Musch, Tilman – Brückner, Dorothea

# Clayton Rings and ancient beekeeping: an ethno-zoological contribution.

aus / from

**Journal of Global Archaeology 2020: pp. 186–197**

DOI: https://doi.org/10.34780/joga.v2020i0.1004

**Herausgebende Institution / Publisher:**
Deutsches Archäologisches Institut


## ABSTRACT

**Clayton Rings and ancient beekeeping**

An ethno-zoological contribution

Tilman Musch, Dorothea Brückner

The paper deals with the use of the still enigmatic "Clayton Rings" found on about 50 sites of the Central Sahara, most of them in the Libyan desert. According to hypotheses made so far, the ceramics, which are supposedly related to special subsistence strategies in an arid environment, have served for food procurement. In our ethno-biological approach, we will revisit one of these hypotheses dealing with beekeeping and honey production. In so doing, we will compare the ceramics to different mud- or clay-hives from the Mediterranean area and relate their use to the occurrence of *Apis mellifera sahariensis*, a subspecies of the honeybee and probable relic of a former bee-population widespread over nowadays Sahara. We conclude that the use of the enigmatic ceramics as hives may seem the most probable solution to their mystery.



## KEYWORDS

Clayton rings, Central Sahara, beekeeping, honeybee, ceramic

TILMAN MUSCH, DOROTHEA BRÜCKNER

# Clayton Rings and ancient beekeeping

## An ethno-zoological contribution

1 In 1931, during his South-Western Desert Survey expedition, Patrick Clayton "noticed two rings" embedded in the ground "and worn down to the level of the ground by wind and sand. In the centre of each was a circular disc [...] with a tribal or owners mark on it and a central hole." And Clayton concluded: "I have no clue as to their purpose" (Clayton 1937: 255). In 2000, when a paper summing all available data about Clayton rings was published (Riemer – Kuper 2000; cf. Kuper 2006), 100 examples of them had been discovered on 19 sites in the Eastern Sahara, but the role they played "in adaptation to a desert already void of habitation" remained still enigmatic (Kuper 2006: 93; cf. also Darnell 2002; Gatto 2001; Marchand 2003). In the following years, the number of ring discoveries and sites grew again. 108 rings were found only on the sites of El Kharafish (Riemer 2011: 62). Actually, Clayton rings have been found on about 50 sites, most of them in the Libyan Desert (Förster 2015: 146–153).

2 It is supposed that the Clayton rings "are part of special subsistence strategies in arid conditions, or to techniques of desert travelling" (Riemer – Kuper 2000: 98), and in fact most suggestions made so far as to their purpose are dealing with food procurement, for example cheese confection, salt collection, the trapping of small animals or the production of honey, the latter being one of the most favored hypotheses (Förster 2015: 99–100)[1]. In a recent analysis, Pachur finally (Pachur 2017) describes the Clayton rings as part of a pyrolysis apparatus.

3 In the present contribution, we will revisit the hypothesis of honey production. In an ethno-zoological approach[2], we will compare the Clayton rings to some examples of ancient hives of mud or terracotta from Mediterranean civilizations and raise the question how they could be related to specialized beekeeping in the desert. Considering the fact that the very small measurements of the ceramics compared to other hives

1 Concerning the production of honey, Riemer and Kuper (Riemer – Kuper 2000) are referring to a personal communication of F. Klees, pointing out "an actual analogy of collecting wild honey by similar clay vessels" recorded from Darfur. No reference could be found.

2 The authors of the present contribution are an ethnologist working in the Central Sahara and bordering regions (Tilman Musch, Bayreuth University) and a zoologist specialized in bee-research (Dorothea Brückner, Bremen University).

Fig. 1: Rings and disks at Eastpans 95/3

could put the beekeeping hypothesis into question, we will center our discussion on two hypotheses which are not mutually exclusive: 1. the ceramics could have served as small hives, as combinable hives or as extension rings for more voluminous hives; 2. the bee colonies kept in the desert where, due to adaptation to an extremely scarce environment, particularly small. Nevertheless, the aim of our contribution is not to give any conclusive proofs, but rather to emphasize on parallels between the production of honey in clay or ceramic tubes and features of the Clayton rings, providing thus possible evidences for beekeeping in the Sahara 5000 years ago.

## Description of the Clayton rings

4 The Clayton rings from different sites seem to be "quite standardized pieces" (Riemer – Kuper 2000: 92). They represent a conical ring with a diameter between 55 mm and 149 mm at the top rim and a height between 80 and 132 mm (Riemer 2011: 66). Two unusually large rings have also been found at the site Meri 00/11 (Förster 2015: 149). At sites with well-preserved pottery each ring seems to be associated with a slightly curved clay disk with a central perforation of 13 to 20 mm in diameter. The disks were either made of old potsherds or of clay lumps which then were fired; they are seemingly related to the smaller opening of the rings (Riemer – Kuper 2000: 97).

5 At the sites, "often the pottery was not *in situ* and the original context seemed to be destroyed" (Riemer – Kuper 2000: 94). However, on three of the sites, "nearly identical arrangements" of the pottery could be found (Riemer – Kuper 2000: 94). Site Eastpans 95/3 yielded two deposits on a small inselberg (Fig. 1). Here, respectively seven and four rings have been found in the caches with disks, either scattered between and under the rings (cache 1) or inside the related ring (cache 2). At cache 1, "the seven Clayton rings (…) were set in a line under a small rock overhang at the northern slope of the hill" (Riemer – Kuper 2000: 94). Three short pieces of string where also found here below one of the disks (Riemer – Kuper 2000: 94). An inselberg at Regenfeld 96/15 (see Fig. 5) yielded a similar arrangement with two caches in rock niches of about 30 rings. Single rings or disks could be found on the slopes or in front of low hills, where "the original caches might be completely destroyed" (Riemer – Kuper 2000: 94–95). The frequency of rings "on or beside rocks […] seems to confirm this position as characteristic" (Riemer – Kuper 2000: 94–95).

Fig. 2: Clayton Ring during excavation

6 Two other assemblages presented a different picture, with rings and disks inside a stone circle (Basecamp 96/8) or set together in three clusters on the floor of an interdune valley (Mirmala 00/10). However, whereas the "clear grouping of the pieces [at Mirmala 00/10] promised clues to the use and function of the Clayton rings" no "other artefacts, remains of their content or any related features" could be found (Riemer – Kuper 2000: 95). As it is suggested, Mirmala 00/10 could present an arrangement of rings and disks in use, "while cached rings in rocky shelters may have been stored to await the return of their owner" (Riemer – Kuper 2000: 94–95); (Fig. 2).

7 The piece of twisted cord found under the pottery of cache 1 at Eastpans 95/3 allowed radiocarbon dating which yielded a date of 4430 ± 80 bp (UtC-5940) with a calibrated age of 3124 ± 152 BC (Riemer – Kuper 2000: 96). This dating places the pottery between the late Predynastic or early Dynastic period of Egypt and is partly confirmed by potmarks of some of the ceramics coinciding with marks of the same period from the Nile Valley (cf. van den Brink 1992). A radiocarbon date obtained from rings at Bir Sahara approximatively covers the same time span (Gatto 2001: 59). However, evidences from several sites suggest that Clayton rings where used up to the Old Kingdom still by the indigenous nomads of the region. Radiocarbon dates from the shelter deposit of El Kharafish allow to date back Clayton ring potsherds and additional pharaonic pottery from the same deposit to about the 4th Dynasty, which excludes an early dynastic age of this pottery (Riemer 2013: 188–194). Clayton rings where also found at the 4th-dynasty pharaonic desert outpost of "Djedefre's water mountain" (= Chufu 01/1), some of which show potmarks like hieroglyphs (e.g., Riemer 2013: 77–106). One can interpret in the same way Clayton rings associated to sites along the Abu Ballas Trail comprising Late Old Kingdom pharaonic pottery (Förster 2015: 146–154). However, they lack precise context dating, and any earlier period for the deposition of the rings cannot be completely excluded (cf. Förster 2015: 209–216).

## Beekeeping in clay or ceramic tubes in ancient Egypt

8 Since several thousand years, ceramic or clay and mud tubes have served as beehives. The earliest known representation of beekeeping is on a stone bas-relief from the sun-temple of Ne-user-re from Abu Ghorab in Lower Egypt (now in the Egyptian Museum, Berlin) dated to 2400 BC which shows horizontal tube-like vessels as beehives

Fig. 3: Beehive from Kahun

narrowing at one end (cf. Armbruster 1921: 68–70; Crane 2000: 164; cf. also Kuény 1950). Since several thousand years and still in recent times Egyptian beekeepers used cylindrical tubes made from Nil mud as hives. They are made into piles numbering hundreds of them (Crane 2000: 167–171; Ruttner 2003: 256–257). A perforated mud end cap serves to close the cylinder and is, in its shape, extremely similar to the Clayton disks (cf. Kritsky 2015: 117, Fig. 13.2). Mud cylinders have also been used in Palestine for beekeeping (Neufeld 1978).

9 In the town of Kahun (dated to about 1900 BC) in the Fayum oasis about 100 km from Saqqara, a long pipe-like conical clay cylinder closed at one end was found (Petrie 1890; Pl. XIV, Fig. 14, here Fig. 3). Remains of beeswax, pollen, and the hind leg of a bee have been detected by chemical analysis in this ceramic, and it was supposed to represent an ancient Egyptian beehive (David 1986: 156). However, for Kritsky (Kritsky 2015: 117), it seems too small for this purpose, as it is only 38 cm long and 9 cm / 7 cm wide (Crane 2000: 164). Thus, it was suggested to be an Egyptian model of a hive (Crane 2000: 164). This hypothesis seems however questionable, as there then would be no explication for the presence of beeswax, pollen and the hind leg of a bee.

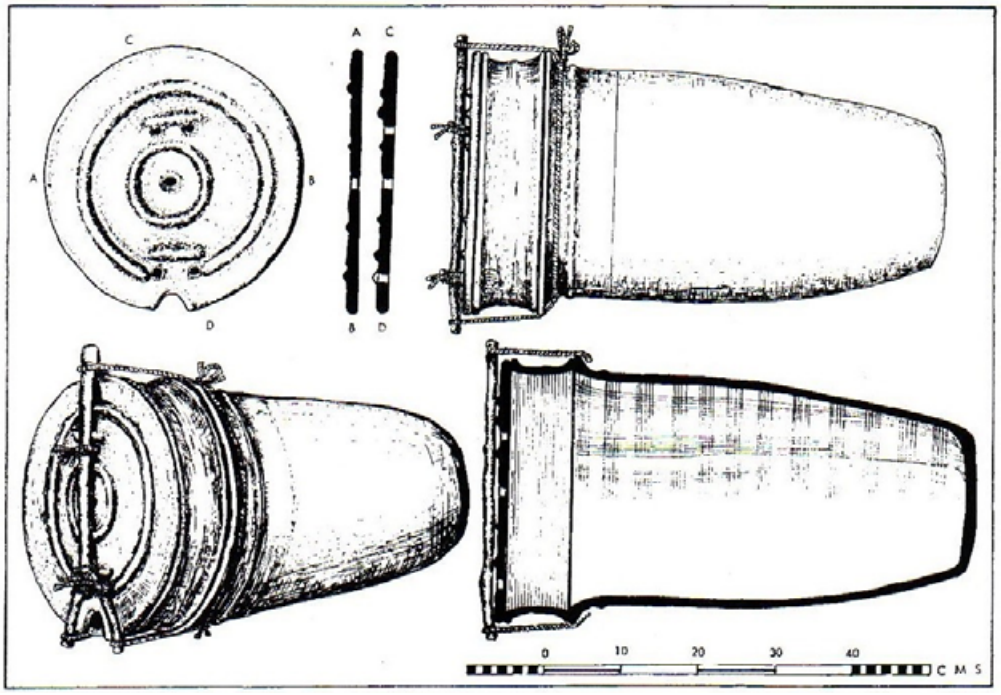


Fig. 4: Terracotta-hives and extension rings from Trachones

## The extendible hive

10 Hives as the Egyptian mud-cylinders were not extendible and honey was stored in the same container at its back side as honeybees always do to better protect their harvest from predators. A major technical improvement occurred when extensions have been invented which could be added, for example as rings (see Fig. 4), to the basic hive for honey storage during the main nectar flow. Their use allows to harvest honey without disturbing the colony. Such extensible hives were found on the Arabian Peninsula, Lebanon, Turkey, Iraq, Iran as also Sudan (cf. Crane 2000: 175; Karpowicz 1989; Rashad – El-Sarrag 1978).

11 In South Yemen, for example, sophisticated clay hives are used, with a "'brood chamber' [...] shaped like a large artillery shell with no base. It lies horizontally and has clay pipes added as 'honey supers'". When honey is harvested, the bees are smoked out of the super which is removed completely with the combs (Karpowicz 1989: 26). In Sudan, the "Omdurman hive" is constituted by two pots (12 inches in diameter) of baked

clay put one in row with the other vertically. A clay disk with a small whole (1 inch) separates the brood-chamber from the honey-chamber (Rashad – El-Sarrag 1978).

12 Such extendible hives of fired clay are widespread in Mediterranean beekeeping (cf. Graham 1975; Ruttner 1979) and have still been in use in the 20th century (Ruttner 1979). On Crete, for example, a terracotta tube, narrowing conically towards its back, which could be extended by supplementary tubes, was used in traditional beekeeping. This hive is considered to be an enlarged modification of the oriental and African tube-hive (Ruttner 2003: 239–240). On Malta, a bottle-shaped hive of fired clay was used still in the 1900s. "One or more cylindrical extensions could be fitted telescopically to the back of the hive" (Crane 2000: 188). Still in the 1990s, a horizontal pottery hive was used on Syros, with a conical main chamber of about 84 cm in length, a diameter from 37,5 cm to 16 cm, an extension of 44 cm in length and a disc-like closure with small perforations around a central whole (cf. Crane 2000: 194 according to Bikos 1994).

13 Hive-like pottery called *kalathoi* has been found during excavations (Jones – Graham – Sackett 1973: 397–414; cf. also Jones 1976) at Vari (350–275 BC) and Trachones (400–300 BC). They are associated with perforated lids the whole(s) of which served to attach them to the tubes they covered and / or to allow bees to pass. Also associated terracotta rings served seemingly to extend the hives and show thus striking parallels to the so-called "ekes", similar circles made of wickerwood which serve to extend skep hives (Jones 1976). Gas-chromatography showed the presence of beeswax in the pottery and thus confirmed their supposed purpose as beehives (Jones 1976: 412–414).

14 Diameters of the lids, the rings and the mouths of the jars of the Vari pottery were about 32 cm to 40 cm; the jars were about 40 cm – 45 cm tall. The height of the rings varies from 6,5 cm to 9 cm (Graham 1975: 68). The illustration below shows the hive from Trachones (Fig. 4). The hive was closed by a disk which was attached by means of a stick and strings to the main corpus. An extension ring could be inserted between the main corpus and the disk.

## Beekeeping in the desert

15 Compared to most cylindrical or conical clay or terracotta hives mentioned above, the Clayton rings would have constituted a relatively small hive. The above mentioned conical hive found in the town of Kahun may correspond best in size and shape to the rings. In this context, we have to take into account the already arid environmental conditions, which may also impact the size of a bee colony and their activity-cycle and which may lead to the evolution of a well-adapted ecotype of the honeybee.

16 The dating of the Clayton rings shows in fact that they have been in use about 2000 years after the desiccation of the Sahara (cf. Kröpelin 1993); thus the pottery served probably highly specialized groups inhabiting the desert and its oases and maintaining far contacts with Egypt, Nubia and perhaps also the West to exploit still unknown resources of the arid environment (Riemer 2002: 15)[3].

17 There is in fact one subspecies of the honeybee which is supposed to be a relic of a bee population formerly widespread over the areas covert actually by the

3 There exists some fragmentary testimonies from more recent epochs of beekeeping in the desert: Aristomachus and Philiscus wrote during the Hellenistic period the probably most relevant books on beekeeping in Ancient Greece. Pliny and Columella comment on their writings (which are lost) the following: "Nobody must be surprised that love for bees inspired Aristomachus of Soli to devote himself to nothing else for 58 years, and Philiscus of Thasos to keep bees in desert places, winning the name of Wild Man; both of these have written about them" (Pliny XI.9.19; in Crane 2000: 197). A reference to beekeeping in Saharan or Sahara bordering regions is related to Aristaeus, a Greek deity. The latter is said to have travelled through the Mediterranean, probably up to Libya, to teach people there, among other agricultural activities, beekeeping (Crane 2000: 196; cf. Fraser 1951). For background information on Saharan flora and biogeography, see, amongst others, Médail & Quézel (Médail – Quézel 2018).

Fig. 5: The inselberg at Regenfeld (site 96/15) southwest of Dachla Oasis. Fieldwork as part of SFB 389 "ACACIA"

Sahara (cf. Ruttner 2003: 213–214): *Apis mellifera sahariensis*. Small populations of this subspecies can still be found in southern Morocco and south-western Algeria (Ruttner 2003). The "Saharan bee" is adapted to an environment where flowering plants are scarce and nectar sources restricted to some weeks during a year in particular by its extremely economic breeding behavior and the resulting small size of the colony, as also by the ability to cover 2–3 times longer distances when searching for flowering plants than other ecotypes of the honeybee (Baldensperger 1932: 855–839; Haccour 1960).

18 *A. m. sahariensis* shows also a spectacular capacity of adaptation to temperature, as peaks of 50° Celsius in summer and freezing in winter-nights occur in its habitat (Ruttner 1975: 334). Furthermore, a honeybee-subspecies showing close morphometric affinities to *A. m. sahariensis* as also to *A. m. jemenitica* (a subspecies living in areas bordering the Sahara in its south and on the Arabian Peninsula) occurs in the Libyan Kufra oases with their environmental conditions characterized by high temperatures and extremely low rainfall (cf. Shaibi – Fuchs – Moritz 2009).

19 Beekeepers of the Moroccan Tafilalet house colonies in very small hives (20 cm x 25 cm x 50 cm) embedded in cavities of the walls of their houses (Haccour 1960: 97)[4]. The favorite nesting places for wild colonies are cavities in rocks (Baldensperger 1932: 855–839). Former colonies of wild bees in the Libyan desert also have reportedly nested "in rock fissures in the steep side of wadis 100–200 m high" (Crane 2000: 47)[5].

20 Not least, it could also be possible that the Clayton Rings served to house stingless bees. Colonies of these meliponines (cf. Mitchener 2013) are in general even smaller than those of *A. m. sahariensis*, and their honey is hunted for by humans in Africa and other continents (cf. Eardley – Kwapong 2013). Recently, one of the present authors (Musch) could find colonies of stingless bees around Timia in the Air mountains (Niger, March 2019), where their honey is occasionally exploited by locals.

4 See also: "Dans toute la région des Oulad-Sidi-Cheikh, les indigènes logent leurs abeilles dans un creux du mur, ferment l'ouverture avec une pierre plate et plâtrent le tout de façon à ne laisser visible que le trou de vol pour les abeilles, mais rendent l'approche à l'abri du vol humain" (Baldensperger 1932: 836).

5 According to a personal communication (Saad 1989).


Fig. 6: Site 96/15 detail of the Clayton Rings. Some of them showing "signs" during excavation

## Note on ownership marks and beekeeping

21 Often Clayton rings are marked by crosses, squares and other rectangular figures (Fig. 6), whereas on the disks single lines, crosses or tree-shaped motives can be found (Clayton 1937: 255; Riemer – Kuper 2000: 97–98; Riemer 2011: 72). Most of these marks have been engraved after firing, and thus supposedly not by their producer but by their user (Riemer – Kuper 2000: 98; Gatto 2001: 56). Potmarks on Clayton rings from El Kharafish have all been applied after firing (Riemer 2011: 71).

22 The incised signs on the Clayton rings could be ownership marks of a clan or an individual on "his" hive(s). Such marks, close to ancient potmarks (cf. Adams – Porat 1996; van den Brink 1992) are still nowadays widely used all over the Sahara by pastoralists as livestock brands (cf. Musch 2017) but also on salt bars by the sedentary Kanuri of Fachi and Bilma (Fuchs 1983: 76–77). Similarities exist for example between several of the marks shown in figure 18 by Riemer and Kuper (Riemer – Kuper 2000: 99) and livestock brands of the Tubu Teda (cf. Le Cœur 1969: 141–145, 166–168, 178; Musch 2017: Fig. 4, 221), as for example the "throwing knife" (*muzuri*), the "axe" (*tomori*) or the "raven claw" (*wooso*).

23 Ownership on bees is marked all over the world, either on the nesting place or on the hive itself, by signs, stone piles or other features (cf. Crane 2000: 108–115). In Angola and Kamerun, for example, beekeepers are marking trees where they place their hives (Crane 2000: 108–115), and for the Kenyan Akamba it is reported that "every clan has its own mark (*ubano*), which is put on cattle, arrowheads and beehives" (Thorp 1943: 255).

## Conclusion

24 The aim of the present paper is to show parallels between recent and historic beekeeping devices and the Clayton rings, as also to advance some ideas how beekeeping could have been fitted in an already arid environment. As already mentioned in the introduction, this parallels will not allow to draw any final conclusion; our aim is rath-

er to contribute, from an ethno-zoological viewpoint, some elements to the discussion about the still enigmatic ceramics.

25 Comparing the measurements of the Clayton rings to contemporary and historic hives, the relative small volume of the ceramics could allow to argue in disfavor of the beekeeping-hypothesis. However, two examples of small hives – the pottery from Kahun and the hives of the Tafilalet – show that much smaller hives than the usual ones existed and are perhaps still in use. And there is no reason to exclude that a particularly well adapted and now extinct ecotype of the honeybee lived in colonies of even smaller size than those of the current *Apis mellifera sahariensis* populations, or that the pottery was used in order to house stingless bees. The Clayton rings could also have been extension rings associated to a main corpus of a hive made from more perishable material; or several Clayton rings could have been combined to constitute an extendible hive. The string found at Eastpans 95/3 (cf. Riemer – Kuper 2000: Fig. 6, 94) could have served to attach several rings one to another or to attach one extension ring to a hive, in a similar way as shown on the illustration from the ceramics of Trachones (Fig. 4).

26 Some features linked to the arid environment may also allow to think about honey production (either by a kind of apiculture or by honey-hunting) as purpose of the Clayton rings. As mentioned, *Apis mellifera sahariensis*, the supposed relict of the "Saharan" honeybee, lives, due to its adaptation to the scarce environment, in much smaller colonies than other subspecies of honeybees do. The preference for nesting of this subspecies seems to be mountains and rocks, a fact that could explain the frequency of Clayton rings found in rock shelters or on the slopes of small mountains. In this case, the ceramics could have served, as supposed by the mentioned scholars, to a very specialized exploitation of a resource in the desert environment.

27 The potmarks are, in their shape, very similar to ancient potmarks of the Nile valley, but also to those of recent pastoral or sedentary populations of the Sahara. The fact, that they have been applied by the user and not by the producer could be explained with reference to Saharian and Sahelian habits of marking livestock or other property and to the traditions of marking beehives or other nesting places of bees in order to display ownership. The hives could have been placed in rock-shelters by their owners who would then have come back only after the next flowering season in order to collect the honey from their respective hives.

28 If considering all above mentioned evidences which allow relating the Clayton rings to beekeeping in an arid environment, the use of the still enigmatic ceramics as hives may seem the most probable solution to their mystery.

## References


**Adams, B.** – **Porat, N. 1996** Imported Pottery with Potmarks from Abydos. In: Spencer, A. J. (ed.), Aspects of Early Egypt, pp. 98–107. London.

**Armbruster, L. 1921** Bienenzucht vor 5000 Jahren. Nach einem altägyptischen Relief von 2600 v. Chr. In: Archiv für Bienenkunde 3: 68–80.

**Baldensperger, P. J. 1932** Variétés d'abeilles en Afrique du Nord. In: Proceedings of the Fifth International Congress of Entomology: 829–839. Paris.

**Bikos, T. 1994** Melissokomiki Epitheorisi [Beekeeping recordings] 8: 309–312; 353–358.

**Clayton, P. A. 1937** The South-Western Desert Survey Expedition 1930–1931. In: Bulletin de la Société de Géographie d'Égypte 19(2): 241–265.

**Crane, E. 2000** The World History of Beekeeping and Honey Hunting. London.

**David, R. 1986** The Pyramid Builders of Ancient Egypt. London.

**Darnell, D. 2002** Gravel of the Desert and Broken Pots in the Road: ceramic evidence from the routes between the Nile and Kharga Oasis. In: Friedman, R. (ed.), Egypt and Nubia. Gifts of the Desert. London, pp. 156–177.

**Eardley, C.** – **Kwapong, P. 2013** Taxonomy as a tool for conservation of African stingless bees and their honey. In: Vit, P. / Pedro, S. R. M. / Roubik, P. D. (eds.), Pot-Honey. A Legacy of Stingless Bees. New York: 261–268.

**El-Banby, M.N. 1977** Biometrische Untersuchungen an der Honigbiene in der Sozialistischen Libysch-Arabischen Volks-Jamahiriya. In: Proceedings of the 26th International Beekeeping Congress, pp. 258–259. Adelaide.

**Förster, F. 2015** Der Abu Ballas-Weg. Eine pharaonische Karawanenroute durch die libysche Wüste. Köln.

**Fraser, H. M. 1951** Beekeeping in antiquity. London.

**Fuchs, P. 1983** Das Brot der Wüste. Sozio-Ökonomie des Sahara-Kanuri von Fachi. Wiesbaden.

**Gatto, M. C. 2001** Two Predynastic Pottery Caches at Bir Sahara (Egyptian Western Desert). In: Sahara 13: 51–60.

**Graham, A. J. 1975** Beehives from ancient Greece. In: Bee World 56: 64–75.

**Haccour, P. 1960** Recherches sur la race d'abeille saharienne au Maroc. In: Comptes rendus de la Société des Sciences Naturelles et Physiques du Maroc 6: 96–98.

**Jones, J. E. – Graham, A. J. – Sackett, L. H. 1973** An Attic country house below the cave of Pan at Vari. In: Annual of the British School at Athens 68: 355–452.

**Jones, J. E. 1976** Hives and honey of Hymettus: Beekeeping in ancient Greece. In: Archaeology 29(2). 80–91.

**Karpowicz, J. 1989** Beekeeping with A. m. jemenitica: Modernity in traditionalism. In: Bee World 70: 19–35.

**Kritsky, G. 2015** The Tears of Re. Beekeeping in Ancient Egypt. Oxford.

**Kröpelin, S. 1993** Geomorphology, landscape evolution and paleoclimates of southwest Egypt. In: Meissner, B. / Wycisk, P. (eds.), Geopotential and Ecology: Analysis of a Desert Region, Catena-Supplement 26, pp. 31–66. Cremlingen.

**Kuény, G. 1950** Scènes apicoles dans l'ancienne Egypt. In: Journal of Near Eastern Studies 9(2): 84–93.

**Kuper, R. 2006** After 5000 BC. The Libyan desert in transition. In: Comptes Rendus Palevol 5: 409–419.

**Le Cœur, C. 1969** Mission au Tibesti. Carnets de route, 1933–1934, édités par Marguerite Le Cœur. Paris.

**Marchand S. 2003** Le mobilier céramique. In: Bulletin de l'Institut Français d'Archéologie Orientale 103: 522–523.

**Médail, F.** – **Quézel, P. 2018** Biogéographie de la flore du Sahara. Une biodiversité en situation extrême. Marseille.

**Mitchener, C. D. 2013** The Meliponini. In: Vit, P. / Pedro S. R. M. / Roubik, P. D. (eds.), Pot-Honey. A Legacy of Stingless Bees. New York: 3–17.

**Musch, T. 2017** In den Sand geschrieben. Spuren, Brände und das Suchen von Kamelen bei den Teda. In: Paideuma 63: 207–230.

**Neufeld, E. 1978** Apiculture in ancient Palestine. In: Ugarit-Forschungen 10: 219–247.

**Pachur, H.-J. 2017** Pharaonic Pyrolysis-Activity in the Libyan Desert – Interpretation of a Dyadic Ceramic. Electronic document, http://archiv.ub.uni-heidelberg.de/propylaeumdok/3302/ (accessed June 1, 2018).

**Petrie, W. M. F. 1890** Kahun, Gurob, and Hawara. London.

**Rashad, S.** – **El-Sarrag, M. S. A. 1978** Beekeeping in Sudan. In: Bee World 59: 105–111.

**Riemer, H. / Kuper, R. 2000** "Clayton rings": Enigmatic Ancient Pottery in the Eastern Sahara. In: Sahara 12: 91–100.

**Riemer, H. 2002** Clayton-Ringe: Rätselhafte Keramik aus der Sahara. In: Heinrich-Barth-Kurier: 14–15.

**Riemer, H. 2011** El Kharafish. The Archaeology of Sheikh Muftah Pastoral Nomads in the Desert around Dakhla Oasis (Egypt). Köln.

**Riemer, H. 2013** Lessons in landscape learning: The dawn of long-distance travel and navigation in Egypt's Western Desert from prehistoric to Old Kingdom times. In: Förster, F (ed.), Desert Road Archaeology in ancient Egypt and beyond: 77–106. Köln.

**Ruttner, F. 1975** African races of honeybees. Proceedings of the 25th International Beekeeping Congress: 325–344. Bucharest.

**Ruttner, F. 1979** Minoische und altgriechische Imkertechnik. In: Bienenmuseum und Geschichte der Bienenzucht. Apimondia-Kongress: 209–229. Bukarest.

**Ruttner, F. 2003** Naturgeschichte der Honigbienen. Stuttgart.

**Shaibi, T.** – **Fuchs, S.** – **Moritz, R. F. A. 2009** Morphological Study of Honeybees (Apis mellifera) from Libya. In: Apidologie 40: 97–105.

**Thorp, J. K. R. 1943** African Beekeepers: Notes on Methods and Customs relating to the Bee-Culture of the Akamba Tribe in Kenya Colony. In: Journal of The East Africa Natural History Society 17(3,4): 255–273.

**van den Brink, E. C. M. 1992** Corpus and Numerical Evaluation of the „Thinite“ Potmarks. In: Friedman, R. F. / Adams, B. (eds.), The Followers of Horus: Studies Dedicated to Michael Allen Hoffman 1944–1990, pp. 265–296. Oxford.

ZUSAMMENFASSUNG

**Clayton Rings and ancient beekeeping**

An ethno-zoological contribution

Tilman Musch, Dorothea Brückner

Der Artikel beschäftigt sich mit den immer noch geheimnisvollen „Clayton Rings“, die an ungefähr 50 Fundorten der Zentralsahara, die meisten davon in der Libyschen Wüste, auftraten. Nach bisherigen Hypothesen stand die Töpferware wohl im Bezug zu speziellen Subsistenzstrategien in einer ariden Umgebung, und dienten der Nahrungsbeschaffung. In unserem ethno-biologischen Vorgehen diskutieren wir eine dieser Hypothesen, die auf Bienenhaltung und Honigproduktion abzielt. Dabei vergleichen wir die Töpferware mit verschiedenen Beuten aus Ton oder Schlamm des Mittelmeerraums und setzen ihren Gebrauch in Bezug zum Vorkommen von Apis mellifera sahariensis, einer Unterart der Honigbiene, die wahrscheinlich das Relikt eines früher weit verbreiteten Bienenvorkommens im Gebiet der heutigen Sahara ist. Wir schließen, dass es die wohl wahrscheinlichste Lösung des Rätsels um die geheimnisvolle Töpferware ist, diese als Beuten für Bienen zu deuten.

SCHLAGWORTE

Clayton rings, Zentralsahara, Bienenzucht, Honigbiene, Keramik

## SOURCES OF ILLUSTRATIONS

Title Page: Jörg Linstädter
Fig. 1: Courtesy of Rudolph Kuper
Fig. 2: Jörg Linstädter
Fig. 3: Petrie 1890: Pl. XIV, Fig. 14.
Fig. 4: Jones – Graham – Sackett 1973: Fig. 19, p. 447
Fig. 5: Jörg Linstädter
Fig. 6: Jörg Linstädter

## ADDRESSES

Tilman Musch
Ethnologie Afrikas, Universität Bayreuth
Universitätsstraße 30
95440 Bayreuth
Germany
Tilman.Musch@uni-bayreuth.de
ORCID-iD: https://orcid.org/0000-0002-4851-7151

Dorothea Brückner
Institut für Bienenkunde, Universität Bremen
Postfach 33 04 40
28334 Bremen
Germany
dorothea.brueckner@uni-bremen.de

## METADATA

Titel/*Title*: Clayton Rings and ancient beekeeping. An ethno-zoological contribution

Band/*Issue*: JoGA 2020

Bitte zitieren Sie diesen Beitrag folgenderweise/*Please cite the article as follows*:
T. Musch – D. Brückner, Clayton Rings and ancient beekeeping. An ethno-zoological contribution, JoGA 2020, 186–197, § 1–28, https://doi.org/10.34780/joga.v2020i0.1004



Online veröffentlicht am/Online published on: 05.10.2020
DOI: 10.34780/joga.v2020i0.1004
URN: https://nbn-resolving.org/urn:nbn:de:0048-joga.v2020i0.1004.2

Schlagworte/Keywords: Clayton rings, Central Sahara, beekeeping, honeybee, ceramic

Bibliographischer Datensatz/
Bibliographic reference:
https://zenon.dainst.org/Record/002000976