Middle Palaeolithic Flint Mines in Mount Carmel: An Alternative Interpretation

5

Avraham Ronen

Abstract

Numerous heaps of limestone fragments mingled with occasional Middle Palaeolithic flint artifacts were found on Mount Carmel. They were interpreted as Middle Palaeolithic quarries for the extraction of fresh flint nodules and as flint knapping workshops (Nadel et al. 2011). This interpretation is questioned here due to the virtual absence of concentrations of knapping residues – nodules, cores, flakes and fragments, among the limestone heaps. An alternative interpretation of the limestone heaps is offered here, namely that they were in all likelihood raw material prepared for lime production during the last centuries.

Keywords

Flint mines • Knapping workshops • Piles of limestone • Debris • Lime kilns • Middle Palaeolithic • Mount Carmel

5.1 Introduction

There are abundant concentrations of stone fragments on the surface of Mount Carmel (Fig. 5.1). The concentrations are of two types: the first occurs on vast areas literally covered by rounded and heavily patinated stone debris. These objects were initially believed to be Early Palaeolithic artifacts, and as such were registered during the thorough Archaeological Survey of the 242 square km of Mount Carmel carried out between 1964 and 1969 (Olami 1984, pp. 43–46). The Archaeological Survey has focused solely on human-related features. These gravel beds turned out, however, to be natural deposits of Neogene/Early Pleistocene drainage systems much bigger and largely different from the present one (Clark 1961; Avnimelech 1965).

The second type are smaller, well defined concentrations of angular stone debris mingled with some flint fragments. Typically ca 10 m in diameter and 0.5–1.0 m thick at the center, these piles were initially considered as natural accumulations and unfortunately they were not registered by the Archaeological Survey. In addition, these piles were never subjected to a scientific investigation and their formation is due to unknown causes. "Debris formed in the Last Glacial Maximum", was one geologist's hunch.

5.2 Hypothesis 1

In some areas of Mount Carmel, bedrock consists of alternating series of limestone beds 10–20 cm thick intersected by flint beds 10–15 cm thick. Piles of angular stone fragments are found in these areas. It was suggested that the fragments result from quarrying a limestone bed in order to expose the fresh flint underneath (Nadel et al. 2011). Quarrying a limestone bed with an underlying hard flint layer created step-like "extraction surfaces" or "quarrying fronts" (Nadel et al. 2011, p. 60). The angular debris (Fig. 5.2) have accumulated at the feet of those quarrying fronts. As is well known, freshly extracted flint nodules constitute a better raw material for tool production than nodules collected on the surface, battered by the elements and desiccated under intense sunshine. One large, elongated concentration of angular

A. Ronen (✉)
Zinman Institute of Archaeology, University of Haifa,
199 Aba-Hushi Avenue, Haifa 3498838, Israel
e-mail: aronen@research.haifa.ac.il

Y. Nishiaki, T. Akazawa (eds.), *The Middle and Upper Paleolithic Archeology of the Levant and Beyond*, Replacement of Neanderthals by Modern Humans Series, https://doi.org/10.1007/978-981-10-6826-3_5

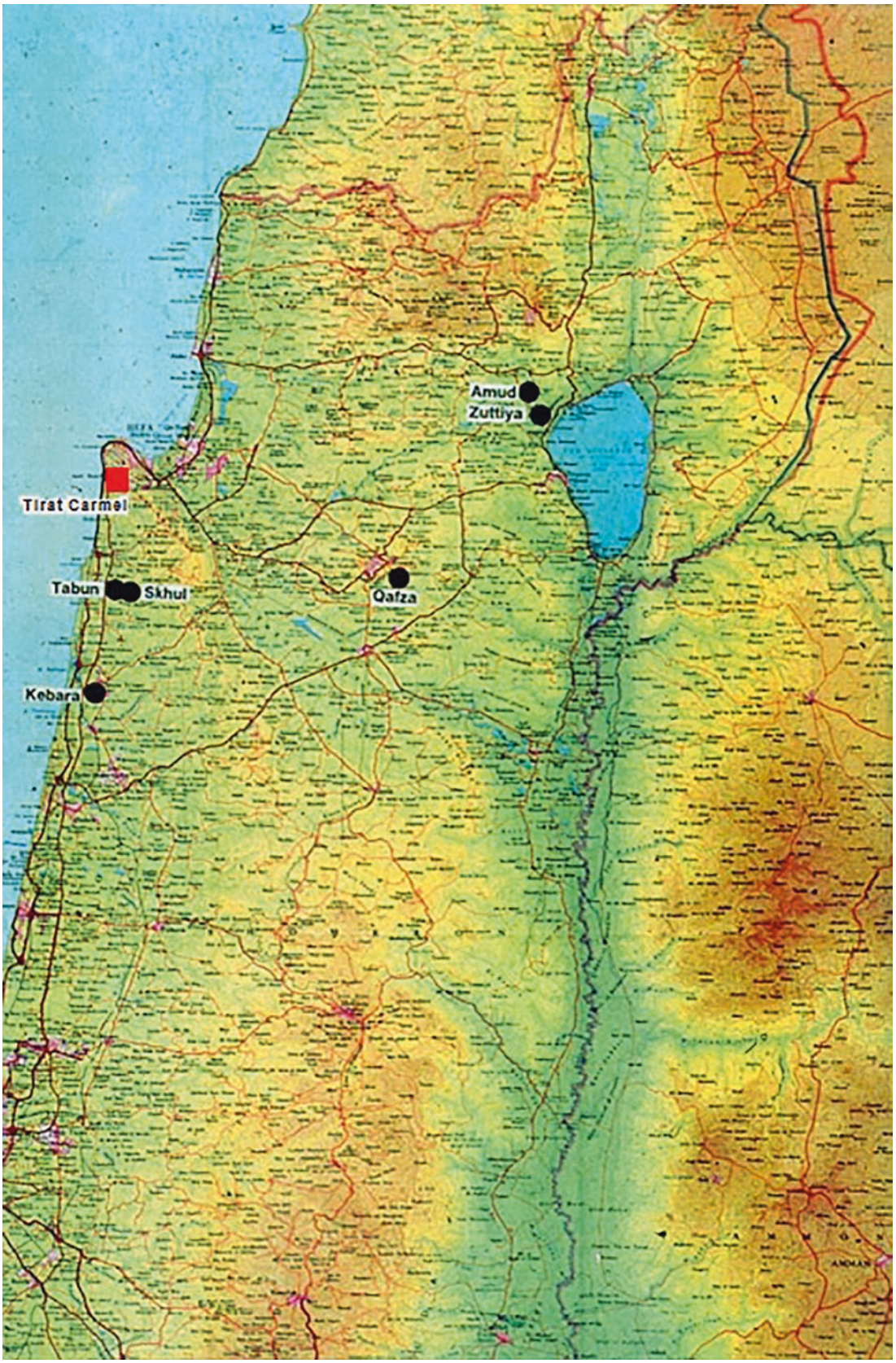

Fig. 5.1 Location map of the study area (red square) among MP burial sites

Fig. 5.2 A pile of limestone fragments in Mount Carnel (Photo, A. Ronen)

limestone debris along Nahal (river) Galim in north-western Mount Carmel was studied in detail (Nadel et al. 2011). Middle Palaeolithic-type flint artifacts were found on top and inside the concentration and these were taken to date the quarry.

Middle Palaeolithic peoples, experts of the Levallois method, would no doubt have the technical ability to break a limestone bed to pieces. Some of the newly exposed flint nodules bear flake scars. These were taken to be "test scars" (Fig. 5.3) indicating knapping activities. Hence the Middle Palaeolithic Nahal Galim flint quarry became a knapping workshop as well. This hypothesis holds far reaching consequences on the social organization of Middle Palaeolithic hominins in the Levant. The society would have the means to assemble individuals for the tedious task of quarrying flint (perhaps even individuals not in immediate need of flint). A mechanism to mobilize individuals for a communal effort intended for future needs reflects a central ruling authority, a level of social organization unexpected of Levantine Middle Palaeolithic society.

Some observations render, however, the Mount Carmel Middle Palaeolithic quarry/workshop hypothesis problematic. First, a very low density of lithic products was found among the limestone piles. The ratio of worked flints to limestone fragments is 0.043 and 0.064 respectively (Nadel et al. 2011, p. 64). Second, the virtual absence of clearly delineated concentrations of knapping residues – nodules, cores, flakes and debris is not compatible with a flint workshop hypothesis. Unquestioned knapping workshops (Neolithic, for example) consist of well defined, rich concentrations of knapping residues (Ronen and Davies 1970; Taute 1994).

5.3 Hypothesis 2

An alternative interpretation of the Mount Carmel limestone piles is offered here. This interpretation does not question the anthropogenic origin of the stone piles (considered of natural origin during the Archaeological Survey). This interpretation questions, however, both the function and the age of the limestone piles. Rather than waste products of flint quarries, according to the new interpretation the piles consist of debris prepared to be burnt for lime production. And rather than Middle Palaeolithic, the piles would date to the last centuries (Sasson 2002). Middle Palaeolithic flint artifacts are abundantly scattered on the surface of Mount Carmel (Olami 1984). Washed down slope, those artifacts could have easily mingled in the limestone piles. Indeed, the Middle Palaeolithic flint products at Nahal Galim occur mainly on the pile's surface, not inside the pile (Nadel et al. 2011, p. 60). Thus, the Middle Palaeolithic age attributed to the Nahal Galim pile is untenable. The "test scars" seen on some

Fig. 5.3 Flint nodules knapped

nodules are here interpreted as a random outcome of the quarry activities rather than a deliberate knapping.

Lime was a very important element in the traditional Levantine house building (Peled 2010). Building required large quantities of lime: mixed with sand, the lime served as mortar to bind the building stones while mixed with clayey earth, it served as plaster to be applied on the surface of the walls and the roof to repel moisture (Canaan 1933). Building a house actually started by building a lime kiln (Fig. 5.4) at the site (Canaan 1933). A round pit of the circumference of the planned kiln was dug to a depth of 1–2 m. The kiln walls began at the bottom of the pit. Rising above ground level, the walls terminate in a vault. The stone structure is covered by earth to ensure its being hermetically sealed (Canaan 1933, p. 20). The kiln had two openings at the bottom: one for feeding fuel and the other for ventilation. The kiln had to be fed with fuel day and night for 3–6 days, depending on the size of the kiln, until the stones turned lime. This procedure echoes lime production in biblical times: "And the peoples shall be as the burnings of lime: as thorns cut up shall they be burned in the fire" (Is. 33, 12). Trees were scarce in the Levant and thistles, especially *Sarcopoterium spinosum (L.)* constituted the main source of domestic fuel. Women and men collected a sufficient quantity of thistles during weeks before lime production began and stored it near the kiln. Burning lime in a small kiln required 700–1000 single person's loads of thistles. A large kiln took 2000–3000 loads (Canaan 1933, p. 21). Then the kiln was left to cool for 4–6 days before the lime could be removed and used. Hence it took some 10 days on average for a kiln to be re-loaded. In the

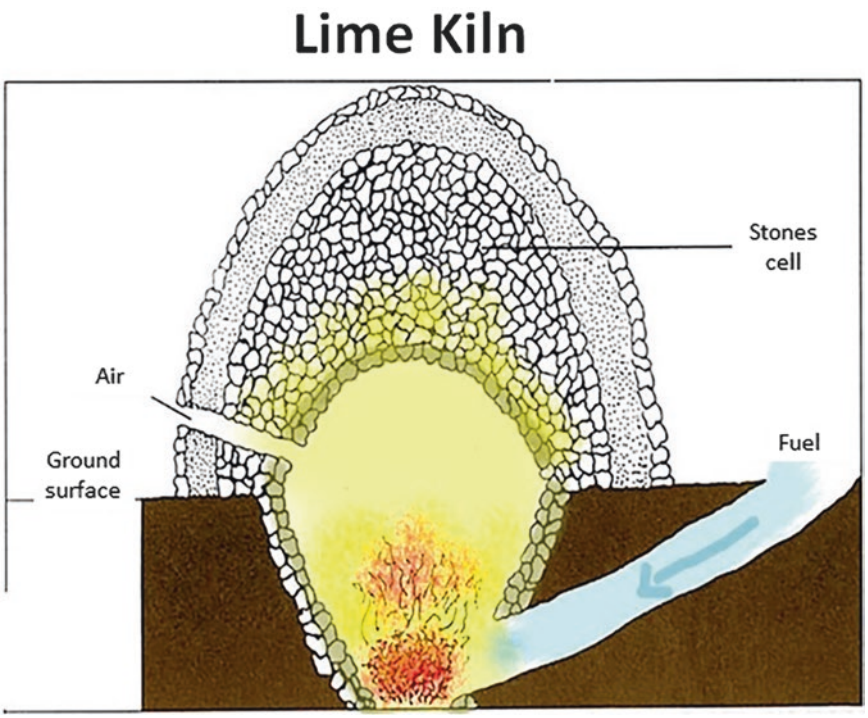

Fig. 5.4 Cross section of a lime kiln (From Sasson 2002)

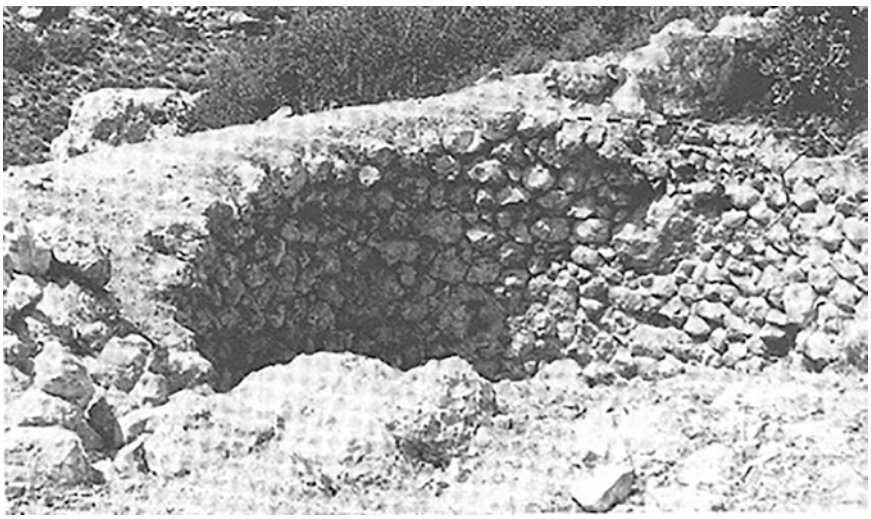

Fig. 5.5 Remains of a lime kiln in Mount Carmel (From Olami et al. 2003)

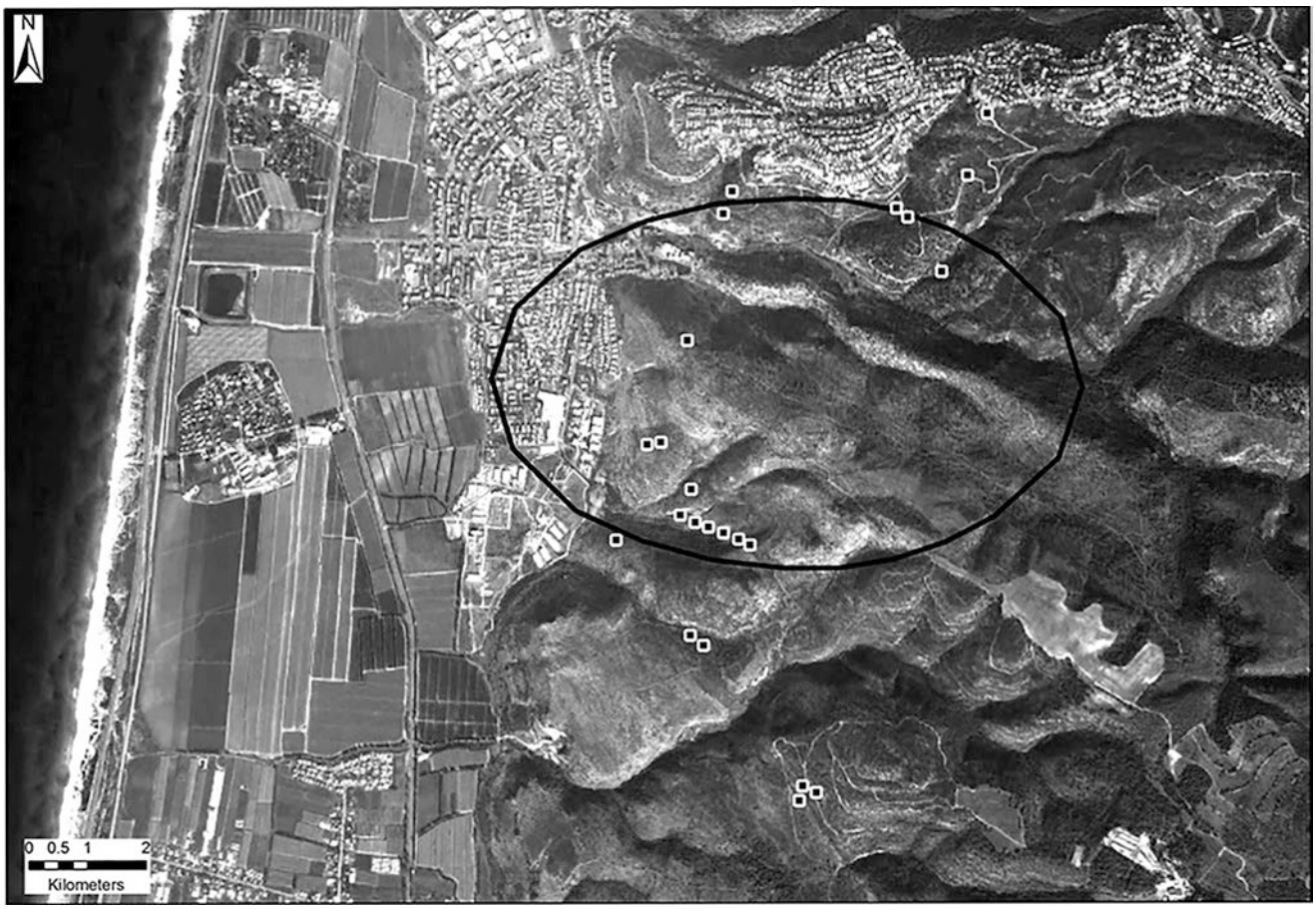

Fig. 5.6 Area of the Nahal Galim stone piles (circle) and location of lime kilns (squares)

immediate area of the stone piles discussed here, around Nahal Galim, the remains of some 20 lime kilns were revealed by the Archaeological Survey of Mount Carmel (Figs. 5.5 and 5.6) (Ronen and Olami 1978; Olami et al. 2003). Each kiln was fed ca. 4–5 tons of limestone fragments 10–15 cm in size (Sasson, pers. Comm.). For comparison, 98% of the limestone fragments reported by Nadel et al. in the Nahal Galim concentration are less than 20 cm long (Nadel et al. 2011, figs. 13 and 15). With 4–5 tons of debris in a kiln, the 20 kilns in the research area

would have used some 100 tons of stone debris every 10 days, i.e. approximately 10 tons per day.

Women participated in the building activities (Peled 2010, p. 72). They carried water in various containers from the source to the building place, they hauled building stones for the walls and even to the roof and they were responsible for applying mortar to the walls and plaster to the walls and the roof. The proverb says that "There is no joy like the joy of roofing (one's house)" (Canaan 1933, p. 82).

5.4 Conclusion

Nadel et al. (2011) believed to have discovered Middle Palaeolithic flint quarries, but in reality they have identified the method of obtaining stone debris for lime production in the Carmel area. The method consisted of attacking a limestone bed above a hard flint bed and breaking it into fragments 10–15 cm long. In conclusion, the Nahal Galim limestone piles are not flint quarries and knapping workshops, nor are they of Middle Palaeolithic age. They are in all likelihood stone debris prepared for lime production during recent historical times.

References

Avnimelech MA (1965) The problems of quaternary geology of the Sheikh Suleiman Cave on the Carmel and their bearings on the regional quaternary history. In: 6th Congress UISPP Rome, pp 170–173

Canaan T (1933) The Palestinian Arab house: its architecture and folklore. J Palest Orient Soc 13:1–83

Clark JD (1961) Fractured chert specimens from the Lower Pleistocene Bethlehem beds, Israel. Bull Brit Mus (Nat Hist) 5:71–90

Nadel D, Rosenberg D, Zisu NS, Filin S (2011) The Nahal Galim/Nahal Ornit prehistoric flint quarries in Mt. Carmel, Israel. Eurasian Prehist 8(1–2):51–66

Olami Y (1984) Prehistoric Carmel. Israel Exploration Society, Jerusalem

Olami Y, Ronen A, Romano A (2003) Map of Haifa-West. Israel Antiquities Authority, Jerusalem

Peled K (2010) Architecture, the Arab house as a social text. Resling, Tel-Aviv

Ronen A, Davies M (1970) Un Atelier de Taille Nèolithique au Mt. Carmel: Le Point 355z. l'Anthropologie 74:161–194

Ronen A, Olami Y (1978) Atlit map. Archaeological Survey of Israel, Jerusalem

Sasson A (2002) Lime Kilns on the Carmel. Michmanim 16:41–42

Taute W (1994) Pre-Pottery Neolithic flint mining and flint workshop activities southwest of the Dead Sea, Israel (Ramat Tamar and Mesad Msazzal). In: Gebel HGK, Kozlowski SK (eds) Neolithic chipped lithic industries of the Fertile Crescent. Ex-Oriente, Berlin, pp 495–510