DEPARTMENT OF MINES
SOUTH AUSTRALIA

RB 66/160

PANDURRA AGATE DEPOSIT

PRECIOUS STONES CLAIM 2824 CO. MANCHESTER

- A.W. Kitteä -

by

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SENIOR GEOLOGIST
NON METALLICS SECTION

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PLANS ACCOMPANYING THE REPORT

No.	Title	Scale
S6645	Pandurra Agate Deposit	1" to 1 mile

Rept. Bk.No.66/160
G.S. 4020
D.M.1522/65

14th June, 1968

DEPARTMENT OF MINES
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ABSTRACT

Banded agate of gem quality occurs as cavity fillings in Gawler Range Volcanics and as detrital fragments in younger sediments. The distribution of agate is discussed.

Results of laboratory testing of kaolinised porphry are given. Prospecting for further clay deposits is warranted.

INTRODUCTION

An occurrence of agate located 5 miles southwest of Pandurra Homestead and 27miles west of Pt. Augusta was inspected on 21st September 1967 at the request of the claimholder.

Mineral rights in the area are reserved to the Crown. Mr. Kittel holds a Precious Stones claim (No.2824) and a Licence to Search (No.56) covering 1 square mile.

Following the inspection a number of specimens were presented to the Departmental museum.

GEOLOGICAL SETTING

The area has low relief and the deposit is located on the gentle western slopes of a northerly trending ridge.

On the Corunna 1:63,360 map sheet (Johns and Solomon 1952) the ridge proper is shown to be underlain by conglomerate, grit and sandstone equated with the Corunna Conglomerate of Cambrian age. More recent mapping has redefined the rock sequence west of Pt. Augusta and the bed is now referred to as Pandurra Formation (Thomson 1966) and placed in the Adelaide System of Upper Proterozoic age.

The Pandurra Formation dips at a low angle to the east and overlies unconformably a sequence of older metasediments and a variety of igneous rocks. These are frequently deeply weathered and kaolin is developed extensively in the more felspathic rock types.

Locally the only outcrops of the older rocks are poorly exposed masses of altered trachy-andesite and volcanic breccia (see Appendix 1) which occur along the western slope of the ridge. These are equated with the Gawler Range Volcanics (Thompson op. cit.) and are the source rocks of the agate. Because of their subdued outcrop, these rocks may be more abundant than is shown on the accompanying plan.

Sandy sediments of Tertiary age formerly blanketted the area in a thin layer but only erosional remnants, usually capped by a band of silcrete (siliceous duricrust), now remain. Precious Stones claim 2824 is located on a minor rise underlain by this formation.

Elsewhere the surface is blanketted by red stoney soils which are characteristed by the development of a surface layer of stones.

The Roopena Fault scarp lies within a mile to the west of the claim. This is one of a series of meridionally trending fault lines which were active in the Pliocene and Pleistocene (Miles 1952).

ECONOMIC GEOLOGY

Agate is not restricted to the area over which the claims are held but is known to occur for at least 2 to 3 miles to the north and south. It has been observed in the following geological environments

1. as geodes and complete cavity fillings in the Gawler Range Volcanics.
2. as detrital fragments in the Pandurra Formation
3. as detrital fragments in the Tertiary sediments both in the siliceous duricrust and in the underlying uncemented

sands.

4. most abundantly in the stone carpet of the present day stoney soils.

The agate is found principally as fragments varying from ¼" up to 1" but occasionally complete geodes and split nodules up to 3" are recovered.

Specimens showing finely banded alternating red and white laminae are most common except in the Tertiary sediments where invariably red colouration is absent and the banding is in differing shades of grey.

True geodes are uncommon. Usually the cavity is completely filled either entirely with banded agate or with an outer rim of agate and an inner core of coarse grained quartz crystals or occasionally in the reverse order with a central core of banded agate.

Some carnelian and amethyst crystals also occur.

WORKINGS

Although Mr. Kittel has known of the deposit for many years it has not been previously worked. Present workings consist of shallow shafts sunk through the duricrust capping on the Tertiary outlier into the underlying uncemented sand. Some grey banded agate is being recovered from this opening.

By far the largest quantities of agate are won from the surface by hand picking of the stone carpet. A rotary hoe and an attached windrowing device have been used to a limited extent to expose stones partially covered by soil

Attractive stones are made by the usual lapidary tumbling techniques.

CLAY DEPOSITS

The outcrop of Gawler Range Volcanics shown on the accompanying plan (S6645) 1 mile north of the main road is completely kaolinised and a sample was submitted for pre-

REFERENCES

JOHNS, R.K. & SOLOMON, M. 1952 Geological Atlas of S.Aust. Sheet Corunna 1:63,360 series.

MILES, K.R. 1952 Tertiary Faulting in North Eastern Eyre Peninsula. Trans. Roy. Soc. S.Aust. 75(1) pp.89-96

THOMSON, B.P. 1966 The Lower Boundary of the Adelaide System and Older Basement Relationships in S.A. Journ. Geol. Soc. Vol.13 (1) pp203-228.

APPENDIX I

PETROLOGICAL DESCRIPTION OF ROCK SAMPLES

PORTION OF REPORT MF755/68 AEDEL

PETROLOGICAL DESCRIPTION OF ROCK SAMPLES

PORTION OF REPORT MP755/68 AMDEL

Sample P429/67 TS19811

Location: 6 miles north-north west Roopena Homestead.

Rock Name: altered, porphyritic quartz trachyandesite

Hand Specimen:

A dark, massive pinkish-purple rock. The sample is fine-grained and porphyritic with phenocrysts of feldspar largely replaced by greenish-yellow clay minerals.

Thin Section:

A visual estimate of the constituents gives the following:

	%
phenocrysts -plagioclase	15
opaques	1
groundmass - undifferentiated	84

The rock is composed of partially resorbed phenocrysts of plagioclase feldspar set in a fine-grained groundmass of alkali feldspar (?orthoclase) and minor quartz. Some of the plagioclase crystals are euhedral, but more commonly are some-what irregular and indicative of a fragmentary origin. Resorption is a common feature. The crystals are completely pseudomorphed by ?kaolin but relic twinning suggests they were probably oligoclase. Rather coarse-grained opaque mineral crystals are common and these are rimmed by a "halo" of disseminated ? hematite derived from the groundmass. The groundmass is composed of a fine-grained aggregate of alkali feldspar crystals with occasional quartz. Incipient alteration to kaolin has occurred. Apart from the opaques no primary mafic minerals were found.

Special Features:

Textural features, and composition suggest that this rock has affinities with samples from the Gawler Range Volcanic Complex. Rocks with similar macro and micro-characteristics are found in the Gawler Range Province. The resorption and alteration of the phenocrysts is noteworthy.

History:

Igneous ?extrusive

Sample P430/67: TS19812

Location:

About 6 miles north-north-west Roopena Homestread

Rock Name:

Altered, vesicular, rhyolitic, volcanic breccia

Hand Specimen:

A massive, fine-grained rock. The sample is pale green in colour and dotted with reddish, coarse-grained, rock fragments. Numerous vesicles are infilled with secondary silica minerals.

Thin Section:

A visual estimate of the constituents gives the following:

	%
Vesicles	20
Rock fragments	20
Groundmass	60

The host rock is composed of a mass of microcrystalline, granular quartz, and altered alkali feldspar. The feldspar is partially chloritized along a network of intersecting convolute surfaces. It is thought that this structure may represent relic perlitic cracking. A few crystals of opaque minerals are found through the rock but no feldspar phenocrysts were found.

The reddish-brown fragments so evident in hand specimen are rock fragments composed of a compacted mass of micro-crystalline granular quartz. Occasional fragments of flow banded siliceous rocks are found. Chlorite and disseminated opaques are associated with the quartz. The fragments definitely have an igneous origin and most probably represent fragments of an invaded rock type. The fragments are coarse-grained and quite irregular in shape. Vesicles are abundant. These are infilled with various combinations of chlorite, carbonate and silica, of these the most common being chalcedony and granular silica. One crystal of rounded Beta-quartz was found.

Special Features:

This rock resembles closely siliceous varieties of the Gawler Range Volcanic Complex.

History:

Igneous, extrusive, secondarily, silicified.

Investigation and Report by A.R. Turner, 23.10.67

APPENDIX 2

LABORATORY TESTING OF CLAY SAMPLE

REPORT CE 981/68

Application dated 25.9.67

IDENTIFICATION A2286/67 - 4m. W-N-W of Pandurra H.S., 29m. W. of Port Augusta

LABORATORY NUMBER: CE 3181

Investigated by: Ceramics Section

Officer in Charge: D.C. Madigan

FIRING TEST

1. Sample Preparation

The sample was ground to minus 18 mesh (BSS). It ground with some difficulty and contained considerable grit.

The sample was washed, as requested. 2kg of the ground material were slurried with 6 litres of water and blunged for several hours. The slurry was then screened through 200 mesh BSS and the oversize dried and weighed. The minus 200 mesh material was allowed to settle overnight and 250 ml of water were drawn off, leaving a slurry of 19% solids content. The slurry was dried out on a plaster slab to a suitable moisture content for extrusion. The sample contained 32% of plus 200 mesh material.

2. Extrusion

The prepared sample was extruded non-de-aired at the moisture content shown in Table 1.

Sample 2286/67 unwashed extruded to form a smooth, weak column of low plasticity, free from dog-ears or cracks. Wire-cutting exposed coarse-textured surfaces, owing to the grit present. The specimens were dried for 16 hours at room temperature 8 hours at 40°C and 16 hours at 105°C and showed no cracks. The washed material formed a very smooth and fairly strong extruded column, of medium plasticity. Specimens dried for 24 hours at room temperature showed severe core cracks, which increased on drying at 40°C and 105°C.

The drying shrinkage is shown in Table 1.

3. Firing

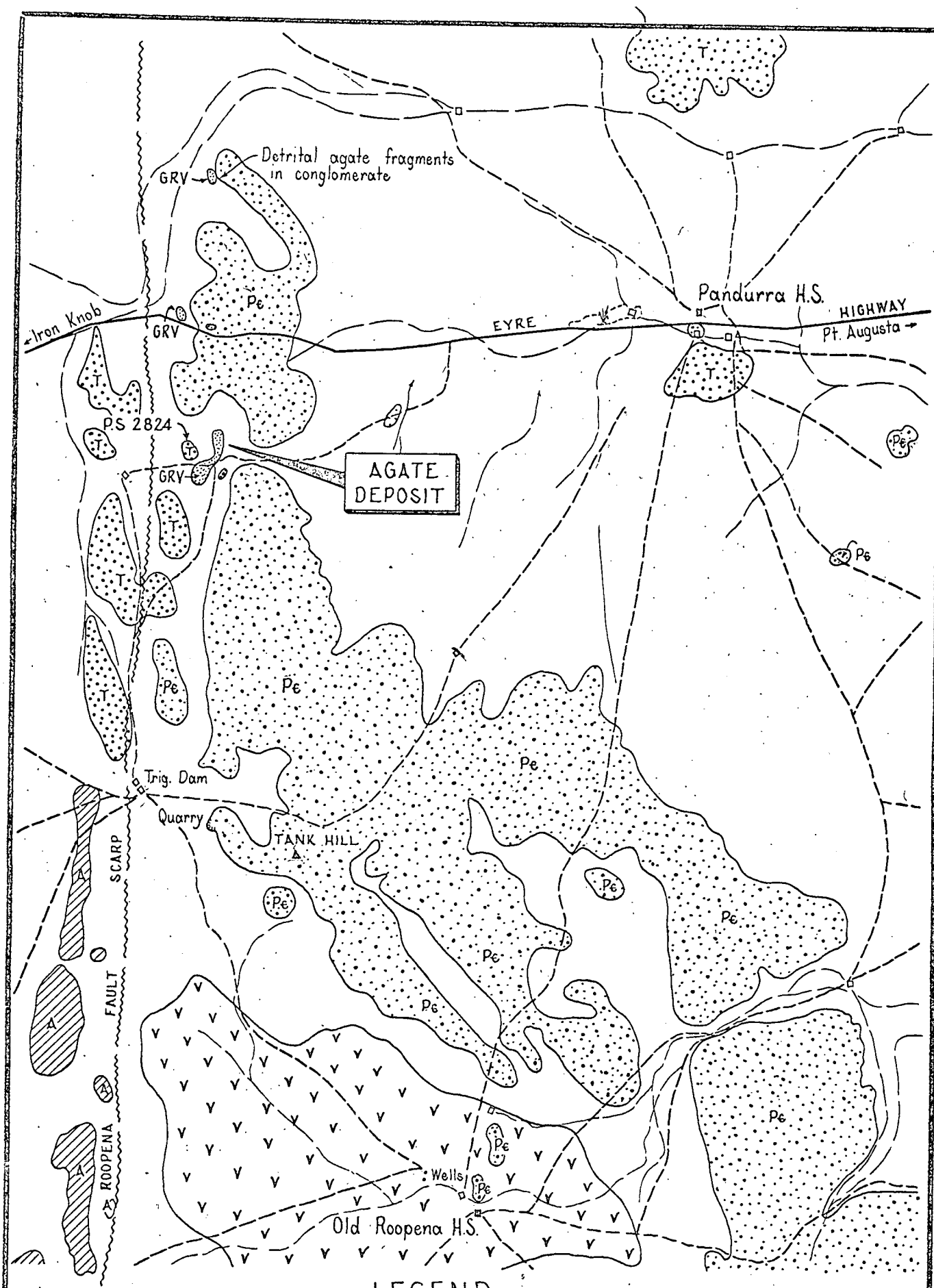
The dry specimens were fired in 50°C steps over the range 800-1200°C. The linear firing shrinkage is shown in Table 2 and the 24-hour cold water absorption in Table 3.

Fired appearance: 2286/67 The unwashed sample changed from dirty pink through brown to brown-grey with marked salt glazing and bubbling above 1100°C The washed sample changed from dirty cream to fawn at 1100°C.

TABLE 1: DRYING SHRINKAGE

Sample	Extrusion Moisture %	Linear Drying Shrinkage %
2286/67		
Unwashed	22.8	4.8
Washed	29.0	7.6

2286/67: The unwashed clay contains salt and grit and gives a fired product of poor texture and colour. It is unlikely to find any application in ceramics. Washing greatly improves the texture and colour, though the colour still remains poor. The washed clay has a very high firing shrinkage and low vitrification temperature. It could be used in stoneware pipe blends, but further work is not recommended since much better white clays are available in South Australia



LEGEND

TERTIARY	T	Lateritic gravel, siliceous cement, grit, sandstone.
PRE-CAMBRIAN	Pe	Conglomerate, grit, sandstone. (Corunna Conglomerate, now Pandurra Formation.)
	V V V V	Basic lavas, Roopena Volcanics
	GRV	Felspar porphry, Gawler Range Volcanics
	A	Metasediments

0 1 2

Geology from Corunna 1:63,360 sheet, R.K. Johns, M. Solomon.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

NON-METALLIC MINERALS SECTION	Drn. N.H.	PANDURRA AGATE DEPOSIT	SCALE: 1 inch = 1 mile
	Tcd. R.H.	GEOLOGICAL PLAN	S6645 Ea
	Chd.		
	Exd.		DATE: 12 June 1968