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Archaeological research in Sarawak, one of Malaysia's two states in the northern part of the island of Borneo, began just after the Second World War under the leadership of Tom Harrisson.[1] Somewhat paradoxically, the latter was first and foremost an ornithologist and an anthropologist. He became Curator of the Sarawak Museum in 1947 and began exploring the Sarawak River Delta, a 600 km² area between Telaga Air in the northwest, Tanjung Sipang in the north, Tanjung Po in the northeast, Samarahan in the southeast and Kampung Makam in the southwest. The Sarawak River itself, about 120 kilometres long, originates in the Upper Kapuas Range and flows into the South China Sea north of Kuching. The surface area of its basin is about 2,500 km². The hinterland is accessible with a relatively easy passage southward to other river basins on the island, along the Java Sea.

It is the village of Santubong at the foot of Gunung Santubong (alt. 810 m), some 30 kilometres north of Kuching (fig. 1), at the mouth of the Santubong River, one of the branches of the delta, that first caught Harrisson's attention because of observations and chance finds made there since the middle of the 19th century. Mention should be made of the famous Batu Gambar (fig. 2), an anthropomorphic sculpture in high relief on a rock at the Sungai Jaong site (rediscovered by a local in the 1880s and near which was found a "Hindu" terracotta figurine), of carved stones reported at the beginning of the 20th century on the neighbouring site of Bongkisam, of "Indian character" pottery, as well as of various objects in gold, of Chinese coins, and of residues from ironworking (cf. especially Evans 1929). It was also known that, at the end of the 19th century, small amounts of gold were washed in seashore areas in the delta, especially near Santubong.

In the Sungai Jaong site, Harrisson noticed iron slag at the foot of Batu Gambar. He therefore decided in 1948 to conduct surveys using mine detectors to look for iron slag concentrations indicating potential sites for excavation. He identified five of them, later excavated intermittently between

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1. A biography of Tom Harrisson has been published by Judith M. Heimann (*The Most Offending Soul Alive: Tom Harrisson and His Remarkable Life*, Honolulu, University of Hawai'i Press, *ca.* 1998).

1952 and 1966: Sungai Jaong, Sungai Buah, Bongkisam, Bukit Maras and Kampung Ayer. Two of them are of particular interest to us here: Sungai Jaong and Bongkisam, about three kilometres apart.

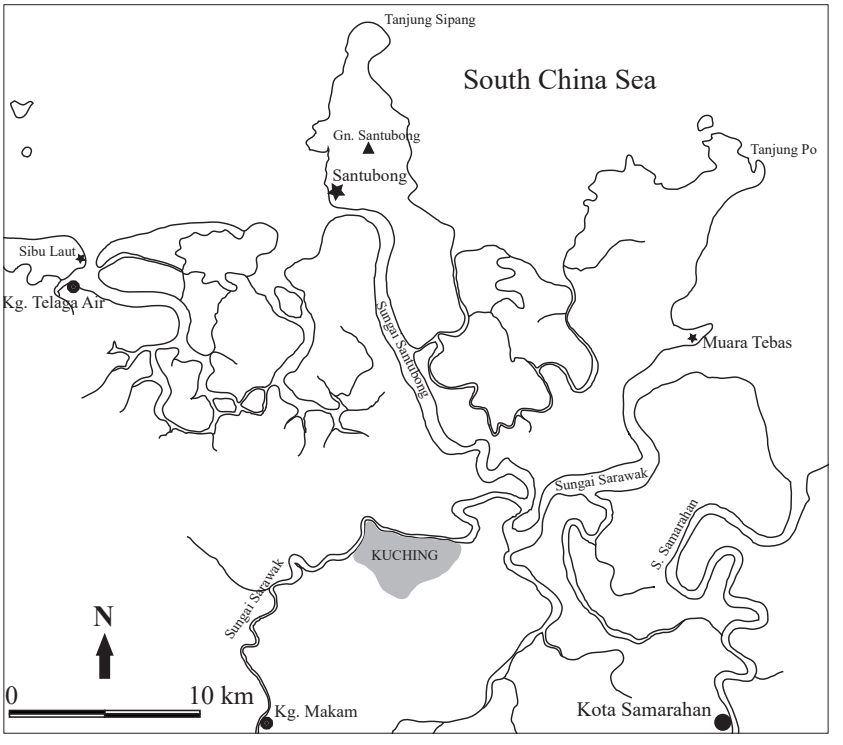

Fig. 1 — Map of the Sarawak River Delta.

Fig. 2 — The Batu Gambar at Sungai Jaong (photo: Daniel Perret, 2017).

The Sungai Jaong site (N 01° 43.041'; E 110° 20.699'), about three kilometres from Santubong, occupies the sides of a small hill overlooking the mangrove swamp (approximate altitude 15 m), the tidal Jaong River, a tributary of the Santubong River, and the Raso River, a small tributary of the Jaong. The site is now less than one kilometre from the right bank of the Santubong River. According to Harrisson, Sungai Jaong, as seen from the air, was once a major waterway in the Sarawak River Delta system. The Bongkisam site (N 01° 43.150'; E 110° 19.350') is now located on the edge of Santubong, some 400 metres from the right bank of the mouth of the Santubong River and less than one kilometre from the sea.

Tom Harrisson started digging in Sungai Jaong in 1952 (his first excavations in the delta), where iron slag was detected over nearly a mile along the edge of the mangrove. It seems that the main stages took place in 1952 and 1957. What is certain is that he completed his fieldwork in Sungai Jaong in June–July 1966. The first trench, dug at the foot of the Batu Gambar, yielded iron slag, as well as stoneware and earthenware shards. He mentioned repeatedly that the excavations produced large quantities of iron slag (some pieces weighing up to three kilograms) and Chinese ceramics, but the total does not appear in any of his publications. On the other hand, among surprising details for an archaeological publication, he explained that he had a jetty made from excavated iron slag built on the Raso River. He also mentioned that fifty gold objects were recovered during the 1952 and 1957 seasons (30 plain and 15 decorated pieces of gold foil, 3 small rings, 2 beads), most of them from an area he interpreted as a burial ground, which also yielded glass beads as well as a handful of whole small Chinese vessels. Harrisson also described many rock carvings that he thought were contemporary with the commercial activities carried out on this site, an occupation he dated between the end of the first millennium and the beginning of the second millennium CE.

Harrisson started his excavations in Bongkisam in the 1950s, apparently after the first one conducted at Sungai Jaong, and undertook his last campaign there in July 1966. Preliminary surveys detected iron slag over about 800 metres along the Santubong River. As with the Sungai Jaong site, he does not provide any general data on the finds. He pointed out however that the 1955 season alone yielded 67,000 shards of pottery, 49,000 shards of stoneware and porcelain, more than 600 beads and glass bangle fragments, as well as more than 22 tons of iron slag. The July 1966 season revealed a Hindu-Buddhist stone structure, which remains the only Hindu-Buddhist monument built of permanent materials discovered to date in Sarawak. It is a rectangular platform (3 m × 2.40 m) facing north-south, resting on sand. In what Harrisson interprets as a sealed shaft filled with yellow sand, he found a ritual deposit composed of a decorated silver box, gold objects, semi-precious stones, a stone image, beads, and earthenware shards. The silver box contained a gold *lingga*, a piece of gold foil, and organic black material. Outside the box, in the sand, Harrisson uncovered 141 gold objects, including gold foil pieces cut in the shape of animal and human figures, finger rings, small circular objects, beads, needles, pins, and gold fragments.

The stone object, a badly eroded image of a seated figure, was interpreted by Harrisson as one of the aspects of Tārā. He dated the structure based on the Chinese ceramic shards found on its surface. A radiocarbon dating on charcoal collected outside the structure, carried out in the USA in 1968, yielded a date range of 1220–1410 CE. Comparing his finds with other ritual deposits known at the time in Southeast Asia, Harrisson interpreted this structure as a Tantric shrine dated after 1000 CE and before 1300 CE. He pointed out that a tile bearing a motif of elephant, a *stūpa* finial and a stone Buddha statuette were discovered in Bukit Maras, a site just above Bongkisam. A date prior to the 10th century CE has been proposed for this Buddha image (Griswold 1962).

Between 1949 and 1967, Tom Harrisson published several articles on his archaeological work in the delta, followed by a three-volume final report (1969 and 1970), co-authored with Stanley J. O'Connor. This final report is disconcerting, to say the least, being a mixture of partial statistics, typologies and reflections written in a disorderly manner.[2] The authors gave pages and pages of statistics (solely based on the last season of excavation, without explaining the reason) on iron slag, terracotta fragments (interpreted as crucibles and tuyeres), stoneware and porcelain shards per excavation unit (lateral and vertical scattering), while crucial basic information is lacking: no map of the excavations in the various sites, no horizontal or vertical drawings of the trenches, no comprehensive tables of the finds, either by site or overall, with the exception of gold objects.

Harrisson briefly explained that the excavations in the delta sites yielded more than one million artefacts, but no clear succession of surface occupations. Many pages were devoted to a typology of iron slag, a typology that is not justified (we now know, thanks to recent archaeo-metallurgical studies, that this kind of typology is not relevant). Based on iron slag and finds associated with iron working, Harrisson examined the iron industry activities carried out in the delta, as well as the origin of the ore used, reflections fuelled by his ethnographic observations and older accounts. He also wondered about the presence of numerous shards of earthenware, stoneware and porcelain on iron industry sites. While claiming intermixing of Chinese ceramics and iron industry remains, he does not offer an explanation. There is a documentation of nearly 100 rock carvings (human figures, symbolic representations, markings), as well as a description of block-cut boulders at Sungai Jaong. Harrisson was convinced that the iron industry and these rock carvings were contemporary and the work of locals. The study devoted to Chinese ceramics found in excavations in Sarawak, published with Carla Zainie (1967), is more systematic, but the region is treated as a whole without

2. "This strange work, inflated and colloquial almost beyond the endurance of cis-Atlantic man, threatens to bring the craft of prehistoric archaeology into disrepute." This is the reaction of William Watson (1971) in his review of the two volumes published in 1969. About the volume published in 1970, Ian Glover (1972) wrote: "[…] the organization appears to have developed out of random thought associations. Consequently, it is difficult to be certain what the authors' main thesis is, and which data they think relevant to, or supporting such a thesis."

distinguishing the types of finds for each site. Harrisson concluded that the Chinese ceramics found in the delta are dated between the 7th and the middle of the 14th century CE, a period that would also correspond to the maximum time span of iron working in the Santubong region.

If major shortcomings in these publications can be explained by the fact that Harrisson was not a trained archaeologist,[3] it is necessary to place this work in its Southeast Asian context. By focusing on the archaeological sites of the Sarawak River Delta starting in the 1950s, he was a pioneer in two ways. In British Malaya, only two researchers preceded Harrisson on old settlement sites. In 1931, Ivor Hugh Norman Evans excavated some 200 m² at Kuala Selinsing (3rd century BC – 10th century CE), in the Perak region. Five years later, Horace Geoffrey Quaritch Wales conducted the first excavations on old settlement sites in Johor, precisely at Kota Tinggi and Johor Lama. This pioneering position is even clearer with regard to iron industry archaeological sites, Harrisson pointing out that, at that time, there was no publication on this subject in Southeast Asia.[4] These publications had at least the merit of drawing attention to these Sarawak sites, showing the importance of the history of the iron industry in Southeast Asia and raising many questions, some of which hopefully may be answered in the near future. Tom Harrisson retired as Sarawak museum director in September 1966 and left Sarawak for good at the beginning of 1967.

In the same year as the publication of the first two volumes of the final report (1969), Cheng Te-K'un, a Chinese archaeologist who visited the excavations in 1966, published, in agreement with Harrisson, his own observations and reflections in a short book. For Cheng Te-K'un, Santubong was a trading post frequented by foreigners, mainly Chinese and probably also a few Indians, who came to exchange commodities, such as textiles, for local products, such as forest products. These foreigners would have discovered iron ore by accident and started the smelting industry. Santubong would have reached its peak in the 12th–13th centuries and its history was closely linked to that of China, in particular China's dependence on overseas sources for mineral supply. This predominance of the Chinese factor thus contradicts Harrisson's main hypothesis that the Santubong iron industry was the work of indigenous people.

Twenty years later, these hypotheses of Harrisson and Cheng Te-K'un regarding the Santubong sites are discussed by Jan Wisseman Christie (1988). She rejects both Cheng Te-K'un's hypothesis on the dominant presence of Chinese craftsmen and Harrisson's suggestions on the size of this iron industry in Santubong, on the origin of the technique used (South India or Sri Lanka according to Harrisson), as well as on the identification of

3. In 1977, Alastair Lamb wrote about Harrisson (1977: 9): "[…] he was willing to turn hand, spade and labour force to any archaeological goal, yet he gave relatively scant thought to the longer term problems of recording and publication. […] Indeed, one could argue that both Wales and Harrisson belong to a tradition […] which owed much more to Schliemann than to Sir Mortimer Wheeler."

4. Stanley O'Connor made the same observation ten years later (1977: 5): "It is astonishing how very little is presently known about the development of iron technology in Southeast Asia."

iron slag and crucibles among the terracotta remains. According to Christie, who appears to have directly examined the collections left by Harrisson at the Sarawak Museum, most of the material identified as iron slag is in fact laterite naturally present on the sites, laterite constituting the raw material for the iron reduction activity. In addition, she proposes that the material identified as crucible fragments by Harrisson would be tuyeres or furnace cover fragments. She thus suggests that the remains linked to the iron reduction activity show neither foreign technical influences nor the presence of foreign populations in significant numbers.

It is only forty years after the last Harrisson excavation season in the delta that a new archaeological fieldwork was undertaken in Santubong, namely a brief field evaluation conducted by a team of researchers from the universities of Leicester and Oxford at Sungai Santubong (cf. Doherty *et al.* 2007), a site that seems to have been unknown to Harrisson. This project was not pursued.

It is in this context that Daniel Perret, the EFEO representative in Kuala Lumpur, approached the Sarawak Museum Department in 2012 to examine the possibility of conducting new archaeological research in the delta in cooperation between the two institutions. The archaeological project became clearer in 2017 when the Santubong Archaeological Park Project, initiated by the Museum Department, reached advanced stages. As the Santubong Archaeological Park Project includes the Sungai Jaong and Bongkisam archaeological sites, it was decided to concentrate the research on these two sites. A major obstacle still had to be overcome before excavations could begin, namely the acquisition of the land at these two sites by the State of Sarawak. Short visits on several occasions since 2012 had shown that in Bongkisam the remains of the Hindu-Buddhist structure appeared to be protected by a fenced shelter and that the Sungai Jaong site seemed to have been left undisturbed since Tom Harrisson's digging. In fact, the boundaries of his excavations were still clearly visible in the field (fig. 3). Another important point was that the site had remained a forest, without any construction, with the exception of three light rock-carving shelters.

Confident regarding the potential of both sites after more than half a century of interruption of field research, the idea is to start from scratch without neglecting, however, the reappraisal of the archaeological collections from Sungai Jaong and Bongkisam, now kept in the Sarawak Museum Department. The project will address the following aspects.

The first aspect will be devoted to the spatial evolution of the ancient occupation of the Sungai Jaong site. Based on the excavation of trenches (the size of which will vary mainly according to the constraints of the environment and the available workforce) carried out as systematically as possible throughout the site, our aim will be to identify its boundaries and collect information to try to reconstruct the scenario of the evolution of this occupation. This approach has already been implemented on settlement sites in North Sumatra with very interesting results. With reference to Tom Harrisson's finds in Sungai Jaong, the density in stoneware and porcelain shards, which constitute the main dating elements for the occupation, is sufficient to expect interesting results.

Fig. 3 — Clearing of Harrisson's trenches at Sungai Jaong (photo: Daniel Perret, 2019).

In the case of Sungai Jaong, this spatio-temporal approach based on Chinese ceramics will need to be complemented by a chronological examination of the remains of iron reduction activities. Indeed, whereas Harrisson considered that Chinese ceramics and the remains of ironworking activity were contemporary, without providing proof, their a priori antinomic character raises questions. At this stage, it is important to be open to the possibility that ironworking activities may have preceded the occupation marked by Chinese ceramic shards.

The second aspect will be devoted to the technological study of ironworking activities whose history has yet to be established in Southeast Asia. The type or types of iron ore have yet to be identified, let alone their origin. The same applies to the nature, organisation and evolution of technical processes. In addition, the nature of semi-finished or finished products remains to be determined. Answers to these questions will make it possible to establish a series of comparisons with other contemporary ironworking sites in Southeast Asia, and even further afield in Asia, as well as to be able to trace the circulation of products from the Sarawak River Delta at various geographical scales.

The third aspect concerns the origin of resident (or semi-resident) populations and their way of life. Which communities were the driving forces behind the ironworking activity? Were there "ethnic" quarters, as described in local or foreign written sources about urban centres in the region at a later date? Does Sungai Jaong show a variety of habitat (on stilts or directly on the ground surface)? Which were the activities carried out on the site and what are the reasons that would have motivated the choice of this location? The circumstances of the abandonment of Sungai Jaong will also be questioned. Was it the result of environmental changes or destructions that would be noticeable in the stratigraphy and among the finds? This new

Fig. 4 — Clearing of the Hindu-Buddhist structure at Bongkisam (photo: Daniel Perret, 2018).

Fig. 5 — Possible supports for iron ore crushing at Sungai Jaong (photo: Daniel Perret, 2019).

Fig. 6 — Block-cut boulders with possible remains of a structure related to iron smelting at Sungai Jaong (photo: Daniel Perret, 2019).

phase of research in the delta after more than half a century opens up the possibility to undertake various detailed comparisons with contemporary sites. We are of course thinking of ironworking activities, of pottery, as well as the different types of stoneware and porcelain. Finally, what kinds of contacts were maintained between Sungai Jaong and the outside world (Borneo, China Sea, Southeast Asia, Indian Ocean)?

The fourth aspect focuses on the Hindu-Buddhist structure at Bongkisam. After more than fifty years of research on Hindu-Buddhist structures in Southeast Asia following its discovery, a reappraisal is required from chronological, functional and symbolic points of view.

The fifth aspect concerns the dynamics of the natural environment based on litho-stratigraphic and phytolitic studies. These studies should make it possible to suggest hypotheses on the site's environment during the period of ancient occupation, on the choice of this site and on its abandonment.

The sixth aspect concerns the study of rock-carvings and traces of cutting on numerous large sandstone blocks at Sungai Jaong. While Harrisson has compiled a documentary corpus of about a hundred items, much remains to be done in this regard and this objective already represents a challenge in itself, given the environment. This is without mentioning the chronological issues and their interpretation, as proposed previously. In fact, Harrisson was convinced that these traces were contemporary with the ironworking activity, but he did not provide absolute evidence to support this hypothesis. At this stage, it is important to be open to the possibility that these carvings and traces of cutting may have nothing to do with the occupation marked by the ironworking remains and the Chinese ceramic shards.

Initial fieldwork took place in two phases in 2018, namely topographical survey and clearing of the remains of the stone structure in Bongkisam (with the collaboration of Christophe Pottier for a diagnosis regarding the conservation of the remains) (fig. 4), and core soil sampling at the Sungai Jaong site. A preliminary study of the old collection of artefacts relating to the ironworking found at the Sungai Jaong site was also carried out.

Following the acquisition of the land at both sites by the end of 2018, the way was opened to start excavations in 2019. The 2019 fieldwork took place at Sungai Jaong from the 12th of June until the 10th of July. Stéphanie Leroy[5] participated in the programme for its archaeo-metallurgy component. Yohan Chabot[6] carried out a palaeo-environmental study at Sungai Jaong. Zhao Bing[7] worked on the study of stoneware and porcelain remains. In July 2019, in collaboration with Tang Hui, she undertook an inventory of the corpus collected by Tom Harrisson at Sungai Jaong (30,000 shards kept in the Museum Department) and examined the finds collected during the 2019

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excavations. Without going into detail, since the publication of a progress report is planned following the 2020 fieldwork, it can already be said that the first field operations in Bongkisam and Sungai Jaong yielded very promising results and bode well for the future, both in scientific terms and in the context of the development of the Santubong Archaeological Park (figs. 5 and 6).

A Memorandum of Understanding between the EFEO and the Sarawak Museum Department concerning archaeological research on the Sarawak River Delta sites, particularly in Sungai Jaong and Bongkisam, has been signed in Miri (Sarawak) in September 2019.

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