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Desert kites in the Negev desert and northeast Sinai: Their function, chronology and ecology

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ABSTRACT

Desert kites are stone-built, funnel-shaped installations comprising two long and low stone-built walls ('arms') converging on an enclosure or pit at the apex. They are found in the deserts of the Near East, and are generally accepted as representing game traps to catch herds of wild ungulates. Their chronology is debated but some desert kites appear to have functioned as early as the 7th millennium BC. The largest number of these structures is recorded in the deserts of eastern Jordan where they often form chains of up to 60 km long. In contrast, in the Negev (Israel) and Sinai (Egypt) deserts, the desert kites are few in number and occur as small, individual installations.

This paper presents the results of archaeological surveys and excavations of 16 desert kites from the Negev desert and northeast Sinai. We present radiocarbon dates, infrared stimulated luminescence ages and chronology of material culture to show that desert kites in this region were established in the late 4th–early 3rd millennia BC and ceased to function by the mid-2nd millennium BC. The size, shape and location of the desert kites fits the physical conditions of the terrain and also the ethology and ecology of the prey species hunted.

1. Introduction

Desert kites (also termed hereafter, kites) are ancient funnel-shaped installations comprising long, low walls built of local field stones, with two long sides ('arms') converging on a stone-walled enclosure or pit at their apex (Figs. 1a,b). These installations were first identified by RAF pilots flying over the eastern desert of Jordan after the 1st World War who coined the term 'desert kites' due to their shape as seen from the air (Maitland, 1927; Rees, 1929). To date, kites are known from the desert regions of Jordan (Betts and Helms, 1986; Betts, 1998; Helms, 1981; Helms and Betts, 1987), Syria (Castel et al., 2005; Kennedy and Freeman, 1995; van Berg et al., 2004), Saudi Arabia (Adams et al., 1977: 35–36; Ryckmans, 1976), Israel and the Sinai Peninsula, Egypt (Avner, 1972; Meshel, 1974, 2000; Perevolotsky and Baharav, 1991).

Two interpretations of the desert kites were initially offered by the RAF pilots; Maitland (1927) suggested they served as hunting traps, while Rees (1929) explained them as devices used in the past to corral and defend domestic herds in times of danger. In an editorial note to the latter publication, Crawford (1929: 408) referred to a description by the 19th century traveller Burckhardt (1831) recounting a gazelle hunt, probably in Syria, using such an installation. The hunting interpretation proposed by Maitland, was adopted by Dussaud (1929: 151) and later by Field (1960: 129–131), but was surplanted by the herd corral theory which gained wider acceptance (Eissfeldt, 1960; Kirkbride, 1946; Ward, 1969: 208; Yadin, 1955: 5–10).

In the early 1970s, following the discovery of desert kites in the southern Negev and northeast Sinai, two researchers argued for a return to the hunting trap theory (Avner, 1972; Meshel, 1974). They based themselves on archaeological data, animal ethology as well as on the vivid, eye-witness accounts of Aharoni (1946: 31–33), Burckhardt (1831: 220–221) and Musil (1928a: 26–27), that described hunting of Persian goitered gazelle (*Gazella subgutturosa*) using such installations. These and other narratives, such as that recounted by the early 17th century traveller Teixeira (cited in Legge and Rowley-Conwy, 2000: 443), described huge gazelle herds being hunted in Syria using funnel-shaped structures with diagonal stone-built walls, or lines of parallel wooden poles hung with rows of rag pennants, that ended in an enclosure. In all instances, the gazelle herd was driven into the broad opening of the funnel along a passage created by the walls/poles, up to the walled

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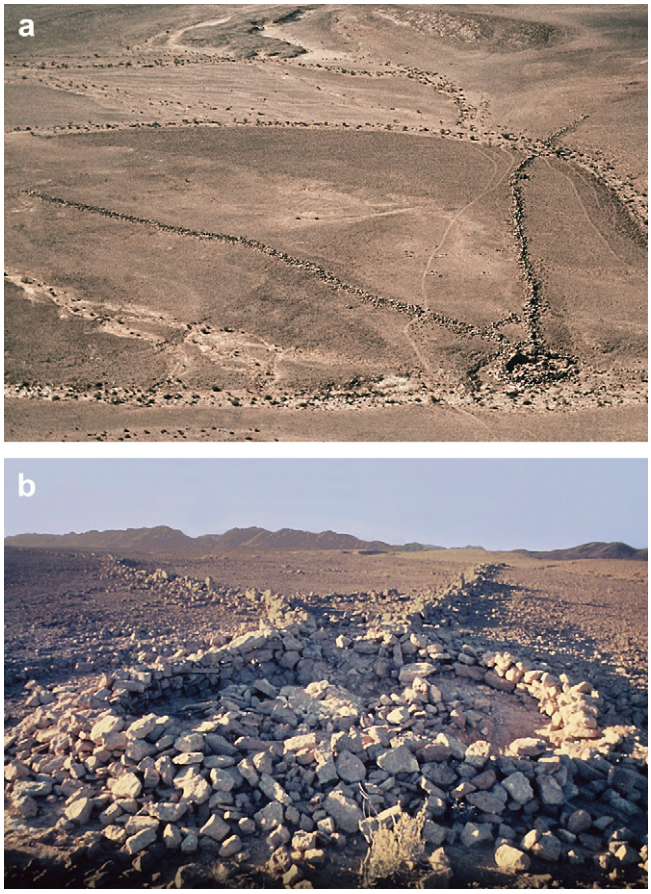

Fig. 1. (a) Jebel Hamra desert kite, southeast Sinai. (b) Close-up showing the pit of the Jebel Hamra desert kite with intersecting walls.

enclosure at the apex which was surrounded by pits, where they were trapped and killed. It should be noted that there is little if any evidence from the Jordanian deserts for such 'killing pits' surrounding the desert kites (e.g. Betts, 1998). In Syria, Wright (1895) mentions 40–50 gazelles slaughtered at a time in one killing pit, Musil (1928b: 4) notes that 50–60 gazelle were killed in this manner in half a day; Burckhardt (1831) describes the killing of hundreds of gazelles, while Aharoni (1946: 31) documents 500–600 animals slaughtered in a single kite.

During the last 80 years several other theories have been offered to account for the function of desert kites, including a role as Roman defensive lines against the Parthian or Sassanian cavalries (Poidebard, 1934: 77–78, 191–196), Neolithic corrals for capturing wild goats and cattle undergoing domestication (Echallier and Braemer, 1995), installations for channelling run-off water (Helms, 1976: 19–20) and even as cult installations (Eddy and Wendorf, 1999: 180). However, the hunting interpretation has gained wide acceptance (Betts and Helms, 1986; Betts, 1998; Betts and Yagodin, 2000; Castel et al., 2005; Fowden, 1999; Helms, 1981; Helms and Betts, 1987; Hershkovitz et al., 1987; Meshel, 2000; Perevolotsky and Baharav, 1991; Rosen and Perevolotsky, 1998; van Berg et al., 2004) and is the paradigm guiding this paper.

Extensive research on desert kites has been carried out in eastern Jordan where their number has been estimated as over 1000 by Helms (1982: 101) or as 500–600 by Echallier and Braemer (1995: 36). In the Sinai Peninsula (Egypt), some 50 such structures are known, concentrated in the south, as well as four in the northeast (Haiman, 1986; Meshel, 1974, 2000). Research on the southern Sinai desert kites has focused on their association with pasture areas (Perevolotsky and Baharav, 1991). Despite several publications on kites of the southern Negev desert (Israel) and northeast Sinai (Egypt) (Avner, 1972; Avni, 1994; Haiman, 1986; Meshel, 1974, 2000) they have not been studied in detail. New investigations are currently in progress on several Negev kites, but only preliminary results are available (Bar-Oz et al., 2009).

In this paper we present a brief survey of the 16 desert kites known to date from the Negev desert and northeast Sinai Peninsula (Fig. 2), as well as principal results of archaeological excavations of two such structures. We present radiocarbon dates and infrared stimulated luminescence (IRSL) ages from the excavated kites and discuss regional variation in kite function, location and chronology. The environmental context of the kites is discussed in relation to the ethology of the probable prey species targeted.

2. Kites in the Negev desert and northeast Sinai Peninsula

A total of 12 desert kites are currently known from the Negev desert that together with four kites situated in northeast Sinai just over the Israeli–Egyptian border, share the same ecological niche (Fig. 2). An additional kite has recently been discovered at Ein Gedi in the Judean desert (Hadas, in press) (Fig. 2) and represents the northern-most desert kite in Israel. With this kite, the total number of these structures in the Negev–northeast Sinai is 17, which is a very low density given the size of the Negev – an area of ca. 13,000 sq km – especially when compared to the quantity of desert kites in eastern Jordan, Syria or even in southern Sinai.

2.1. Negev Highlands

Five desert kites are located in the western Negev Highlands (Nos. 1–5) (Fig. 2). The area is arid, receiving ca. 80–100 mm average rainfall per annum, while the annual potential evaporation is ca. 2700 mm. The vegetation is predominantly Irano–Turanian with some Mediterranean species. It is fairly dense in the wadis but also grows on the north-facing slopes (Danin, 1983).

Two kites (Nos. 1–2), only 1 km apart, were found on flat hilltops just above Nahal Horsha, a broad wadi used today by wild herbivores for grazing. They open to the north with their pits lying to the south on a rocky, steep slope ca. 5–10 m below the hilltop (Haiman, 1986: Nos. 145, 188). Additional two kites, also 1 km apart, are located 10 km to the south, just over the Sinai border. They are both built on flat terrain, on trails leading to an important perennial water source – 'Ein Qadis. One kite (No. 3) opens to the north with its pit below a 3 m step in the rock (Haiman, 1986: No. 370), the other (No. 4) opens to the northeast, ending on a steep slope and the pit is below a 5 m step in the rock (Haiman, 2007: No. 116). Desert kite No. 5 was built on a hillside and opens to the southeast (discovered by the late Z. Shaham; Meshel, 1974: 129–130; Meshel, 2000: 121–122).

2.2. Ramon Crater

Two desert kites are found within the Ramon Crater (Fig. 2 – Nos. 6 and 7), a hyper-arid area, much poorer in vegetation than the Negev Highlands (Danin, 1983). These installations are smaller than those of the Negev Highlands. In the Pitam kite (No. 6, Rosen, 1994: Site 168) the pit is built on the steep side of a wadi, while the Harut kite (No. 7, Avni, 1994: 147–148), is built in a wadi and utilizes a natural rock step, 2 m deep, for the pit whose walls are not preserved. The environment behind these kites is almost devoid of vegetation and it is hard to imagine, even given wetter conditions in the past, why this location was chosen for kite construction. However, both kites cut ancient paths. Kite No. 6 is an ancient trail used by both people and animals (today mainly by re-introduced