



REVISITING THE HILLY FLANKS
University of Copenhagen
21-25 June 2021

Scientific Committee

Hojjat Darabi, Tobias Richter, Barbara Helwing, Abbas Moghaddam & Peder Mortensen

Keynote Speaker

Melinda Zeder, National Museum of Natural History
Smithsonian Institution

[Revisiting the Hilly Flanks: the Epipalaeolithic and Neolithic periods in the eastern Fertile Crescent \(ku.dk\).](#)



C.L. DAVIDS FOND OG SAMLING

How to join

The conference will take place fully online via Zoom webinar. Please find below the link and passcode to attend the Zoom webinar:

<https://ucph-ku.zoom.us/j/68481166879?pwd=OXRqRFIPWnU0elFvOEdQYTc5MzBBQT09>

Passcode: 979579

At the end of each 15 minute presentation, there will be five minutes dedicated to questions. You can ask questions through the Zoom chat or by raising your hand in Zoom. A digital moderator will collect questions on the Zoom chat and manage the “raised hands”.

There are scheduled breaks in the proceedings and there will be Zoom ‘breakout rooms’ available during the breaks, where presenters and members of the audience will have an opportunity to meet in smaller groups.

The entire event will be live streamed from the website: [Revisiting the Hilly Flanks: the Epipalaeolithic and Neolithic periods in the eastern Fertile Crescent \(ku.dk\)](https://www.ku.dk/en/press-and-publications/visiting-the-hilly-flanks). People will have the opportunity to ask questions in the live chat too. Additionally, the recorded talks will be made available on the same website at the end of every day for the duration of the conference.

The programme and list of abstracts are available for download at the above-mentioned website.

Instructions for presenters

Presenters will join the conference through a dedicated Zoom link that will be sent a few days before the start of the conference. Presenters can join the conference any time using the dedicated link, but should join **at least 15 minutes before the start of their talk** so we can ensure they are set up in time. Presenters will be asked to share their screen with the audience.

We ask that especially those colleagues living in countries with poor internet connectivity to please record their presentations before the conference and to send them to us no later than the 15th June. Presenters sending their poster presentations are asked to send their poster as a pdf document by the 15th of June. Poster will be displayed on the conference website [Revisiting the Hilly Flanks: the Epipalaeolithic and Neolithic periods in the eastern Fertile Crescent \(ku.dk\)](https://www.ku.dk/en/press-and-publications/visiting-the-hilly-flanks).

If you require technical assistance, please email us at camimazz@hum.ku.dk or bwv299@hum.ku.dk

Keynote Lecture

Out of the Shadows: rehabilitating the hilly flanks as a center of agricultural origins.

Melinda A. Zeder, Department of Anthropology, National Museum of Natural History
Smithsonian Institution

From the early 1950s through the late 1970s interdisciplinary teams comprised of archaeologists, geologists, botanists, and zoologists investigated the origins of agriculture in the Taurus/Zagros arc of the Eastern Fertile Crescent. While researchers working in this area differed over the context and causes for these developments, the general consensus at the time saw this region as a primary center of initial domestication and agricultural emergence. Political events in the 1960s and 70s caused a shift in the focus of archaeological investigation of early agriculture to the Western Fertile Crescent region of modern day Israel, Jordan and northern Syria. This work promoted a view of this region as the earliest and most important center of agricultural origins in the Near East, with the Eastern Fertile Crescent retreating into the shadows, portrayed as a backwater that lagged far behind the transformative innovations of the west. Recently, the resumption of archaeological investigations in the Taurus/Zagros arc, coupled with the advances in scientific methods for documenting domestication and agricultural emergence, has succeeded in overturning this notion. This recent work reaffirms the Eastern Fertile Crescent's status as a heartland of domestication of a number of crop and livestock species. It has also provided insight into how and perhaps even some of the reasons why people and a range of species in this region set down pathways leading to domestication. This lecture reviews the history of research on agricultural origins in the Eastern Fertile Crescent and the landmark new studies that have rehabilitated it as a major center of domestication and agricultural emergence.

Time Zone				Monday 21/06/2021	
USA EST (EDT)	British Summer Time (BST)	Iran Tehran (IRDT)	Central Europe Copenhagen (CEST)		
3:30-4:00	8:30-9:00	12:00-12:30	9:30-10:00	Participant sign-up and brief welcome	
4:00-4:20	9:00-9:20	12:30-12:50	10:00-10:20	Barbara Helwing - Revisiting the Hilly Flanks: new data and shifting paradigms.	Presentations
4:20-4:40	9:20-9:40	12:50-13:10	10:20-10:40	Dorian Fuller - Multi-centred or mosaic? Consideration of meta-populations of early domesticated crops and their domesticators around the "Fertile Crescent".	
4:40-5:00	9:40-10:00	13:10-13:30	10:40-11:00	Trevor Watkins - From cradle to mosaic: the metaphors we live by.	
5:00-5:30	10:00-10:30	13:30-14:00	11:00-11:30	Break	

5:30-5:50	10.30-10:50	14:00-14:20	11:30-11:50	Hojjat Darabi, Tobias Richter and Peder Mortensen -The TCEC Project: objectives, achievements and implications for the Neolithization of the EFC.	Presentations
5:50-6:10	10:50-11:10	14:20-14:40	11:50-12:10	Douglas Baird - Revising Braidwood's Hilly Flanks.	
6:10-6:30	11:10-11:30	14:40-15:00	12:10-12:30	Mehmet Özdoğan - The emergence and the dispersal of Neolithic way of living- form Core to peripheries.	
6:30-7:30	11:30-12:30	15:00-16:00	12:30 -13:30		Lunch
7:30-7:50	12:30-12:50	16.00-16-20	13:30-13:50	Benjamin S. Arbuckle – Perspectives on early animal management in SW Asia from Braidwood to today.	Presentations
7:50-8:10	12:50-13:10	16:20-16:40	13:50-14:10	Nicholas, J. Conard, Angel Blanco-Lapaz, Doga Karakaya, Mario Mata-Gonzalez, Simone Riehl, Britt Starkovich and Mohsen Zeidi. - Chogha Golan and its high resolution record of cultural and economic change during the Aceramic Neolithic in the foothills of the Zagros Mountains	

8:10-8:30	13:10-13.30	16:40-17:00	14:10-14:30	Frank Hole. - Braidwood's legacy and the elusive transition.	
8:30-9:00	13:30-14:00	17:00-17:30	14:30-15:00		Break
9:00-9:20	14:00_14:20	17:30-17:50	15:00 - 15:20	Roger Matthews and Hassan Fazeli Nashli - MENTICA: Middle East Neolithic transition - integrated community approaches. Project overview	Presentations
9:20-9:40	14:20-14:40	17:50-18:10	15:20 - 15:40	Tobias Richter -The late Epipalaeolithic in the Zagros and the Levant: the Natufian and the Zarzian compared.	
9:40-10:30	14:40-15:30	18:10:18:30	15:40 -16:30		Break

10:30-11:00	15.30-16:00	19:00-19:30	16:30 – 17:00	<p>Official Welcome to the Conference</p> <p>Kirsten Busch Nielsen - Dean, University of Copenhagen, Welcome Address.</p> <p>Annika Hvithamar - Head of the Department of Cross-Cultural and Regional Studies, University of Copenhagen, Welcome Address.</p> <p>Tobias Richter – Center for the Study of Early Agriculture Societies, Copenhagen University.</p>	Welcome Remarks
11-12	16-17	19:30-20:30	17:00-18.00	<p>Melinda Zeder - Out of the Shadows: rehabilitating the hilly flanks as a center of agricultural origins.</p>	Keynote Lecture

Time Zone				Tuesday 22/06/2021	
USA EST (EDT)	British Summer Time (BST)	Iran Tehran (IRDT)	Central Europe Copenhagen (CEST)		
3:10-3:30	8:10-8:30	11:40-12:00	9:10-9:30	<p>Lee Claire and Moritz Kinzel - Revisiting Early Neolithic Göbekli Tepe.</p>	Presentations

3:30-3:50	8:30-8:50	12:00-12:20	9:30-9:50	Yutaka Miyake - The earliest sedentary settlement in the upper Tigris: Hasankeyf Höyük and its significance.	
3:50-4:10	8:50-9:10	12:20-12:40	9:50-10:10	Abu Bakar Siddiq and Vecihi Özkaya - Körtik Tepe in the origin and flourish of the Pre-Pottery Neolithic.	
4:10-4:30	9.10-9.30	12:40-13:00	10:10-10.30	Sari Jammo, Akira Tsuneki, Nobuya Watanabe, Ryo Anma, Yuki Tatsumi and Kamal Rasheed - Investigating the Eastern wing of the Fertile Crescent two seasons of excavations at prehistoric Jarmo	
4:30-5:00	9.30-10:00	13.00-13:30	10:30-11:00		Break
5:00-5:20	10:00-10:20	13:30-13:50	11:00-11:20	Takahiro Odaka - Investigating the Late Neolithic in the Shahrizor Plain: Tell Begum, Shaikh Marif and Shakar Tepe.	Presentations
5:20-5:40	10:20-10:40	13:50-14:10	11:20-11:40	Marco Jaconi - Emerging complexity in Iraqi Kurdistan: archaeological investigations at Asingeran in the plain of Navkur.	

5:40-6:00	10:40-11:00	14:10-14:30	11:40-12:00	Meisam Nikzad and Elham Ghasemi - The Neolithic dispersal in the east of the Hilly Flanks.	
6:00-7:00	11:00-12:00	14:30-15:30	12:00-13:00		Lunch
7:00-7:20	12:00-12:20	15:30-15:50	13:00-13:20	Kate Dudgeon - Comparisons and connections between the Hilly Flanks and the Euphrates regions during the Epipalaeolithic and Neolithic.	Presentations
7:20-7:40	12:20-12:40	15:50-16:10	13:20-13:40	Wendy Matthews - Sustainability of early sedentary agricultural communities in the Hilly Flanks of the Eastern Fertile Crescent	
7:40-8:00	12:40-13:00	16:10-16:30	13:40 - 14:00	Julien Riel-Salvatore, Andrew Lythe, Sanaz Shirvani, Alejandra Uribe Albornoz and Lyne Grondin - Back from beyond: ongoing work on the 1967-1974 Ganj Dareh archive.	

8:00-8:20	13:00-13.20	16:30-16:50	14:00-14:20	Afshin Akbari, Sepideh Jamshidi, Sanaz Beyzaei Doust, Homa Fathi, Hossein Davoudi, Margareta Tengberg, Marjan Mashkour, Ali Vahdati, Judith Thomalsky, Mohammad Hossein Azizi Kharanaghi - Archaeological investigations at Tappeh Pahlavan, a late Neolithic site in Khorasan (NE –Iran).	
8:20-8:50	13:20-13:50	16:50-17:20	14:20 – 14:50		Break
8:50-9:10	13:50-14:10	17:20-17:40	14:50-15:10	Ingrid Iversen - The spatial organisation of activities: the need to look outside.	Presentations
9:10-9:30	14:10-14:30	17:40-18:00	15:10-15:30	Alessandro Guaggenti - Multi-scalar analysis of early built environments in the Eastern Fertile Crescent.	
9:30-9.50	14:30-14:50	18:00-18:20	15:30-15:50	David Mudd - Pecked stone and getting peckish: ground stone and foodways at Early Neolithic Bestansur.	

9:50-10:10	14:50-15:10	18:20-18:40	15:50-16:10	Marjan Mashkour, Hossein Davoudi, Sonia Shidrang, Marie Orange, Farhad Khoramli, Pantelitsa Mylona, Morteza Djamali, Margareta Tengberg, Morteza Rahmati, Sanaz Beizae Doost, Babak Moradi, Roya Khazaeli, Homa Fath and, Zeynab Fathi - The first archaeological campaign at Tappeh Qazānchi, a new PPN site in the West Central Zagros.	
10:10-10:30	15:10-15:30	18:40-19:00	16:10 - 16:30	Benjamin Mutin and Omran Garazhian, The Neolithic in the eastern margins of the Zagros Mountains.	

Time Zone				Wednesday 23/06/2021	
USA EST (EDT)	British Summer Time (BST)	Iran Tehran (IRDT)	Central Europe Copenhagen (CEST)		
3:10-3:30	8:10-8:30	11:40-12:00	9:10-9:30	Barbara Horejs, Bogdana Milić and Lily Niakan - "Parallel Neolithic landscapes?" - New survey data from the Sirvan and Chardavol Valleys in the central-west Zagros, Ilam province (Iran).	Presentations
3:30-3:50	8:30-8:50	12:00-12:20	9:30-9:50	Morteza Khanipuor and Mohammed Hossein Azizi Kharanaghi - Geographical zone and evaluation of the Neolithic period in Fars, Iran.	

3:50-4:10	8:50-9:10	12:20-12:40	9:50-10:10	Mohammad Hossein Azizi Kharanaghi, Marjan Mashkour, Antoine Zazzo, and Fazlolah Khaluei - Relative and absolute chronology of Qasr-e Ahmad (Fars); a new Neolithic site in southern Iran.	
4:10-4:30	9:10-9:30	12:40-13:00	10:10-10:30	Hamzeh Ghobadi Zadeh and Sirvan Mohammadi Ghasrian - Investigation of Neolithic period sites in Kuh-Dasht region, West of Iran.	
4:30-5:00	9:30-10:00	13:00-13:30	10:30-11:00		Break
5:00-5:20	10:00-10:20	13:30-13:50	11:00-11:20	Ahmad Azadi - Early Holocene occupations in the Kohgilouyeh Region, Southern Zagros, Iran.	Presentations
5:20-5:40	10:20-10:40	13:50-14:10	11:20-11:40	Judith Thomalsky - From the slopes towards the Iranian Plateau: Neolithic life in the outskirts	
5:40-6:00	10:40-11:00	14:10-14:30	11:40-12:00	Hassan Fazeli Nashli and Michael W. Gregg - The dispersal of agricultural societies on the southern flanks of Alborz Mountains during the Neolithic period.	

6:00-7:30	11:00-12:30	14:30-16:00	12:00-13:00		Lunch
7:30-7:50	12:30-12:50	16.00-16:20	13:00-13:20	Aso Abdi - Neolithic period associated with Southern Urmia Lake, questions and challenges.	Presentations
7:50-8:10	12.50:13:10	16.20-16:40	13:20-13:40	Amy Richardson and Sam Walsh - Treatments of the dead at Bestansur: evidence for mortuary practices in the Early Neolithic.	
8:10-8:30	13:10-13:30	16:40-17:00	13:40 - 14:00	Deborah Merrett, Christopher Meiklejohn, David Reich and Ron Pinhasi - Ganj Dareh burial practice and social memory.	
8:00-8:20	13:00-13.20	16:30-16:50	14:00 - 14:20	Arkadiusz Sołtysiak and Hojjat Darabi - Lifetime mobility at Ali Kosh: research on stable strontium isotopes.	
8:20-8:50	13:20-13:50	16:50-17:20	14:20-14:50		
					Break

8:50-9:10	13:50-14:10	17:20-17:40	14:50-15:10	Amaia Arranz Otaegui - Early Neolithic plant-based subsistence in the Eastern Fertile Crescent: hunter-gatherers or early agriculturalists?	Presentations
9:10-9:30	14:10-14:30	17:40-18:00	15:10-15:30	Golnaz Ahadi - The missing piece: preliminary results of phytolith analysis from Ganj Dareh, Iran.	
9:30-9:50	14:30-14:50	18:00-18:20	15:30-15:50	Birgül Ögüt - Phytolith analyses in the transition from hunting and gathering to agriculture – Limits and possibilities at Göbekli Tepe.	

Time Zone				Thursday 24/06/2021	
USA EST (EDT)	British Summer Time (BST)	Iran Tehran (IRDT)	Central Europe Copenhagen (CEST)		
3:10-3:30	8:10-8:30	11:40-12:00	9:10-9:30	Fiona Pichon - Farmer lifestyles in the eastern Fertile Crescent: new data through functional analysis of harvesting tools from Tappeh Sang-e Chakhmaq, Iran.	Presentations

3:30-3:50	8-30-8:50	12:00-12:20	9:30-9:50	Charlotte Diffey - Food and farming: New archaeobotanical evidence from the Zagros region.	
3:50-4:10	8:50-9:10	12:20-12:40	9:50-10:10	Mohsen Zeidi and Nicholas J. Conard - The Earliest Neolithic Lithic Traditions of the Iranian Zagros Region: Evidence from Chogha Golan in the western foothills of the Zagros Mountains of Iran.	
4:10-4:30	9.10-9.30	12:40-13:00	10:10-10.30	Robin Bendrey - Ecologies of domestication: human-goat-environment interactions at the start of farming in the Neolithic Zagros.	
4:30-5:00	9.30-10:00	13.00-13:30	10:30-11:00		
5:00-5:20	10:00-10:20	13:30-13:50	11:00-11:20	Donna de Groene - Human-animal interactions in the Early Holocene of the eastern Fertile Crescent.	Presentations
5:20-5:40	10:20-10:40	13:50-14:10	11:20-11:40	Eleni Asouti, Ceren Kabucku, Kate Swinson, Louise Martin - Environment and subsistence in the Zarzian: new evidence from Palegawra cave.	

5:40-6:00	10:40-11:00	14:10-14:30	11:40-12:00	Kevin Daly, Lisa Yeomans, Pernille Bangsgaard, Marjan Mashkour, Melinda Zeder and Daniel Bradley - Ancient goat genomes from the Neolithic Zagros.	
6:00-7:00	11:00-12:00	14:30-15:30	12:00-13:00		Lunch
7:00-7:20	12:00-12:20	15:30-15:50	13:00-13:20	Pernille Bangsgaard and Lisa Yeomans - Wild fauna at the Neolithic sites of Asiab and Ganj Dareh	Presentations
7:20-7:40	12:20-12:40	15:50-16:10	13:20-13:40	Lisa Yeomans and Pernille Bangsgaard - Perinatal remains of livestock at Neolithic sites: Ganj Dareh and the development of ovicaprine herding in southwest Asia.	
7:40-8:00	12:40-13:00	16:10-16:30	13:40 - 14:00	Paul Clarkson - Jird, mouse, vole, and shrew.....the tale of an early Neolithic settlement.	
8:00-8:20	13:00-13:20	16:30-16:50	14:00-14:20	Michael W. Gregg, Hassan Fazeli Nashli and Judith Thomalsky - The persistence of hunting and gathering and the adoption of Neolithic small blade technologies in the southern Caspian basin and northern flanks of Alborz Mountains.	

8:20-8:50	13:20-13:50	16:50-17:20	14:20 - 14:50		Break
8:50-9:10	13:50-14:10	17:20-17:40	14:50-15:10	Maryam Shakuie, Omran Garazhian and Benjamin Mutin - Lithic industries from the Southern Lut Desert (southeastern Iran) during the Neolithic period.	Presentations
9:10-9:30	14:10-14:30	17:40-18:00	15:10-15:30	Yoshihiro Nishiaki - Tracing the development of the Neolithic lithic industries in West Zagros.	
9:30-9:50	14:30-14:50	18:00-18:20	15:30-15:50	Mozhgan Jayez - The Epipalaeolithic-Neolithic component: chipped stone assemblage from Izeh Caves and Rock Shelters, Khuzestan, Iran.	
9:50-10:10	14:50-15:10	18:20-18:40	15:50-16:10	Stefan Karol Kozlowski - Early and Middle Holocene lithics at the Neolithic Hilly Flanks.	
10:10-10:30	15:10-15:30	18:40-19:00	16:10 - 16:30	Saman Heydari-Guran and Elham Ghasidian - Epipalaeolithic of Kermanshah region: Bawa Yawan rockshelter.	

Time Zone				Friday 25/06/2021	
USA EST (EDT)	British Summer Time (BST)	Iran Tehran (IRDT)	Central Europe Copenhagen (CEST)		
3:10-3:30	8:10-8:30	11:40-12:00	9:10-9:30	Natalia Petrova, Hojjat Darabi, Anna Babenko and Hafez Ghaderi - Neolithic pottery technology in Iranian Zagros.	Presentations
3:30-3:50	8:30-8:50	12:00-12:20	9:30-9:50	Mohammad Bahrami - Neolithic potteries of Khorramabad; reflection of subsistence based on herding and Nomadism during the Neolithic period in West and Southwestern Iran.	
3:50-4:10	8:50-9:10	12:20-12:40	9:50-10:10	Mino Salimi - Horegar (Women Potters); Neolithic way in modern time: an ethno archaeological research.	
4:10-4:30	9:10-9:30	12:40-13:00	10:10-10:30	Joe Roe - Computational models of chronology and regional settlement in the Epipalaeolithic-Neolithic Zagros (20000-6000 BP).	
4:30-5:00	9:30-10:00	13:00-13:30	10:30-11:00		Break

5:00-5:20	10:00-10:20	13:30-13:50	11:00-11:20	Maria Rabbani - Investigating human-environmental interactions in the Zagros region during the Late Glacial and Early to Mid-Holocene period.	Presentations
5:20-5:40	10:20-10:40	13:50-14:10	11:20-11:40	Homa Rostami, Ghasem Azizi, Hojjat Darabi, Tobias Richter and Anthony H. Ruter -Reconstructing paleoclimate and paleoenvironment of the Central Zagros during the late Pleistocene and early Holocene.	
5:40-6:00	10:40-11:00	14:10-14:30	11:40-12:00	Matt Bosomworth, Mark Altaweel, Pascal Flohr, Melanie Leng, Diana Sahy, Hillary Sloane and Dominik Fleitmann - A Holocene multi-proxy speleothem palaeoclimate record from Iraqi Kurdistan.	
6:00-7:00	11:00-12:00	14:30-15:30	12:00-13:00		Lunch
7:30-7:50	12:30-12:50	16.00-16:20	13:00 - 14:00	Final Discussion	

Poster presentations

Ali Feizi Kavkani - Description and classification of stone tools (rock-cut installation) in the Izeh Plain south-west of Iran.

Alibaigi Sajjad - Garbage pits or storage pits; a look into the 10 thousand-year process of keeping food stuffs.

Sepideh Jamshidi Yeganeh, Moreza Khanipour, Hamid Tabatabai, Mahdi SafaiNejad - Darab Plain in the Neolithic period.

Zamani Dadaneh, Sirvan Mohammadi Ghasrian and Steve Renette - A View from the Mountain Valleys: New Insights into the Neolithic of the Marivan Region.

Shokouh Khosravi, Patrick Nørskov Pedersen, Sajjad Alibaigi, Mohsen Heydari Dastenaee, Joe Roe, Hojjat Darabi, Tobias Richter and Peder Mortensen - Razavar Valley in The Neolithic Period, Archaeological survey in north of Kermanshah Province.

Abstracts

Monday 21/06/2021

Revisiting the Hilly Flanks: new data and shifting paradigms.

Barbara Helwing, Staatliche Museen Berlin SMB SPK, Berlin.

The Oriental Institute's Prehistoric Project directed by Robert Braidwood is a prime example of problem-driven research into the early steps of sedentary life in the "Hilly Flanks of the Fertile Crescent", a region he had previously identified as ideal stage for these crucial changes in human lifeways due to the accessibility and abundance of potential food resources. In seeking the foundations of changing lifeways in new methods to access the material sources sustaining life, Braidwood built on earlier concepts, in particular on Gordon Childe's "Neolithic Revolution". Due to the almost complete stop of field research in Northern Iraq and Iran since the 1970s, the elegant "Hilly Flanks" model continues to inform research in the eastern wing of the Fertile Crescent until today. Further west, however, new discoveries since the 1980s have called for the formulation of less material- and more human-focused models: pioneered by Jacques Cauvin, a revolution of symbolic behavior correlating with the shifts in lifeways was recognized, reflecting a new understanding of the place of humans in the world. This shift in paradigm has not yet fully been received in the eastern wing of the Hilly Flanks due to the dearth of data that could serve to test the model. This situation is slowly beginning to change with the influx of new data and the revision and restudy of existing collections. In this paper, I plan to confront the theoretical models of the post-Braidwood era with the current status of field research in the eastern wing of the Hilly Flanks.

Multi-centred or mosaic? Consideration of meta-populations of early domesticated crops and their domesticators around the 'Fertile Crescent'

Dorian Q Fuller, University College Institute of Archaeology

The accumulation of archaeobotanical data over recent years has led to increasing evidence that the domestication process was protracted, taking dozens to hundreds of human generations instead of just a few. This has been accompanied by increasing discussion of evidence for pre-domestication cultivation and the discussion of the likelihood that Western Asian agricultural origins were non-centric or multi-centric. In this context the possibility of separate and different processes at the origins of agriculture in the Northern versus Southern Levant or in the Eastern Fertile Crescent has gained increasing currency, but does a dispersed and gradually process necessarily mean a separated process? As we have come to better understand some of the underlying genetics behind domestication, it is also possible to posit that domestication results

from the bringing together of a range of traits, and dozens of gene loci, that have their origins in different regions. In which case different sub-centres Fertile Crescent could perhaps be seen as part of the same meta-population. What then might constitute a meta-population of a cereal or pulse crops undergoing domestication? Can we also start to think about different human communities and cultural groups as constituting a cultural meta-population, that collectively had in place the range of practices necessary to propel crops to domestication? Taking the notion of meta-population to both early crops and early cultivators, this presentation will explore whether or not Fertile Crescent domestication processes were necessarily multi-centric, and which sub-regions may not have participated in the initial domestication processes, which was arguably the case of the eastern Hilly Flanks.

From Cradle to Mosaic: the metaphors we live by.

Trevor Watkins, University of Edinburgh

In common with everyone else, archaeologists have great difficulty in identifying and abandoning received wisdom in order to think clearly, formulate advances, and forge new perspectives. It is a double problem. Archaeologists are stuck with the terms that have become embedded in our subject, terms like Neolithic, which was created for some now irrelevant reason, reframed by Gordon Childe a long time ago, and which has been discussed, criticised, and reformed many times since. More insidious than our technical terms, however, are 'the metaphors we live by'. How many archaeologists have declared the area where their research has been centred to be the 'cradle' of agriculture? Behind such a metaphor there is the unconsidered idea that important developments such as the domestication of cereals or of sheep or goats originated in a particular place, from where they were diffused to the rest of 'the Fertile Crescent', or 'the hilly flanks'. The site of Qermez Dere in north Iraq confirmed for me that our ideas about the unfolding of the Epipalaeolithic-Neolithic transformation were flawed because of our inability to recognize inherited and deeply embedded metaphors. Equally, we archaeologists have sometimes/often failed to remember that absence of evidence is not evidence of absence. Salvage excavations in the upper Tigris drainage over the years have filled in some of the gaps. We are slowly coming to appreciate that the Epipalaeolithic-Neolithic transformation process took the form of a 'mosaic'. Autonomous communities living in individual settlements worked out the continuity of their own lives within the resources of their immediate environment, and within the framework of their intensive and extensive socio-cultural networks: each piece of the mosaic may be distinctive, but together they make up a composite picture, the narrative of the Epipalaeolithic-Neolithic transformation.

The TCEC Project: Objectives, achievements and implications for the Neolithisation of the EFC.

Hojjat Darabi, Razi University, Kermanshah; Centre for the Study of Early Agricultural Societies, University of Copenhagen

Tobias Richter, Centre for the Study of Early Agricultural Societies, University of Copenhagen

Peder Mortensen, Centre for the Study of Early Agricultural Societies, University of Copenhagen

The Eastern Fertile Crescent (EFC) has played a major role in the investigation of the transition from hunting-gathering to farming and village life in western Asia. Although the pioneering research by R. Braidwood and also subsequent fieldworks yielded a considerable amount of evidence, the region was marginalized in the literature until recently when some new excavations were undertaken at a few early Neolithic sites while the preceding late Epipaleolithic was even overlooked. Moreover, previous excavations at both key early Neolithic sites of Asiab and Ganj Dareh were not admittedly published and they seemed to have faced some chronological controversies. The putative chronological gap between the late Epipaleolithic and the early Neolithic in the central Zagros was still in place though recent investigations had narrowed it. Thus, an Iranian-Danish project entitled "Tracking Cultural and Environmental Change (TCEC): the late Epipaleolithic and early Neolithic in the Seimareh Valley, central Zagros" was begun in 2016. The overall objective of the project was to attain a better understanding of the Neolithisation process in the central Zagros using new research methods and techniques. In this regard, stratigraphic excavations at Asiab, Ganj Dareh and Mar Gurgalan were undertaken in 2016-19. Moreover, a reconnaissance survey was directed in the Razavar Valley and a paleoclimatic investigation was carried out in the region. Asiab showed evidence of the earliest semi-subterranean communal structure (ca. 9600-9300 BC) yet known from the EFC which shares interesting similarities with those synchronous structures in the western Fertile Crescent. Unlike previous ideas about chronology and occupational levels of Ganj Dareh, this site seems to have continuously been under occupation for a ca.600-year-period (ca.8200-7600 BC); it contains a complicated stratigraphy showing remains of 12 levels in the central part. Mar Gurgalan presented some evidence of human activities in the cave roughly dated to ca. 22000-13000 BP though a long hiatus is also evident in the sequence.

Thanks to the overall available data, the TCEC project has contributed to the investigation of Neolithisation process of the region, specifically in terms of chronology, climatic conditions and the emergence of animal herding, plant cultivation, and sedentary life. This article presents the significance of the new finds and that how they may contribute to better understanding of cultural trajectories of the central Zagros and, in a wider context, the EFC.

Revisiting Braidwood's Hilly Flanks.

Douglas Baird, Liverpool University

Renewed excavation and survey by University of Liverpool at 3 sites investigated by Braidwood's classic early 'hilly flanks' project, Turkaka, Palegawra, and Karim Shahr allows reconsideration of developments in the northern Zagros from the late upper Palaeolithic to the earliest Neolithic. Analysis of the lithic assemblages allow insights into dating of these sites, developments in technology, raw material procurement, mobility and exchange, especially when placed in the broader context of other studies from these sites. In addition, the evidence provides better understanding and definition of the late Upper Palaeolithic through Zarzian sequence and the changes at the beginning of the Neolithic, including introduction of pressure blade production.

The Emergence and the dispersal of Neolithic way of living- From core to peripheries.

Mehmet Özdoğan, Istanbul University

During the last decades there has been an almost sudden inflow of information from the upper reaches of the Euphrates and Tigris on the incipient stages of Neolithic formation, featuring a picture substantially different from our conventional understanding of early Neolithic communities, that is from Southern Levant and Central Anatolia. Excavations at early PPN sites such as Göbeklitepe, Çayönü, Körtiktepe, Nevalı Çori and Boncuklutarla covering the time period from 10.400 to 7.400 cal. BC, have forced to change our conventional views, even on what is implied by the term "Neolithic". The incipient stages -the Pre-Pottery Neolithic Period- now stands as a highly sophisticated cultural stage when innovative changes took place in almost every aspect of life. It is now possible to define early Neolithic communities with terms such as stratified society, craft specialization, monumental architecture, long-distance exchange of commodities and of raw materials, dominance of clerical elite, elite competitiveness, all such cultural attributes that were previously conceived as the markers of later societies. To present, 18 sites in Turkey and 11 in Northern Syria and Iraq has been excavated, making it possible to define various particularities of this intriguing culture, ranging from settlement organization to burial customs and symbolism to material assemblages and craftsmanship. It is also of interest to note that sites of this culture appear almost simultaneously with no detectable precedents in the region, though sharing similar traits in the full extent of the region.. The presentation will present a conspectus of this cultural entity, also noting the modalities of its dispersal by the end of PPN.

Braidwood's legacy and the elusive transition.

Frank Hole, Yale University.

Robert Braidwood conceived of The Hilly Flanks of the Fertile Crescent as the inevitable heartland of "The Primary Village-Farming Community". Dissatisfied with Childe's notion of an Agricultural

Revolution, he proposed instead to take a processual view. He defined eras of “Food Collecting”, “The Terminal Aspect of Food Collecting”, the “Era of Incipient Cultivation”, and finally the era of “The Primary Village-Farming Community”. Recognizing that there was a gap in understanding of how and why people left their caves and rockshelters and moved into the open with houses, planted fields and kept livestock, he decided to focus on that transition. To implement his ideas he engaged an interdisciplinary team, consisting of a geologist (Herb Wright), a plant scientist (Hans Helbaek), and a zoologist (Charlie Reed). Together they recognized the overlapping geographic distributions of the wild plants and animals that composed successful agropastoralism. They designated the region, “The Hilly Flanks of the Fertile Crescent”.

Braidwood knew that excavations of single sites could not solve the problem; rather he had to excavate sites of all types that spanned the gap, from caves to villages. He engaged in a program of small test trenches in 13 sites ranging from Paleolithic through Chalcolithic, and fuller excavations at key sites that covered the temporal range: Palegawra, Karim Shahr, and Jarmo.

I was fortunate to have studied with Braidwood and participated in the excavation of Sarab in Iran. After finishing my PhD I took to heart his problem oriented approach, initially seeking the transition from Middle to Upper Paleolithic, and then focusing on the transition to agriculture. Like Braidwood, my research combined extensive surface survey with excavations at key sites that spanned the transitions. As these are foundational to subsequent research they are briefly described.

Chogha Golan and its high resolution record of cultural and economic change during the Aceramic Neolithic in the foothills of the Zagros Mountains

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The high-resolution artifactual and archaeobiological record from Chogha Golan in the foothills of the Zagros Mountains in Ilam Province of Iran dates between ca. 11.7 and 9.7 ka cal BP and is crucial for our understanding of the Neolithization process. The long-term subsistence strategy

over roughly 2000 years begins with the rich basal unit of Archaeological Horizons (AH) XI and reflects an economy that relied mostly on gathering wild cereals and pulses and hunting a variety of wild animals. While the record of seed taxa is relatively stable throughout the lowermost four horizons, the wood charcoals indicate more arid conditions in AH XI and IX than in the following horizons. AH VI-IV show a reduction in the large-seeded *Aegilops* sp. (goat-grass), an increase in small-seeded grasses, an increase in wild barley seed-sizes, and the first occurrence of its domesticated-type rachis internodes. The latter are however, consistent with mutants of phenotypically domesticated types in wild populations. Additionally, a strong reduction in pistachio wood charcoal, and an increase in riparian wood species (*Salicaceae* and *Tamarix* sp.) are apparent in these horizons, as is an increased abundance of small ungulates, gazelles in particular. The uppermost horizons II and I yielded domesticated-type emmer wheat and a strong increase in arable weeds, the highest proportions of the semi-arid *Pistacia-Amygdalus* woodland, and an increase in the abundance of cattle bone.

The sequence from Chogha Golan is characterized by a rich record of material cultural remains. Lithic assemblages document a stable pattern of stone knapping based primarily on the use of bullet cores and pressure flaking to produce highly standardized blanks. Similarly, the ground stone tools tend to point to a high degree of technological continuity. The iconography of many clay figurines appears to become more diversified over time. In the area of architecture, we see many glimpses of buildings, walls, plaster floors and installations, but the excavation strategy has emphasized high stratigraphic resolution within small areas rather than exposing large occupation horizons and architecture.

MENTICA: Middle East Neolithic Transition – Integrated Community Approaches. Project overview.

Roger Matthews, Reading University

Hassan Fazeli Nashli, University of Tehran

The MENTICA project represents an ambitious programme of scientific research into the Epipalaeolithic-Early Neolithic transition in the Eastern Fertile Crescent (EFC), funded for 5 years from October 2018 by a European Research Council Advanced Grant. In this paper I will provide an overview of the MENTICA project, summarising the aims, objectives, and methods of the six integrated work packages that form the project. The overall project question is: how did Epipalaeolithic and Early Neolithic human communities of the EFC negotiate disruption in their transition from mobile hunting and foraging to sedentary farming and herding? In order to address this question, an interdisciplinary team based at the University of Reading is pursuing the following research objectives: 1) conducting excavations at key Epipalaeolithic and Early Neolithic sites in the EFC to generate multi-scalar, richly contextualised evidence; 2) examining

ecological and sociocultural aspects of the Early Neolithic transition for insights into changing human-plant-animal-environment interrelations at household, neighbourhood and site scales; 3) investigating the nature of community networks, collective identities and resilience strategies, and; 4) exploring and articulating the global significance of the EFC as a core zone informing on societal engagement with disruptive changes, with significance for approaching challenges of today, including connections between environmental and social change.

The Late Epipalaeolithic in the Zagros and the Levant: the Natufian and the Zarzian compared

Tobias Richter, Centre for the Study of Early Agricultural Societies, University of Copenhagen

It is generally acknowledged that Epipalaeolithic societies laid the foundation for the development of the subsequent aceramic Neolithic in southwest Asia. Braidwood's Hilly Flanks hypothesis held that it was during the late Pleistocene that gatherer-hunters settled in to their respective ecotones and began to exploit wild plants much more extensively than before. The familiarization and engagement with these ecotones and plants build knowledge that enabled people to further exploit and take advantage of plants and animals in the subsequent Neolithic. This co-evolution of humans, plants and animals in southwest Asia appears to have followed two different sets of paths. Whereas Late Epipalaeolithic Natufian groups in the Levant appear to have established longer lasting open air sites, tamed the dog, created a rich body of artwork and practiced elaborate burial rituals, the evidence from the Late Epipalaeolithic Zarzian in the eastern Fertile Crescent is more patchy. In this contribution I will compare the Natufian and the Zarzian and reflect on the similarities and differences in material culture, settlement pattern, economy and consider the importance of the different pathways leading up to the emergence of plant cultivation and the 'Neolithic way of life'.

Tuesday 22/06/2021

Revisiting Early Neolithic Göbekli Tepe.

Lee Clare, German Archaeological Institute, Istanbul Branch.

Moritz Kinzel, German Archaeological Institute, Istanbul Branch.

Twenty-five years ago the Neolithic site of Göbekli Tepe was introduced to the Neolithic research world, opening up new debates on the origins and role of beliefs, innovation and the development of agriculture. According to the latest research results, Göbekli Tepe was not just a ritual 'sanctuary' but a settlement with several 'special buildings'. Judging from the available radiocarbon ages from PPNA sites in the region, we argue that T-shaped stone pillars made an appearance at Göbekli Tepe at a time when other PPNA sites are in decline and abandoned (i.e.

along the Tigris and Euphrates). For this reason, we propose that they are an attempt by these late hunter-gatherer communities to preserve their Epi-Palaeolithic narratives, mythology and traditions.

In other words, instead of being genuine progressive, we would suggest that the 'Göbeklians' were more 'conservative' than previously thought. In this context, Göbekli Tepe – and sites like it – could be seen as a last-ditch attempt to continue and to preserve hunter-gatherer lifeways or at least to maintain their narratives, cosmic order, and mythology. Accordingly, they had to invent new approaches, concepts, and techniques to keep their old traditions alive.

The earliest sedentary settlement in the upper Tigris: Hasankeyf Höyük and its significance.

Yatuka Miyake, University of Tsukuba.

It has been generally thought that in southwest Asia the beginning of food producing economies or the systematic cultivation of morphologically wild cereals (pre-domestication cultivation) had a great impact on the development of prehistoric societies. However, new evidence from Hasankeyf Höyük in southeast Anatolia, which was mostly occupied during the later tenth millennium cal. BC, indicates that social complexity could have been improved alongside other early Neolithic sites of the upper Tigris without relying on cereal exploitation. All the plant and animal remains recovered from the site are morphologically wild, and wild progenitors of cereals are virtually absent from or insignificant in the plant assemblages. The presence of communal buildings, complex mortuary rituals, elaborate craftsmanship, long-distance trade networks and lively symbolic behaviour indicate that the sedentary hunter-gatherers of the upper Tigris developed rather complex societies.

Körtik Tepe in the origin and flourish of the Pre-Pottery Neolithic.

Abu Bakar Siddiq, Mardin Artuklu University.

Vechihi Özkaya, Dicle University.

Körtik Tepe was among the very few influential cultural hubs that contributed the origin and development of Neolithic across West Asia. Occupied throughout the Younger Dryas and Early Holocene, between 10405 and 9280 cal BC, the site yielded highly rich quantity of artifacts; so far no other early PPNA site has been found as enormous and rich in material culture as Körtik Tepe. Along with about 1060 burials and 460 architectural remains, the notable artifacts of the site include over five hundred stone vessels with depiction of animals, plant and geometric designs; hundred thousands of stone and shell beads; hundreds of stone axes; over two thousands bone tools; varieties of bone and stone plaques; household objects; hundred thousands of stone tools and many more. Besides, some of the unique examples of animal symbolism and material culture

at Körtik Tepe were later widely appeared in other notable PPNA and PPNB sites. Therefore, considering the cultural influence and chronological position, it is arguable that perhaps Körtik Tepe was the predecessor of some late PPNA sites including Hallan Çemi, Hasankeyf Höyük, Gusir Höyük, Çayönü and Demirköy Höyük in the Upper Tigris basin. It is also likely that, if not the predecessor, Körtik Tepe at least had great influence in the flourish of material culture and symbolism at Göbeklitepe, Jerf-el-Ahmar, Dja'de el Mughara, Tell Abu Hureyra and Nevalı Çori in the

Middle Euphrates basin, as well as Nemrik 9 and Qermez Dere in the Middle Tigris basin. Together with its chronological position, this paper primarily presents a glimpse of material cultures of Körtik Tepe, unearthed in past twenty years of excavation. Citing some of its trademark examples, it further attempts to clarify the significance of Körtik Tepe in the origin, development and flourish of the Pre-Pottery Neolithic culture in West Asia.

Investigating the eastern wing of the Fertile Crescent two seasons of excavations from prehistoric Jarmo.

Sari Jammo, Tokyo University.

Akira Tsuneki, University of Tsukuba.

Nobuya Watanabe, Chubu University.

Ryo Anma, Tokushima University.

Yuki Tatsumi, University of Tsukuba.

Kamal Rasheed, Slemani Antiquities Directorate.

Jarmo (*Charmo in local Kurdish*) is a large prehistoric site located in the eastern part of the Fertile Crescent in Slemani Province in the Iraqi Kurdistan region. The site was first excavated by Robert J. Braidwood of the University of Chicago in the late 1940s and early 1950s. Since 2014, the University of Tsukuba has undertaken archaeological surveys and excavations in a number of sites, including Jarmo. We began excavations at Jarmo in 2018 and continued for a second season. The aim of our excavation is to investigate the Neolithization process in this Chamchamal region, investigate and reconstruct the ancient landscape during the time of the Jarmo Neolithic village, and further reassess the chronology of the site. Thus, five sounding trenches at different locations within Jarmo were excavated and produced various kinds of materials. In addition, geophysical surveys were undertaken to investigate the extent of Jarmo village on the southern slope of the site. Further, extensive GPS and UAV surveys were conducted, and we made a detailed map covering Turkaka and Jarmo. Moreover, topographical and geological studies were undertaken to reconstruct the paleo-environment of the Neolithic period. In this paper, we present the ongoing excavation work and the preliminary results of our investigation about the Neolithization developments, ancient landscape, and early farming process in the Slemani region.

Investigating the Late Neolithic in the Shahrizor Plain: Tell Begum, Shaikh Marif and Shakar Tepe.

Takahiro Odaka, Kanazawa University

The Shahrizor Plain (Sulaymaniyah Governorate, Iraqi Kurdistan) is an intermontane valley located in the western Zagros foothills. Its local prehistory is gradually coming into view through ongoing investigations. For the Late Neolithic period (middle of the 7th to 6th millennium BC), however, archaeological evidence is still limited. Although the Shahrizor Survey Project (SSP) started in 2009 recorded 22 sites attributed to the Late Neolithic so far, most are identified primarily with the late Halaf materials, dated to the late 6th millennium BC. In fact, our re-excavations at one of these, Tell Begum, reached the late Halaf layers, but thus far any earlier evidence could not be found. Excavations at Tepe Marani by the UCL mission point to a similar chronological stage within the Late Neolithic, while Bestansur excavated by University of Reading indicates a much earlier Neolithic phase. Thus, in the Shahrizor, an apparent hiatus existed from the mid-7th to the mid-6th millennium BC. To tackle this issue, the SSP investigated a cluster of small Late Neolithic sites on the lakeshore of the Darband-i Khan Dam in 2012. The analysis of collected ceramics at these sites, Shaikh Marif I and II, demonstrates a possibility to fill this chronological gap. Testing this hypothesis by excavations, we started a new field project in September 2019. As the lake water covered with both of the Shaikh Marif mounds last summer, an alternative site, Shakar Tepe was excavated. Although only a few Neolithic sherds were previously collected at this site by the SSP, we succeeded to recover thick Late Neolithic layers on the skirt of the mound. New radiocarbon dates obtained from Shakar Tepe fall within 6400-6000 BC, filling part of the chronological gap. Therefore, the early 6th millennium BC remains enigmatic at present.

Comparisons and connections between the Hilly Flanks and the Euphrates regions during the Epipalaeolithic and Neolithic.

Kate Dudgeon, Reading University

Archaeobotany contributes crucial evidence for shifts in human economy from foraging to farming, understanding early village life and for understanding the strategies employed by people in the past to cope with changing environmental conditions. However, differential preservation of plant proxies leads to the over or under representation of some plant types. This research adopts a multi-proxy approach, including the analysis of phytoliths, charcoal and faecal spherulites to provide new perspectives on human economy during the Neolithic of the Near East. This paper compares the site of Abu Hureyra, N. Syria (~11,150-6000BC) with key sites in the Hilly Flanks, focusing on Neolithic Bestansur (7700-7200BC) on the Shahrizor Plain in the

western foothills of the Central Zagros Mountains. Comparing early Neolithic lifeways between these two regions contributes to our knowledge of how people managed local resources and interacted with plants in different environmental settings.

Sustainability of early sedentary agricultural communities in the Hilly Flanks of the Eastern Fertile Crescent

Wendy Matthews, Reading University.

Archaeological investigation of the ecological and social sustainability of communities has a powerful role to play in providing crucial new insights into the challenges faced by communities not only in the past but today and in the future. There is currently increasing discussion of the sustainability and health of early sedentary agricultural communities, as it is widely recognised that the development of early sedentism and agriculture represents a major demographic and epidemiological transition and transformation in human-environment inter-relations.

The aim in this paper is to highlight the rich range of interdisciplinary theory, approaches and data that Archaeology can access to provide a deep time perspective on sustainable construction, energy sources and social relations. The case-studies are drawn from new interdisciplinary research in the Central Zagros from 10,000-7,000 BC. Integrated microstratigraphic and archaeobotanical studies of the built environment, earthen architecture, plant remains and human and animal coprolites are providing new insights into the biodiversity and sustainability of early sedentary agricultural communities, which are presented here. This paper also explores ways in which the results can inform on current individual and community choices and options.

Back from beyond: ongoing work on the 1967-1974 Ganj Dareh archive.

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Andrew Lythe, Département d'anthropologie, Laboratoire d'archéologie de l'Anthropocène, Université de Montréal

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Lyne Grondin, Département d'anthropologie, Laboratoire d'archéologie de l'Anthropocène, Université de Montréal

Excavated by Philip Smith between 1967 and 1974, the aceramic Neolithic site of Ganj Dareh was never the subject of a monographic treatment which has created challenges in precisely situating observations drawn from its various artifact assemblages over the decades. In 2017, the field documentation and artifact collections from Smith's projects were located at Université de

Montréal by the lead author who set about organizing these materials and evaluating their scientific value. This has resulted a project focused on two distinct but related components 1) effectively curating and perennializing the excavation documentation and the artifact collections; and 2) using these records and collections to fill in some of the gaps in our understanding of history of human occupation at the site and to provide better context useful for ongoing work by other research groups working on material from the site. Here we present an overview of the state of these efforts. In particular, we present a reconstruction of Smith's five-level stratigraphy, including a 3D rendering that permits an assessment of shifting site-use over time. Drawing on the field documentation, we are also able to propose a finer-grained, 14-level stratigraphy and provide unprecedented resolution on some of the burials found at the site. Further, cross-referencing this more detailed sequence with Smith's records of counts of various artifact categories further leads to us to propose that the basal 'firepits' level may have represented a less sedentary occupation of the site that was itself preceded by ephemeral occupations by mobile foragers.

Archaeological investigations at Tappeh Pahlavan, a late Neolithic site in Khorasan (NE – Iran).

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Sepideh Jamshidi, University of Tehran, Department of Archaeology

Sanaz Beyzaei Doust, University of Tehran, Central Laboratory, Bioarchaeology Laboratory, Archaeozoology section.

Homa Fathi, University of Tehran, Central Laboratory, Bioarchaeology Laboratory, Archaeozoology section.

Hossein Davoudi, University of Tehran, Central Laboratory, Bioarchaeology Laboratory, Archaeozoology section.

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Ali Vahdati, ICHHTO, North Khorasan.

Judith Thomalsky, Deutsches Archäologisches Institut, Tehran.

Mohammad Hossein Azizi Kharanaghi, Iranian Center for Archaeological Research (ICAR), Tehran.

The Zagros region has long been a focus of archaeological researches of Iran and much less attention has been paid to the eastern parts of this country. In the past few decades, archaeological fieldworks in northeastern Iran and south Central Asia carried out both by the

native archaeologists and the international community, have highlighted the importance of this region for a better understanding of the process of Neolithisation.

Tappeh Pahlavan is a 13 m high mound and among the rare Neolithic-Chalcolithic site in northeastern Iran known from the mid 60's, but never subjected to proper archaeological investigations before 2010. The site is located in an arid zone between Dasht-e Kavir and the southern foothills of Alborz in the plain of Jajarm. Archeological investigations at Tappeh Pahlavan were conducted during two seasons in 2010 and 2014 to investigate the development of Neolithic way of life in the fringes of desert in northeastern Iran. Since Tappeh Pahlavan provides the earliest evidence of Neolithic in western Khorasan, we are also interested in the cultural interaction of the Neolithic population of this area with the Iranian Plateau and the piedmont zone of southern Turkmenistan.

This paper presents results of archaeological investigations, discusses the material culture, the bioarchaeological data as well as the chronological framework of the site. Given the limited area of excavated trenches, no evidence of prehistoric architecture has yet been found in Tappeh Pahlavan. The pottery typology shows similarities with several sites in the Central Plateau of Iran, but the most readily parallels could be found in the pottery assemblage of Tappeh Sang-e Chakhmaq East, some 130 km to the east-southeast of Jajarm. The combined analysis of these results and absolute dating from all trenches indicates that the site was occupied from the end of the sixth to the beginning of the fifth millennium BC. The analysis of faunal remains suggests that the climate was already arid and people relied both on pastoral and wild resources. The analysis of a limited number of archaeobotanical samples shows the cultivation of barley and wheat.

The spatial organisation of activities: the need to look outside.

Ingrid Iversen, Reading University.

Evidence for the spatial organisation of activities in a settlement can be used to understand the nature of social interactions and to address questions relating to social relationships and community structure. Of particular interest is the structured use of external areas, which is frequently overlooked in studies which focus on architecture and features as the key sources of data. Ethnographic studies have recognised that 'important social and economic activities' take place in 'nonarchitectural areas' (Kramer 1982) which can represent a significant proportion of the total area of a settlement.

The method employed in this study of the Early Neolithic site of Bestansur is the analysis of the material retrieved in the heavy residue resulting from wet-sieving and/or flotation. Despite being well suited to identifying regular and repeated activities, and the spatial patterning of material, its systematic use is rare. Living practices may not be at all obvious from architectural remains as

inside floors were often swept clean of evidence of activities while outdoor spaces are the loci of many activities. At Bestansur, spaces within buildings show few signs of activities while the external areas produce microarchaeological evidence suggesting a wide range of activities. The spatial pattern of microartefacts, with well-defined different external areas, point to the structured organisation of activities at the site.

Multi-scalar Analysis of Early Built Environments in the Eastern Fertile Crescent

Alessandro Guaggenti, Reading University.

The study of the built environment has recently been highlighted in multiple academic disciplines. Current archaeological discourse has argued that built environments are complex, diverse, animate and metabolic. As such they comprise the coming together and continuous unfolding of multiple materials, agents, activities, processes and experiences at different spatio-temporal scales. Therefore, built environments, and their constitutive elements, can be seen as being in a continuous state of becoming. In this complex spatio-temporal perspective, built environments can be seen as being polychronic. As such, the archaeological investigations of past built environments have relevance to current world issues on many aspects including well-being, human-environment interaction and sustainability.

The transformation from the Epipalaeolithic to the Neolithic was a time which witnessed fundamental changes in human life-ways. This can be seen directly in the move to more sedentary forms of living. Consequently, the built environment is a major area of research at this critical time in human history. Studies of the built environment during the Neolithic have largely been undertaken in relation to major sites in the western fertile crescent, however the Eastern Fertile Crescent witnessed an early move towards the establishment of sedentary communities and provides an important, and often overlooked, case study. Nonetheless the previous research in this latter region has been limited, consisting of analyses which focus on form and function of architectural remains. There is considerable scope in the Eastern Fertile Crescent for new analyses that examine the complexity and multi-linearity of built environments.

Pecked stone and getting peckish: ground stone and foodways at Early Neolithic Bestansur.

David Mudd, Reading University.

The presentation will show how ground stone has been used to understand foodways at the Early Neolithic settlement of Bestansur in the Iraqi Zagros. The Zagros Neolithic has in the 20th century been under-researched in comparison to other regions. More recently, this imbalance is being redressed, using modern techniques of excavation, analysis and interpretation. Ground stone has a valuable role in these processes. In excavations since 2012 by the Central Zagros

Archaeology/MENTICA Project, over 500 ground stone tools have been recovered, with a considerable quantity of debitage and unworked stone.

The site is located at the meeting of several ecozones - flat steppe, river and marshlands, and the hills and mountains of the Zagros, giving the ability to exploit a wide range of animal and plant resources. Good quality stone was another important local resource, quarried from locations close to the settlement, and worked to make robust long-lasting tools. Stone tools both supported and structured the social and symbolic life of the community, particularly in relation to the procurement, preparation and consumption of food. The presentation will look at the range of functions which can be inferred from the stone artefacts excavated, considering the selection of stone, evidence of manufacture and use in quotidian and symbolic food practices, and discard behaviour. It will compare the Bestansur assemblage with those from other Zagros Neolithic sites.

The first archaeological campaign at Tappeh Qazānchi, a new PPN site in the West Central Zagros.

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Hossein Davoudi, University of Tehran, Central Laboratory, Bioarchaeology Laboratory, Tehran.

Sonia Shidrang, National Museum of Iran, Palaeolithic Department, Tehran.

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Zeynab Fathi, University of Tehran, Central Laboratory, Bioarchaeology Laboratory, Tehran.

Recent archaeological investigations in the North West of Kermanshah have highlighted the importance of this region for documenting initial stages of the Neolithisation of Central Zagros. During winter 2019 we excavated Tappeh Qazānchi, near Kermanshah. The site was first reported by Robert J. Braidwood during the 60's. It is unfortunately now heavily damaged by agricultural activities. Tappeh Qazānchi is a 2 hectares mound of 13 meters height, 160 meters

long and 160 meters wide. Our preliminary surface collection on the site during 2012 indicated a multi-period occupation and the presence of lithic tools characteristic of the Early Neolithic period. The 2019 sounding confirmed these preliminary observations. We opened three trenches and found a Bronze Age deposit on the top of the mound and pre-pottery Neolithic ashy layers from eight to thirteen meters lower down. The Neolithic occupation of Tappeh Qazānchi is comparable to Chogha Golan, Sheikhi Abad and East Chia Sabz on the basis of radiocarbon dating and lithic analyses. This presentation will summarise the results of chronological, bioarchaeological, lithic and micromorphological studies.

The Neolithic in the eastern margins of the Zagros Mountains.

Benjamin Mutin, Harvard University

Omran Garazhian, University of Neyshabur

In this paper we synthesize current knowledge and issues regarding the Neolithic period in southeastern Iran, with an emphasis on recent fieldwork conducted within the southern Lut Desert. We have been conducting this fieldwork since 2016 as part of an Iranian-French, collaborative archaeological research project, Bam Archaeological Mission. We carried out surface surveys in 2016 and 2017 as well as new excavations at the Neolithic site of Tell-e Atashi in 2017 and 2018. Our surveys recorded about 250 sites dating from the Paleolithic to the Iron Age, including a substantial Neolithic settlement in an area called Darestan, east of Bam. We now also begin to have a solid picture of the chronology, spatial organization, function(s), and material culture of Tell-e Atashi, and we have been able to start evaluating its relationships to the other Neolithic sites recorded in southern Iran, as well as to Mehrgarh in Pakistan. This research has come at a time when new data has been collected on the Neolithization in the eastern part of the Fertile Crescent, throughout the Zagros mountains. Yet, the eastern margins of this region are still poorly known as far as the transition from hunting and gathering to agriculture is concerned. Despite recent fieldwork, the surveys and few excavations of Neolithic deposits conducted twenty to forty years ago indeed remain the basis of current archaeological reconstructions on this topic, and some questions that emerged at that time are still unanswered today. In this paper we present results from our fieldwork in the southern Lut Desert and attempt to combine these results with those from previous research in the eastern margins of the Zagros Mountains. While raising new questions, we show that the aggregate of this work contributes to a more diverse picture of farming communities across the eastern Fertile Crescent.

Wednesday 23/06/2021

“Parallel Neolithic landscapes?” – New survey data from the Sirvan and Chardavol Valleys in the central-west Zagros, Ilam province (Iran).

Barbara Horejs, Institute for Oriental and European Archaeology (OREA), Austrian Academy of Sciences, Vienna.

Bogdana Milić, Institute for Oriental and European Archaeology (OREA), Austrian Academy of Sciences, Vienna.

Lily Niakan, Iranian Center for Archaeological Research (ICAR), Tehran.

This paper will present the new Austro-Iranian project and the outcomes of the first survey campaign in the Sirvan-Chardavol district of the Ilam province in Iran, started in 2018. Field investigations aimed to define prehistoric activities in the valleys of two tributaries of the large Seymareh River, and to document the Neolithic finds in detail. The focus of the broader project with the research teams from the Prehistoric and Historic archaeology is gaining of a diachronic perspective concerning the settling patterns starting with the first farming communities in the area. A previously unexplored micro-region was investigated in the course of extensive and intensive archaeological surveys involving artefact collecting and recording, GIS analyses and environmental studies. Based on the preliminary reconstruction of the landscape, environmental and geo-morphological conditions involved in the site formation processes, this contribution will discuss the role of natural mounds and elevations, tell sites, river terraces and hill flanks alongside the rivers, as preferable locations for long- and short-term settling activities during the Neolithic. Initial investigations let us assume potential varying settlement patterns in the valleys during prehistoric times. Direct comparison of artefacts, including typological and technological attribution, demonstrated possible contrasting manifestations of the Neolithic evidence between the Sirvan and Chardavol Valleys. Lithic scatters of the Sirvan Valley and stone tool collection from the tell site of Chogha Khaki will be used to address questions concerning the availability and use of lithic raw materials. Based on these new primary data, we will finally discuss the potential indications for the parallel Neolithic landscapes in the highlands of the Central Zagros.

Geographical zone and evaluation of the Neolithic period in Fars, Iran.

Morteza Khanipuor, University of Tehran

Mohammad Hossein Azizi Kharanaghi, Iranian Center for Archaeological Research (ICAR), Tehran. Considering the long history of innovations during the Neolithic period in Fars, there remain several fundamental questions that have not been answered. Of these unanswered questions, the most important concerns that of the chronology of the Early Neolithic pottery that would provide insights into the early phases of settlement and production of food in the region. The problems of representativeness are not only chronological, but the cultural region of Fars presents various environments that dominated the formation of settlements during every given period. In order to

better understand the different cultures of the Fars province, it is necessary to study individual regions and valleys to develop a comprehensive analysis. Because the Fars region has not been uniformly investigated archaeologically, many regions such as Darab plain, QareAqaj River Basin unknown. On the other hand, investigations in other regions, including Marvdasht, have seen concentrated activities focusing on special periods or sites. Therefore, the expansion of cultures has remained largely unknown in relation to all of the regions. The current study focused on previous fieldwork and recent work which had been done by authors from surveys in Bavanat and Darab, and excavations in Rahmat Abad, Hormangan, and Tol-e Sangi to investigate in chronology and cultural aspect in the distinct zone in the Neolithic period. According to these excavations, the southern part of Fars is different from the North in pottery styles. In the north instead of local motifs there is a lot of similarities in style that would be a suggestion for dating. therefore by comparing the cultural materials and absolute chronology done in other regions, a sequence chronology including Rahmat Abad (7500-7000 B.C.), formative Mushki (7000- 6400 B.C.), Mushki (6400- 6000 B.C.), Jari (6000-5600 B.C.) and Shams Abad (5600- 5200 B.C.) for the Neolithic period of Fars can be presented.

Relative and absolute chronology of Qasr-e Ahmad (Fars); a new Neolithic site in southern Iran.

Mohammad Hossein Azizi Kharanaghi, Iranian Center for Archaeological Research (ICAR), Tehran
Marjan Mashkour, UMR 7209-AASPE- CNRS/MNHN Paris.

Antoine Zazzo, UMR 7209-AASPE- CNRS/MNHN Paris.

Fazlolah Khaluei, Fars Province Cultural Heritage, Tourism and Hands Crafts.

The study of the Neolithic period in Fars began in the 1950s and 1967 with archaeological surveys of the Kur River basin and the Marvdasht plain. The first Neolithic excavations in the plain were initiated by Japanese archaeologists at Mushki and Jari. In 2012, at about 54 km South East of Shiraz, in the Kavar plain, a new Neolithic site, Qasr-e Ahmad was excavated by H. Azizi Kharanaghi. A radiocarbon date of the mid 8th millennium obtained on a large sheep bone revealed the importance and antiquity of this site. Qasr-e Ahmad is one of the Neolithic largest sites in Iran, with 6.5 hectares area. The sounding of two stratigraphic trenches A and B , 5.5 meters exposed continuous cultural deposits of PPN and Pottery Neolithic levels. Excavation in the main stratigraphic trench A, revealed for the second time after Rahmat Abad, evidence for the presence of PPN and Pottery Neolithic cultures in Fars. According to several 14C dates the earliest date for the PPN is 7200 BC. Excavators discovered in the PPN level a right-angled stratified structure with ocher plaster on the walls and the floor. This is the first known example of architecture from the PPN period in Fars. Pottery production is documented from 6800 BC with handmade redware simple coarse bowls. In the upper layers of the Pottery Neolithic, simple

redware pottery is replaced by simple other geometric patterns and then black geometric patterns in the later phases. The lithic technology does not show a noticeable difference from the PPN to the Pottery Neolithic; grinding stones are found in all phases and large sickle blades and micro blades for harvesting grains are common in the assemblage. Interestingly, a large number of obsidian micro blades of Anatolian origin are present in the lithic assemblage. According to the archaeobotanical and archaeozoological studies, the subsistence economy of Qasr Ahmad was based on the exploitation of domesticated plants and animals already from the beginning of the settlement, i.e the late eight millennium BC, with the contribution of some wild taxa.

Investigation of Neolithic period sites in Kuh-Dasht region, West of Iran.

Hamzeh Ghobadi Zadeh, University of Tehran

Sirvan Mohammadi Ghasarian, University of Tehran

Regarding prehistoric period studies, Kuh- Dasht plain is one of the most important areas. But Comparing to the neighbors' plains like Holailan, our information about the Neolithic period is really less. Previous archaeological surveys did not result in identifying Neolithic sites. During a recent archaeological survey in Kuh-Dasht, February 2020, directing by Hamzeh Ghobadi Zadeh with the contribution of Sirvan Mohammadi Ghasarian important Neolithic period sites was identified. They are including both caves(Qar-e Jomy) and open air sites(Kharmanjah and Sartapeh).the sites range from early Neolithic to Transitional Neolithic/Chalcolithic period(J ware). Lithic from Sartapeh are typically early Neolithic period comparable to other early Neolithic sites like Ganj Dareh, Gouran, Sheikhi Abad. This site has also some chaff temper of Middle and Late Neolithic potteries and also typical Neolithic to Transitional Neolithic/Chalcolithic period (J ware). What has been surveyed from Kud-Dasht regions, not only fills the present gap of Neolithic period studies in this area but resulted in first information about the Neolithic period.

Early Holocene occupations in the Kohgilouyeh region, southern Zagros, Iran.

Ahmad Azadi, Iranian Center for Archaeological Research (ICAR), Tehran.

Kohgiluyeh region at an elevation between 500 to 3300 meters above sea level in southern Zagros is located between two major cultural zones of Khuzestan and Fars. This intermediate region is archaeologically less known compared to its neighbors. Based on archaeological surveys of Kohgiluyeh region, 16 sites from early Holocene period were identified. Regarding the typology of the sites, they include 5 mounded sites, 8 open sites, 2 rock shelters and one cave site. It seems that during this period, the plains have not been under attention enough but the mountainous landscape and margin of the rivers such as Maroun River has had a main role in attracting the human groups. Stone artifacts of chert are the most common classes of raw materials recovered

from surface of the sites. Generally, in terms of the technological structure, stone tools can be classified into four main groups including core/core fragments, debitage, tools and debris. Cores include numerous single and double platform bullet cores and few flake and mixed cores (bladelet and flake cores and blade and bladelet cores). The debitage is almost exclusively bladelet and flake based. Tools are the main group of stone artifacts and some of them include bladelet with continuous fine retouch on one and two edge, backed bladelet, bladelet with inverse retouch on both edges, end-scraper and simple burin on a flake.

From the slopes towards the Iranian Plateau: Neolithic life in the outskirts.

Judith Thomalsky, German Archaeological Institute, Tehran Branch

The process of neolithisation in Iran can be only understood on different levels of social and technological developments and networking. The introduction of architecture or ceramic production, neolithic subsistence, and other innovations in symbolism and technical all-day life can be summarized in major chronological steps of “Neolithic” evolution throughout the Iranian Plateau. But by focusing the detail, one observes certain heterogeneity in the material culture and diversity in subsistence patterns that result from different components of local groups and cultural interactions. This paper will discuss pathways of cultural traits and interactions spheres on the Iranian Highland along two case studies: a) the northernmost end of the Hilly Flanks, the Lake Urmia plain that obviously is encircled by diverse Neolithic entities that form specific local trends and the b) northeastern edge of the Iranian plateau, the Gorgan Plain, where the so-called Djeitunian “entered” the Iranian Plateau, a process which is still rarely understood.

The dispersal of agricultural societies on the southern flanks of Alborz Mountains during the Neolithic period.

Hassan Fazeli Nashli, University of Tehran

Michael W. Gregg, University of Toronto Mississauga, Ontario

In contrast to the foothills of the Alborz Mountains in the Caspian basin, the southern flanks adjoining the Iranian plateau have yet to yield evidence of independent development of agricultural societies dating to the early eighth or late ninth millenniums BC. However, agricultural ways of life were adopted in this region as early as 7200 BC at sites such as Qaleh Asgar and Sang-e Chakhmaq. There is also increasing evidence for interaction and communication with other early farming communities in the foothills of the Zagros Mountains, the southern Caucasus and eastern Anatolia during the during the seventh millennium BC. This paper will outline the diversity of subsistence practices and changes in economic activities through space and time during the Neolithic period in the northeastern portion of Iran and adjacent central plateau. In the northeast, this period is currently divided into two major phases

with a 300-year gap between stages: Pre-Pottery Neolithic (7200 - 6600 BC); Pottery Neolithic (6300 - 5200 BC). While on the central plateau, the Pottery Neolithic is divided into two sub-phases: the first being reflective of local cultural developments between 6200 - 5600 BC, followed by a phase more regional in character between 5600 - 5200 BC. In addition to examining the adoption of domesticated cattle and wheat species from outside the region, varying forms and stylistic patterns of pottery will be used to provide insights into the movements of people and adoption of ideas during the seventh and sixth millennium BC. This will be the diffusion of Djeitun ceramic wares originating in northeastern Iran into Turkmenistan via agricultural communities of the Gorgan plain and Caspian basin.

Neolithic Period Associated with Southern Urmia Lake, Questions and Challenges (Iran).

Aso Abdi, Free University, Abhar Branch, Iran

Evidence and findings obtained from surveys and excavations in the vast northern and central Zagros region represent a significant expansion of the Neolithic period (Between 4000 - 8000 BC), from the early to the new villages. Jarmo (Early Village), Hassuna (Late Village), Halaf (Middle Village), Ubaid (New Villages), and Ganj Dareh in the Southern Zagros, Goodin (Late Village), Tri Gabi (Middle Village) and Hassanabad Tepe (New village), all of these are landmarks of this period in northern Zagros. At the same time, however, excavations (in the 1960s and 1970s) near the northern central Zagros and southern northern Zagros, i.e. the southern basin of Lake Urmia, has raised only the Late Village period, the Hajji Firouz Tepe and the Middle Village in the Dalm a Tepe as well as the New Village period, that is to say, Pisdeli Tepe. According to clay finds of the Late Village in the excavation of Hajji Firouz Tepe, Mary Voigt believes that the Late Village communities settled south of Lake Urmia were immigrants from the Hassuna area in northern Zagros to the southern basin of the Lake Urmia. The link and closeness of the southern basin of the Lake Urmia with the Northern Zagros as well as the Southern Zagros are largely due to the proximity of the structural similarities of the Neolithic villages. Since each basin in Iran has a different social structure, it is not possible to introduce settlement structure in Neolithic villages south of Lake Urmia based on the settlement structure of other basins (North and South Zagros). Due to the favorable living conditions in the southern Urmia Lake basin area, the lack of early villages in the area could be due to the lack of exploration of the primary layers of the sites south of Lake Urmia, due to the high surface water levels, as well as the lack of targeted surveys and detailed stratigraphy. Why did Neolithic areas without pottery not introduced in the south of the Lake Urmia? What was the pattern of settlement during the Neolithic period south of the Lake Urmia? Did neighboring Neolithic areas such as the North Zagros and the South Zagros influence the areas south of Lake Urmia?

Treatments of the dead at Bestansur: evidence for mortuary practices in the Early Neolithic.

Amy Richardson, Reading University

Sam Walsh, Reading University

Evidence of complex burial practices and extended mortuary rites in the Early Neolithic have been documented across the Fertile Crescent. On the edge of the Shahrizor Plain, treatments of the dead at the PPNB settlement of Bestansur, c.7600 BCE, exemplify and reinterpret ideas shared through networks of practice from the Mediterranean to the Zagros highlands. At Bestansur, human remains from at least 75 individuals are associated with several phases of a large rectilinear building. Diverse approaches to the deposition and memorialisation of the dead in a single room include burial wrappings, disarticulation and skull caching. Amongst these remains, there is evidence for the application of substances such as plaster, ochre and bitumen to skulls and other skeletal material. With the human remains, hundreds of beads were deposited, for the most part with juveniles. The bead assemblage includes exotic materials such as carnelian and dentalium, transported hundreds of kilometres to the site, and numerous cowrie shells set with bitumen have been recovered. This paper brings together the osteological, material and artefactual evidence from Bestansur to examine the treatment of the dead by the community. We consider the adornment and decoration of the body after death, exploring the significance of these practices in the life course, setting the Bestansur assemblage in the context of networks of human movement, material exchange and knowledge transfer across the hilly flanks.

Ganj Dareh burial practice and social memory.

Deborah C. Merrett, Simon Fraser University

Christopher Meiklejohn, University of Winnipeg

David Reich, Harvard Medical School, Broad Institute of Harvard and MIT, Howard Hughes Medical Institute, Harvard Medical School and Department of Organismic and Evolutionary Biology, Harvard University

Ron Pinhasi, University College Dublin, Dublin and University of Vienna

Burials beneath house floors have long been recognized as a predominant practice in the Early Neolithic of the Near East. Although exhibiting variability from region to region the widespread similarities include clustering of burials within and under burned buildings. Burial practices in the Central Zagros have not been as closely examined as those in the Levant and Anatolia. A fundamental question in Early Neolithic bioarchaeology is 'who was buried beneath house floors'. In this paper we explore burial as a vital component of social memory construction in the Early Neolithic at Ganj Dareh in the Iranian Central Zagros ca. 10,000 cal B.P.

Clusters of burials were observed in both levels D and C. Extraction of ancient DNA from individuals in one cluster in Level D demonstrates that related individuals were buried within a single archaeological structure. Age-at-death analysis suggests that not all deaths occurred at the same time. Memory within the house of burial locations facilitates burial of additional family members at later dates. We suggest that houses are part of the mnemonic of burial, social memory, and meaning that creates embodied spaces, often accompanied with large scale burning of the structures as an integral part of social memory preservation processes.

Lifetime mobility at Ali Kosh: research on stable strontium isotopes.

Arkadiusz Sołtysiak, University of Warsaw

Hojjat Darabi, Razi University, Kermanshah

Proportions of stable strontium isotopes ($87\text{Sr}/86\text{Sr}$) are good proxies for human lifetime mobility, as they are dependent on local bedrock and therefore change of the place of residence may produce differences in the $87\text{Sr}/86\text{Sr}$ values between tissues that had been formed before and after this mobility event. We have used this method for a small sample of human remains ($n=6$) recently excavated at Ali Kosh, a PPN site in southwestern Iran, compared with plant samples reflecting bioavailable $87\text{Sr}/86\text{Sr}$ distribution in Deh Luran plain, both in the close neighbourhood of the site ($n=6$), in the more elevated northern part of the plain ($n=4$) and at the piedmont of Zagros Mountains ($n=2$). Enamel samples of all individuals were taken from early developing permanent teeth, representing first years of life. All individuals had $87\text{Sr}/86\text{Sr}$ values different than the local background at Ali Kosh and in five of them the $87\text{Sr}/86\text{Sr}$ values were consistent with the local values of the northern part of Deh Luran plain or even the piedmont area. One individual had particularly high $87\text{Sr}/86\text{Sr}$ value, suggesting migration from the area closer to the sea shore. The data from Ali Kosh indicate high level of human mobility during the PPN, even if this mobility was mostly limited to Deh Luran plain.

Early Neolithic plant-based subsistence in the Eastern Fertile Crescent: Hunter-gatherers or early agriculturalists?

Amaia Arranz Otaegui, Muséum National d'Histoire Naturelle, Paris

The eastern Fertile Crescent represents one of the areas in southwest Asia where researchers first sought to find evidence for domesticated plants and animals. Early studies at important sites in the Zagros such as Ali Kosh, Jarmo or Ganj Dareh were central in the discussions on the emergence and development of agriculture. In the last years however, increasing archaeobotanical evidence has started to significantly alter our view about this fundamental transformation. Evidence from early Neolithic sites in the Zagros, southeast Turkey and Anatolia suggests that plant exploitation was completely different from that practiced by early Pre-Pottery

Neolithic populations in the Levant. Instead of relying on cereals such as wheat or barley, aceramic Neolithic groups in the eastern Fertile Crescent focused on the exploitation of several wild grasses such as goatgrass or feathergrass, small-seeded legumes and a wide range of other edible wild plants. This paper provides an overview of the archaeobotanical evidence accumulated to date in the Zagros, including new data from Asiab and Ganj Dareh, and in so doing revisits some of the theories put forward to explain the transition from foraging to farming in this part of the world.

Phytolith analysis at Ganj Dareh, Iran: preliminary results.

Golnaz Ahadi, Centre for the Study of Early Agricultural Societies, University of Copenhagen and University of Tübingen

Multidisciplinary approaches to archaeological sciences are commonly used in excavations today and play a pivotal role in addressing human-environment interactions in the past. Phytoliths are opal silica bodies produced in many plants and the analysis of these microremains is often used in conjunction with other scientific approaches to clarify numerous archaeological and palaeoenvironmental questions. Despite the large number of phytolith studies in the Near East over the last two decades, the literature indicates a lack of such studies in Iran. This study presents the first detailed analysis of phytolith assemblages from the Neolithic site of Ganj Dareh and provides insights into the composition of the local vegetation communities, regional environmental conditions, and probable human activities at the site. The assemblage is characterized by an abundance of Pooideae grasses, wetland resources (reeds and sedges), and low quantities of phytoliths produced by dicotyledons. Preliminary analysis shows a relatively good state of preservation and reveals no significant differences between the archaeological phases. Through the combination of phytolith and spherulite analysis, this study indicates that plant materials were not only brought in by humans for construction, fuel, and food, but animal dung also contributed to the archaeobotanical assemblage. The combination of phytolith analysis with macro-botanical and zooarchaeological records from Ganj Dareh makes a significant contribution to our understanding of animal management and plant utilization in Central Zagros during the Early Neolithic.

Phytolith analyses in the transition from hunting and gathering to agriculture – Limits and possibilities at Göbekli Tepe

Birgül Öğüt, German Archaeological Institute, Orient Department, Berlin

Applied since about the 1980s as an analytical method for microbotanical remains, the examination of phytoliths in archaeological sediments still does not seem to be an integral part of the scientific evaluation of excavations. As inorganic cell imprints of plants, it allows primarily

the differentiation of botanical material into grasses and woody plants. Furthermore, within grasses, subgroups such as cereals, and in many cases even the distinction of areas of the plants such as stems, leaves or fruit, is possible, even if no macrobotanical remains are preserved. This makes phytolith analyses a much desired tool for questions concerning the transition to agriculture and, consequently, the cultivation of plants, especially for Neolithic sites in Southwest Asia. However, starting with a short overview of already conducted investigations at Neolithic sites in south-eastern Turkey, the status of research, limits and possibilities of phytolith analyses in the Neolithic of south-west Asia will be explored on the basis of earlier and more recent analyses at Göbekli Tepe. The presentation of an analysis strategy developed especially for Göbekli Tepe, which also takes into account the local conditions and offers solutions in line with scientific ethics when carrying out these analyses, is intended to stimulate discussion and to set the questions we load this method with in a scientifically acceptable framework.

Thursday 24/06/2021

Farmer lifestyles in the eastern Fertile Crescent new data through functional analysis of harvesting tools from Tappeh Sang-e Chakhmaq, Iran.

Fiona Pichon , University of Tsukuba

The twin mounds of Tappeh Sang-e Chakhmaq (« Flint Mound»), located near the town of Shahroud on the southern flank of the Alborz Mountains, were excavated during the 1970s, by a Japanese team that focused specifically on the Neolithic of the eastern Fertile Crescent. Tappeh Sang-e Chakhmaq is one of the only known Neolithic site in the whole eastern Iran that had both aceramic and ceramic Neolithic occupation (8th to the late 6th millenia BC). This represents the longest and unbroken archaeological occupation among the sites that have been identified in north-eastern Iran and still contribute to a more comprehensive of the process of Neolithisation in this region. In this presentation, I propose to present new results of an ongoing post-doctoral research about harvesting techniques in the eastern Fertile Crescent, focusing on the functional analysis of about 300 hundred sickles blades coming from Tape Sang-e Chakhmaq (West and East mounds). My objective will be to propose a synthesis of the evolution of agricultural techniques in this region, to understand the specific trajectories of of the establishment of farmer lifestyles societies in the eastern Fertile Crescent.

Food and farming: New archaeobotanical evidence from the Zagros region.

Charlotte Diffey, University of Reading

The Neolithic and Chalcolithic periods of the Eastern Fertile Crescent has come to be characterized as a time of 'transformative disruption'. During the Neolithic, the renegotiation of relationships between humans and their environment, centred on the cultivation of a new suite of domesticated plants and animals, led to the development of new and diverse societal interactions, at both an intra- and inter-community level. These relationships were strengthened and solidified throughout the subsequent Chalcolithic period, as permanent, mixed agriculture provided the foundations for the emergence of complex, hierarchical communities, particularly in southern Iraq and Iran. In the Western and Central Zagros regions, however, discussions surrounding these themes have been limited by a lack of direct archaeobotanical evidence for plant exploitation, particularly from the Chalcolithic period.

This paper will present the results of ongoing archaeobotanical investigations, conducted as part of the ERC-funded MENTICA project, at the Neolithic site of Bestansur (7700 - 7200 BC) located within the Western Zagros foothills, Iraq, and the Middle Chalcolithic site of Nad Ali Beig in the Central Zagros region, Iran. Recent archaeological excavations at these sites have revealed small agricultural communities based around the cultivation of domesticated plant species and the herding of animals, alongside the continued use of wild plant resources. It is hoped that detailed archaeobotanical analysis of charred plant remains recovered from both sites will shed light on the emergence of the Neolithic agro-economy as well the development and continuation of these relationships throughout the succeeding Chalcolithic period in the Zagros region.

The Earliest Neolithic Lithic Traditions of the Iranian Zagros Region: Evidence from Chogha Golan in the western foothills of the Zagros Mountains of Iran

Mohsen Zeidi, Department of Early Prehistory and Quaternary Ecology, and Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen

Nicholas J. Conard, Department of Early Prehistory and Quaternary Ecology, and Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen

With the earliest date near the end of the Younger Dryas, Chogha Golan represents one of the oldest and exclusively preceramic Neolithic sites, which helps to fill an important gap in reconstructing the region's settlement history and social-economic development. This paper aims to analyze the techno-typological characteristics of the chipped lithic assemblages recovered from the basal layer of the site in the Deep Sounding. The early settlement of Chogha Golan begins with Archaeological Horizon (AH) XI, which is exceptionally rich in nearly all classes of archaeological materials, especially lithic artifacts. The earliest phase of settlement at the base of the tell also, reflects an exceptionally intense use of the site near the end of the Younger Dryas cold climatic phase ca. 11,700 cal BP., that led to the formation of rich, thick middens that also contain materials from the intense harvesting of wild plants and hunting, fishing and foraging

diverse faunal resources. Our ongoing lithic analysis clearly indicates that the lithic assemblages are characterized mainly by unidirectional bladelet core production using a pressure flaking technique, and frequent manufacture of retouched and backed bladelets and other standardized tools from produced bladelets. This combination of techno-typological characteristics are the major traits and diagnostic of the Neolithic chipped lithic industry known as the M'lefaatian, which is widely distributed in the Zagros Mountains. This being said, the early dates, consistent use of pressure debitage, and common production of a variety of backed and retouched bladelets assign the lithic assemblages of the basal layer to the early phase of M'lefaatian.

Ecologies of domestication: human-goat-environment interactions at the start of farming in the Neolithic Zagros.

Robin Bendrey, University of Edinburgh

The emergence of animal farming in the Neolithic Near East brought with it radical and inter-related shifts in the ecology of both animals and humans. The earliest animal husbandry is thought to have developed gradually, evolving from hunting strategies and the intensification of relationships between humans and wild animals into the management of, at first, morphologically unchanged animals. Current evidence indicates goat husbandry emerged in potentially diverse centres across the Near East around the late ninth/early eighth millennia BC, with one centre being the Zagros Mountains uplands. Mountains are characterized by marked altitudinal and seasonal variation in environmental variables which contribute to elevation clines in diversity and composition of ecological communities. The first part of this paper presents a simplified mountain ecology model of the seasonal movement and structure of medium-sized herbivore communities and compares this to regional published zooarchaeological quantitative data to explore the questions of seasonality of site occupation, human sedentarisation, and the emergence of animal husbandry in the Neolithic Central Zagros. The second part of the paper explores the potential impact of goat domestication on zoonotic disease ecology and human infection risk. Zoonotic diseases, frequently hypothesized as emerging with farming, represent some of the greatest health challenges facing the modern world, with some 60% of human pathogens of animal origin. Brucellosis, today's commonest global bacterial zoonosis, likely emerged as a zoonotic disease with caprine farming, yet evidence is elusive in the archaeological record. Results are presented of a model developed to simulate the transmission of *Brucella melitensis* within early domestic goat populations in the Zagros. These show that the pathogen could have been sustained even at low levels of transmission within these populations due to the creation of dense populations and major changes in herd demography. Interactions between Neolithic settlements would have further promoted pathogen maintenance.

Human-animal interactions in the Early Holocene of the eastern Fertile Crescent.

Donna de Groene, Reading University

The transition from mobile foraging and hunting to sedentary farming and herding is one of the most significant changes in the history of humankind. This shift was a slow and complicated process, which took place in multiple places in the Near East independently, from around 9500 BC, rather than a sudden revolutionary change from a single core zone (Zeder 2012). In the past century, most archaeologists relied on morphological markers to assess whether plants and animals were domesticated. However, it has been successfully indicated based on culling profiles that humans started to manage animals several millennia before the first changes in morphology are visible (Zeder 2012). The lack of morphological markers makes it hard to understand when people first started to manage animals and what these first stages of animal management involved (Makarewicz and Tuross 2012). Stable isotopic analysis on bone collagen of domestic and non-domestic animals has already shed new light on Neolithic human-animal relationships in the Levant (Makarewicz and Tuross 2012) and Anatolia (Pearson et al. 2007), but has not yet been applied to assemblages from the Eastern Fertile Crescent. The aim of this research is to gain further insight in early human animal management practices using stable isotopic analysis on animal bone collagen in this relatively understudied area.

Results of the faunal analysis from the Epipalaeolithic site of Palegawra and their environmental context.

Kate Swinson, University College London

Louise Martin, University College London

Eleni Asouti, University of Liverpool

Douglas Baird, University of Liverpool

Kamal Rashid, Sulaymaniyah Directorate of Antiquities

Palegawra, a Zarzian cave site located in the Bazian valley in Sulaymaniyah province, is important for our understanding of Epipalaeolithic foodways in the Fertile Crescent.

The site represents a long series of repeated occupation. The length of activity, combined with good organic preservation, has resulted in tens of thousands of bones being recovered from recent excavations. The site therefore provides an excellent opportunity to enhance our understanding of the subsistence strategies used by hunter-gatherers during this period in the Eastern Fertile Crescent. Palegawra was first excavated by Howe and Braidwood in the 1950s. As was the norm during this period, sieving and flotation were not used. Consequently, the resulting zooarchaeological analysis conducted by Turnbull and Reed (1974) is problematic due to recovery bias. Although the majority of the interior of the cave was fully excavated in the 1950s, the entrance to the cave remained undisturbed. Investigation of this area, utilising modern

excavation and recovery methods, has the potential to give us a clearer picture of subsistence at the site. With this in mind, as part of the University of Liverpool Eastern Fertile Crescent Project, excavations were renewed and took place in 2016 and 2017. In contrast to previous excavations, a comprehensive sampling strategy was undertaken, using a combination of flotation and dry sieving. This paper will present the results of the analysis of the faunal material from Palegawra and place it within a wider local and regional environmental context.

Ancient goat genomes from the Neolithic Zagros.

Kevin G. Daly, Trinity College Dublin

Lisa Yeomans, University of Copenhagen

Pernille Bangsgaard, The GLOBE Institute, University of Copenhagen

Marjan Mashkour, CNRS France and the National Museum of Iran

Melinda Zeder, National Museum of Natural History Smithsonian Institution

Daniel Bradley, Trinity College Dublin

The Zagros highlands contain some of the earliest evidence of goat management and the development of greater control by humans in the life history of the animal. However, little is known about how emerging management strategies may have shaped the genetic makeup of these populations, or the exact relationship of these early herds with modern goats. We present genomic data from the sites of Ganj Dareh and Tepe Abdul Hosein, comprised of over 30 complete mitochondrial sequences and 15 partial nuclear genomes. We present contrasting patterns of maternal and paternal genetic diversity, with evidence of limited population size. This ancient genomic information, supported with zooarchaeological evidence, will be used to draw inferences as to the nature of the early goat management in the Zagros mountains.

Wild fauna at the Neolithic sites of Asiab and Ganj Dareh

Pernille Bangsgaard, The GLOBE Institute, University of Copenhagen

Lisa Yeomans, University of Copenhagen

The sites of Asiab and Ganj Dareh are often mentioned in the discussion concerning early domestication in the Zagros area, Ganj Dareh in particular feature prominently, for displaying some of the earliest evidence of goat domestication in the world. Yet the fauna recovered from these early Neolithic sites also include a wide range of wild species, which often receive significantly less attention. The renewed excavations by the project *Tracking Cultural and Environmental Change* in 2016-2018 have generated new faunal results, which are of significant interest to this aspect of human-animal interactions.

In this paper we wish to examine the dynamics of the human-animal relationships pertaining to the use of wild mammalian and avian species during a period of fundamental change. Due to the

prominence of the development of domestication the role of wild fauna is often overlooked or marginalized. These resources still played an important role in these early human societies, both as food for body and for thought. Based on the new faunal assemblages Asiab and Ganj Dareh we will examine aspects of this relationship further.

Perinatal remains of livestock at Neolithic sites: Ganj Dareh and the development of ovicaprine herding in southwest Asia.

Lisa Yeomans, University of Copenhagen

Pernille Bangsgaard, The GLOBE Institute, University of Copenhagen

Archaeological evidence for penned animals is increasingly used as an indication for managed livestock. Advances in techniques allow for the identification of dung and urine derived components within archaeological sediments. Corralling animals into settlements protected them from predators at night, provided additional control over their breeding and enabled humans to offer aid in birthing. Deposits associated with livestock management at Neolithic settlements across Southwest Asia contain the bones of perinatal animals. Reviewing the literature, it is evident that these faunal remains are not systematically reported or perhaps they are not preserved in all burial environments. However, variation may reflect different patterns of livestock integration into human settlements. The presence of perinatal remains at sites where early livestock herding took place has important implications. Not only are they compelling evidence for managed herds, particularly alongside evidence for penning deposits, but the death of perinatal animals inform us about the stresses that these early herds faced. This in turn provides information about the skills needed by early pastoralists as they developed animal management strategies. Regional differences in penning practices could add to ongoing discussions of the development of pastoral economies across Southwest. This can only be achieved if zooarchaeologists systematically report remains of perinatal livestock. This paper therefore end with a plea for a discussion of perinatal remains of livestock to be included as standard in faunal reports.

Jird, mouse, vole, and shrew... the tale of an early Neolithic settlement.

Paul Clarkson, Bournemouth University

The concentration of microfauna retrieved during excavations at Tepe Ganj Dareh allowed us to address important issues about the site's natural and cultural environment. Microfauna live in a small area and are highly sensitive to their environment so they adapt rapidly to any changes in local conditions, whether caused naturally or anthropogenically. As a result of this, the

microfaunal assemblage allowed us to reconstruct the past environment and make inference about the nature of human occupation at the site. At the same time taphonomic analysis of the assemblage enabled us to answer questions concerning possible taphonomic pathways of the microfauna into the archaeological record and improve understanding of formation processes.

The persistence of hunting and gathering and the adoption of Neolithic small blade technologies in the southern Caspian basin and northern flanks of Alborz Mountains.

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This paper presents evidence for the persistence of hunting and gathering at the intersection of the southern coastal plain of the Caspian Sea and the foothills of the Alborz Mountains during the terminal Pleistocene and early Holocene.

Findings from our 2017 excavations at Komishani Tappeh in northern Iran, demonstrate that Epipalaeolithic/Mesolithic foragers were targeting sheep, goats and water birds, collecting wild oats and wild barley, and using ground stone tools as early as 9200 cal. BC; while the earliest 'Neolithic' inhabitants of the site continued to rely on the same suite of wild resources for at least 400 years following the first appearance and wholesale adoption of a pressure-flaked, single-platform core stone tool industry, circa 8600 cal. BC.

Palynological evidence obtained from a lagoon nearby the site demonstrates that there was a relatively benign impact of the Younger Dryas in this region, with climatic conditions favourable for human predation on a broad range of plant and animal food resources. Archaeological, botanical and faunal remains recovered from Komishani Tappeh indicate that the process of Neolithization was a gradual, low-cost adaptation to new ways of life without a climatic trigger event for the emergence of food-production. However, the abrupt and complete replacement of Mesolithic stone tools with a 'Neolithic' small flake industry, coupled with the continuing reliance on wild resources at the site, suggests that this new technology (or at least the idea for it) was acquired from outside the immediate region.

In light of these findings, we will present potential pathways between contemporaneous aceramic Neolithic communities north and south of the Alborz Mountains, and outline promising research strategies for identifying interactions between foraging or food-producing groups within these regions during the early Holocene.

Lithic Industries from the Southern Lut Desert (southeastern Iran) during the Neolithic Period

Maryam Shakuie, University of Mazandaran

Omran Garazhian, University of Neyshabur

Benjamin Mutin, Harvard University

For a long time, data on the Neolithic lithic industries from southeastern Iran have been mostly limited to material from fieldwork conducted between the mid-1960s and mid-1970s, such as excavation at Tepe Yahya and Tal-i Iblis as well as surface survey in the Daulatabad Plain.

Eleven years ago, the Neolithic site of Tell-e Atashi in the Bam-Narmashir region, located in the southern Lut Desert area, was excavated for the first time and yielded substantial new information on this topic. The assemblage collected at this site is characterized by an abundance of flakes, many backed and lunates, as well as evidence for the pressure technique and indirect percussion in the production of blades and bladelets. The latter were used as sickle elements hafted in wooden or bone hafts. Three years ago a new survey in the Bam-Narmashir region identified about 80 Neolithic sites including about 35 aceramic sites. Preliminary technological analysis of the lithic assemblages from these sites has shown that they are very similar to the assemblage from Tell-e Atashi. The raw material is the same, and we also have recorded many flakes, many backed flakes, blades and bladelets, as well as evidence for pressure technique. In this article, we present the main characteristics of this survey assemblage from the Bam-Narmashir region and compare it with the Neolithic lithic industries known thus far in its neighboring regions of southeastern Iran and Fars. We provide preliminary observations on the organization of the lithic production in the southern Lut Desert during this period, including access to raw material and production technology, as well as on settlement pattern and interregional interaction. At a broader scale, these observations aim to contribute to the research on the origin and development of the Neolithic in this part of the Middle East, a topic that is poorly understood.

Tracing the Development of the Neolithic lithic industries in West Zagros

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Our understanding of the emergence and development of the Neolithic society in the west Zagros has greatly advanced in this decade owing to an increasing number of new field investigations in western Iran. Notable discoveries include long cultural sequences at Sheikhi Abad, Chogha Golan, and East Chia Sabz, which have documented the earliest stages of Neolithization from the 10th to the 9th millennium BC. On the contrary, relatively little new data have emerged from the period of the later development, that is, from the 8th to the 7th millennium BC, when the change from the Pre-Pottery to Pottery Neolithic occurred. Given that a range of cultural changes have been known to occur during this period in the northern Mesopotamian plain and the Levant, the situation in the Zagros foothills would provide an intriguing comparable data set. To do this, the present paper refers to new archaeological data from Tepe Abdul Hosein. The site was excavated by Judith Pullar in 1978 revealing stratified Neolithic deposits over 5 m thick, reportedly consisting of both Pre-Pottery and Pottery Neolithic cultural layers. As lithic artifacts are considered to represent the most pertinent artifacts to monitor cultural changes over this period,

their re-analysis was conducted by the present author at the National Museum of Iran. In this paper, the chronological development of the Neolithic lithic industries at the mound as well as its implications to understand the cultural changes are addressed.

The Epipalaeolithic-Neolithic component: chipped stone assemblage from Izeh caves and rock shelters, Khuzestan, Iran.

Mozhgan Jayez, University of Tehran, Iran

Two seasons of intensive survey in Izeh Plain, northeast of Khuzestan, has led to the discovery of 128 cave and rock shelter archaeological sites. From the surface of the outer slopes of these caves and rock shelters, chipped stones have been sampled in a controlled manner. The chipped stone assemblages indicate a comparative chronology based on typical tools and cores which are attributed to Upper Palaeolithic (conical bladelet cores and their subtypes, carinated burins and scrapers, many bladelets, end scrapers, rare lamelle dufours), Epipalaeolithic (many bladelets, conical bladelet cores, geometric microliths, backed bladelets, thumbnail scrapers), and Early Neolithic (pressure "Bullet Cores", sickle elements with gloss along their edges) in the Zagros region.

Most of the assemblages indicate multi-period chronology of the sites. The differentiation between Upper Palaeolithic and Epipalaeolithic is less clear, since common elements such as conical bladelet cores, their products and thumbnail scrapers are present in almost all assemblages; but Neolithic components such as pressure microblade cores and sickle elements, although few in number, are helpful in identifying Neolithic caves and rock shelters which clearly indicate the continuation of occupation of the sites in later periods. The lack of Neolithic early village sites in the vast plain of Izeh might be the consequence of either poor condition of preservation, or the occupation patterns of Early Neolithic people of the region.

Early and Middle Holocene lithics at the Neolithic Hilly Flanks .

Stefan Karol Kozłowski, Warsaw University

1. PPN and Early PN periods at Hilly Flanks and Mesopotamian Plain are characterized by the Mlefaat chipped industry (name after Iraqi Mlefaat). 2. The industry itself (Mlefaat, Shimshara, Jarmo, Guran, Ali Kosh, Choga Sefid, Abdul Hosein) stems from Zarzian. It starts around 10 600 years BP and ends at Hilly Flanks at 6500, with perfect continuation (several stratified tells). 3. Here we use original material and unpublished drawings, as well publications of Peder Mortensen, Frank Hole, and Judith Pullar. 4. Description of the industry : technology - single-platform conical core for blades and bladelets, exploited by punch and/or pressure technique, sectioning of blades/bladelets for obtention of rectangular inserts. retouched tools - blade, short end-scrapers, massive flake denticulates, slim perforators, blade truncations, use -retouch

bladelets, backed and nibbled microlithic bladelets/points. 5. Evolution - from the Early Pottery phase (c. 8000 ys BP) some geometrics (trapezes and broad crescents), paralelly and locally grow of the retouched blades index (Jarmo). 6. Late Mlefatian of Western Zagros - massive use of imported, Nemrud Dag obsidian. 7. Prolongation of chipping tradition - e.g. Ubaid sites at Tell Ubaid and Bahra 1 (the last in Kuwait). 8. Similar industry, with strong Mlefatian features, but also with rhomboidal and willow leaf arrowheads , called Nemrikian, existed in the more or less similar time in Iraqi and Syrian Jezirah, as well in SE corner of Turkey. 9. The indexes of microliths strongly varies, depending of methods of excavations (sieved viz.unsieved).

Epipalaeolithic of Kermanshah region: Bawa Yawan rockshelter.

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As part of the research project of "Human evolution in the Zagros Mountains" (HEZM), three seasons of archaeological excavations has been conducted in the new site of Bawa Yawan rockshelter located in Nawdarwan Valley, Kermanshah Region, West-Central Zagros Mountains. So far, Bawa Yawan rockshelter has revealed five geological horizons in almost 4.5 m deep deposits embracing human occupations associated with a complete cultural sequence from Middle Palaeolithic to Epipalaeolithic (ca. 79 to 11.500 kya). To date, two absolute dates are available for Epipalaeolithic layer which comprises a duration of 2500 years of occupation between 14-11.5 kya BP. The Epipalaeolithic materials, including lithic artifacts and fauna, appear in around 50 cm on the uppermost deposits of the geological horizon 2.

The vantage of this site to the other sites in the Zagros is the absolute dating provided on the Palaeolithic sequence together with the in situ findings. We observed the gradual change from Upper to the Epipalaeolithic findings through the detailed techno-typological analysis of the lithic artefacts. The lithics are lamellar oriented and include the platform bladelet cores together with the typical geometric microliths. End and thumbnail scrapers are present in a good number. These data are especially important since, Bawa Yawan is among the very few sites in Zagros present transitional phases from Middle to Upper Palaeolithic and from Upper to Epipalaeolithic associated with absolute dates.

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Neolithic pottery technology in Iranian Zagros

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Anna Babenko, Institute of Archaeology Russian Academy of Sciences, Moscow.

Hafez Ghaderi, Razi University, Kermanshah

As it has yielded one of the earliest examples of pottery production in South-West Asia, the Zagros is known as an important region for understanding the development of pottery technology. In this regard, 55 potsherds from the Neolithic sites of Ali Kosh, Mahtaj and Guran were analyzed to examine their past composition and methods of construction. As the result, a mixture of plants and dung is seen as temper in pottery paste. The presence of dung is determined based on two methods: by microscopic studying the traits of plant prints, and by analyzing dung spherulites that formed in the digestive system of a variety of animals and found in the considerable amount of ceramics. Construction methods have the highest degree of resistance to external factors among all other stages of pottery technology. Therefore, the study of their features, especially at an early stage of pottery production development, may give an insight into the relationships between different population groups. The Iranian Zagros provides an opportunity to trace the beginning of the formation of vessels building methods, as well as the sequential appearance of two building methods: slab and coil construction. Further consideration of the relationship and distribution of these methods needs to be given attention in future.

Neolithic potteries of Khorramabad; reflection of subsistence based on herding and nomadism during the Neolithic period in west and southwestern Iran.

Mohammad Bahrami, Lorestan University

Lorestan province is a mountainous land in Central Zagros in western Iran and east of Fertile Crescent. In the past, three sites have been excavated: Abdul Hussein in the Delfan plain, the Eastern Chia Sabz in the Seymareh Valley, and the Kallek Asadmord in the west of Pol-e Dokhtar. These settlements have been dated between the early ninth to the early seventh millennium BC. Each of these settlements are associated with the Pre-Pottery Neolithic period. The pottery from Abdol Hussein belongs to the "Bag-e No" culture in Lorestan (Lower Chalcolithic period). In recent years, surveys have been carried out in many areas of Lorestan that have resulted in the identification of about 20 new Neolithic sites including three sites with pottery that had not been identified previously in the region. These three sites, Roahol, Kargonah, and Chal-Ab, are located in the Khorramabad and in the west of Khorramabad Valley. The only site to which this pottery can be compared is Ali Kosh in the Dehloran plain. In the layers of Mohammed Jafar, as Hole says, and in recent excavations by Darabi, three pottery groups have been identified, including Jafar plain, Jafar painted, and Red Khazineh. By studying the pottery in the three sites in the

Khorramabad valley, we can clearly see the presence of all three pottery groups from Ali Kosh in these sites. This uniformity may indicate their belonging to a single community on either side of a vertical migration route, or it may represent close cultural links between the Neolithic peoples of the Lorestan highland and Dehloran plain.

Computational models of chronology and regional settlement in the Epipalaeolithic-Neolithic Zagros (20000–6000BP).

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Our understanding of the chronology of the Epipalaeolithic-Neolithic transition in the Zagros region is poor compared to other parts of Southwest Asia. The current framework is based primarily on lithic typologies, anchored by limited radiocarbon sequences from key sites. However, the resumption and expansion of field work in the region in recent decades has made much more absolute dating evidence available. Here, I present a comprehensive review of published site locations and radiocarbon dates from Epipalaeolithic, Neolithic, and early Chalcolithic sites in the Zagros mountains and foothills. Computational techniques Bayesian calibration, summed radiocarbon modelling, and spatiotemporal aoristic analyses—are used to explore and refine this large dataset. The initial results suggest a poor fit with current typological chronologies of most periods, including the critical Epipalaeolithic-Neolithic transition, highlighting

the need for formal integration of absolute and relative dating evidence into models of regional chronology. I also present a preliminary analysis of long-term settlement patterns and demographic trends in the Zagros based on the radiocarbon and site catalogue datasets.

Investigating human environmental interactions in the Zagros region during the Late Glacial and Early to Mid-Holocene period.

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The significant wide-scale transition from mobile hunter-gatherer to sedentary farmer communities in the Fertile Crescent during the Neolithic period marked the beginning of a new lifestyle. However, available palaeoenvironmental records for the Zagros region are sparse, making it difficult to compare palaeoenvironmental records with the archaeological data, and distinguish between anthropogenic and climatic factors that might have impacted on vegetation cover over time. The aim of this three-year long research is to reconstruct the environmental history of Hashilan wetland (Iran) and Lake Ganau (Iraq) during the Late Glacial and Early to Mid-Holocene period (13,000-5000 cal.BP) with a view to correlate changes in vegetation cover and land-use with nearby archaeological records and known periods of climate change. The objectives are: (1) to evaluate the impact of human activities on the landscape and environment, especially

periods of cultivation and/or animal husbandry through integration of palaeoenvironmental and archaeological records. This will enable us to improve understanding of the role farming communities had in driving patterns of vegetation and broader environmental change; (2) to assess the impact of climate change on vegetation succession and the agricultural system, and the resilience of human communities and ecosystems to climate change e.g. Oak (*Quercus*) woodland expansion in the region. To produce high-resolution palaeoenvironmental record for Hashilan wetland and Lake Ganau, sediment core sequences have been sampled for pollen, microscopic charcoal, non-pollen palynomorphs, and geochemical analyses. This paper presents preliminary data and interpretation of the cores extracted from Lake Ganau and Hashilan wetland. This interpretation forms a key component of the multi-proxy research for the Zagros region to form a better understanding of human-environmental relationships and to what extent early human societies were resilient to changes in the environment and climate.

Reconstructing paleoclimate and paleoenvironment of the Central Zagros during the late Pleistocene and early Holocene.

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Tobias Richter, Centre for the Study of Early Agricultural Societies, University of Copenhagen

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The study of lake sediments has been widely used in recent decades to identify past climate and environmental changes. Lake basins have significant spatial and temporal patterns and provided valuable evidence of physical and chemical changes. Using the multi proxy method, in this study paleoclimatic and environmental changes of the Central Zagros from the Late Pleistocene to the Early Holocene have been reconstructed. In this regard, geochemical analyses, magnetic susceptibility, chronology and palynology of sedimentary cores taken from the Hashilan marsh in Kermanshah were studied and analyzed. Analyses performed on sedimentary samples showed that the climate of the Central Zagros region was cold and dry during the Late Pleistocene spanning ca. 30000-19000 years ago. Dry climate intensities began 29000 years ago and continued until 27000 years ago when suddenly droughts and dust storms subsided. Such conditions seem to have continued for 1000 years. But then again, dry climatic conditions with dust storms prevailed in the region until 19000 years ago, a condition indicating the Last Glacial Maximum (LGM). Around 18000 years ago, there was a warm and humid climate in the Central Zagros region that lasted until 13000 years ago. This period identified corresponds to the Bølling-Allerød era. The cold, dry Younger Dryas event in the Central Zagros appears to have occurred at roughly 12300 – 11600 BP. The warm and humid climate of the Early Holocene began in the

region ca. 11600 years ago. Drought conditions seem to have occurred in the region around 10400 BP and then peaked in 10200 years ago while ended in 10100 BP. Subsequently, the warm and relatively humid climate prevailed in the Central Zagros. However, rising in temperature and humidity was halted by a 200-year-old cold and dry event that occurred 9400 years ago. This event was associated with an increase in dust storms and lasted until 9200 years ago and was probably part of a dry event known as 9.2. Another dry climatic event associated with the Early Holocene in the Central Zagros began around 8400 years ago and lasted until 8200 years ago.

A Holocene Multi-Proxy Speleothem Palaeoclimate Record from Iraqi Kurdistan.

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Pascal Flohr, University of Oxford

Melanie Leng, University of Nottingham

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Dominik Fleitmann, University of Reading

The eastern half of the Fertile Crescent (EFC), along with Levant, was the earliest global centre for the emergence of plant cultivation and animal herding, major components of the Neolithic transition. The importance of climate and environmental change for these developments, particularly climate amelioration during the early Holocene, has been emphasised numerous times. However, our actual understanding of climate conditions during this important transition is surprisingly poor. Firstly, no high resolution palaeoclimate records exist in the EFC that cover the early Holocene. Secondly, there are unresolved issues in the palaeoenvironmental interpretation of lake sediment palaeoenvironmental records from Iran and Turkey. The most notable problem is the apparent contradiction of pollen and isotopic data, termed the *earlyHolocene precipitation paradox* (Jones, 2013; Jones and Neil Roberts, 2008; Stevens et al., 2006, 2001). We present a high-resolution multi-proxy speleothem palaeoclimate record covering most of the Holocene from Iraqi Kurdistan to identify and investigate the presence and magnitude of Holocene climate variability and address the outstanding questions in palaeoenvironmental research that exist in the region. The stalagmite (SHC-03) is 3.17m long and was collected from Shalaih Cave, Iraqi Kurdistan. It is sampled at a ~5-10 yr resolution and covers the last ~10,300 years. We use a multi-proxy approach through the use of oxygen ($\delta^{18}O$) and carbon ($\delta^{13}C$) isotopes and trace element (Mg/Ca and Sr/Ca) analysis. As the first record of its type to cover the majority of the Holocene, the SHC-3 stalagmite provides a more detailed environmental context for the important cultural changes that occur during the early Holocene. Our results indicate a relatively dry early Holocene and is broadly consistent with the

interpretation of pollen, plant macrofossil and diatom data from lake sequences from Iran and Turkey. As a result, our findings support claims that climate aridity was the cause for the delay in the expansion of oak woodland during the early Holocene.