

# GEO-MAGNETIC OBSERVATIONS AT GOUGH ISLAND AND TRISTAN DA CUNHA

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1. The S.A. Survey Ship *Natal* having been detailed to carry out the relief trip of stores and personnel to the above islands in April-May 1958, it was decided by the S.A. Naval Hydrographer, Commander J. K. MALLORY, S.A. Navy, to take advantage of the opportunity to carry out precise magnetic observations on the islands.

2. This project was warmly welcomed by the Officer in Charge of the Magnetic Observatory, Hermanus, Mr. A. M. van WYK, who not only undertook to provide the instruments, but in addition sent one of his staff, Mr. G. L. M. SCHEEPERS, to assist in the field work.

3. The naval representative of the party, who had previously served on the staff at the Magnetic Observatory, was able to spend a few days there prior to departure practising with the instruments to be taken.

These were : —

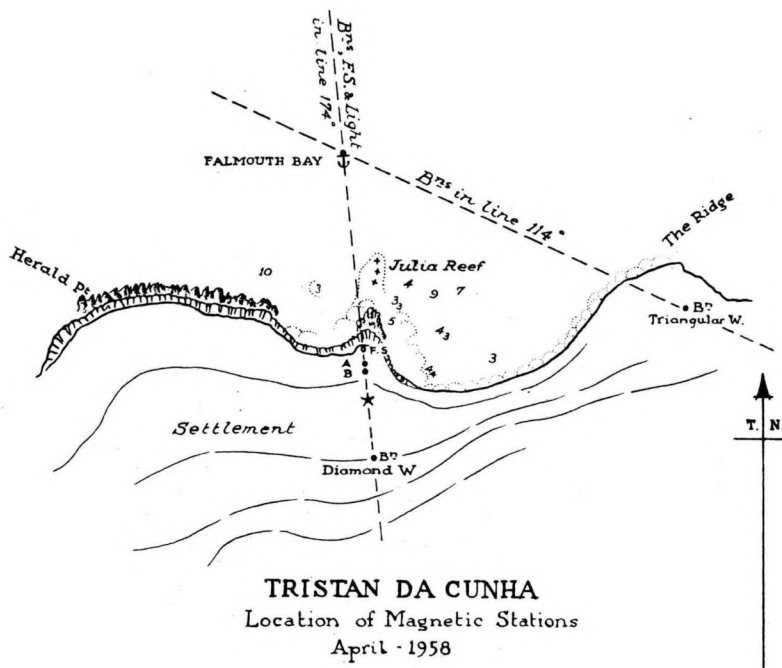
- (i) For measuring the declination — Askania Declinometer.
- (ii) For measuring the horizontal intensity — QHM 30.
- (iii) For measuring the vertical intensity — BMZ 36.

4. S.A.S. *Natal* under the command of Lt. J. C. WALTERS S.A.N., left Simonstown at 0900 on Thursday 24 April and, after an uneventful passage, anchored in Falmouth Bay, Tristan da Cunha at 0700 on Tuesday 29 April.

5. The weather being fine and warm, no difficulty was experienced in landing stores and personnel. The magnetic survey party landed at about 8 a.m. and proceeded to the transit line  $174^{\circ}$  shown on Admiralty Chart 1769 and established two stations between the flagstaff and the light, marking the stations with brass trig. plates (station A) and a brass bolt (station B) set in concrete. (See Fig. 1).

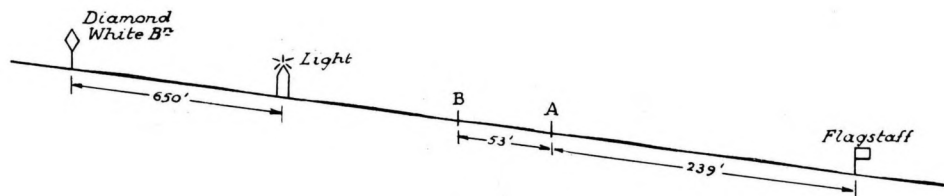
6. Theodolite observations of the sun for azimuth were taken by the naval representative while his colleague was setting up and calibrating the magnetic instruments. Thereafter both observers took readings, one doing the vertical intensity at a station, while the other did horizontal intensity and declination readings at the other, and vice versa. Results are as shown in Section I of the appendix.

7. After some 4 hours work the recall was hoisted by *Natal* and the party reembarked. The ship sailed for Gough at 16 00 hrs. the same afternoon.



· Azimuths ·

- (i) Station A to Triangular White Beacon       $078^{\circ} 45' 11''$
- (ii) Station B to ---       $077^{\circ} 57' 02''$
- (iii) Transit Line Flagstaff to Diamond White Beacon       $174^{\circ} 07' 20''$



*Section along Transit Line*  
(Not to Scale)

FIG. 1

8. It was blowing really hard when Gough Island was reached early on 30 April, the wind gusting to 75 m.p.h. and a nasty sea running. Conditions were generally so bad that any thought of land was quite unpracticable. The ship therefore steamed up and down in the lee of the island until the following morning, 1 May, when conditions had improved and landing operations were feasible.

9. The magnetic party was put ashore in one of the three dinghies brought from Tristan to help in the beach work at Gough. The beach (very rough and covered with boulders and shingle) was successfully reached and a quick reconnaissance of the ground round Archway Rock and the settlement made. It had been hoped to use the trig. station on Archway Rock, established in 1955 by the Gough Island Scientific Survey Expedition under J. B. HEANEY, as a magnetic station, which would have facilitated the question of a good azimuth determination. Unfortunately the presence of wireless masts in the rock rendered its use undesirable so that alternative stations some 250 yds. up the glen had to be chosen. These were marked permanently, station A with a brass trig. plate set in concrete and station B with a block of concrete. (See Fig. 2). Theodolite observations for azimuth using the sun and a chronometer watch were then taken. It is more than likely that the accuracy of these observations was adversely affected by (1) thick hazy conditions, (2) softness of the very damp ground which must have provided poor holding ground for the theodolite tripod. However, we were lucky to see the sun at all; so were quite prepared to discount other minor adverse conditions! Station A was now used for declination and horizontal intensity observations while the second observer at B did vertical intensity readings. Results are as shown in Section II of the appendix to this report.

10. From tests with stones and adjacent rocks, it was confirmed that both islands are intensely magnetic. The absolute determinations obtained at the stations can therefore only be taken as representatives of the particular stations and not of the islands as a whole. They will also be useful, at the stations can therefore only be taken as representative of the part-variation of the magnetic elements in those far away and little visited islands.

11. During the return voyage, the ship carried out observations for variation in position  $36^{\circ}33'.5$  S,  $8^{\circ}41'.5$  W the mean result being  $27.78^{\circ}$  W. This accords well with the value shown on Admiralty Chart 2202 A.

*Approx Sketch Map*

**GOUGH ISLAND**

Location of Magnetic Stations  
April - 1958

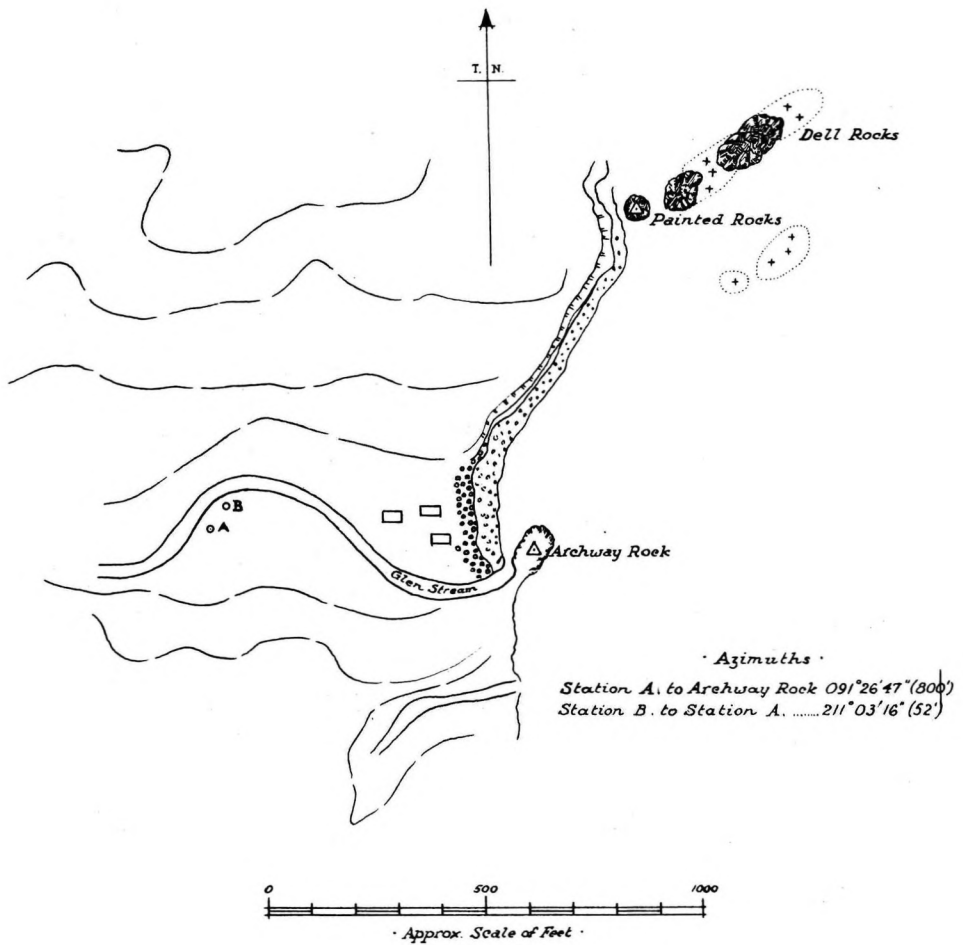


FIG. 2

APPENDIX

**RESULTS OF MAGNETIC OBSERVATIONS ON GOUGH ISLAND  
AND TRISTAN DA CUNHA  
1958 April 29 — May 1**

I. — TRISTAN DA CUNHA

1) *Magnetic Declination.*

Date	U.T.	Station	Magnetic Declination	Mean
29/4/58	0950-0957	B	— 28°07.9	Station B : — 28° 10.4'
	1005-1009	B	11.1	
	1115-1121	B	12.3	
29/4/58	1227-1232	A	07.6	Station A : — 28° 05.0'
	1333-1338	A	02.4	

2) *Horizontal Intensity.*

Date	U.T.	Station	Horizontal Intensity $\gamma$	Mean
29/4/58	1030	B	15856.9	Station B : 15846.0 $\gamma$
	1041	B	50.7	
	1053	B	45.6	
	1102	B	31.0	
29/4/58	1241	A	15831.7	Station A : 15831.9 $\gamma$
	1250	A	33.9	
	1316	A	28.5	
	1324	A	33.6	

3) *Vertical Intensity.*

Date	U.T.	Station	Vertical Intensity $\gamma$	Mean
29/4/58	1134	B	— 22821	Station B : — 22819 $\gamma$
	1149	B	819	
	1220	B	810	
	1225	B	814	
	1233	B	815	
	1239	B	813	
	1301	B	821	
	1306	B	819	
	1310	B	818	
	1319	B	823	
	1323	B	822	
	1328	B	826	
	29/4/58	1006	A	
1008		A	528	
1013		A	528	
1353		A	519	
1357		A	518	

## II. — GOUGH ISLAND

1) *Magnetic Declination.*

Date	U.T.	Station	Magnetic Declination	Mean
1/5/58	1152-1201	A	— 25° 06'1	Station A : — 25° 03.6'
	1340-1352	A	02.8	
	1400-1406	A	02.1	

2) *Horizontal Intensity.*

Date	U.T.	Station	Horizontal Intensity $\gamma$	Mean
1/5/58	1222	A	18066	Station A : 18059 $\gamma$
	1230	A	63	
	1244	A	61	
	1252	A	59	
	1259	A	60	
	1308	A	(40)	
	1314	A	61	
	1322	A	59	
	1420	A	51	
	1425	A	47	

3) *Vertical Intensity.*

Date	U.T.	Station	Vertical Intensity $\gamma$	Mean
1/5/58	1045	B	— 21772	Station B : — 21768 $\gamma$
	1049	B	68	
	1110	B	74	
	1119	B	73	
	1206	B	56	
	1212	B	59	
	1218	B	70	
	1243	B	70	
	1247	B	71	
	1301	B	70	
	1305	B	70	
	1321	B	74	
	1325	B	81	
	1341	B	67	
	1353	B	67	
	1402	B	69	
	1406	B	65	
	1417	B	70	
	1421	B	68	
	1425	B	63	
1427	B	62		
1456	B	61		
1458	B	59		