Journal of Archaeological Science 47 (2014) 142–163

Contents lists available at ScienceDirect

Journal of Archaeological Science

journal homepage: http://www.elsevier.com/locate/jas

The Iron Kuay of Cambodia: tracing the role of peripheral populations in Angkorian to colonial Cambodia via a 1200 year old industrial landscape

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ARTICLE INFO

Article history:
Received 11 July 2013
Received in revised form
7 April 2014
Accepted 12 April 2014
Available online xxx

Keywords:
Southeast Asia
Cambodia
Angkor
Archaeometallurgy
Iron smelting
Kuay

ABSTRACT

The Industries of Angkor Project (INDAP) is the first scientific study combining investigation of the chronology, supply network and technology of raw and finished iron within Angkorian (9th to 15th c. AD), Middle Period (15th to 19th c. AD) and Colonial (1863–1953) Cambodia. This paper is concerned with the production technology employed at five iron smelting sites in the northern province of Preah Vihear, three loci within the enclosure walls of the Angkorian Preah Khan complex and two, c. 30 km east, near *Phnom Dek* or 'Iron Mountain'. The Phnom Dek area is a historic homeland of the ethnic minority *Kuay* people, who continued to smelt iron from local mineral sources into the 1940s. With the aim of testing a previously proposed 'Angkorian Kuay' hypothesis, that Kuay ancestors were responsible for Angkorian period iron smelting at Preah Khan of Kompong Svay (Preah Khan), the objective of this preliminary study was to establish whether any technological continuity could be detected across a 1200 year old industrial landscape, and thus if any socio-culturally homologous relations could be proposed for the ironmakers respectively responsible. Our preliminary results suggest that the iron smelting remains at Preah Khan date from Angkor's terminal phase and into the subsequent Middle Period, whereas as the two studied production sites near Phnom Dek range from the 9th–11th c. AD and to the 19th/20th c. AD. Preah Khan and Phnom Dek production systems appear to have used different iron ore sources but, in the absence of well-preserved furnace remains, statistical analysis of slag chemistry indicates a technological conservatism spanning more than a millennium. At this stage the 'Angkorian Kuay' model can be neither rejected nor sustained but the complexity of Preah Vihear province's settlement and industrial history is becoming increasingly apparent and will only become clearer with further excavation and study of chronologically and geographically intermediate sites.

1. Introduction

The emergence, expansion, and decline of the Angkorian Khmer empire between the 9th and 15th centuries AD (traditionally 802–1431) have been themes of intense scholarly study for over 100 years. Due to its initial domination by epigraphic and architecturally-focussed research in and around the Angkorian capital, this resulted in an understanding of medieval Cambodia heavily biased towards culture history and artistic achievement (e.g. Aymonier, 1900–03, Bergaigne and Barth, 1893; Cœdés, 1909, 1954; 1968; Cœdés and Parmentier, 1923; Jacques and Lafond, 2004; Lunet de Lajonquière, 1901; Lunet de Lajonquière, 1902; Parmentier, 1939). Building upon the precocious wide-area synthesising efforts of Bernard-Philippe Groslier (1966, 1973, 1979),

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http://dx.doi.org/10.1016/j.jas.2014.04.009
0305-4403/

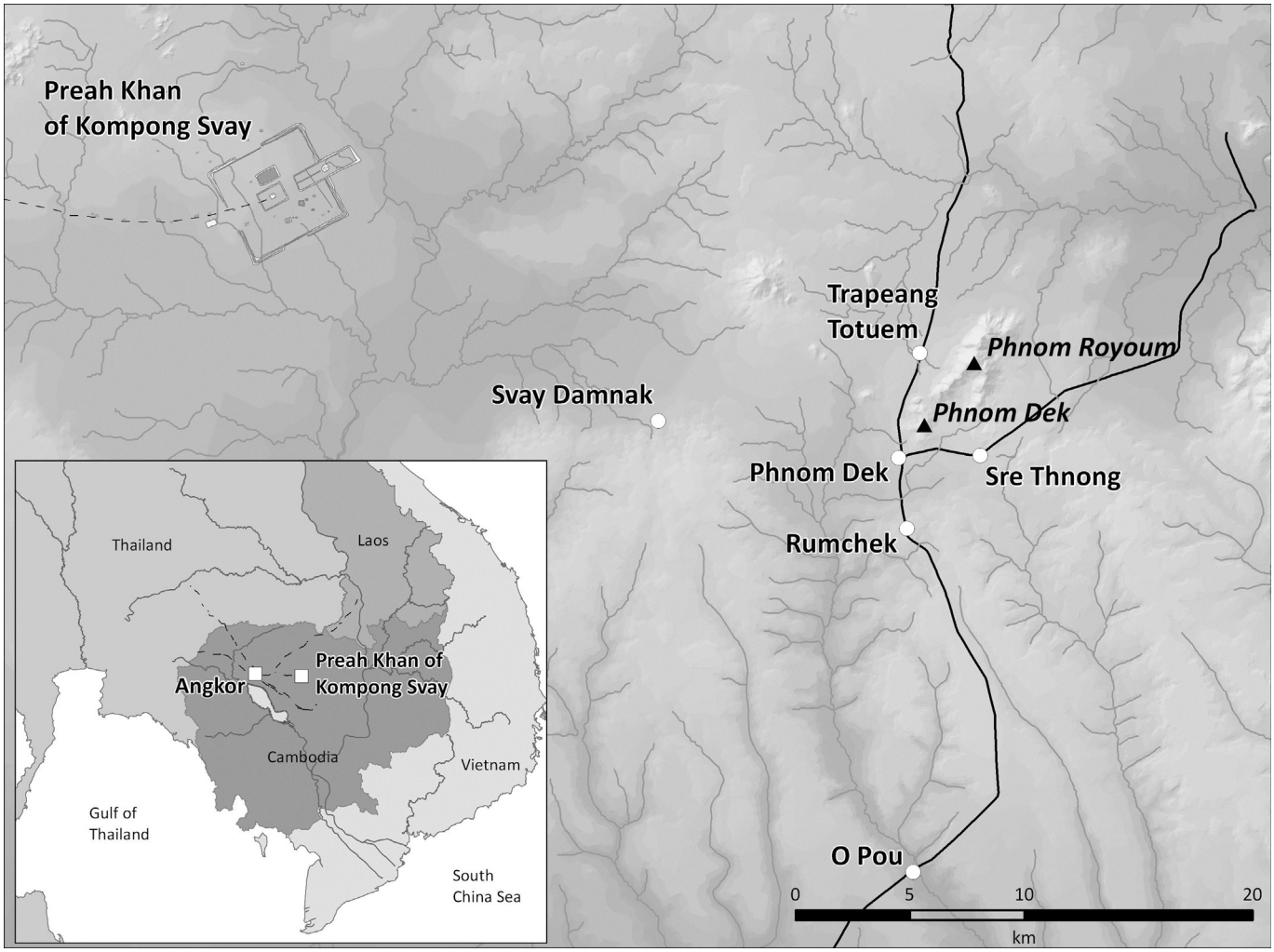

Fig. 1. Location of Preah Khan of Kompong Svay, modern villages (circles) with evidence of metallurgical remains and known ore sources (triangles) surveyed in Preah Vihear province. Insert shows spatial relationship of Preah Vihear sites to Angkor (square) and the medieval Khmer road system (dashed line).

recent work at Angkor and its provincial centres has shifted attention away from the temple-centred mindset toward integrating the peripheral socio-political and socio-economic landscapes coeval with the capital (e.g. Evans et al., 2007; Fletcher et al., 2008; Penny et al., 2006; Polkinghorne, 2007; Pottier, 1999).

Much in this latter theme, Hendrickson's (2008, 2010, 2007) integration of landscape and transport geographic theories identified a critical association between state-level Angkorian settlement patterning and access to specific economic resources; in particular the iron needed for the Khmer's intensive agricultural production, vast building programmes and fervent militarism, especially during the 10th to 13th centuries. This paper concerns Cambodia's northern province of Preah Vihear, which hosts the major Angkorian politico-religious urban complex of Preah Khan of Kompong Svay (hereafter 'Preah Khan'), located 100 km east of the Angkorian capital in Siem Reap Province (Fig. 1) and the extensive reserves of high-quality iron oxides at Phnom Dek, literally the 'Iron Mountain'. The region surrounding Phnom Dek iron is itself a historic homeland of the *Kuay* ethnic minority, who were smelting iron as recently as the 1940s (Levy, 1943) and are known to have smelted iron for Khmer elite during the 16th century (Khin, 1988: 151). Preah Khan is the largest complex built by the Angkorian Khmer, comprising four concentric walls reaching a maximum length of 4.8 km, and an architectural history beginning in the early 11th century and subsequently modified/expanded through to the 13th century AD. Preah Khan is historically associated with the rise of Jayavarman VII, the famed king who reclaimed Angkor from the Cham in 1181 AD (Groslier, 1973). However, due to the proximity of ore deposits and its evidence for iron production (mineral, slag, and technical ceramic) inside the enclosure, Preah Khan's long-standing role is postulated to be an important supplier of iron metal to the Angkorian heartland (e.g. Jacques in Jacques and Lafond, 2004: 259–261; 286), and as such is a major focus of Hendrickson's "Industries of Angkor Project" ("INDAP", see Hendrickson et al., 2013; Hendrickson and Pryce, 2011; Hendrickson et al., in press). Subsequent surveys by INDAP[1] around Phnom Dek itself, however, (Fig. 1) have documented the presence of a vast (400–600 km^2)[2] 'industrial landscape' with a quantity and scale of iron production evidence dwarfing that seen at Preah Khan.

Late 19th and early 20th c. AD francophone accounts of *Kuay* minority populations clustered around northeast Thailand,

[1] This initiative commenced in 2010 as the lead author's subsidiary Wenner-Gren funded research programme, the "Iron Kuay Project", but henceforth should be considered an integral part of INDAP's long-term objectives.

[2] As much of this area is densely forested and contaminated with unexploded ordnance, it is likely that our estimate is dramatically low.