IRON AGE IN SOUTHEAST ASIA

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In this paper, I shall discuss the issue of the Iron Age in Southeast Asia under two headings - mainland Southeast Asia and island Southeast Asia. On the mainland, I shall discuss the evidence from Vietnam, Thailand and Peninsular Malaysia, but exclude Burma, Laos and Kampuchea for lack of relevant data. In the islands, I will discuss Indonesia, Sabah, Sarawak and the Philippines. I would argue that the Iron Age as a separate cultural entity is evident on the mainland, but in the islands there is no identifiable Bronze Age preceding the adoption of iron. By the Iron Age, I mean a period associated with iron artefacts, wet rice farming, brisk internal exchange and external trade and, in the lowland at least, a ranked society. This corresponds roughly to the General Period C of Bayard (1984b, 163, see also Higham and Kijngam 1984, 13-21). But two points should be made about this scheme:

1 - This is a heuristic device, so all sites in Southeast Asia can not be easily fitted into it.

2 - There is as yet no general agreement among scholars regarding the chronology of various periods.

The Iron Age in mainland Southeast Asia

Vietnam

For Vietnam, Chinese sources generally associate iron with the Chinese annexation of Giao-chi in 111 BC and with the Han Chinese tombs in North Vietnam. However documentary evidence for iron in "Nam-Viet" is known from the 3rd century BC (Davidson 1979, 112). Archaeologically, the iron artefacts are found in two distinct cultural zones, (a) in association with the classic Dongson Culture of the north and (b) in the Sa Huynh Culture in Central and South Vietnam.

The Dongson Culture, named after the site of Dongson on the Song Ma river in Than Hoa province, came to light through the excavations of Pajot in the 1920's and Janse in the 1930's (Janse 1958; Solheim 1990). It is well known for its bronze drums, and the rich, high status burials. The first appearance of iron came in the Dongson sequence, and at Go Chien Vay (Ha Son Binh Province). It is dated to 400 ± 100 BC (Bln-893) (Ha Van Tan 1980, 131). Iron was rare in the Dongson culture which included some bimetallic spears with iron blades and bronze hilts and what is claimed to be a cast iron hoe (for a brief discussion of different views on the origin of the Dongson Culture in Vietnam, see Davidson 1979, Ha Van Tan 1980, 128-34, Solheim 1990). However, it is argued by Vietnamese archaeologists that the classic Dongson marked the culmination of a process of indigenous evolution of bronze craftsmanship in Vietnam that began in the Phung Nguyen period from about the first half of the 2nd millennium BC and went through the Dong Dau and the Go Mun periods (Ha Van Tan 1980, Hoang Xuan Chinh and Bui Van Tien 1983, 56-9). But this does not explain the appearance of iron artefacts in some (but not all) Dongson sites,because the evidence is meagre and the Dongson Culture was clearly in contact with South

China (Bellwood 1985, 274-5; Higham 1988, 145, 1989, 198; Murowchick 1988, 184). Bellwood (1985, 275) suggests that the limited iron industry of the Dongson Culture could have an immediate Chinese origin. The possibility of an Indian source is ruled out because of the lack of other evidence for Indian contacts at this time and the differences between the specific forms of the artefacts. Dongson iron tools seem to be mainly socketed, or even bimetallic types which are unknown in contemporary India.

There is more evidence of iron in the Sa Huynh Culture. The type site Sa Huynh is in Quang-Ngai province on the coast of Central Vietnam. First discovered by Vinet in 1909 (for a history of the site see Solheim 1961), this culture was associated with the jar burials, iron tools, ornaments, ear pendants, glass, agate and carnelian beads and pearls (Parmentier 1918; Saurin 1963; Trinh Can and Pham Van Kinh 1977; Ha Van Tan 1980, 136-7). It is broadly distributed along the sea from Central Vietnam to the Mekong Delta in the south and also in the interior of Xuan Loc region (Bellwood 1985, 275-6; Fontaine 1980, 1983; Janse 1961). Recently, some Sa Huynh sites were discovered in mountainous areas (Ngo Sy Hong 1988, 153). The iron repertoire included both socketed and unsocketed varieties and, like the Dongson, did not resemble the Indian bronze and iron artefacts, but iron sickles from Phu Hoa, a Sa Huynh culture site, are parallel to those in Late Chou China (Bellwood 1978a, 193). Thus Bellwood (1985, 277) again suggests a Chinese origin for the iron working, but he keeps his mind open. As regards the origin of the Sa Huynh culture, Ngo Sy Hong (1988) suggested that the urnfields with iron artefacts and beads have a long ancestry along the coasts and hinterlands of Vietnam. But according to Bellwood (1985, 275), the Sa Huynh culture belonged to an Austronesian speaking (Chamic) population of Indo-Malaysian origin.

It should also be remembered that the Sa Huynh culture had contacts with Central Thailand, Sarawak, North Vietnam and the Palawan Island in the Philippines in the forms of a distinctive knobbed pennanular stone ear-ring (*ling-ling-O*) and a two-headed animal ornament (Loofs-Wissowa 1982; Murowchick 1988, 197)..

Some radiocarbon dates are available for the Sa Huynh culture (Bronson n.d.). Bronson and White (n.d., 15) mention two dates, one each from Con Con Ngua (ZK-375 of 2600 ± 80 BP) and Phu Hoa in South Vietnam (Gif-1999 of 2590 ± 290 BP) showing the earliest evidence of iron in Vietnam. However, except these two, dates for the early appearance of iron in Vietnam are in the range of 500 BC Taking the case of Vietnam and Thailand together (discussed below), Bronson and White (n.d.) argued that in many places in northern mainland Southeast Asia iron came into use between 700 BC and 500 BC Bellwood (1985, 278) is sceptical about whether iron was common in South Vietnam as early as 600 BC., because the internal phases of sites and cultures are not clear and mostly rely on single dates for which information on context is not available. Moreover, some comb-incised pottery from Phu Hoa is similar to that from Oc Eo, a Funanese site in the south, which developed in the early 1st millennium AD.

Thus two problems remain for the Iron Age in Vietnam - absence of a secure chronology and the problem of its origin. As regards the former, it

seems safe to conclude that the Iron Age developed not before the mid-1st millennium BC As to the latter, I would keep an open mind, but it is clear that in the north of Vietnam, at least, iron appears only as the area comes under strong Chinese influence.

Thailand

During the last two decades, much archaeological work has been carried out in Thailand. During the early days of the discovery of the Ban Chiang Culture in the 1970's when some archaeologists argued that the Bronze Age dated from the early 4th millennium BC, the beginning of the Iron Age was correspondingly pushed back to about 1600-1200 BC at Ban Chiang (Gorman and Charoenwongsa 1976, 23). Since then the chronology for bronze and iron has been shortened and, although not every one is in agreement (see for example the arguments in Bayard 1979, 1986-7; Bayard and Charoenwongsa 1983; Higham 1986-7; Loofs-Wissowa 1983a, 1983b; Solheim 1983; White 1986 and 1990), the dating for the first appearance of bronze and iron in Thailand is roughly the same as in China - late 3rd millennium BC for bronze and mid-1st millennium BC for iron.

Higham (1989, 204-28) discussed the iron age sites in Thailand under two divisions - Central Thailand and the Khorat Plateau. In Central Thailand, iron appeared first in the sites of Nil Kam Haeng about 700-500 BC (Pigott n.d.) and Tam Ongbah with a single radiocarbon date of 2180 ± 100 BP (K.1300), (Sorenson 1974, 139), Ban Don Ta Phet dated to the early 4th century BC (Bennet 1982, Glover 1990, 155), Chansen (Period 1a), dated to 800-500 BC (Bronson 1979, 317-8), and Ban Tha Kae (Period II), dated to 500 BC-1 (Hanwong 1985).

Recently Glover (n.d.) argued that in case of Westcentral Thailand, the iron age was not preceded by a bronze age, as one finds in the Khorat Plateau; rather, it succeeded a developed late neolithic technology, starting perhaps between 700 and 500 BC. However, by about 400 BC iron had mostly replaced the stone technology. Glover emphasized the role of external westerly trade in this transition.

More work has been done on the Khorat Plateau. To cite some examples, the earliest complete iron objects with the most well defined stratigraphic contexts occurred in Ban Chiang MP VII (dated 800-400 BC), although several iron fragments appeared to be from earlier contexts (White 1986, 291-2). At Ban Na Di, iron first appeared as a fragment from level 7 (c.900-500 BC), but it was from level 5 (c.100 BC-AD 200) that it became abundant along with the evidence for smelting (Higham and Kijngam 1984, 121). Iron was recovered (along with bronze) from the earliest phase at Non Chai (500-350 BC), but became dominant in Phase V (50 BC-AD 200) (Charoenwongsa and Bayard 1983, 521)

With regard to the Iron Age, differences arise on two issues : a) whether the earliest evidence can be dated to the earlier or the later part of the 1st millennium BC and b) whether the beginnings of the iron technology was due to evolution in Thailand or diffusion from outside.

According to Higham, the transition from the Early Period to the Middle Period in Northeast Thailand was accompanied by the advent of iron, water buffalo and Om Kaeo pottery (Higham 1983, 244-5, Higham and

Kijngam 1984, 707). Moreover, the initial appearance of iron was as prestige items of import, most probably from the Dongson Culture of North Vietnam because of the similarity of cast-on bronze hafts of Ban Chiang and Dongson spear points (Higham and Kijngam 1984, 721), and also because of the bimetallic tradition in Southeast Asia, particularly in areas offering easy contact with China (Higham 1983, 236-7). Iron technology, that is the local manufacture of iron, was introduced from India in the Chi and Mun valleys through the same exchange network that brought glass and semi-precious stone beads from India (Higham and Kijngam 1984, 720-1). Higham (1989, 190) was reluctant to accept any evidence for iron working in Southeast Asia before 500-400 BC, but more recently Pigott's excavations at Nil Kam Haeng in the Wong Prachan Valley northeast of Lopburi city has yielded buriel tombs in a metal working site with secure contexts and dated to c. 700 BC (Pigott, n.d.)

Higham has been criticized by others as allowing too short a chronology for the introduction of iron in Thailand. Thus, White (1986, 292-3) pointed out that though iron blades and bangles are available from well defined stratigraphic positions in MP VII, dated 800-400 BC, at Ban Chiang, there are about half a dozen iron objects which could be earlier than those with a good context. On the whole, she feels that iron was certainly present by 500 BC and possibly earlier. She also pointed out the following limitations in Higham's scheme (White 1986, 296-302):

1 - The advent of iron, Om Kaeo pottery and bones of water buffalo did not appear simultaneously at the beginning of the Middle Period.

2 - White did not rule out the possibility of import of iron artefacts from Kampuchea and Vietnam. According to her, these three regions constituted a "metallurgical province". She felt that within a couple of centuries the people in northeast Thailand should have learnt the technology because of an already rich bronze technological tradition; therefore, there was no need for them to have learnt how to make iron from some Indian technological diffusion to the northeast, in view of the linguistic and logistical barriers, and the lack of other evidence for Indian contacts at this time.

3 - The bimetallic spear points were iron versions of bronze artefacts already well established in Thailand. If there were any imports, they might have come from South Vietnam, in view of the similarity of iron bangles from both regions. Iron bangles were not found in the Dongson Culture nor in Yunnan.

4 - Iron can be an inevitable by-product of copper and lead smelting through an accidental encounter and subsequent use of iron ore. This could explain the occurrence of a few iron artefacts to begin with (see also Piggott and Marder 1984, 279 and 298; Bennet 1988).

5 - Higham's assumption that iron working could not have developed prior to Late Period (Level 5) at Ban Na Di for lack of evidence of slag might not be true, because of the possibility of smelting done near the ore source rather than in the village.

Bronson (1985, 206-07) drew attention to the evidence for iron in Thailand prior to the period of intensive contact with India and China which occurred, in his opinion, not until the 1st century BC. At least eight radiocarbon dates associated with the Iron Age, and earlier than 500 BC are

available. He saw that the evidence of iron was earlier in the northeast and in the east-central part of Thailand than in the the west-central part (Bronson and Charoenwongsa 1988, 14). For lack of hard evidence, Bronson did not enter into the controversy of whether iron was independently evolved inside or diffused from outside. But he was certain that it never came from China, because early evidence of iron in Thailand was a product of direct iron working, while the indirect process dominated early iron production.in China (1985, 209, 213).

Higham (1989, 190) points out that we do not have a satisfactory date for the appearance of iron and the beginning of Indian contact; however, he assumes that local bronze workers in Thailand learnt iron working sometime between 600-400 BC.

While the chronology of the Iron Age in Thailand is yet settled, it may be safe to conclude that iron had certainly appeared in Thailand by the mid-1st millennium BC and possibly a few centuries earlier. Whether one agrees with the idea of an initial diffusion of iron technology from India to Thailand or not, it is not unreasonable to conclude that the pace of the iron technology would have accelerated because of contacts with India.

Peninsula Malaya

In Malaysia, the archaeological context for iron working is far less good than in Thailand, and no excavations have yielded *in situ* dateable material. Linehan (1951, 55-6) felt that in Malaysia the Bronze Age did not precede the Iron Age, but that both cultures were connected from the beginning, introduced from Funan between the 1st and 3rd centuries AD.. Funan, in turn, got the inspiration from the Dongson Culture. Because of the lack of copper in Malaysia he felt that the bronze objects were items of import, while the iron artefacts were locally made.

Loewenstein (1962, 60-5), however, felt a Bronze Age had preceded the Iron Age in Malaysia, because iron tools were very rare in the Dongson Culture. It should be remembered that Loewenstein, like many archaeologists of his day, extended the term Dongson Culture very widely. On the other hand, many iron objects were found in Malaya, so there must be a considerable time gap for the diffusion of iron smelting to Malaysia. He assumed a difference of at least 1000 years between the emergence of the Bronze and the Iron Age in Malaya.

Sieveking (1962) identified four types of pottery - Slim River, Bukit Chumpong, Kalumpong and Pontian wares. According to him, the Malaysian iron industry was derived from Indo-China and penetrated from Northeastern Malaya (ibid., 112). The break up of the Dongson Culture might have led to a shift to Cambodia and Malaya (ibid.:122). Though the designs of the iron tool types seemed to have derived from the Dongson Culture, he found it difficult to trace any direct connection (ibid., 124). More recently we can see a close link between the iron tools of Malaya and west central Thailand (e.g. Ban Don Ta Phet) but this material was described only after Sieveking had written.

Peacock (1979, 205) considered Sieveking's attempts to find similarity between the Dongson artefacts and those from the Peninsular Malaysia to be over-contrived. He pointed out that the Iron Age materials

were near tin and gold mining areas of Western Malaysia, and again argued for the contemporaneity of the Bronze and the Iron Ages, (or the lack of separate ones) taking into account the evidence of both bronze and iron artefacts from Kampong Sungei Lang and Kuala Terengganu (ibid., 213).

Bellwood (1985, 290-92) addressed the two issues of chronology and origin. He referred to artefacts of low carbon steel found with the Klang bells and the Kampong Sungeilang drums dated to between the late centuries BC and the early centuries of the Christian era and rejected Loewenstein's belief that the Malaysian Iron Age was as late as 1000 AD Regarding origin, he referred to the socketed artefacts from Sa Huynh in South Vietnam, Tam Ongbah and Ban Don Ta Phet in Westcentral Thailand and also from South Thailand which are dated to the last few centuries BC..

Only a few radiocarbon dates are available for the Iron Age in Peninsular Malaysia (Bronson n.d.). Except one from Sungailang (GX-280, 2435 ± 95 BP), they date from about 300 BC onwards. The exceptional sample from Sungailang is from a source of large wood, hence its ability to give a precise date when the context of burial is doubtful.

Thus, in Peninsular Malaysia, while we do not get clear evidence of the Bronze and Iron Ages as separate entities as we find in the case of Vietnam and Northeast Thailand, iron here too can be dated from about the 3rd century BC..

Iron Age in Island Southeast Asia

Indonesia

It is unfortunate that despite the vast area and good potential, work on late prehistoric archaeology in Indonesia is deplorably inadequate. In 1958 Heekeren wrote of a 'Bronze-Iron Age' in Indonesia following the Neolithic period (1958, 1). But Bellwood (1985, 297) suggested that some sites included Heekeren's Bronze-Iron Age might be historic.

Usually bronze and iron objects occur together in sites excavated recently such as Gilimanuk in Bali (Soejono 1979, 193), Plawangan (Sukendar and Awe 1981) Lamongan and Leuwiliang in Java (Sutayasa 1979, 69), Leang Buidane in Salebabu (Bellwood 1978b, 277-8, 1985, 307). There are only a very few pieces of bronze, dated and clearly preceding the appearance of iron, at Uai Bobo 1 in East Timor (Glover 1986, 153) and at Sasi in the Lou Island, Papua New Guinea. (Ambrose 1988). The former has a radiocarbon date of 2190 ± 80 BP (ANU-237). Three radiocarbon dates on charcoal are accepted for the latter - 2200 ± 140 BP (ANU- 2155), 2040 ± 100 BP (ANU-3014) and 2060 ± 180 BP (ANU-5398) (Ambrose 1988,489).

The chronology also remains unclear except in a few cases. The Dongson drums are distributed from Java and Sumatra in the west to the Kai Islands in the south and New Guinea in the east (Bellwood 1985, 280-1). But in the absence of proper contexts, these cannotbe used to date the Early Metal Age in Indonesia. Nine radiocarbon dates on charcoal are reported for Gilimanuk, Bali - the earliest being 2020 ± 165 BP (GrN-7129) (Bronson and Glover 1984, 41). Pasir Angin is dated to 2460 BP (Indraningsih 1985,136) but is a single date with no mention of its context or laboratory number. The Early Metal Phase at Leuwiliang near Bogor and Pejaten near Jakarta is dated to before 200 AD (Bellwood 1985, 301). A date for iron from

Pejatan in Java was 2550 ± 200 BP (ANU-1520), but the association between the dated carbon and the iron artefact is not clear (Bronson and White n.d., 15)

Glover (1979, 179) talked of seven principal types of burial structure (urn-fields, stone slab or cist graves, stone built graves, terrace graves, dolmens, rectangular stone sarcophagi and cylindrical stone vats), associated with the Early Metal Age in Indonesia. While the Western Indonesian sites were associated with mixed burials - including those of jar and slab - (for example, for Gilimanuk, see Soejono 1979, 195-7 and for Plawangan, see Sukendar and Awe 1981), the Eastern Indonesian sites were primarily jar burial, for example, Leang Buidane (Bellwood 1978b, 267-74), the Melolo cemetery in Sumba (Heekeren 1958, 85-9). The slab graves of Western Indonesia are said not to be of South Indian origin, despite their formal similarity to some Indian megalithic graves, due to a lack of diagnostic Indian black-and-red ware. Moreover, slab graves were known from the Neolithic onwards in Central and Eastern Taiwan (Bellwood 1985, 303).

One can conclude, for the moment at least, that there was no separate Bronze and Iron Ages in Indonesia; rather the metals appear together. The evidence of the Early Metal Age is much earlier in Western Indonesia beginning in the late centuries BC than that in Eastern Indonesia, dated to the second half of the 1st millennium AD

Sabah and Sarawak

Harrisson and Harrisson (1971, 209), feel it is not possible to distinguish between Bronze and Iron Age in Sabah. Bronze and iron objects occur together in the Early Metal Age jar burial sites of Madai-Baturong, Sabah (Bellwood 1984, 50-2). Five radiocarbon dates - one from shell and four from charcoal, are reported from Madai Cave 1 (Bronson n.d. , Entry No. 95, 97-100). The earliest date from the shell sample (ANU-2943) is 2820 ± 70 BP. but is considered about 500 years too early (ibid., Entry No.95). The other dates range from about 2nd century BC to mid-1st millennium AD Usually iron is believed not to precede the 7th century AD in Borneo (Harrisson 1972, 36). Although two radiocarbon dates (No. unknown), associated with iron from the Painted Cave at Niah in Sarawak are dated 2300 ± 80 BP and 2115 ± 150 BP, the excavator thought them to be errors because of the samples of wood from large trees (Harrisson 1967, 96).

Philippines

Subscribing to Heine-Geldern's grand theory of diffusion rather than basing their arguments on local evidence, Beyer (1947) and Beyer and De Veyra (1947) advocated that in the Philippines the Copper-Bronze Age started between ca. 800-500 BC and the Iron Age ca 300-200 BC, coinciding with their scheme of the fifth and sixth waves of migrations respectively. Beyer (1948, 66) thought that iron technology came from South India reaching the Philippines through the Malay Peninsula and Borneo, probably not earlier than 2nd or 3rd centuries BC.. The Iron Age of the Philippines, according to Beyer, was characterised by four industries - the manufacturing of iron artefacts, decorated pottery, cloth weaving and glass bead making.

Solheim (1964, 207-12) saw iron first coming to the Philippines between c.400 and 100 BC.. He discussed the four associated pottery complexes of the Filipino Iron Age - the Kalanay, the Bau, the Novaliche and the Lo Boc. He felt that Iron technology was carried to separate areas in the Philippines by two or three groups - the Kalanay people brought iron to the Visayan islands, Mindoro, the Calamianes and Palawan; the Novaliche group to the Manila Bay and the Northern Palawan and the Malays (with the Bau pottery complex) brought iron and glass to Mindanao.

Fox (1970, 14-6, 163-6, 172; also see Jocano 1975, 109-22) used the term Metal Age which he divided into the Early Metal Age from 700 BC to 200 BC with copper, bronze and gold artefacts, and the Developed Metal Age which included iron and dated from 200 BC to AD 1000. The earliest radiometric date (UCLA-992C) for iron comes from Chamber B of the Manunggul cave, 2140 ± 100 BP (Fox 1970, 15). However,he did not consider the Bronze Age as a major period in the Philippines because, "the early appearance and rapid diffusion of iron and iron-making precluded the development in the Philippines of a true 'Bronze Age' (Fox 1970, 122).

Solheim (1981, 47) found no evidence of rapid diffusion of iron and iron-making. In his revised periodization for Filipino prehistory, the earliest evidence of bronze is found in the Early Formative Period (1000-500 BC) from the Tabon caves around 800-700 BC (ibid., 44) and the first evidence of iron artefacts in the Middle Formative Period (500 BC-AD100) (ibid, 39). As opposed to bronze and bronze technology, there was a time gap between the introduction of iron artefacts and the appearance of iron technology (ibid., 57). The iron objects were basically prestige items with no evidence of local manufacturing of iron artefacts until the Established Period (AD 500-1521). Moreover, "Nusantao" sailors played an important role during the Formative Period (ibid.,39).

Hutterer (1977) opposed the idea of a Filipino Iron Age. He (ibid.,184-86) rejected the diffusionist idea of population movement to different islands as the cause of the spread of metal technology. Rather, for him, metals (both iron and bronze which, in his opinion, are dated to 500-300 BC in the Philippines) found their way to Island Southeast Asia by maritime trade.

Summary

While one can distinguish the Bronze from the Iron Age as separate cultural entities in mainland Southeast Asia (except Westcentral Thailand and Peninsular Malaysia), it is difficult to do the same in the case of the islands , where the two metals come together as an 'Early Metal Age'. There is no consensus regarding the chronology for the iron but iron had certainly appeared by the mid-1st millennium BC and possibly, a few centuries earlier in certain areas of the mainland. In the islands and Peninsular Malaysia, iron appeared from about the 3rd century BC onwards. The origin of iron technology is uncertain. But considering the scale and elaboration of bronze production through the 2nd millennium BC in the "Metallurgical Province" of Thailand, Kampuchea and Vietnam, iron may have developed independently in Southeast Asia. Irrespective of the origin, iron industry was spread by the development of an active trade and exchange with India

from the late centuries BC. However, iron tools from different areas in Southeast Asia have distinct local forms and a single source of origin and inspiration is unlikely.

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