

1. INTRODUCTION

This report details radiocarbon analyses of coral samples recovered during a drilling programme on the fringing reef, Fantome Island during May, 1981. The programme was funded by the Australian Institute of Marine Science (AIMS), and involved scientific personnel from AIMS, and the Department of Geology, James Cook University of North Queensland.

Fantome Island is situated 75km north of Townsville (Fig. 1) and is composed of Permo-Carboniferous granite (de Keyser, Fardon & Cuttler, 1965). The island is one of several continental islands which lie offshore between Townsville and Lucinda, and each island has fringing reefs developed. These islands and their fringing reefs are sufficiently close to the coast to be influenced by terrigenous outfalls from the mainland. As such they represent a different reef environment to the main shelf reefs which lie further offshore (Fig. 1), and are beyond the influence of river outfalls.

The Fantome Island fringing reef (Fig. 2) was cored to provide a comparison with previously studied, offshore shelf reefs, e.g. Britomart Reef (Johnson, Cuff and Rhodes, 1984). A more detailed, general paper is in preparation (Johnson and Risk, in prep.).

Methods

The cores were recovered using equipment described by Rhodes (1981). The cores are 85mm diameter. Apart from intervals of no recovery (see Fig. 3), recovery was 50% and generally 75%. Sixteen coral samples were selected for radiocarbon dating. However, two were rejected after x-ray diffraction analyses indicated they contained less than 95% aragonite. The weight and mineralogic composition of each dated sample are given in Table 1.

The samples were analysed by BetaAnalytic Inc., whose report is attached (Appendix I). The report states the measuring standards and assumptions used. Three duplicate samples were sent to the Radiocarbon Laboratory, University of Waterloo (Canada) and results are in close agreement. Age dating results and aragonite composition of each sample are given in Table 2, listing the C14 age, the conventional age incorporating correction for isotopic fractionation (Stuiver and Polach, 1977), and corrected ages using the Gillespie and Polach (1979) connection for C14 depletion in seawater relative to the atmosphere.

Individual samples were prepared by sawing and drilling under tap water to remove impure sections (contaminated by matrix introduced by boring organisms). Samples were treated with Chlorox, etched in 10% HCl for 2 minutes to remove loosely adhering material, then rinsed twice in distilled water for 1 hour, and dried at room temperature.

TABLE 1

Fantome Core Samples for Radiocarbon Dating

Sample	Location	Approx. Wt.	Aragonite	Calcite	Quartz
1	Fantome 1/1.08m	110 gm	100	0	Tr
2	Fantome 1/2.05	98	100	0	0
3	Fantome 1/3.20	95	100	0	0
4	Fantome 1/4.40	115	100	0	Tr
5	Fantome 1/5.20	93	100	0	Tr
6	Fantome 1/8.60	40	100	0	Tr
7	Fantome 1/10.90	94	96	2	2
8	Fantome 2/1.50	53	100	0	Tr
9	Fantome 2/3.92	69	56	44	0
10	Fantome 3.1.15	76	98.5	1.5	Tr
11	Fantome 3/2.40	109	100	0	Tr
12	Fantome 3/4.84	53	100	0	0
13	Fantome 3/6.30	68	99	0	1
14	Fantome 3/7.20	123	100	0	0

Tr = less than 0.5%

FIGURE 1

Location Map

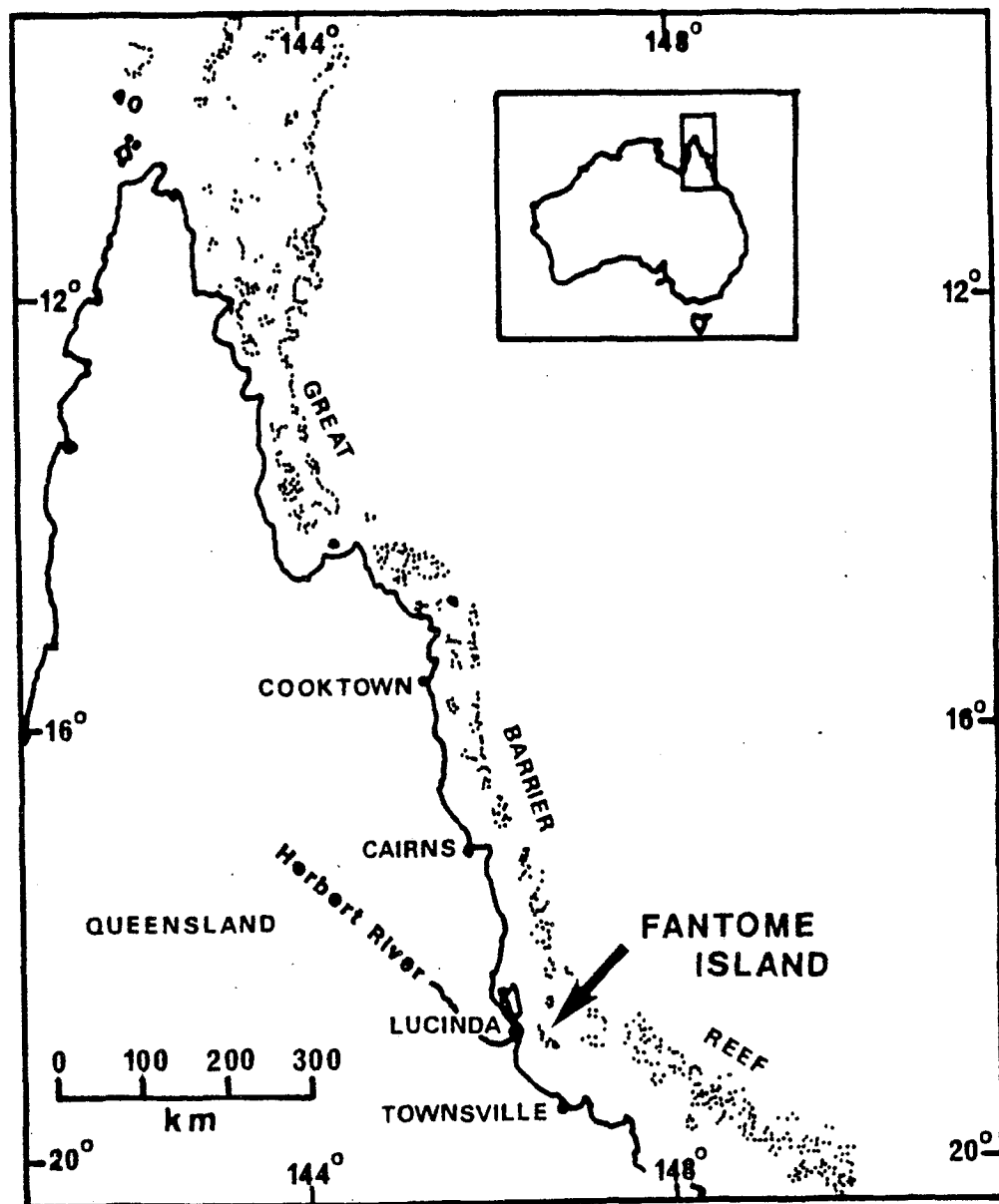


TABLE 2

Radiocarbon Dating Results

Sample No. ¹	Core depth ²	Composition Aragonite %	C13 12 0/00	C ¹⁴ age B.P. ± 1sd ³	Conventional age ⁴	Corrected age ⁵
Beta 5702	1/11.08m	100	+0.93	1000 ± 70	1420 ± 70	970 ± 80
Beta 4703	1/2.05m	100	+0.61	1820 ± 90	2250 ± 90	1810 ± 100
Beta 5704	1/3.20m	100	-0.92	2150 ± 70	2550 ± 80	2100 ± 90
Beta 5705	1/4.40m	100	-0.73	2520 ± 80	2920 ± 90	2470 ± 100
Beta 5706	1/5.20m	100	-1.10	1950 ± 100	2340 ± 100	1890 ± 105
Beta 5707	1/8.60m	100	-0.75	2180 ± 100	2580 ± 110	2130 ± 115
Beta 5708	1/10.90m	96	-0.91	2490 ± 90	2880 ± 100	2430 ± 105
Beta 5709	2/1.50m	100	-1.43	5520 ± 100	5910 ± 110	5460 ± 115
Beta 5711	3/1.15	99	-0.24	4070 ± 110	4470 ± 120	4020 ± 125
Beta 5712	3/2.40m	100	+1.19	3480 ± 80	3910 ± 80	3460 ± 90
Beta 5713	3/4.84m	100	+0.14	4190 ± 70	4600 ± 70	4150 ± 80
Beta 5714	3/6.30m	99	+0.44	4920 ± 100	5340 ± 100	4890 ± 105
Beta 5715	3/7.20m	100	+0.18	3880 ± 110	4290 ± 120	3840 ± 125
Wat 1107	3/1.15m	99	0.0	4160 ± 100	4575 ± 100	4125 ± 105
Wat 1109	3/2.40m	100	+0.1	3960 ± 80	4380 ± 80	3930 ± 90
Wat 1108	3/6.30m	99	+0.7	4900 ± 120	5330 ± 120	4880 ± 125

1 Beta = Beta-Analytical Inc., Miami laboratory number
Wat = Radiocarbon Lab., University of Waterloo, Ontario laboratory number.

2 1/1.08m = Fantome 1, 1.08m depth below surface.

3 Radiocarbon age, Libby half-life.

4 Conventional age = corrected for C¹³ content to -25‰ P.D.B.

5 Corrected age = conventional age minus reservoir effect (450 ± 35 years for eastern Australia).