کتابخانه

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References


Fig. 1- Rodent and other small animal's remains hunted and consumed by man, sieved soil, washed and picked from Qaleh Bozi cave 2

Fig. 2- Birds and other small animal's remains hunted and consumed by man, sieved soil, washed and picked from Qaleh Bozi cave 2

Figs 3, 4 & 6- Tooth and hoof of Equus (horse) discovered from Qaleh Bozi cave 2, hunted and consumed by man.

Fig. 5- Upper jaw of Equus (horse) discovered from Yekoh Chah cave 1 (in the depth of 105 meters from entry of cave and 80 cm blow surface), hunted and consumed by man (see burned teeth)
Fig. 1- Cut and polished slice, changed to opal limestone with Nummulite

Fig. 1- cut and polished slice, changed to opal limestone with Nummulite (Paleocene to Eocene in age), Babashidar, area (Zagros, Sherkord) Pebdel Formation, Yezdi’s collection.

Fig. 2- Stripped opal bed with Nummulites, (Paleocene to Eocene in age), Babashidar, area (Zagros, Sherkord).

Fig. 3- The source of flints and opal pebbles (Man used them for tools in Qaleh Bozi, after transportation as pebbles by Zayandeh-Rud River), Paleocene to Eocene in age, Babashidar, area (Zagros, Sherkord). These beds sometimes change into nodules and opal concentration. Arrows show limestone with Nummulite bed that completely changed into silica (opal).

Figs 4 & 6- SEM photos from black bed (charcoal bed) sampled, washed and picked from Qaleh Bozi cave 2 (80 cm below surface) showing beak and nail of hunted and consumed birds.

Fig. 5- A part of pebble (opal) collected from Samsam & Deabe (Zagros, Bakhtari) Talazang and Koblins Formations showing glassy texture (particles in pebble are Radialarite in the age of Late Cretaceous)
Fig. 11: Main routes and time of migration of Hominids and early Man (After White, 1991, P. 123)

PLATE 1

Figs 1 & 2: Bifacial points (opal, hunter gatherer tool) recovered from Qaleh Bozli (cave 2)
Fig. 3: Lithic tool (scraper, opal, hunter gatherer tool) recovered from Qaleh Bozli (cave 1)
Figs 1 &5: Bifacial points (opal, hunter gatherer tool) recovered from Qaleh Bozli (cave 2)
Fig. 6: Handy opal pebble (used for tool making), recovered from Qaleh Bozli (cave 2)
Fig. 7: Pebble with stripped lines, used for tool, recovered from Qaleh Bozli (cave 2)
Fig. 8- Cross section of Yekeh Chah Cave

Fig. 9- Lithic tool, Qaleh Bozi with Nummulite. Opalized carbonates bed with Nummulite from Babehidar, recovered from Qaleh Bozi

Fig. 10- Cheghakhor concentration. Opalized beds(concentration), Jahlum Formation, Cheghakhor, Bakhtiari (Zagros Mountains)
Fig. 5- Lithostratigraphical beds of Qaleh Bozi trench 3

Fig. 6- Lithostratigraphical beds of Qaleh Bozi trench 2

Fig. 7- Beds and lithostratigraphical details of Yekeh Chah Cave.
fig.3- Opalized limestone with Nummulite, cut and polished, Bab el Hyder, Zagros Mountains

Fig.4- Faults and calcium carbonate solution reacts and water can get into caves and rock shelters.
Fig 1- Localities studied in this research (From Gitabhena, Scale 1: 2, 250,000. 2007)
1- Qaleh Borzì Cave. 2- Yocho Chah Cave. 3- Sepamb-e-Nain. 4- Baba Hydar (source of lithic tools in Zayandeh Rıd River or locality that opalized limestone with Nummulite can be traced) 5- Chadoran (Tapah Ashena or New lithic area).

Fig 2- Polished and sliced opalized limestone with Nummulite, Baba Hydar, Zagros Mountains
sedimentology of flint and opal that man used as tools. Based on recovered Nummulite observed in a lithic tool, this idea was carried out and we found out that many opalized pebbles with Nummulite are abundant in Zayandeh Rud River. We tried to trace the source of these pebbles. We came to this conclusion that all of them come from Baha ‘Hyder area (Shahr-e Kord, Zagros Mountains).

Geological setting and sedimentology
Apart from a few examples of lithic tools exploited from Early Cretaceous limestone, more than 2000 pieces of opal lithic tools (knife, scrapers, points, handy axe and opal pebbles) were discovered from Qaleh Bozi caves and rock shelters (2004 & 2005), see plate 1, figs 1 to 7. Most of this assemblage is composed of flints and opal pebbles collected by Man (Paleolithic, mousterian) from nearly Zayandeh-Rud River. By thin section preparation and controlling of this assemblage under binocular microscope we found that, many of them had remains of Nummulite. We did a survey along the Zayandeh-Rud River from Mobarakeh up to Chehelgard and Zardkuh in order to find the source of opal pebbles. In fact we choose two routes; firstly along the Zayandeh-Rud River and secondly a route from Isfahan to Broujen. All opal pebbles (100 percent) are coming from first route into the Zayandeh-Rud River (see plate 2, figs 1, and 3).

All rivers, detritus sediments and conglomerate beds along the second route (Isfahan to Broujen, Shalamzar, Parsan, and Shahr-e Kord to Isfahan) had no trace of opalized limestone pebbles. Based on the presence of radiolarite layers in Late Cretaceous sequences in Zagros Mountains and following the presence of opal pebble with radiolarite in younger formations (Kashkhan, Taleczan and Shahbazan formations, see plate 2, fig. 5). Presence of opal layers with Nummulite in Pabdeh and Jahrum formations confirmed that biota remains changed into opal (see plate 2, fig 3). We can conclude that, at the time of Late Cretaceous a deeper condition was dominated in Zagros Basin. Radiolarite beds were deposited in deeper environment. Those beds were eroded and were redeposit in Kashkhan, Talehzang and Shahbazan formations (biochemical opal pebbles, see plate 2, fig. 5). We believe that, the source of opalized beds with Nummulite in Pabdeh and Jahrum formations (see plate 2, fig. 3) could be as a result of peel solution act at the Paleocene to Eocene time interval.(fig. 2,3)

Faults parallel to Zagros trust zone are passing close to the Qaleh Bozi Mountain. These Faults resulted caves and rock shelters. Man used them as shelter at least from Mesolithic time in Mobarakeh area. Since the trend of beds (deeps) is towards caves (B), simply calcium carbonate solution reacts and water can get into caves and rock shelters. At the time of man occupancy humid and wet condition was dominated. Water and faults created unstable conditions for caves (A). This situation optionally led to falling ceiling and covering floor by big rocks (fig. 4). By digging three trenches (Qaleh Bozi Cave 2, rock shelters 3 and Yekeh Chah cave 1), (figs. 5-8) systematic sampling (sieving, separating, washing and picking methods) we found artifacts (lithic tools), consumed bones, egg shells (fresh and burned), seeds and microscopic microelements (beak and nail of birds, both fresh and burned). Since horse bones are abundant as a consumed hunt we can report that in the time of Mousterian, horses were a favorite food for man (see plate 3, figs 1 to 6). SEM photos from discovered microelements (after picking, both from Qaleh Bozi and Yekeh Chah) show that, at the time of famine they robbed and collected bird chicks (see SEM photos on plate 2, figs 4 and 6).

Within lithic tools we found out that some of opalized tools have Nummulite (fig.9). We convinced that our survey regarding to the tools source is correct. In Chegakhlor Lake the concentration of opal can also be found in the age of Paleocene to Eocene time interval (fig.10). In many humans sites in Zagros and central Iran we found the source of opal tools, which are biochemical opalized limestone and cherty beds. Regarding to man occupancy we believe that man migrated from northwest and west towards central Iran. After finding good sites they tried to live accord to land (hunting, gathering and collecting food). By increasing the number of population they migrated to new places as a result of obligation (fig.11).

Conclusion
A survey was done on at list on five caves (three in Qaleh Bozi, Yekeh Chah and Separab Naain) that were occupied by Man at the Mousterian time in central Iran. This research confirmed the presence of Man (hunter-gatherer) from at least 60 000 years ago up to 10 000 years ago in central Iran. Similarity between food and style of hunting (based on the remains of bones in trenches, see plate 3, figs 3-6) confirmed that a humid and cooler condition dominated Iran at that time. According to the presence of hunted and remained bones in studied caves, we propose that Man hunted: horses, rhinos, deer, wild sheeps and goat, fishes and turtles and gathered greases and wild fruit in central Iran. According to White, 1991 Man migrated from Middle East (west) to Iran. Vanishing of many vertebrate groups from central Iran like Rhino and Bison (bones of them discovered from Qaleh Bozi caves) shows a dry and warmer paleoclimate from 10 000 years ago to now. Bones of rhino and bison’s are not figured in this paper. These bones are under loan in Paris at the moment.

Acknowledgment
We thank the supports of the University of Isfahan (research No. 830103), department of Geology, and we also appreciate the help of local government of Chelgered within the field trips in Zagros.
Sedimentology and Geoarchaeology of Paleolithic (Mousterian) Lithic Tools in Central Iran

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Received: 2007 August 07
Accepted: 2008 July 19

Abstract
Determined and studying collected lithic assemblages, biota remains and deposited beds (regarding to sedimentology) of two rock shelters in the age of Late Pliocene to recent interval in central Iran were the aims of this research. Moharnokh (Qaleh Bozi) and Yekeh Chah (near Golpayegan) are two sites in which remains of consumed and hunted biota by human were checked by this research. Lithic assemblages are studied considering their sources. Mousterian lithic assemblages from Qaleh Bozi caves and rock shelters (Hassan Abad Caves) are made of silica pebbles (limestone with Nummulite or cherty beds in the age of Paleocene to Eocene time interval) that hominids had collected from the Zayandeh Rud River in the Middle Paleolithic Period. Finally it should be stated that lithic artifacts in Yekeh Chah are mostly Quartzite sand stone (probably belong to Jurassic). Black beds (charcoal lenses) in Qaleh Bozi and Yekeh Chah caves were sampled and washed for Determining biota remains and sedimentary components. All washed samples from two localities had remains of: burned wood (charcoal), large vertebrate mammals (mosty horse), vertebrate and micro vertebrates (fish, rodent, reptile and amphibian), egg of birds, scads and grass. SEM photos related to hunted and consumed birds' bones and nails from Moharnokh and Yekeh Chah confirmed that the food of man in those localities could be similar. This research is first report the presence of hunter-gatherer hominids in Central Iran (Mousterian). Lithic assemblages are collected from Separan Nain in the age of Mesolithic and from Tappeh Ashana (Chadegani) in the age of Neolithic as well.

Key words: Cherty bed, Limestone with Nummulite, Charcoal lenses, Lithic assemblages, Central Iran

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1- Introduction
Remains of hunted or consumed biota associated with Mesolithic assemblages were discovered (Plates 1-3) from three areas in Central Iran. Determining deposited or dumped levels (ash, charcoal, bones and lithic tools) within rock shelter levels or in the nearby sequences confirmed that at the time of humid occupancy cool conditions were dominated in central Iran. Collected scattered samples (bones and lithic tools) by farmers, geologists and students in year 2003 from Hassan Abad caves (No.1), Yekeh Chah (No.2) and Nain (No.3) areas were the base of an excavation and exploration project which started in 2004 under the support of University of Isfahan (project No. 830103). Since the source of recovered lithic assemblages is different in the studied areas, at first the project started to control the source of collected tools. The Paleoenvironment of the studied rock shelters in central Iran can be compared to the environment of man which was reported by Archer et al. (1991) in the Rivershine area (Australia), Andrew and Stringer, (1989 p. 44) from Neanderthals, Europe, and White (1991) from Tasmania. In Separan Nain (No. 3), chipped and crafted tools can be found around a hill close to Dehshir farm (No. 3). Lithic tools from this area had been reported by: Davodzhadeh (1972) for the first time. Collected lithic assemblages in Separan Nain mostly red to light colored radiolarite (out of Ophiolitic complex in the age of Late Cretaceous). The source of lithic tools from Qaleh Bozi caves and rock shelters is limestone with Nummulite of Paleocene to Eocene which can be traced in Baba Hydar area (No.4) (Farsan and Sherkord, Zagros Mountains). Since (2004) reconnaissance and controlling caves and rock shelters in central Iran (regarding to man's occupancy) has been under study of a team from the department of geology, University of Isfahan. Since that time several abstracts and papers have been published including: Hamadani et al. (2004) (in Persian), Yandi & Salehi Khakha (2005) (in Persian), Javari et al. (2005) (in Persian), Yazdi et al. (2006) (in Persian), Biglari et al. (2006) and Biglari et al. (2007).

In this research charcoal lenses and cave soils (Qaleh Bozi and Yekeh Chah caves and rock shelters) were sample and studied for the source of human food and lithic tools. In charcoal and ash lenses (dumped ash and rubbish) in both areas we found several pieces of crafted lithic tools and consumed bones. Hunted, cooked and consumed bones are mostly remains of: horse, wild sheep and goat, deer, birds, rhino, bison, fishes, turtle and seeds. Regarding to the source of lithic tools we found out that, crafted tools in Qaleh Bozi caves were made out of opalized pebbles from Zayandeh Rud River or form (Baba Hydar area). A preliminary search was done on
رسوب‌شناسی و زمین‌پیمایی شناسی ایزاهای سنگی (موسترن) در ایران مرکزی

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تاریخ دریافت: 1389/05/15	تاریخ پذیرش: 1389/05/07

چکیده
این تحقیق در ارتباط با نقش‌بازی کهریزی مجموعه‌های ایزاهای سنگی و نمایه‌های رسوب‌گذاری شده در محورهای زنجیری انسان به سی پیام‌ساخته تو هزاران تا هزاران حاضر در ایران مرکزی است. این محورهای مرکزی مربوط به ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است. این مجموعه‌های ایزاهای سنگی موسترن به دست آمده از محورهای زنجیری انسان به دو محورهای دیگری است که پیاده‌سازی شده بوده است.