

The First C-14 Date for an Open Site in Borneo

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IT has been possible for the first time to secure a sample of charcoal suitable for radiocarbon dating from excavations in the ancient ironworking sites in the Sarawak River Delta (Santubong area). Although these sites have been subjected to a long series of archaeological excavations by Sarawak Museum teams since 1947, chronological conclusions have until now necessarily been based on typological study of value objects, especially Chinese ceramics, which abound in the Delta ground. The recovery of organic material free of contamination and in sufficient quantity to allow of analysis for C-14 (radiocarbon) dating is extremely difficult in open sites in Borneo. The disintegration of exposed organic material is rapid in the tropical environment, while significant disturbance of abandoned fire hearths is almost assured out-of-doors through the luxuriant growth of plant life along with the movements of the rich community of mammal and invertebrate fauna. There is the added complication in the Delta that re-occupation of the area, dating from the early 19th century, has led to much disturbance in the ironworking sites as a result of modern cultivation with fruit and rubber trees.

One of the rare exceptions to the general rule was the recovery of a concentrated cluster of charcoal in good condition on 12 July 1966. The sample was obtained at Bongkisam, a large site located on the inland side of the modern village of Santubong. Bongkisam downriver, and Jaong and Buah two miles upriver, are the three major iron manufactories located in the area. Jaong, one-half mile up a mangrove creek from the true right bank of the Sarawak River, is the oldest of the ironworking sites, dating (by ceramic types) back to the latter part of the T'ang dynasty. Buah is a later Sung dynasty site on the opposite bank, now accessible only by about one-half mile of tidal creek, but at one time (like Jaong) on a main branch of the river, since silted up. Buah is roughly contemporary with Bongkisam; but activity probably

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ceases there somewhat earlier than at Bongkisam, which continued on a large scale into the Yüan (A.D. 1280).

On the basis of ceramic evidence, as analyzed in a series of articles (see Bibliography, below), the whole iron-operation in all these sites is *provisionally* fitted into the following chronology:

Maximum:	A.D. 615 to 1370
Minimum:	A.D. 900 to 1350
Optimum peak:	A.D. 1100 to ca. 1345

The ceramics at Bongkisam all fall typologically into the Sung and Yüan dynasties. There is a complete absence of blue-and-white sherds characteristic of the Ming dynasty, or of any other Chinese ceramic wares which could reasonably be classified as Ming. The inference is, of course, that the terminal date for the site lies before A.D. 1368. We now have a C-14 date that broadly confirms the terminal date provided by this ceramic picture.

The sample was excavated from Z/3 trench at the upper level of deposition, 9–12 inches, in July 1966. This is rather higher in the trench than one would have wished, given the fact that it is generally an area of overhead rubber and fruit cultivation. However, this did offer a good prospect of an uncontaminated sample, possibly dating from the pre-rubber period. Through the courtesy of the Curator, Sarawak Museum (Mr. Benedict Sandin), the charcoal was submitted to Geochron Laboratories, Cambridge, Massachusetts, where the Technical Director (Dr. Harold W. Krueger) kindly expedited the test and provided the following report:

Sample:	Bongkisam site, charcoal (Z/3, 9–12").
Age:	635 ± 95 C-14 years B.P. = A.D. 1315 (maximum A.D. 1225, minimum A.D. 1410). [Geochron uses A.D. 1950 as a reference base.]
Description:	Large pieces of charcoal. Some hair-like roots present.
Pretreatment:	The charcoal was cleaned and the rootlets were removed when observed. The charcoal was then treated with hot dilute HCl and NaOH to remove contaminants prior to analysis.
Comment:	It could be that the date is slightly lowered by some root hairs that may have escaped our examination.

In considering this Geochron result of A.D. 1315, it should be noted that the tiny rootlets mentioned in Dr. Krueger's report came from living vegetation in the rubber garden overhead, none of which could have been more than 60 years old; the effect, if any, of this intrusive material could be to make the given data come out younger, that is, *later*, than the deposition of the charcoal itself. If contamination is a factor here, it should operate within narrow limits and the charcoal would thus be *pre*-A.D. 1315 (perhaps, say, A.D. 1290).

This C-14 date operates as an effective check against other evidence to indicate that Bongkisam flourished up through the 13th century. The whole major delta operations evidently came to an end by the middle of the 14th century.

There is evidence that the early Ming emperors consciously disrupted trading patterns in Southeast Asia in an effort to stamp out private trading and to enforce the tributary system. Disablements against trading centers such as Santubong could have disrupted the complex web of exchanges that were the motive power and energy which sustained the iron industry. On this point we are indebted to Professor O. W. Wolters for discussing with us his manuscript *The Fall of Srivijaya in Malay History*, in which his analysis of Ming trade policy provides economic rationalization for the "Ming Gap" in ceramics, noted at several Southeast Asian sites that had been flourishing trade centers during Sung and Yüan times.

The C-14 date is also important as parallel testimony for the dating of the "Tantric" shrine excavated at Bongkisam in 1966. The charcoal sample was taken from an area adjacent to the shrine and from a level just *above* the stone-platform surface of the shrine. On the basis of the constellation of ritual objects—including 142 pieces of gold and a silver reliquary box with golden *linga*—we had tentatively assigned the shrine to the 12th through the 13th centuries. (For a full discussion see Harrisson and O'Connor 1967.) The C-14 sample almost certainly dates *after* the shrine.

These chronological conclusions are tentative. They fit easily, however, with the wider implications of the ironworking industry in the Delta sites as fully explored in the authors' monograph, *Excavations of the Prehistoric Iron Industry in West Borneo* (1969).

Following is a short bibliography of publications relevant to the Delta program.

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