DEPARTMENT OF MINES
SOUTH AUSTRALIA

A SURVEY OF MOUND SPRINGS BETWEEN MARREE AND STRANGWAY SPRINGS

by

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A SURVEY OF MOUND SPRINGS

BETWEEN MARREE AND STRANGWAY SPRINGS

1. ABSTRACT

Mound springs, constituting natural outlets to artesian water of the Great Artesian Basin, reach their greatest size in South Australia in the Coward Springs region and to the north-west of there. The travertine forming the mounds is harder than normal calcitic limestone, is white in more recent mound deposits and brown in some old mounds.

The highest mounds within the area of fluorine-bearing waters of eastern origin include Hamilton Hill, hills east and north-west of Kewson Hill and Mt. Hamilton homestead hill. Testing for the presence of fluorine by drilling is recommended in the large mound complex east of Kewson Hill.

2. INTRODUCTION

Between December 1 and 6, 1958, a survey was made of mound springs in the Marree-Strangway Springs region in order to select certain large and accessible mounds for testing by drilling. Testing was recommended because of the possibility of concentration of fluorine within the mound rock.

Marree is just over 400 road miles north of Adelaide; Coward Springs, near which are most of the large mound springs, is a further 93 miles north-west of Marree by a road which is only fair under the best of conditions.

3. PREVIOUS INFORMATION

Pastoral plans 11, 12 and 13

Aerial photographs: Callanna and Marree sheets.

Departmental photographs of Hamilton Hill, Blanche Cup, Horse Springs, Coward Spring, Beresford Hill and Jersey, Petermorra, Twelve and Pigeon Springs and Paralana Hot Springs.

Brown, H.Y.L.	1892 1894	Parliamentary Paper 141 " " 25
Jones, K. Peake-	1952	Mound Springs in Lake Frome Proc. Roy. Geog. Soc. Aust. (S.A. Branch) 53, 19-23.
Scoular, G.	1887	Sketch of the geology of the southern and western parts of the Lake Eyre basin. Trans. Roy. Soc. S. Aust., 9, 39-54.

Ward, L.K. 1946 The occurrence, composition, testing, and utilization of underground water in South Australia, and the search for further supplies. S.A. Geol. Surv. Bull. 23.

1954 Fluorine in South Australian underground waters. S.A. Mines Dept. Report of Investigations 1.

4. GENERAL GEOLOGY

Mound springs are natural outlets for underground water of the Great Artesian Basin. In South Australia they occur in greatest concentration between Marree and Oodnadatta but are known also around the north-eastern extremity of the Flinders Ranges and in Lake Frome.

The artesian water richest in fluorine is that of eastern origin - this commonly contains about 4 parts per million fluorine, is characterized by a richness in sodium carbonate and its evaporated salts contain about 1 percent calcium carbonate. The sulphate waters (of western origin) which are low in fluorine, contain about 10 per cent calcium carbonate in their evaporated salts. The mounds appear to have been built up by successive depositions of this calcium carbonate while most of the remaining dissolved salt has been leached away. Old mound deposits, such as Hamilton Hill, have become hardened and are brown in colour, while more recent deposits are white and also harder than normal calcitic limestone.

Well-developed mounds are commonly flat-topped and have a side-slope of about 12 degrees. The limestone has a laminated structure parallel to the surface of the mound. Surrounding the mound may be a platform of old travertine or a flat saline area. The spring itself may form a small pool in the top of the mound or issue from its side. Saline deposits in stream channels extend for up to about a mile from groups of mound springs. Mounds greater in height than about 10 feet occur only in the Coward Springs region or north-west of it. Many of the active mound springs south-east of Coward Springs are very small and silted over. The available information on mound springs north-east

of Farina and in Lake Frome does not indicate any large mounds. The larger size of mounds to the north-west is possibly in part connected with the higher calcium carbonate content of the water.

Detailed descriptions of mounds visited appear in the Appendix. The numbers of mounds in the Appendix correspond to those on the accompanying plan.

5. MOUNDS SUITABLE FOR TESTING

Because of the drop in fluorine-content of artesian water north-west of Strangway Springs, the survey was confined to mounds of the Kewson Hill area and south-east from there to Marree. The following are the numbers (see Appendix) of the larger mounds, in decreasing order of size:

1 (Hamilton Hill), 20, 24, 4, 8 (Coward mound spring), 3, 5 (Anna Springs) and 2 (Blanche Cup).

It is recommended that the first mound to be drilled be number 20. This is because it is large, is less hard and altered than Hamilton Hill and is more readily accessible. As indicated in the Appendix, the summit of this mound complex can be reached by proceeding eastward from the main road about a quarter of a mile up a slope of 5 degrees. The distance north-west of Coward Springs is 3.2 miles and from Marree 96 miles.

The depth to be drilled would be approximately 60 feet. The limestone at the surface is hard. Softer, normal limestone may, perhaps, be encountered at depth, as well as silty pockets and open voids in the limestone. Soft Cretaceous shale may be expected below the limestone. There is a possibility that the mound complex thinly covers an old table-topped hill of Cretaceous shale, in which case the shale would be encountered at shallow depth.

If the above drilling reveals concentrations of fluorine, the similar mound complex number 24 might then be tested. If results

from the drilling of number 20 are unfavourable, it would be best to test number 4 near the ruins of Mt. Hamilton homestead. This mound would have the virtue of being physically different from number 20 as well as being accessible.

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APPENDIX

MOUNDS VISITED

(All bearings magnetic)

1. Hamilton Hill about 5 miles south-east of Coward rail siding is an old, flat-topped spring deposit. Its summit is about 65 feet above the surrounding plain and 580 feet in diameter. The less-steep side slopes vary between about 14 and 22 degrees. The rock is brown, very hard and fine-grained, and extends from the summit right down to the base of the hill.

2. Blanche Cup is one of the largest of the group of active or recently-active mound springs a short distance east of Hamilton Hill. It is about 15 feet high, and has side slopes of about 10 degrees and a flat summit about 90 feet across. The centre of the mound is occupied by a reedy pool which leaves a distance of 20 feet between its edge and the edge of the summit. A thin trickle of water escapes down the slopes of the mound from several places around the edge of the pool. The rock is white and hard.

3. About 1.3 miles east of Hamilton Hill is a group of sandy reed-topped mounds which appear to have become recently extinct. One of the largest of these is on a bearing of 82 degrees from Hamilton Hill trig. It is 20 feet high, about 150 feet long and 70 feet wide on top. The side slopes are about 12 degrees.

4. Near the ruins of old Mt. Hamilton homestead, about 5 miles on a bearing of 125 degrees from Hamilton Hill, is a large mound about 20 feet high and 300 feet long with side slopes very shallow in parts. At the top of the mound is a small pool of stagnant water.

5. The larger mound at Anna Springs is about 23 feet high and 140 feet across the top. There is a slightly raised central crater. Side slopes are about 11 degrees.

6. About 200 feet east of the above is a low mound which contains water in its crater.

7. At Horse Springs there are eight small springs, the two largest of which average about 60 feet in overall diameter and 14 feet in height. There is a trickle of water from seven of the springs, which contain grass and mud.

8. Coward mound spring is about 1.4 miles by road from Coward railway station. It is about 20 feet high and has a flat top about 170 feet across. Water occurs at the top and side of the mound. The side slope is about 13 degrees.

9. About 0.3 miles bearing 235 degrees from the old Billakalina hut, are two small extinct mounds, one of which contains soil and bushes in a crater-like basin.

10. Half a mile, bearing 220 degrees from the above hut, is a small mound with a pool about 2 feet in diameter at the top.

11. About 0.8 miles, bearing 210 degrees to the hut is a mound about 10 feet high and 70 by 35 feet at the top. The side is marked prominently by a white salt mark. The side slope is about 12 degrees.

12. A very small mound spring lies on a bearing of 223 degrees, about 1.6 miles from the hut. Water was seen through a small hole in the top.

13. A low, silted-over mound spring occurs about 2.8 miles south-west of the hut.

14. About 4½ miles south-west of the hut is a low, extinct mound spring a few hundred yards south of the track. The mound is about 80 feet in diameter.

15. At the north-east end of the samphire swamp west of Billa Kalina hut is a very small mound from which high bamboo-like reeds grow.

16. About 1500 feet on a bearing of 255 degrees from the above are two mounds. The larger mound has an overall diameter of about 120 feet and a crater containing reeds and water.

17. Other small mounds occur south-west, west and north-west of the above. Most of them lie within the Billa Kalina samphire swamp.

18. About 850 feet from the hut, on a bearing of 113 degrees, is a mound spring about 6 feet high with a pool 40 feet in diameter. The pool contains reeds. Water flows from the side of the mound and also copiously from a vertical steel pipe.

19. A mound similar to the above with a good flow of water lies nearby.

20. About half a mile bearing 105 degrees from Kewson Hill and 3.2 road miles north-west of Coward is a long white hill, about 50 feet high, made up of a number of mound springs upon old white travertine deposits. South of the crest of this mound complex are low cliffs between which flows a trickle of water. Further south is a broad, low platform of old white travertine. The slope of the hill eastward from the main road is about 5 degrees. The crest of the hill is perhaps a quarter of a mile from the road. The mounds on top of the hill are low and silted over. The ground is sufficiently damp to support areas of reeds.

21. Immediately south-east of Kewson Hill is a mound spring about 12 feet in height and 50 feet across the top, where there is a pool of water with reeds.

22. Kewson Hill is a platform of soft shale capped with an old brown silicified travertine. The hard rock is similar to that forming Hamilton Hill.

23. East of Kewson Hill, on the opposite side of the road, is a double mound about 150 feet long and 10 feet high.

24. About 1.2 miles and bearing 333 degrees from Kewson Hill is a second large white complex of mounds very similar in appearance to that (20) near Kewson Hill.

25. There are a few small mounds and travertine platforms north-west and south-east of the above hill.

26. Walgarina Spring, near Curdimurka, is a small mound with old travertine deposits nearby.

27. The north-western group of Fred's Springs is about 2 miles east of Lake Eyre rail siding and is composed of four small, damp, silty mounds.

28. A similar group of springs occurs about a mile south-east.

29. Bopeechee Springs are composed of very scattered small silty mounds extending in a north-north-west direction along the edge of a low ridge of travertine.

30. North-east of Bopeechee rail siding very small silty mounds are scattered over a flat saline area ringed by sandy hills. Some of the mounds produce a trickle of water.

31. West of the ruins of old Finniss Springs homestead are very low scattered mounds, some of which give a small flow of water. South-west of the ruins is a low platform of travertine on shale.

32. At Davenport Springs there are scattered very low mound springs with a good flow of water.

33. Wangianna Springs, south of Wangianna rail siding, is a saline flat surrounded by cliffs. No mound springs were seen.

34. The Welcome springs are about 10 feet high and occur in a broad saline creek bed leading to Kennebery Creek. The main north-western spring is about 100 feet in overall diameter and gives a slight flow of water. The south-eastern spring gives a small flow of water at some sheep-yards. Nearby is an extinct mound. The last two mounds are somewhat larger in plan than the north-western mound spring.

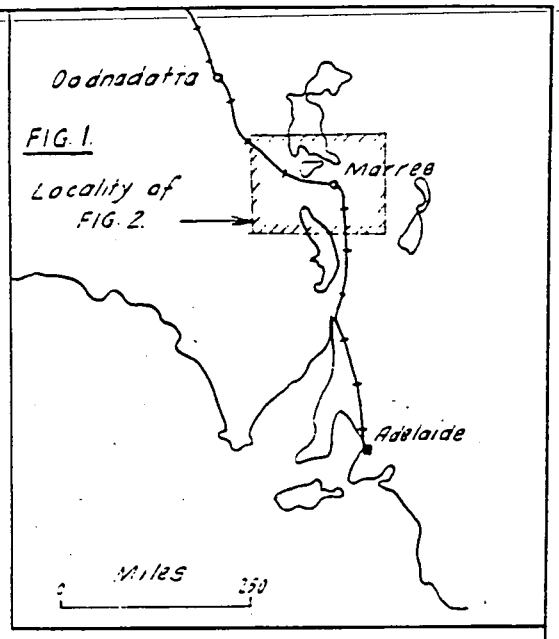
35. At Marree Springs only a low silted-over mound was seen.

(The following springs in the region were not visited:- Group A because they were known to be small, group B because they were not readily accessible:

A. Boorloo, Coolong, Wirringina Springs - near Marree;

B. McLachlan's, Gosse's Smith's, Priscilla and Emerald Springs.)

FIG. 2 LOCATION OF MOUND SPRINGS EXAMINED (NUMBERED)



To accompany report by B. G. Forbes, Geologist.

S.A. DEPARTMENT OF MINES

MOUND SPRINGS VISITED BETWEEN MARREE AND STRANGWAY SPRINGS

No.	Amendment	Ent.	Date

Approved	Passed		Scale : 16 MLS. TO 1"
		Drn. B G F	58 - 413
		Tce. A W	BC
		Ckd. R.R.	
Director		Ent.	Date 19-12-58