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Shellfish Consumption during the Late Ottoman and Early British Mandate Periods in Jaffa, Israel

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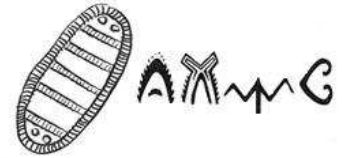
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Welcome to Issue 30 of the AMWG newsletter. In this issue we have an interesting paper on shellfish consumption during the Late Ottoman and Early British Mandate periods, and information on the upcoming AMWG meeting in Ankara (*page 9*).

About the Newsletter

The Archaeo + Malacology Newsletter warmly invites contributions related to archaeomalacology in its widest sense. Please email submissions and questions to the editor.

Annual deadlines are 31st

January for circulation in February and 31st July for circulation in August. Current and previous issues of the newsletter are available at archaeomalacology.com.

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About the Image

Thank you to Dr. Fariñas-Franco (National University of Ireland Galway), Dr. William Sanderson (Heriot-Watt University) and Hamish Torrie (Glenmorangie) for this issue's front page image of one of the carbon-dated



native European oyster (*Ostrea edulis*) shells collected from the subtidal of the Dornoch Firth, Scotland (^{14}C age of $6,520 \pm 44$ years BP) as part of the Dornoch Environmental Enhancement Project (DEEP). This novel interdisciplinary project identified the occurrence and human exploitation of native oyster populations in North-East Scotland from 8000 years BP to the late 1800s when they became extinct. These findings have potential widespread implications for restorative conservation in European Marine Protected Areas. For more information, see the paper abstract by Fariñas-Franco *et al.* on page 7 and <https://www.youtube.com/watch?v=dtfqTqB-IQw>.

The content of this newsletter does not reflect the official opinion of the editor or online host. Responsibility for the information and views expressed herein lies entirely with the author(s).

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Shellfish consumption during the Late Ottoman and Early British Mandate periods in Jaffa, Israel

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During the last decades, the Israel Antiquities Authority conducted a series of salvage excavations in Jaffa as part of an ongoing project of infrastructure renovation and urban redevelopment (Arbel 2017). During 2014-2015, excavations were conducted at the Ben-Gamliel compound in Jaffa (Permit A-7071) on behalf of the Israel Antiquities Authority and under the direction of Lior Rauchberger. During excavation, one of the refuse pits (Area G, loci 783, 791) contained a unique find of 50 fragments that belonged to at least 20 individual specimens of the bivalve *Chambardia rubens arcuata* (Cailliaud 1823), formerly known as *Aspatharia rubens* (Lamarck 1819) (Mienis 2004) (Fig 1). It appears that the refuse pit was covered over during the construction of a street that first appeared on a map from 1930 (Map of Jaffa Tel Aviv; scale 1:10,000. Survey of Palestine 1930, The National Library, Eran Laor Cartographic Collection). The refuse pit was dated to the Late Ottoman and the early years of the British Mandate Periods (circa 1900-1930). Alongside the bivalve fragments, the pit also contained ashlar stones, pottery, Marseilles roof tiles, wine bottles, pieces of iron and a western-style horseshoe (Fig 2).

During the Late Ottoman period, Jaffa lacked a municipal authority and formal regulations for the disposal of garbage. The clearing of domestic waste was tasked to the individual and therefore took many forms, such as burning, crushing, and dumping in the sea or fields, alongside partial reuse as construction material, feed, fertilizer or fuel (interviews with Jaffa residents, 2018). By the early years of the British Mandate, Jaffa – not unlike its neighbour Tel Aviv, organized the disposal of domestic rubbish by establishing a municipal dump at al-Bassa east of the city (Balslev 2016: 294-296). However, private disposal of rubbish continued. Archaeological excavations revealed one common way of disposal of waste was burying it on the spot in refuse pits or disused lime pits (Arbel 2008, 2016; Haddad 2013; Rauchberger 2009). Moreover, during the BM, wells from the Late Ottoman period that interfered with the paving of streets, were filled with building debris (Haddad 2011; Rauchberger 2015; Arbel and Rauchberger 2015).

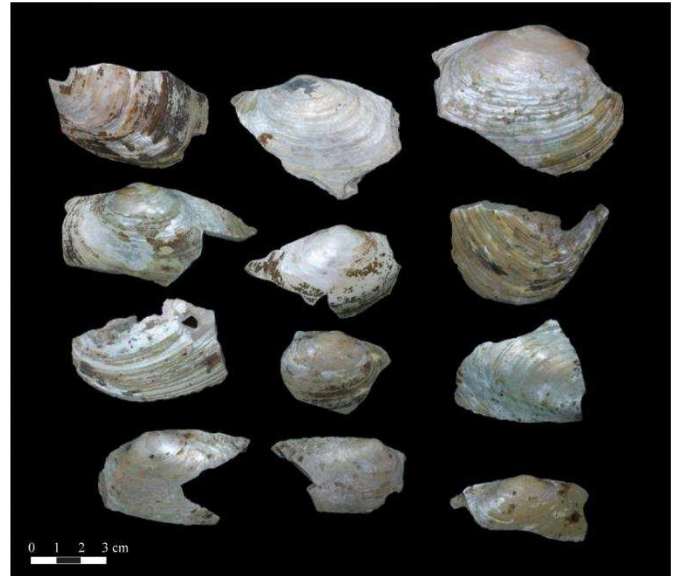


Fig 1. Shells of *Chambardia rubens* found in a refuse pit in Ben Gamliel Compound (Area G, loci 783, 791). Photo C. Amit; courtesy of the IAA.



Fig 2. Refuse pit locus 791. Photo L. Rauchberger, courtesy of the IAA.

Table 1. Unpublished findings of shells in the Late Ottoman/ British Mandate periods excavation sites in Jaffa.

Site	Findings of <i>Chambardia rubens</i> in Late Ottoman/ British Mandate contexts	Context
Qishle compound	Not found	
Jaffa Port	Not found	
HaZorfim St.	Not found	
Yehuda HaYamit Street	Not found	
Roslan and Mifraz Shlomo Streets	2 fragments	accumulation under road
Yefet 27 Street	Not found	
MeRaguza Street	Not found	
Magen Avraham	Not found	
Yafo, the Greek Market	Not found	
Ben Gamliel compound	50 fragments (20 specimens)	refuse pit under road

Chambardia rubens, is a large freshwater mussel whose described range stretches from the Nile basin to Western Africa. Two subspecies are currently recognised: *C. rubens rubens* is present in Senegal River, Niger River and Lake Chad, while the subspecies *C. rubens arcuata* exists in the Nile basin up to Lake Tana in Ethiopia. It exists mainly in stagnant or slowly running water and lives in the bottom sediment (muds, silts and sand). The shell is solid and ovate. The interior of the shell is pink mother-of-pearl that changes to white when exposed to sunlight (Mandle-Barth 1988; Pain and Woodward 1962; Seddon *et al.* 2016).

Throughout history, *Chambardia rubens* had a wide range of uses, ranging from food to the exploitation of the empty shells as cosmetics containers, oil lamps and as raw materials for the manufacture of ornaments and inlays. Remains of *Chambardia rubens* have been discovered in archaeological sites from Israel and the broader Levant since the Natufian Period (Mienis 1987) until the present day, attesting to long-term social, economic and cultural interactions with the Nile basin (Reese *et al.* 1986). During the Chalcolithic and Early

Bronze Age I periods, for example, there was an intensive use of *Chambardia rubens* in the Levant for ornaments, toolmaking and as burial offerings (for example see Bar-Yosef Mayer 2002a; 2002b; 2008; Fabian *et al.*, 2015; Horwitz *et al.* 2002:116-117, Table 6; Ktalav Forthcoming; Milevski 2005: 201; Nigro *et al.* 2018). Remains of *Chambardia rubens*, discovered within a small jug found in an underwater excavation near Atlit, suggesting that it was exported to the Levant as a food product during the EB I (Sharvit *et al.* 2002). Later evidence for the consumption of *Chambardia rubens*, dating to the Byzantine Period, has been found in the Monastery of Martyrius in the Judean Desert (Mienis 2005). During the Early Islamic Period (8th-10th centuries CE), *Chambardia rubens* was probably consumed and its valves reused as oil lamps in a Coptic church in Bawit, Egypt (Romanus *et al.* 2008).

Notwithstanding its long provenance in the Holy Land, *Chambardia rubens* is rare among comparable finds in Jaffa from the Late Ottoman and the Early British Mandate periods (Table 1). Finding a large concentration of these bivalves in a refuse pit thereby necessitates an explanation. Due to their state of preservation and their discovery in one cluster, in our opinion, they probably represent the remains of a single meal. For *Chambardia rubens* to be consumed as food in Jaffa, it had to be transported either encapsulated fresh in ice, or preserved in salt or vinegar from the Nile River basin. The bivalves could have been imported directly by sea through the Port of Jaffa, or indirectly by using the railroads linking Egypt and Palestine through the Lydda Railway Junction, and the al-Qantara Railway Junction on the Suez Canal. In either case, the expensive journey would have entailed the payment of railroad and customs fees. It is therefore interesting to ask who could have afforded to import and eat these bivalves.

Social, religious and economic considerations

In order to propose a plausible answer to the above-mentioned question, we have to consider existing knowledge about shellfish consumption during the time and place under discussion. For lack of extant literary sources, our inquiry will make use of the available ethnographic evidence to survey the use of bivalves in Egypt, as well as in Israel/Palestine, within the broader social, religious and economic normative aspects governing shellfish consumption among different social groups. In Arabic, mollusks are called *muḥār* while their shells are termed *aṣḍāf* (sing. *ṣadaḍ*). Specific references to mollusk consumption or their fishing methods are scarce, whether in archival sources or in contemporary press reports¹. To the best of our knowledge, *Chambardia rubens* has no native name in Arabic and Egyptians do not

¹As surveyed through the sites of <http://jpress.org.il> (documenting Hebrew and English Press) and

<http://web.nli.org.il/sites/nlis/he/jrayed> (documenting Arabic Press).

distinguish between different types of bivalves (Arabic: *'anwā'min al-muḥār*). Online reports indicate that saltwater bivalves form a well-established part of the diet of the residents of the coastal towns along the Mediterranean Sea, the Red Sea and the Gulf of Suez. In cities like Alexandria and Port Suez, for example, bivalves are consumed as a delicacy by the urban elites (Muhammad Yasin, *alkhaleej*, December 9, 2016). Furthermore, they are eaten by Copts as an alternative to meat on Christian fast days. *Chambardia rubens* and other freshwater bivalves are consumed by peasants (*fellahin*) along the Nile. One contemporary source mentions the use of the flesh of the "Nile Clam" (*Muḥār al-Nīl*) as fishing bait (Raḥalāt Ṣayd al-'Asmāk al-'Ālamiyyah wal-Maṣriyyah, Facebook, July 20, 2015). Ethnographic evidence offered by surviving former residents of Mandatory Palestine, indicates that bivalves were an exotic and prestigious dish, mostly unheard of in the culinary world of Palestine's rural interior. As in Egypt, bivalves were consumed primarily along the coast, or along bodies of water like the Sea of Galilee. Bivalves were boiled and served accompanied by rice and vegetables. According to some interviewees, a few bivalves used to cost as much as several kilograms of fresh meat (feeding an average family for a week). It was thus consumed mainly by the upper echelons of society, in specialized restaurants and for special occasions.² In the broader Mediterranean world, mollusks were often eaten alongside alcoholic drinks (Knudsen 2006).

During the period under consideration, Jaffa was home to two populations of Egyptian origin (*maṣārwa*). Sunni Muslims formed the majority of Jaffa's residents of Egyptian origin, while the city also sheltered a small population of Christian Copts, who owned a monastery for visiting pilgrims from Egypt (Monterescu 2016). The beginnings of the Egyptian presence in Jaffa following the city's resettlement in the end of the 17th century are unsure, but the most significant wave of Egyptian migration followed the Egyptian occupation of Palestine (1831-1840). During this time, immigrants from the Nile Delta region, and later fugitives from the Egyptian Army, established new suburbs in the outskirts of Jaffa, called *saknāt* and named after their place of origin. By the British Mandate Period, these *saknāt* developed into slums brimming with workers in search of livelihood (Golan 2016). However, they were, by and large, poor manual labourers and therefore unable to pay for such food. Moreover, elderly residents in Jaffa of Egyptian origin maintain that such bivalves did not constitute a part of their family's cuisine.³

² Interview with Abu Ghassān, b. 1937, al-Taybe [Tulkarm S.D.], December 29, 2017; Interview with Abu Mājed, Khirbet Jalameh [Tulkarm S.D.], b. 1935, December 30, 2017.

This observation agrees well with the spatial distribution of the different social classes in the city. During the British Mandate, the market area and the new residential districts to the south and east of Old Jaffa (where the shells were found) were a thriving urban area in which the city's elites resided (Diyāb 1991). The refuse pit excavated is situated only a short distance from King George Avenue (originally called Cevdet Paşa Caddesi, modern Jerusalem Blvd), constructed by the Young Turks regime as a modern thoroughfare to mark the eastern outskirts of the city (Fig 3).

When considering possible participants in the consumption of bivalves, one has to look at religious dietary laws that restrict consumption. Jewish dietary law (*kashrut*) forbids the consumption of all seafood, except for certain species of fish with fins and scales (Levin *et al.* 2014). The basis for this religious dictum is found in Leviticus 11:9-12 and Deuteronomy 14:9-10. Mainstream Christianity, on the contrary, allows its believers to consume shellfish as they are not considered impure (Acts 10: 9-16). Oysters are served as an alternative to meat during fasting periods like Lent (Geisler, 1989: 334). In Islam, the general permission to eat oysters stems from a general permit to eat all the animals that are found at sea (Aboul-Enein 2015): "Lawful to you is game from the sea and its food (*uḥilla lakum ṣaydu al-baḥri wa-ṭa'āmuhu*) as provision for you and the travelers..." (Qur'ān 5:96, Sahih International translation). The four schools of Jurisprudence in Sunni Islam, the Ḥanafiyya, Shāfi'iyya, Mālikiyya and Ḥanbaliyya, differ in their opinion regarding the specific permissibility of consuming oysters (as well as many other marine animals). While the Hanafis allow eating only marine vertebrates, Palestine's Muslim population is comprised primarily of Shāfi'ī and Ḥanbalī Muslims who are allowed to consume mollusks (Knudsen 2006; Shaybat al-Ḥamad 2017; Interview with 'Awnī Maṣārwa, Islamic Jurist, Bāqa al-Gharbiyya, July 18, 2018). Lastly, one has to consider that religious decrees alone might not have prevented individuals from consuming foods forbidden by their religion. Recent excavations in the ruins of the depopulated Palestinian village of Majdal Yābā (19 kilometers east of Jaffa) found evidence of frequent consumption of wild boar, violating a strong religious taboo in Islam (Taxel 2017).

Although we cannot conclusively identify the socio-religious groups whose members participated in the consumption of the *Chambardia rubens*, we can nonetheless frame it within the known historical fabric of Jaffa. Late Ottoman and British Mandate Jaffa was home to Muslims, Christians and Jews. While Judaism forbids

³ Interview with Abu Khalīl, Saknat Abu Kabīr, January 3, 2018.

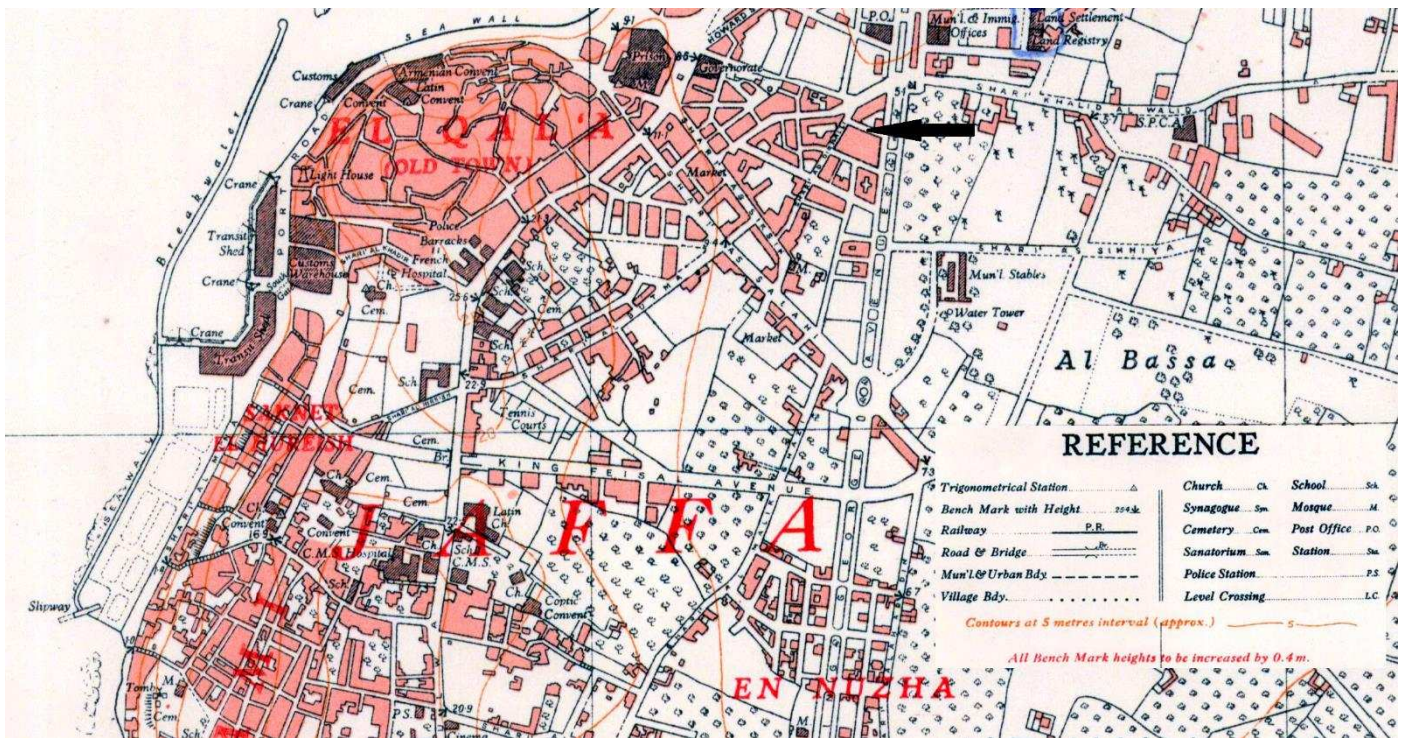


Fig 3. Location of refuse pit is marked in black. Edited from Map of Jaffa Tel Aviv; scale 1:10,000. Survey of Palestine 1935 (edited by R. Marom after Israel State Archive, Map -1/704).

eating shellfish, most Christian and Islamic denominations condone it. The consumption of shellfish in Jaffa thus served as an ethno-religious indicator distinguishing between Jews on the one hand, and Christians and Muslims on the other hand.

Ethnographic evidence suggests that local Egyptian residents did not have access to the capital needed for daily consumption of *Chambardia rubens*, nor did most common Palestinian Arabs regard it as a normal part of their diet. We therefore suggest that those who consumed it were most probably foreigners (like British officers) or local Christian or Muslim elites, making an act of conspicuous consumption involving the investment of large sums of capital on luxury foods. The finding of wine bottles in the same archaeological context as the malacological remains may hint that they belonged to the same meal, and therefore suggest a Christian (local or foreign) participation. In addition, as a specialty dish, requiring long distance shipping, preservation and serving arrangements, it was probably served by someone who had the expertise to import and prepare such seafood.

Summary

In Jaffa, 50 fragments of at least 20 individuals of *Chambardia rubens* were found in a refuse pit of the Late Ottoman to Early British Mandate periods. Although *Chambardia rubens* has been known, used and consumed in Israel/Palestine since protohistoric times, the evidence under discussion for consumption of imported

Chambardia rubens in Late Ottoman and British Mandate Jaffa remains the most significant one of its kind known from the archaeological or written records so far. It is a rare product whose presence testifies to the highly cosmopolitan and urbanized character of Jaffa as a coastal city in the Levant (LeVine 2005).

Acknowledgments

We wish to express our thanks to the Ben Gamliel compound excavation staff and to the publication committee of the Israel Antiquities Authority for permission to publish material from the excavation before its final publication. We thank Prof' Joseph Heller for his useful comments. Graphic design was helpfully performed by Noga Yoselevich and editing was done by Astrid Kampen-Hasday.

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Abstracts

Missing native oyster (*Ostrea edulis* L.) beds in a European Marine Protected Area: Should there be widespread restorative management?

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Abstract

Anthropogenic pressures on the marine environment have escalated and shellfish habitats have declined substantially around the world. Recently, Marine

Protected Areas (MPAs) have rapidly increased in number, but management baselines rarely account for historical conditions. Marine examples of habitat restoration are therefore unusual. An interdisciplinary review of management baselines was undertaken for the Dornoch Firth protected area (NE Scotland) as well as three adjacent inlets and 50 km of open coastline. The protected area has low levels of industrial development, is sparsely populated, and previously achieved management objectives. Here we systematically searched for historical evidence of native oyster (*Ostrea edulis*) beds, a habitat now rare and of conservation importance throughout Atlantic Europe. Archaeological records, navigational charts, historical maps, museum collections, land-use records, fisheries records, public online databases and naturalists' records were searched. We conducted intertidal and subtidal surveys and sample oyster shells were radiocarbon dated. The combined interdisciplinary sources showed that *O. edulis* occurred in the inlets and open coast areas of NE Scotland, and specifically in the protected area: Probably since the end of the last glaciation to the late 1800s when they were likely over-fished. Present environmental conditions are also suitable for oyster restoration. Habitat restoration in protected areas is an emerging global theme. However, European oyster restoration effort is currently confined to remnant populations with a clear history of exploitation or dwindling associated fisheries. An interdisciplinary review of baselines will probably show scope for the restoration of *O. edulis*, for nature conservation, in many other European MPAs.

Call For Papers & Session Proposals

T118. Paleoenvironmental Reconstructions from Biogenic Carbonates

Geological Society of America (GSA) annual meeting

Indianapolis, Indiana, USA

4th – 7th November 2018

Abstracts submission for the Geological Society of America (GSA) annual meeting in Indianapolis, Indiana, USA (4-7 November 2018) is now open:

<http://community.geosociety.org/gsa2018/science-careers/sessions/topical>

The abstracts submission deadline is 14 August 2018 (11:59 p.m., Pacific Time).

We would like to bring your attention to the topical session: T118. Paleoenvironmental Reconstructions from Biogenic Carbonates. This session encourages studies of the physical and/or chemical properties of biogenic carbonate skeletons for paleoenvironmental reconstruction. Contributions include, but are not limited to, paleoclimate inferences, proxy calibration, model development, and novel methods.

Rationale for the Session:

The physical and chemical properties recorded in the skeletons of calcium carbonate-bearing organisms have revolutionized the field of Paleoclimatology since the 1950's. The field was initiated with the study of marine organisms and eventually included the study of freshwater and terrestrial species. Over the last decade, important advances in technology, methodology, proxy calibration, and model development have notably enhanced the quality and objectivity of extracting and interpreting paleoenvironmental records from continental, freshwater, and marine biogenic carbonates. Significant advances include the examination and quantitative modeling of skeletal microstructure and increments, traditional and non-traditional stable isotopes, clumped isotopes, minor and trace elements, heavy metals, etc. In this topical session, we will bring together specialists who use the physical and/or chemical properties of biogenic carbonates for paleoenvironmental studies, discuss recent developments, and identify possible future research directions.

INQUA 2019

Dublin, Ireland

25th – 31st July 2019

Our Organizing Committee are delighted to bring INQUA to Dublin and we would like to warmly welcome you to the 20th INQUA Congress to be held between 25th and 31st July 2019. We all have a deep commitment to the Congress and we all want our delegates to thoroughly enjoy the stimulation of multiple scientific sessions in the purpose built Convention centre. In addition we hope you are all looking forward to the warm welcome from Dublin

and the Irish people and that you enjoy the magnificent Irish scenery on the various field trips we have organised.

Authors are welcome to submit abstracts under the following congress commissions:

- Coastal and Marine Processes
- Humans and Biosphere
- Palaeoclimate
- Stratigraphy and Chronology
- Terrestrial Processes, Deposits and History

Any questions relating to abstract submissions should be sent to abstracts@inqua2019.org

Session proposal closed

Paper submission open

Website: <http://www.inqua2019.org>

Session Title: Sub-annual to decadal records of environmental change

20th INQUA Congress

Dublin, Ireland

25th – July 2019

Convenors and Co-convenors: Amy Prendergast (Convenor) Russell Drysdale (Convenor)

Description of Session: Understanding past climate and environmental change at high-resolution timescales (annual to sub-annual) is important as it allows current and future climate change to be contextualized within long-term frameworks; it provides data for numerical simulations that will allow climate modellers to better predict anthropogenic impacts on the natural climate system; and it facilitates evaluations of the relationship between past environmental changes and human behaviour. In the past decade, advances in technology, methodology, model development, and proxy calibration have enabled the extraction of more robust palaeoenvironmental records from marine, freshwater, and terrestrial palaeoenvironmental archives. Many of these archives including mollusc shells, corals, otoliths, speleothems, and tree rings have periodic growth increments. Studying the growth and chemistry of these increments allows the reconstruction of high-resolution, temporally constrained palaeoclimate and palaeoenvironmental data from varied regions of the globe and are allowing correlations between continental and marine systems. This session invites presentations on

high-resolution climate and environmental records from marine, terrestrial and freshwater archives. We encourage contributions on both palaeoenvironmental reconstructions, and proxy calibration studies.

All abstracts are submitted via an online submission system. The maximum length of an abstract is 450 words.

Please ensure that research findings are described to a level sufficient for reviewers to make an informed decision on scientific quality. **Deadline for abstract submission 9th January 2019.**

Website: <http://www.inqua2019.org/call-for-abstracts/>

Conferences and Events

13th ICAZ International Conference

Ankara, Turkey

2nd – 7th September 2018

Straddling between two continents, as truly a bridge, Turkey is a unique country with rich and varied contemporary culture as well as numerous archaeological sites from the earliest prehistory to most recent civilizations. The rich archaeological heritage and history of Turkey always attracted the attention of archaeologists, which led to formation of multinational, multidisciplinary research teams in many excavation sites. It is also a significant region for zooarchaeology since it holds the remains of cultures that were pivotal in the advancement and establishment of domestic animal economy and its dispersal to other localities. At the same time, throughout history, the continuous moving of people to and through the lands of Anatolia offers numerous challenging research questions to the study of animal management. Ankara, the capital city of Turkey, lies in the steppes of Central Anatolia, which contain many of the well-known archaeological settlements. The venue, METU-CCC is conveniently located in Middle East Technical University campus with many restaurants, banks, health centre and other shops at a walking distance. We hope the meeting will provide an unprecedented opportunity to colleagues from Turkey and abroad for sharing and discussing their research on zooarchaeology. Looking forward to see you in ICAZ 2018, Ankara.

Please note that all participants, even the ones who do not present a paper/poster have to be registered. Registration for ICAZ 2018 is separate from ICAZ membership.

Website: <https://icaz2018ankara.com/registration.html>

Archaeomalacology Working Group Meeting

Ankara, Turkey

7th September 2018

The 13th ICAZ International Conference will be held in September in Ankara at the Cultural and Convention Center at METU, during which a session will be exclusively dedicated to malacology: “Shells of molluscs as archaeological and environmental records”. This session will feature 15 oral presentations and 6 posters, discussing the different roles molluscs and crustaceans played in human culture in various times and spaces, as a source of food or as material. Several papers will also present the latest results in palaeoenvironmental research. The session will be concluded at the end of the day with an Archaeomalacology Working Group Meeting. This reunion will be an opportunity to debate the prospects of our discipline and its involvement in archaeological and historical discourse. The session will be closed by setting up the next AMWG Meeting, to be held in 2020.

For further information please contact Laura Le Goff at icaz2018.malaco@gmail.com

Oceans Past VII

Bremerhaven, Germany

22th – 26th October 2018

Tracing human interactions with marine ecosystems through deep time: implications for policy and management

Rationale: Knowing the past is vital for developing a vision of the future. The oceans and inshore seascapes of the world are rapidly changing, and understanding the human and marine ecosystem forces, trajectories and responses – sometimes over centuries or millennia – is vital for their informed management. Understanding, quantifying, and predicting humanities interactions with the world’s coastal seas and oceans requires examination of our practices of consumption, transportation, extraction

and pollution, as well as our values and governance systems. The conference aims to bring together the vast knowledge pool of two decades of marine historical ecology and environmental history to inform the policies of the Anthropocene.

Website: <https://www.awi.de/forschung/besondere-gruppen/wissensplattform-erde-und-umwelt/opp7.html>

39th Association for Environmental Archaeology Autumn Conference

Aarhus, Denmark

29th November – 1st December 2018

It is our pleasure to announce that the “39th Association for Environmental Archaeology Conference” will be hosted from 29th November to 1st December 2018 at Moesgaard Museum (MOMU) and Aarhus University ‘Moesgaard Campus’ in Denmark. The venue of the meeting is the new museum building, which houses key Danish archaeological collections and is a major focus for environmental archaeology. MOMU has strong collaborative links with the Department of Archaeology & Heritage Studies of Aarhus University, a leading department in its field.

Some of the earliest applications of ecological knowledge in archaeology (if not even the start of human palaeoecology itself) are traceable to mid-19th century Denmark. Back then, archaeologists and natural scientists started collaborating to study anthropogenic shell deposits known as køkkenmøddinger (kitchen middens). The early studies on these well-preserved sites probably represent the first truly interdisciplinary excavation projects in the history of archaeology. These addressed research themes still relevant to environmental archaeology and archaeological science today, such as environmental and vegetational changes, site formation processes, plant and animal exploitation, seasonality of human behaviour, subsistence and diet.

As we are in the course of another ‘scientific revolution’ in archaeology, with the development of biomolecular archaeology and ancient DNA, all the aforementioned topics are relevant for the AEA meeting in Aarhus. Papers merging different methods of environmental and biomolecular archaeology will be particularly welcome, as well as contributions on the human palaeoecology of Scandinavia and northern Europe. Oral presentations and posters dealing with methods which have not been applied on Scandinavian contexts previously, are also relevant for this conference.

For further information please e-mail the organizers at:

AEA2018AARHUS@cas.au.dk

Recent Publications

PAPERS

Ballesta-Artero, I., Zhao, L., Milano, S., Mertz-Kraus, R., Schöne, B.R., van der Meer, J. and Witbaard, R., 2018. Environmental and biological factors influencing trace elemental and microstructural properties of *Arctica islandica* shells. *Science of The Total Environment*, 645, pp.913-923.

Bassett, C.N., Andrus, C.F.T. and West, C.F., 2018. Implications for measuring seasonality in the marine bivalve, *Saxidomus gigantea*. *Chemical Geology*. <https://doi.org/10.1016/j.chemgeo.2018.07.004>

Bolotov, I.N., Aksenova, O.V., Bakken, T., Glasby, C.J., Gofarov, M.Y., Kondakov, A.V., Konopleva, E.S., Lopes-Lima, M., Lyubas, A.A., Wang, Y. and Bychkov, A.Y., 2018. Discovery of a silicate rock-boring organism and macrobioerosion in fresh water. *Nature communications*, 9(1), p.2882.

Christensen, C.C., A Lost Species of Salt Marsh Snail: *Blauneria gracilis* Pease, 1860 (Gastropoda: Ellobiidae) in

the Hawaiian Islands¹.

<https://www.researchgate.net/publication/324835650>

Christensen, C.C., Kahn, J.G. and Kirch, P.V., 2018. Nonmarine Mollusks from Archaeological Sites on Mo’orea, Society Islands, French Polynesia, with Descriptions of Four New Species of Recently Extinct Land Snails (Gastropoda: Pulmonata: Endodontidae). *Pacific Science*, 72(1), pp.95-123. <http://www.bioone.org/doi/abs/10.2984/72.1.7>.

Fariñas-Franco, J.M., Pearce, B., Mair, J.M., Harries, D.B., MacPherson, R.C., Porter, J.S., Reimer, P.J. and Sanderson, W.G., 2018. Missing native oyster (*Ostrea edulis* L.) beds in a European Marine Protected Area: Should there be widespread restorative management?. *Biological Conservation*, 221, pp.293-311. <https://doi.org/10.1016/j.biocon.2018.03.010>.

Hollyman, P.R., Chenery, S., Leng, M.J., Laptikhovskiy, V.V., Colvin, C.N. and Richardson, C.A., 2018. Age and growth rate estimations of the commercially fished

gastropod *Buccinum undatum*. *ICES Journal of Marine Science* <https://doi.org/10.1093/icesjms/fsy100>.

Jackson, K., Southard, E., O'Donnell, S. and Arthur, J., 2018. Estimating crown conch (*Melongena corona*) tissue weight from archaeological shell measurements: An allometric methodology for coastal historical ecological research. *Journal of Archaeological Science: Reports*, 21, pp.107-116.

Ktalav, I. 2018. Molluscs from Chalcolithic and Early Bronze Ib Age Settlement at Beqo'a. *'Atiqot 90*: 75-78.

Ktalav, I. 2018. The Shells from a Chalcolithic Burial Site – Palmahim (North). *'Atiqot 91*: 103-104.

Ktalav I. 2018. Mollusks. In Arbel Y. Yafo, The French School (Preliminary Report). [*Hadashot Arkheologiyot* 130](#).

Lopes-Lima, M., Bolotov, I.N., Aldridge, D.C., Fonseca, M.M., Gan, H.M., Gofarov, M.Y., Kondakov, A.V., Prié, V., Sousa, R., Varandas, S. and Vikhrev, I.V., 2018. Expansion and systematics redefinition of the most threatened freshwater mussel family, the Margaritiferidae. *Molecular phylogenetics and evolution*, 127, pp. 98-118. <https://doi.org/10.1016/j.ympev.2018.04.041>.

Miller, J.M., Sawchuk, E.A., Reedman, A.L.R. and Willoughby P.R. 2018. Land Snail Shell Beads in the Sub-Saharan Archaeological Record: When, Where, and Why? *African Archaeological Review* <https://doi.org/10.1007/s10437-018-9305-3>

Nigro, L., Montanari, D., Mura, F., Yasmine, J. and Rinaldi, T., 2018. A hoard of Nilotic nacreous shells from Egypt to Jericho (Early Bronze II, 3000–2800 BCE): Their finding, content and historical archaeological implications. *Palestine Exploration Quarterly*, 150(2), pp.110-125.