of only saline ground waters.

Boring on a number of sites selected to utilise any existing hydrologic or geologic features which might assist in providing better quality water, has confirmed this suggestion.

The location and details of these bores is shown on Plan No. 3 attached, and logs and analyses accompanying this report.

The only improvement in drainage conditions was noted on the Everard military sheet some 20 miles north of its junction with the Giles sheet. Here the prevailing sand ridges suddenly and sharply give way to flat grassy plains and small swamps marking the southern limits of the watercourse known as the Officer. These swamps are grassy and fresh in appearance, and would be well worth drilling, with fair prospects of providing stock water at least. It is considered probable that following The Officer north to the Everard Ranges would provide even better drilling sites.

Conclusions

(1) It is considered that prospects of obtaining permanent reliable sources of potable underground water in the Giles military sheets are very poor.

(2) Limited supplies of stock water might be obtained in suitable hollows in the sand dunes.

(3) Large permanent supplies of very saline underground water should be available in any of the more defined depressions (salt lakes and clay pans).

(4) Horizontal sediments are considered to be the only strata exposed in the Giles military sheet, but sand dunes mask much of the area. The age of these sediments could not be established.

T.A. Barnes

TAB:JK
29/9/52.

(T.A. Barnes)
DEPUTY DIRECTOR OF MINES

DEPARTMENT OF MINES
SOUTH AUSTRALIA

PETROGRAPHIC REPORT ON ROCKS OF THE GILES 4M MILITARY SHEET.

Contents:

1. Summary.

Most of the rocks are of the nature of highly decomposed arenaceous sediments. Calcareous, ferruginous and gypseous rocks make up the remainder. No lithological guide to the age of the rocks can be given. The origin of the micro-conglomerates is open to doubt, the constituent grains varying in shape from well-rounded to sharply angular, with a variety of rock types represented.

2. Introduction.

The suite of rocks described below were collected during a reconnaissance air survey of the Giles Military Sheet area. The geologist reports that the outcrops are sporadic and mostly show no obvious stratigraphic continuation. Consequently, the nature of the report necessarily takes a form of individual rock descriptions.

The rocks have been dealt with in the following order: firstly, the numbered samples have been considered, beginning with the most southerly and ending with the most northerly in the area. After these the unnumbered samples have been described . Each brief description has been preceded by the sample number (as received), the locality, the name given, and the figure number, where applicable.

All the photographs are reproduced at the same magnification, viz. X70 approx.

An examination was made using material from a borehole, in the area, to ascertain whether spores or other organic

remains were present. No such remains were discovered, although the generally extreme alteration of the sedimentary would not have been conducive to their preservation.

3. Salient Petrographic Features of Samples.

Sample S.29: From White Cliff Hill 50' high; on top to 10'. Sandstone.

Figure 1.

The rock is a medium and very even grained sandstone composed of subangular to subrounded quartz grains set in a fine grained matrix of fibrous to flaky clay. The variable strain effects in the quartz grains suggest more than one origin for the material. Apart from small opaque grains, no other minerals are present.

Sample S.29: From White Cliff Hill 50' high; on top to 10'. Sandstone.

Figure 2.

This rock is somewhat variably grained, most grains being about 0.1 mm. to 0.2 mm across, with occasional quartz grains or rock fragments of much larger size - more than 2.0 mm across. The hand specimen is grey except where iron stained. Chalcedony and clay make up the interstitial material, the chalcedony often forming narrow vein-like structures when it dissects larger grains. Most of the quartz grains are subangular to angular.

Sample S.30: From White Cliff Hill. On 20' level. Micro-conglomerate.

The rock contains extremes in composition and grain size. Rock fragments, which form the most important constituent, range in type from mudstones and shales to arenaceous and chalcedonic rocks. The fragments, some of which are angular, and others of which are well rounded, vary in size from up to 2 cm down to the finest interstitial material. Calcareous material, clay and chalcedony together with fine quartz, form the interstitial cementing material.

Sample S.31: From White Cliff Hill: 20' to 30' down from top. From water cut channel on South side of hill. Siltstone.

Very fine grained subangular to subrounded quartz grains make up the bulk of this rock with a good deal of finely divided

clay and accessory sericite and iron oxides. The grain size of the quartz is up to 0.07 mm. A few accessory heavy minerals are present.

Sample S.32. From South side of White Cliff Hill 25' down from top. Micro-conglomerate.

Figure 3.

This is a heterogeneous, generally coarse and variably grained arenaceous rock. Composed of large subangular pebbles and medium and fine grained quartz grains and quartzose rock fragments. Most of the medium and finer sized grains are of subrounded to rounded outline (as shown in the figure). There is some altered felspar. Fibrous or flakey clay forms the interstitial material and is mostly limonite stained.

Sample S.33: From fallen-in cave, 200 yards South of White Cliff Hill. Below 30' from top. Travertinized arenaceous sediment.

The rock is very variable in composition and texture. It consists essentially of a fine grained matrix of calcite, clay and fine quartz, throughout which are distributed rock fragments from 3 cm across down to the finest quartz grains. Quartzite and chert appear to be the dominant rock types represented. These are of all outlines from angular to well rounded. The rock is variably stained with iron oxides.

Sample S.34: Rocky Knob 50' high, ½ mile North of White Cliff. On top to 15'. Chalcedonic rock.

Figure 4.

This is a mottled rock composed of grey and brown angular to subrounded fragments of extremely fine grained chalcedony set in a matrix which appears to be a fine grained silicified sandstone. The latter is composed chiefly of fine quartz, with variable amounts of clay and iron oxide. The occurrences of chalcedony sometimes include small areas of massive iron oxide. There appears to be much cryptocrystalline silica in addition to the quartz and chalcedony.

Sample S.34: Rocky Knob. 50' high, ½ mile north of White Cliff. From about 20' below top. Mudstone.

Figure 5.

Fine, fairly even grained rock, composed of subangular quartz grains up to 0.1 mm across set in a finer grained matrix, chiefly of clay with fine secondary micas and iron oxides. Bedding is occasionally distinguishable from grain size variations. The clay sometimes forms aggregates up to 1 - 2 mm across.

Sample S.35: Rocky Knob 1 mile north of White Cliff Hill. Siliceous rock.

Figure 6.

Compact, extremely fine grained rock, varying in colour from pale grey to pale buff-coloured. Angular fragments of banded chalcedony occur within the fine grained ground mass, which consists of angular quartz grains set in a groundmass of cryptocrystalline silica and clay minerals with occasional opaque grains and limonite. The whole background to the granular material is extremely fine grained and virtually isotropic.

Sample S.24: 3½ miles South, and 1 mile East of Camp. Grit.

Figure 7.

Variably sized, poorly sorted grit or gravel, consisting of angular to well-rounded quartz grains ranging in size from the finest interstitial material to grains up to several millimetres across. Rock fragments of chert and quartzite and grains of felspar occur in the same way, but a smaller extent. There are many fine grains of opaque minerals, usually in aggregates or at least in fairly well defined areas. Secondary silica occurs throughout both interstitially of forming aggregate structures.

Sample S.24A: 3½ miles South, and 1 mile East of Camp. Grit.

Figure 8.

Variably sized arenaceous detrital rock, composed chiefly of rounded quartz grains ranging in size from the very finest to more than 2 millimetres across. Rock fragments of quartzite

up to 3 mm across occurs; grains of felspar are also present. Fine grained clay, opaque grains and a little secondary silica form the interstitial material. A few larger opaque grains and rare epidote are the only other minerals present.

Sample S.21: East 1 mile North of Camp. Arenaceous ironstone. Figure 9.

Fine grained, finely bedded reddish rock composed chiefly of iron oxides and fine even grained quartz. The staining is variable, and appears to be related to the original composition, which was probably a banded sandstone containing horizons rich in iron oxides. Fine muscovite, sericite, clay minerals and altered felspar are the only other minerals present. This rock may conceivably be comparable with arenaceous ironstone occuring in the northeast of the state, e.g. Mt. Victor, Maldorky Hills.

Sample 14A: Boulder Cliff, 3½ miles South of Camp. Grit. Figure 10.

This rock is believed to be a sediment of variable grain size which has been secondarily silicified, and has weathered in a manner similar to a granite, i.e. with the formation of blocky units which tend to become rounded as weathering proceeds. Of the larger grains, quartz is dominant with minor felspar and rock fragments. The grain size range is from ca. 4mm down to the finest interstitial quartz. Clay, iron oxides and secondary silica make up the remainder of the interstitial material.

Sample 15B: Boulder Cliff, 3½ miles South of Camp. Sandstone. Figure 11.

Variably, usually fine grained white sandstone, composed chiefly of quartz grains averaging 0.5 mm across set in a fine grained matrix of quartz, clay minerals and iron oxides. Most of the larger quartz grains are rounded or subrounded. Quartzose rock fragments and felspar grains occur to the minor extent, and tourmaline rarely. The grain size variation appears to indicate bedding.

Sample 16c: Boulder Cliff, 3½ miles South of Camp. Sandstone.

A medium grained pale grey sandstone consisting of well

rounded to subangular quartz grains, a few grains of altered felspar, muscovite and calcite with minor amounts of amorphous interstitial clay.

Sample 17C: Boulder Cliff, 3½ miles South of Camp. Felspathic Sandstone.

Figure 12.

Fine to medium grained buff coloured sandstone, with a cellular texture, particularly on weathered surfaces. Besides the quartz grains, and minor felspar and rock fragments, there is a good deal of interstitial calcite present, and fairly abundant clay. In other respects the rock is essentially similar to Sample 13 (D), (below)

Sample 13 D: 3 miles South of Camp. Current bedded sandstone; (two specimens examined.)

Figure 13.

(a) Friable, medium and even grained white sandstone with cellular texture suggestive of carbonate removal. No calcite is now present, subangular quartz grains being the dominant mineral with subsidiary felspar and rock fragments. Fine sericite, muscovite and clay minerals form the interstitial material. The bedding is usually apparent from the tendency to orientation of those quartz grains which are elongate.

(b) The second specimen is in every respect similar.

Sample 9: ½ mile South of White Cliff. Ferruginous sandstone.

The rock is a ferruginous sandstone, comprised chiefly of subangular to rounded quartz grains and highly altered felspar. Muscovite, hydromica and calcite occur to a small extent throughout; the remainder of the rock is a fine admixture of iron oxides and clay minerals.

Sample 7: 10' - 11' White Cliff. Micaceous sandstone.

The rock is a white, weakly micaceous, fine grained sandstone, composed chiefly of angular to subangular quartz grains with minor altered felspar. Amorphous clay flakes (? halloysite) occur throughout, together with muscovite, hydromica and rare calcareous material.

Sample 8: 12' - 14' White Cliff. Sandstone.

Figure 14.

White, fine grained evenly granular sandstone, with poorly defined lamination and of a somewhat incoherent and friable nature. The rock consists chiefly of quartz grains about 0.1 mm across of angular to subangular outline. Clay minerals, sericite, muscovite hydromica, opaque grains and tourmaline, occur to a small extent throughout.

Sample 1: 1 mile southeast of Dingoe Camp. Duricrust.

Figure 15.

Fine grained buff coloured calcareous rock containing sub-circular rounded bodies of reddish colour from 1 mm to 1 cm across. The weathered surfaces are coated with friable buff coloured calcite. The unweathered rock is of compact fine grained calcite showing concretionary and veined structures no doubt due to solution. Subrounded to subangular quartz grains occur throughout. The rock is variably stained with iron oxides which give the reddish rounded areas mentioned above. There are rare opaque mineral grains, and, in the section taken, a single grain of ? cordierite.

Sample 2: 1 mile Southeast of Dingoe Camp. Duricrust.

Figure 16.

The specimen is similar to Sample 1, but the hand specimen has a weakly banded appearance. Also, fine clay is distributed throughout, and concretionary structures are often centred around grains of quartz, iron oxide or clay aggregates.

Sample 3.22: 2 miles West of Camp. Micaceous sandstone.

Figure 17.

Micaceous laminated sandstone from contorted area. Fine fairly even-grained sandstone composed of quartz grains in a dominantly clay matrix. Felspar grains, occasional rock fragments, and minor calcite, muscovite, opaque grains and sericite occur as well. Clay and secondary silica form the remainder of the rock. The sericite and elongated quartz grains indicate the bedding direction. The rock appears to be a travertinized and silicified, slightly micaceous sandstone.

Sample No.20: 6 miles West of Camp. Limestone from 10' Cliff face.

Figure 18.

Limestone, generally of extremely fine grain size, with occasional small aggregates of grains up to 0.2 mm across. The rock is variably stained with limonite, generally in the form of small rounded patches stained with iron oxide. Some of these appear to have developed from the weathering of opaque grains in situ. There is also evidence of solution in the calcite; irregular vein-like structures occur. A few angular quartz grains up to 0.2 mm across occur, also a little clay mineral.

Not numbered: From large salt lake. Kopé.

This material appears to consist chiefly of a fine grained admixture of clay and gypsum with occasional rounded to sub-angular grains of quartz stained with ferruginous material. The nodules contained in the sample are chiefly of calcite with minor quartz and clay.

Sample from 1 mile West of Opal Hill. Sandstone.

Figure 19.

Brown, medium and even-grained sandstone, grains averaging 0.2 mm across. A few rock fragments and felspar grains occur and minor opaque grains. The rock is weakly cemented with intergranular limonite.

Sample from 20 miles Northeast of Claypan. Sandstone.

Figure 20.

Pale grey to white sandstone of variable grain size, mostly fine, from 0.5 mm down. Quartz grains, minor epidote, felspar and rock fragments are the chief constituent minerals, with interstitial clay minerals and sericite. The bedding can be distinguished by a tendency towards orientation of the minerals and by persistant variations in grain size.

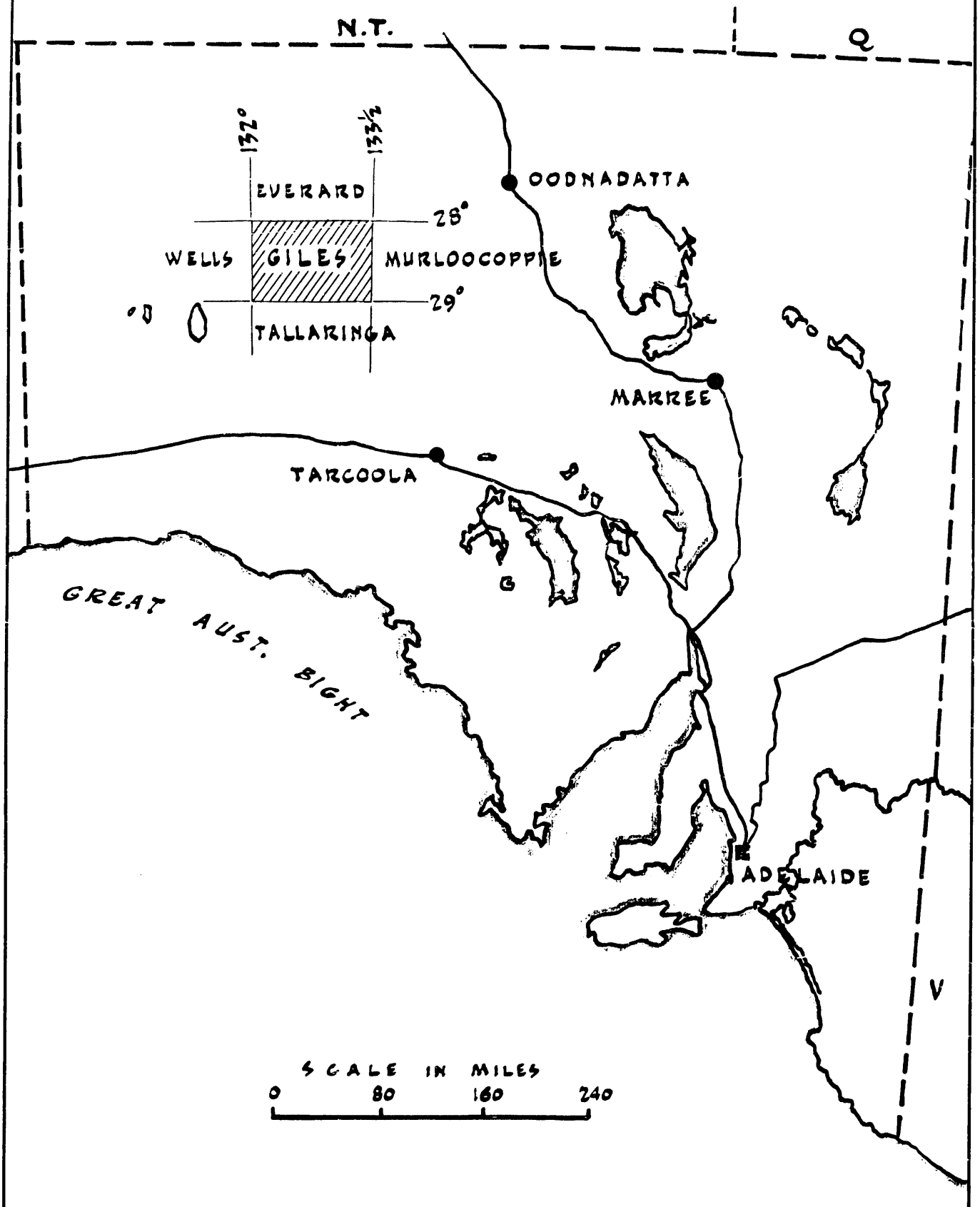
Sample from "23 miles by 30° - Claypan - Opal field Hill."

Sandstone.

Figure 21.

Fine, even grained pale green sandstone with a weakly

banded appearance which may be due to weathering. Lenticles of silica occur parallel to the banding. The quartz grains are subrounded to subangular and are about 0.08 mm across. Felspar and opaque grains are occasionally present and tourmaline and zircon rarely. Green chlorite, finely divided clay minerals and sericite form the interstitial material.



PLAN 1

S. A. DEPT. OF MINES

Approved	Passed	Drn K	GILES 4 M. M.S. LOCALITY MAP	D.M.	Scale 100 m. to 1 inch
L. A. Bonney for Director		Tcd.		Req.	S 653 AB
	C.D.	Ckd.			Date 21.8.52
		Exd.			

OPEN GRASSY COUNTRY

FRESH GRASSY SWAMP
FAIR PROSPECTS FOR
UNDERGROUND WATER

E V E R A R D

132° 00'

132° 10'

132° 20'

132° 30'

132° 40'

132° 50'

133° 00'

133° 10'

133° 20'

133° 30'

28°

28° 10'

28° 20'

28° 30'

28° 40'

28° 50'

29°

NATIVE W. HOLE
(COLLAPSED)

NATIVE ROCK HOLE
(COLLAPSED)

HIGH DUNES

STONEY RIDGE (S.S.?)

GYPSUM FLAT

G I L E S

527

5280 POTCH OPAL, S.S.?

ZE STONY RIDGES SANDSTONE

STONY RIDGE ZE

CONTORTED SHALE & SANDSTONE

S20

SALT WATER AT 2 FT

CONTORTED AREA

S22

S23

S.P.

S4-8

S3-26

GRAND DUNE

S13

S14-18

S21

S24

GYPSUM CLIFF, 20'

BOULDER BED

CRATER

SILL

S11

SMALL CREEK

STONY PATCH
S12

LIMIT OF TRAVERSE

HORIZONTAL S.S. ~~SANDSTONE FLAT~~

BOULDER BED
AND SANDSTONE

S35

S34

S29-33

WHITE HILL BOULDER BED

TRACK TO
HOOHUNGA

TRACK TO TALLARINGA

TALLARINGA

HANGAROO (HOOKUNDA)
OLD NATIVE WELL (COLLAPSED)

LEGEND

TRACKS _____

AIR TRAVERSES _ _ _ _ _

JEEP " ....

BORES ◉3

ROCK SAMPLE S11

PLAN

S.A. DEPT. OF MINES

GILES 4 M. M.S.

GEOLOGY & HYDROLOGY

Req. No.
D.M.
Compiled from T.A.B. Orig'ls.

Associated Drawing | No. | No. | Amendment | Exa. | Date

Approved | Passed

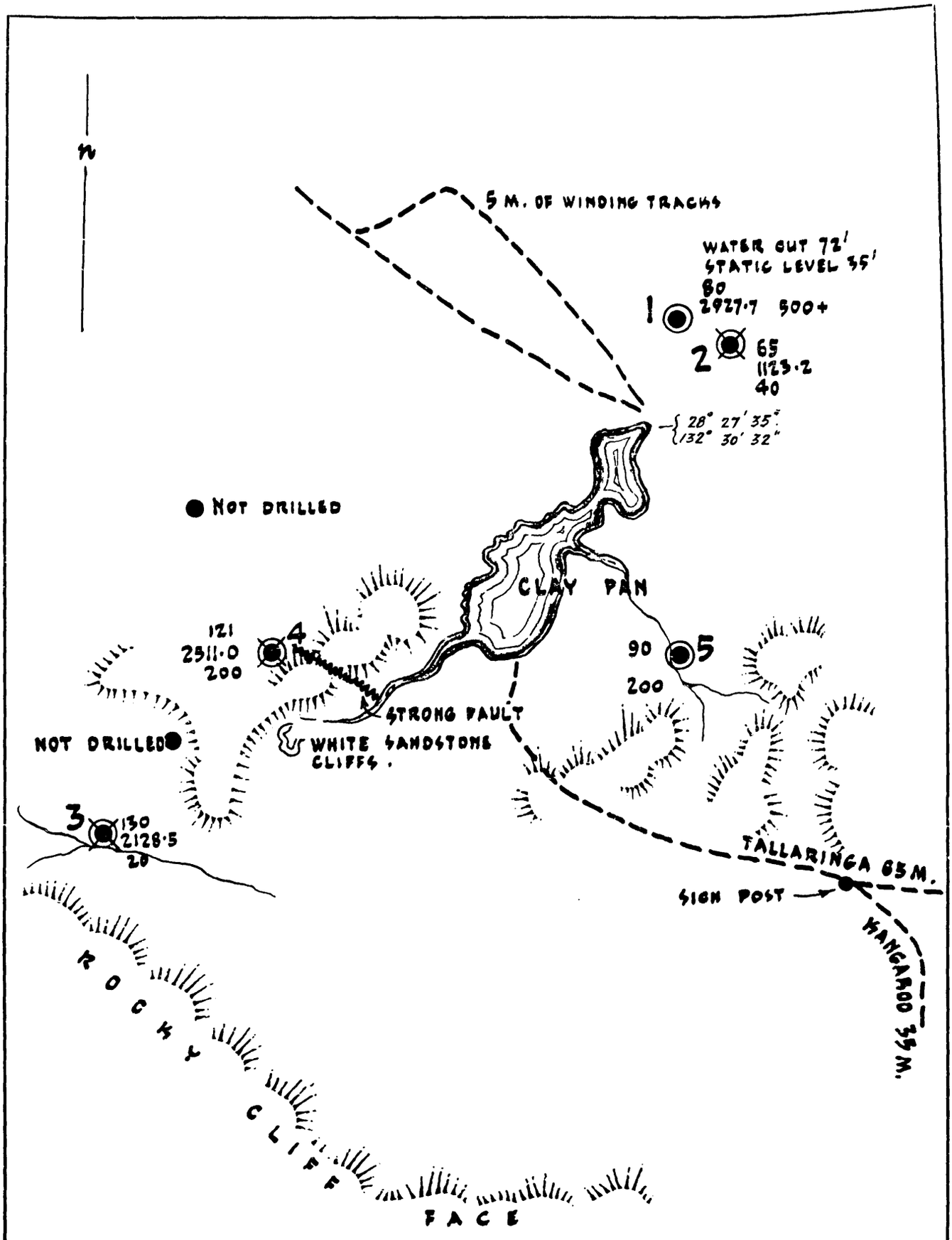
Director of Mines

Drn. K
Tcd.
Ckd.
Exd.

Scale 4 MILES TO 1 INCH

52·260
AB

Date 22·8·52



NOTE: NOT TO SCALE

PLAN 3

S. A. DEPT. OF MINES

Approved	Passed	Drn T.A.B	GILES 4M. M.S.	D.M.	Scale
4.13 mes		Tcd. IC	WATER RECONNAISSANCE	Req.	S 654 AB
Director	C.D.	Ckd. Exd.	LOCATION & DETAILS OF TEST BORES.		Date 21·8·52

AREA 1