

RADIOCARBON DATING AND PALAEOECOLOGY OF THE AITAPE FOSSIL HUMAN REMAINS

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Abstract

The site near Aitape, New Guinea, where fossil human remains were collected by the writer in 1929 was revisited and materials for radiocarbon dating were collected. The associated fossils show that the ecology was mangrove swamp. Organic materials from the lenticle containing the human bones were ^{14}C dated at about 5000 years.

Introduction

The Aitape human cranial fragments (105 gm) were discovered by the writer in the Aitape District of N. New Guinea on 26 April 1929 (Nason-Jones 1930, Fenner 1941, Hossfeld 1949). They occurred in situ in a lenticle containing littoral marine molluscs and fossil coconut remains. The cranial fragments, along with fossil shells and coconut remains, were deposited in the Australian Institute of Anatomy, Canberra, on 7 November 1930. Another sample of shells was deposited in the South Australian Museum in Adelaide. At the request of Section F (Anthropology) of the Australian and New Zealand Association for the Advancement of Science, the site was revisited in May-June 1962 in order to:

- (1) collect samples for radiocarbon dating, because the materials accompanying the bones were no longer available, and the sample in the S.A. Museum was too small, and
- (2) re-examine the stratigraphy.

Site and Samples

The fossils were found on the bank of Paniri Ck, upstream from its junction with Kiyen Ck, about 8 miles S. of the coast and 40 miles W. by track from Aitape (approximately $03^{\circ} 08'S.$, $141^{\circ} 57'E.$), where Paniri Ck emerged from the Barida Range. The elevation is about 170 ft above sea level as determined by aneroid barometer. The work was hampered by the flooding of Paniri Ck.

Marine shells, carbonized coconut fibre, and shell and wood fragments were excavated from the soft blue mudstone, cleaned, sun-dried, then packed in clean polythene bags. The work was terminated by collapse of the bank. Small collections were presented to His Honour the Administrator, Brigadier Sir Donald Cleland, to the Assistant District Officer at Aitape, and to the Holy Cross Mission at Barida.

Geomorphology

The area falls into two natural divisions—the coastal plain and the hill country of the Barida Range which rises steeply to over 2000 ft. The junction of the plain and hills is at about 170 ft and sharply defined, being a former indented shoreline. The coastal plain has a very gentle slope northwards to the sea, so that it is ill-drained and covered largely by sago-palm swamps. The creeks that drain the hills divide into numerous distributaries shortly after entering the plain, the central part of which contains the largest and worst swamps. Near the coast, the drainage waters form definite streams again.

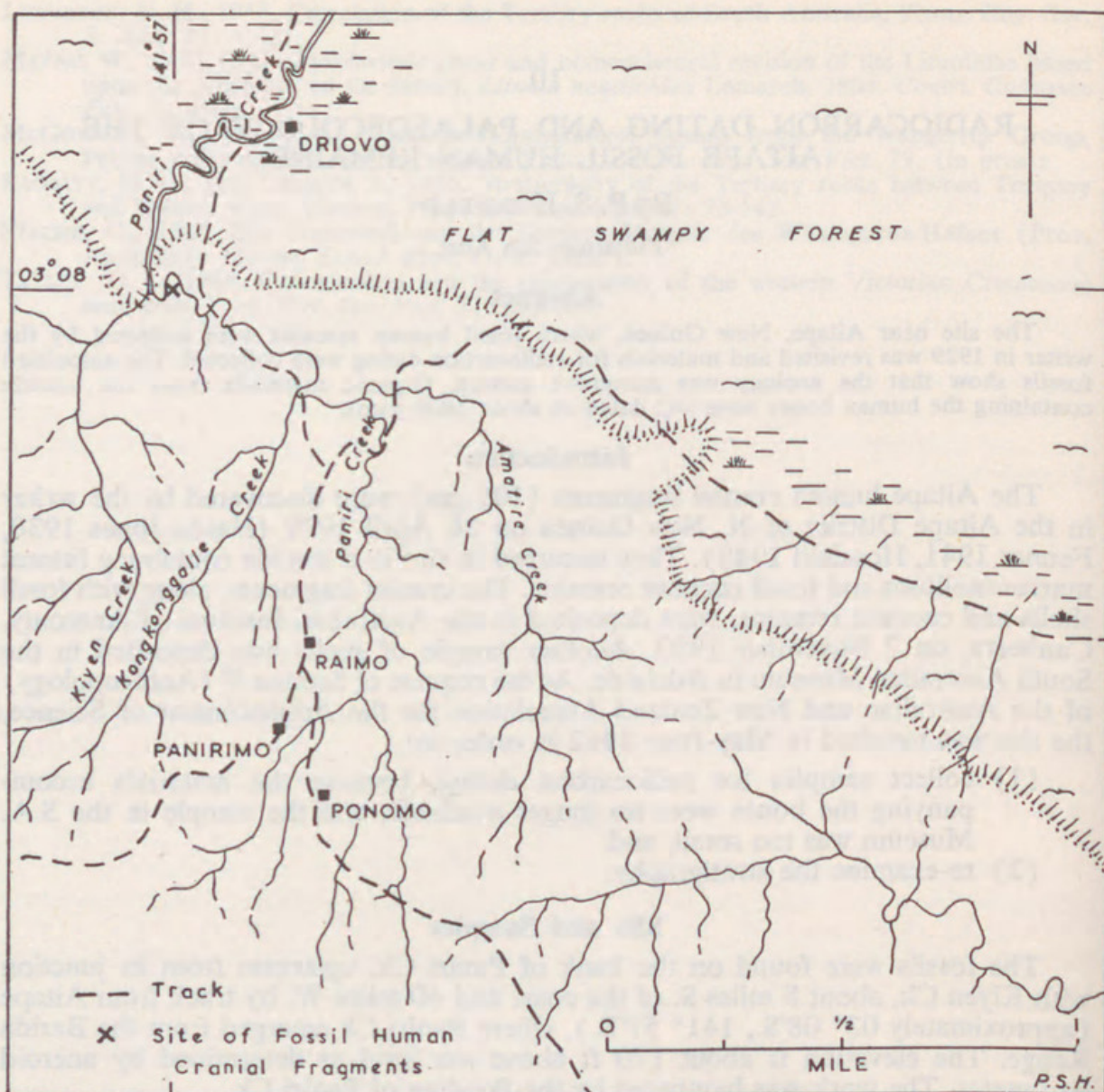


FIG. 1—Location of fossil human cranial remains W. of Aitape, New Guinea.

Geology

A general geological section of the site was given in a previous paper (Hossfeld 1949). The soft, fossiliferous mudstone that contained the human remains outcrops in most of the creeks where they leave the hills and enter the plain. Carbonized wood is present in large amounts in some places. The mudstone is blue when wet, drying to a greenish-grey, but not regaining the original colour upon re-wetting. The formation belongs to the Wanimo Group (Nason-Jones 1930). Similar formations occur more extensively in the Wanimo District, towards the W. border of New Guinea, and represent sedimentation along an emerging coastline of mangrove swamps, tidal mud-flats, and shallow bays and lagoons. These formations probably do not exceed 100 ft in thickness, and can be correlated with coralline and other calcareous deposits in the coastal region W. of Wanimo and elsewhere.

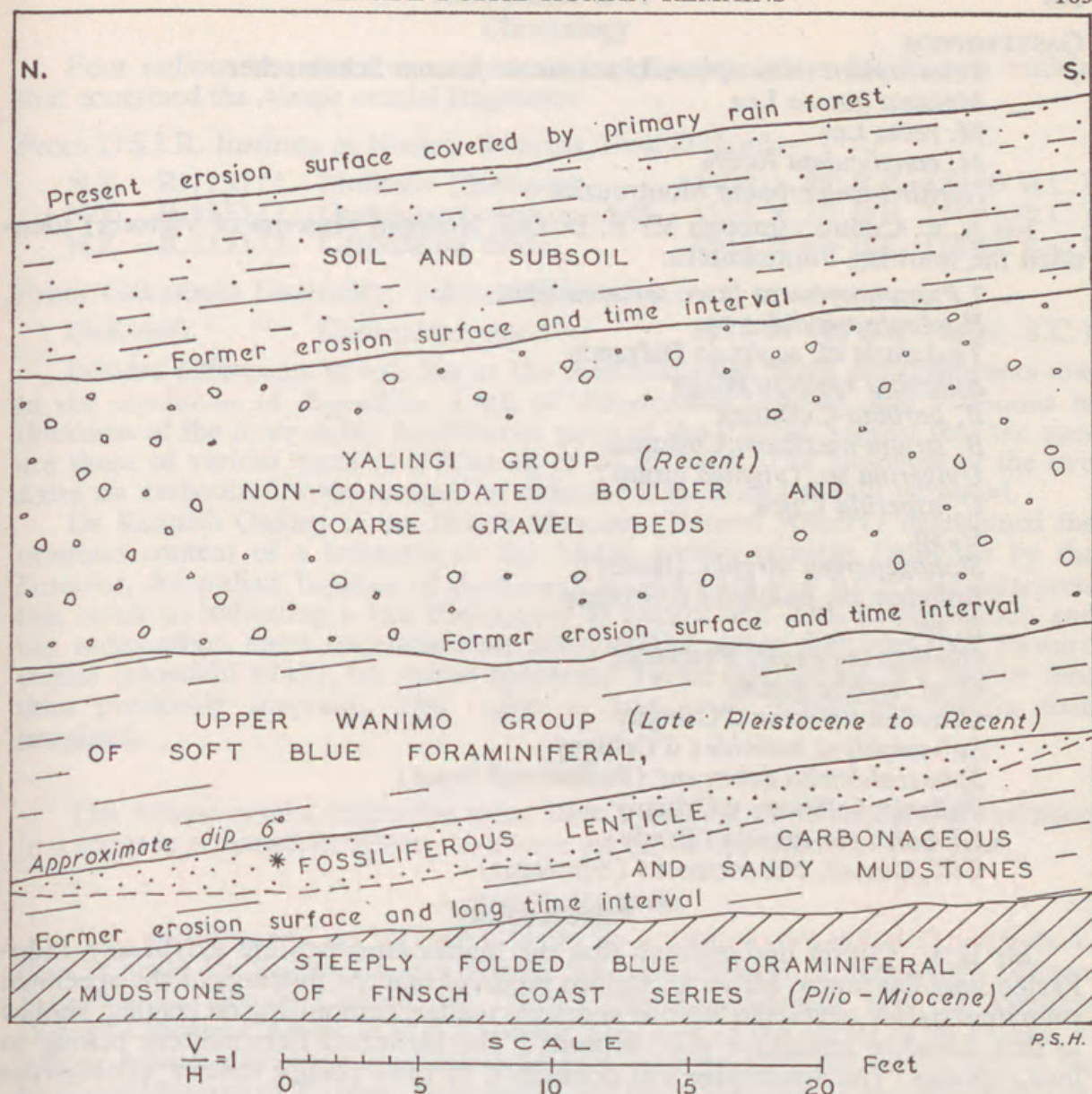


FIG. 2—Section of E. bank of Lower Paniri Ck, Aitape District, New Guinea, showing the stratigraphic relations of the mudstones in which fossil human cranial fragments were found. * Fossiliferous Lenticle: Former hollow, scoured in inter-tidal mud-flat and filled with blue, carbonaceous and sandy muds, containing human cranial fragments, coconut shell and fibre, and other plant remains, marine, intertidal and terrestrial shells and Foraminifera.

Palaeontology

Mr B. C. Cotton has identified the Mollusca collected in 1962 as follows:

PELECYPODA

Arca (Tegillarca) granosa Linnaeus

Placuna placenta Linnaeus

Dosinia sculpta Hanley

Crassostrea sp.

Cyrena coaxana Gmelin

GASTEROPODA

Telescopium telescopium Linnaeus = *fuscum* Schumacher

Melania juncea Lea

M. recta Lea

M. canaliculata Reeve

Neritina souverbiana Montrouzier

Mr A. C. Collins (through Mr E. D. Gill, National Museum of Victoria) identified the following Foraminifera:

? *Psammosphaera fusca testacea* Flint

Haplophragmoides sp.

Textularia cf. *sagittula* Defrance

Bulimina rostrata Brady

B. barbata Cushman

B. striata mexicana Cushman

Uvigerina sp. (*pigmea* group)

U. asperula Czek

U. sp.

Siphogenerina virgula (Brady)

Bolivina aff. *pulchella* d'Orbigny

B. sp.

Globigerina eggeri Phumbler

G. cf. *triloba* Reuss

Orbulina universa d'Orbigny

Sphaeroidina bulloides d'Orbigny

Sphaeroidinella dehiscens (Parker and Jones)

Pullenia bulloides d'Orbigny

Globorotalia tumida (Brady)

Cibicides aff. *cicatricosus* (Schwager).

Palaeoecology

Mr B. C. Cotton has reported that the marine molluscs are a typically Indo-Pacific mud-flat fauna. Mr A. C. Collins reported that the floatings of the specimen submitted to him contained 'fibrous vegetable matter, carbonizing on heating, similar to that found in mangrove pool deposits'. The identified Foraminifera belong to living species. 'The assemblage was dominated by three pelagic species, *Globigerina eggeri*, *G.* cf. *triloba* and *G. tumida*. Several other pelagic species were present in small numbers or as single specimens, e.g. *Sphaeroidina bulloides*, *Sphaeroidinella dehiscens*, *Orbulina universa* and *Pullenia bulloides*. None of the common shallow-water Indo-Pacific forms was present, the remaining species identified being mostly bulimine, uvigerine and rotaline forms more characteristic of offshore waters; these were comparatively rare. On the other hand, with one doubtful exception, there was none of the arenaceous benthic species normally found on mud bottoms in the deeper areas of the continental shelf; nor was there any indication of brackish water conditions.'

'The general evidence suggests that the conditions of deposition were those of a coastal mangrove swamp, probably exposed at low tide and fetid with organic matter (and hence not supporting a normal shallow-water foraminiferal fauna), inundated at intervals by water from a shallow muddy protected sea, bringing with it pelagic Foraminifera from the upper waters and some of the lighter and smaller benthic species. The absence of any rounding and polishing of grains suggests near origin and calm water conditions.'

Chronology

Four radiocarbon dates were obtained for materials in the fossiliferous lenticle that contained the Aitape cranial fragments:

From D.S.I.R. Institute of Nuclear Sciences, New Zealand—

N.Z.	R.1131/1	Molluscs (<i>Melania</i>)	4400 \pm 85 B.P. (2450 B.C.)
N.Z.	R.1131/2	Carbonized coconut shell	4555 \pm 80 B.P. (2605 B.C.)
N.Z.	R.1131/3	Carbonized wood	4915 \pm 65 B.P. (2965 B.C.)

From Gakushuin University, Tokyo, Japan—

GaK-440	Carbonized wood	5070 \pm 140 B.P. (3120 B.C.)
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Besides differences in age due to the materials used, there are differences due to the conditions of deposition. Lack of recognizable bedding, and variations in thickness of the more richly fossiliferous parts of the lenticle, suggest that the ages are those of various parts of a zone 18 to 24 in. thick. The closeness of the two dates on carbonized wood assayed at different laboratories should be noted.

Dr Kenneth Oakley of the British Museum (Natural History) determined the uranium content of a fragment of the Aitape cranial remains (supplied by the Director, Australian Institute of Anatomy) as $e. U_3 O_8 = 8$ p.p.m. He interprets this result as indicating a late Pleistocene to Recent age. This determination and the radiocarbon dates necessitate an interpretation other than that put forward earlier (Hossfeld 1949), the events concerned having taken place in a shorter time than previously supposed. The region is thus more tectonically mobile than imagined.

Conclusion

The Aitape cranial fragments came from a lenticle representing sedimentation in a scour in a mangrove swamp, and have an age of the order of 5000 years.

Acknowledgements

The expedition was made possible by the co-operation of the Hon. Paul Hasluck, then Minister for Territories; His Honour the Administrator of Papua-New Guinea, Brigadier Sir Donald Cleland; the District Officer of Wewak, and the Assistant District Officer of Aitape, and their staffs; the friars of the Order of St Francis of Assisi, Aitape; numerous scientific colleagues, notably Mr Edmund D. Gill of the National Museum of Victoria; the friendly and devoted service of the New Guineans of Barida and Romei, including one who worked with me in 1929. The Australian Institute of Aboriginal Studies paid for two radiocarbon analyses, the Anthropological Societies of Australia paid for a third, while the author paid for the fourth.

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