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PALEOLITHIC AGE IN IRAN

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Introduction. The Paleolithic or 'Old Stone Age' begins with the first stone tools some 2.5million years ago in Africa (Gowlett 1992, p. 350),and it ends with the Neolithic or 'New Stone Age,' essentially at the beginnings of agriculture. The Paleolithic is conventionally divided into Lower, Middle, Upper, and Terminal or Epi-Paleolithic periods. The Paleolithic is known almost exclusively from lithic artifacts—stone tools, classified in conventional ways into types that are diagnostic of the various periods. There is virtually no information about the perishable tools and devices made of wood, fiber, or skins that may have been in use. Layers in archeological sites typically contain quantities of lithics, bones of animals that were hunted and consumed, and the ash from domestic fires. Paleolithic sites in Iran are known primarily from caves and rock shelters in the central Zagros mountains along with a few sites on the Caspian Sea coast and scattered sites on the desert plateau.

Lower Paleolithic. Found in Africa, the eastern Mediterranean and Europe, the Lower Paleolithic is known for two distinctive tool traditions. The first has hand axes and choppers, along with relatively crude flakes struck from flint or quartzite cores. Such tools are thought to have been made by *Homo erectus*, an archaic form of human that preceded the Neanderthals. The hallmark tool of the Lower Paleolithic, the hand axe, is virtually unknown east of the Euphrates, whereas west of that river it is commonly found. Iran may belong to a second Lower Paleolithic tradition that extends across eastern Asia and is known for its choppers, chopping tools, and crude flakes (Movius, 1969).

Barda Balka, a site in the Chemchemal (Čamčamāl) valley of the western Zagros, in present-day Iraq, had a mix of choppers, flint flakes and a few small hand axes. Based on geology, the site is thought to date to the end of the last interglacial (older than 100,000 years ago), a relatively warm period when there were elephants and rhinos, as well as sheep, goats, and onagers, on the landscape (Braidwood and Howe, 1960; Wright and Howe, 1951). A few hand axes have turned up on the surface in Iran (Braidwood, 1960), but none has come from a secure archeological context, and it is possible that they may be Middle Paleolithic in date, as suggested by the occasional presence of hand axes in Middle Paleolithic tool assemblages. Other sites with possible Lower Paleolithic material, but not hand axes, have been reported from the Central Zagros (Biglari et al., 2000), Azarbaijan (Sadek-Kooros, 1974, 1976), Fārs (Rosenberg, 1988, p. 452), Khorasan (Ariai and Thibault, 1975-77), and Baluchistan (Hume, 1976). Sites as old as 800,000 years have been discovered in Central Asia, suggesting that occurrences of similar age may be found in Iran (Davis and Ranov, 1999).

Middle Paleolithic-Mousterian. Middle Paleolithic sites are known from the Taurus mountains (Minzoni-Deroche, 1993), the Zagros mountains (see below), Uzbekistan (Movius, 1953), several sites in Central Asia, one of which is dated to 200,000 years ago (Davis and Ranov, 1999: p.191), and Afghanistan (Dupree and Davis, 1972). Despite the limited extent of investigations in Iran, there are many Middle Paleolithic sites, although few have been excavated and published in full. In the Levant, the Middle Paleolithic extends back more than 200,000 years and terminates 40,000 years ago. The true age of the Mousterian in the Zagros is not known, although carbon from Kunji Cave gave a radiocarbon date of greater than 40,000 years (Hole and Flannery, 1967a). While we cannot be certain when the Middle Paleolithic began in Iran, we know that it ended before 30,000 years ago with the appearance of the Baradostian Upper Paleolithic. Much has been made of the distinctive technical characteristics of the stone tools of the Zagros Mousterian (Baumler and Speth, 1993; Dibble and Holdaway, 1993; Skinner, 1965; Smith, 1986), as compared with those of the Levant or Europe. “The main distinctions include the much lower frequencies of Levallois [a technique of flaking the flint (Dibble and Bar-Yosef, 1995)] in the Zagros and an almost total emphasis on double [two-edged] and convergent [two-sided] scraper forms there instead of the transverse [broad-bladed] and déjeté [obliquely angled] forms” (which are found in the Levant; Dibble and Holdaway, 1993, p. 91).

Shanidar Cave in Iraqi Kurdistan is the most important site in the region (Solecki, 1963) owing to the remains of numerous Neanderthals, some of whom were crushed by rockfalls in this earthquake-prone region. One apparent burial, in sediments containing flower pollen, is the subject of a book (Leroi-Gourhan, 1975; Solecki, 1960 and 1971; Stewart, 1963). The Middle Paleolithic of Shanidar closely resembles that found at Hazer Merd cave near Solaymāniya (Garrod, 1930) and several sites in Iran. No Neanderthal skeletal remains have yet been found in any of the Iranian caves. The best-known sites are Warwasi (Dibble and Holdaway, 1993) and Bisotun (Coon, 1951; Dibble, 1984), near Kermānšāh, and Kunji Cave and Gar Arjeneh (Ḡār-e Arjena) near Ḵorramābād (Baumler and Speth, 1993; Hole and Flannery, 1967a). The cave of Ghar-i Khar (Ḡār-e Ḵar) near Bisotun holds promise of being as important as Shanidar, but it has not yet been fully excavated (Smith 1986, p. 18). Apart from these sites, numerous other similar occurrences are known, but few have seen even small test excavations, and these have simply added similar material (Biglari, 2001; Biglari and Heydari, 2001; Roustaei et al., 2002).

All of the excavated sites have yielded lithics, animal bones, and fireplace ash, but no other types of artifacts, such as might have been made of bone or wood. The Middle Paleolithic occurred during periods of profound climate change, yet there are no indications that habits changed, implying that people occupied these mountain regions only during the warmer periods. The sites inform more on the presence of people and their hunting habits than on other particulars of their life style.

Upper Paleolithic-Baradostian. There was a technological transformation or evolution between the Middle and Upper Paleolithic. Rather than a lithic industry based on flakes, now there is an increasing emphasis on blades (elongate and regularly shaped flakes) and in time a gradual reduction in their size (Hole and Flannery, 1967a; Olszewski, 1993a). More important than the shape of the flakes is that now they are used to make a new array of specialized tools, including scrapers, gravers, and narrow points that were probably hafted on spears or arrows. Significant innovations also include the use of bone for awls, and flat stones for grinding ochre pigments and plant foods. Unlike Europe, here there is no evidence at this time for “art,” although the use of pigments implies deliberate coloring of bodies or artifacts.

The Baradostian is the Zagros variety of the Eurasian Upper Paleolithic. First described by Ralph Solecki (Solecki, 1958), it has subsequently been found in Iran in Warwasi (Olszewski, 1993a), Ghar-i Khar (Smith 1986, p. 27), Gar

Arjeneh (Hole and Flannery, 1967a), and Yafteh (Yafta) Cave. Surveys in the Holaylān valley (Smith, 1986, no. 1452; p. 27), Lorestan (Roustaei et al., 2002), and Khuzestan (Wright, 1979) indicate that there are many more small caves and shelters in the central Zagros. Beyond the Zagros there are surface indications of Upper Paleolithic around the now dry playa Lake Tašk in Fārs province (Krinsley, 1970, no. 8314; p. 224). Rosenberg reports finding 24 sites in Marv Dašt, one of which, Eškāft-e Gāvi, has Mousterian as well as early and late Baradostian indications (Rosenberg, 1988: p. 455).Another reported surface occurrence of Upper Paleolithic is at Šekaft-e Ḡad-e Barm-e Šur on Lake Maharlu, near Shiraz (Piperno, 1974). The numerous occurrences of Upper Paleolithic lithics on the plateau as well as in the Zagros implies that the distribution of people was wider and their adaptation more varied than in the Middle Paleolithic.

The excavated sites give few clues to significant differences in adaptation from the Middle Paleolithic, perhaps because the sites are functionally similar—hunting camps rather than residential. On the other hand, the same animals were being hunted, albeit with new and evolving tool types that give the Upper Paleolithic the appearance of being more diverse and specialized.

The latest part of the Upper Paleolithic occurred during the Late Glacial Maximum (LGM), when the mountains were permanently covered with snow, so that one should expect there to be gaps or discontinuities in settlement. Weather during the late Pleistocene was always colder than today, but there were periods when it cycled between moderate and frigid. Neanderthals as well as the Upper Paleolithic people had to adapt to these changes, either through developing efficient shelters or by migrating to warmer places. If they migrated, then the sites we find in Iran must often have been relatively short-term camps of hunters who made only brief forays into the mountains during the warm periods.

One of the questions driving research is to find sites that hold evidence of a transition from Middle to Upper Paleolithic, a question stimulated by an interest in the origins of modern *Homo sapiens* and the disappearance of Neanderthals. Was there a biological evolution from Neanderthal to modern people, or was there a replacement of Neanderthals? So far, the data in archeological sites have not been adequate to answer this question (Bar-Yosef, 1998; Smith, 1986, p. 25). The actual dates for the duration of the Baradostian are not known, despite radiocarbon determinations from both Yafteh and Shanidar caves. The first series of dates for the early Baradostian from Yafteh

Cave, run on carbon, gave an estimate of 32-38,000 years ago (Hole and Flannery, 1967b), but recent analyses on charred bone, using the more accurate AMS (accelerator mass spectrometry) method, determined an age of 30-32,000 years, while bone collagen yielded dates of only 22-23,000 years ago. One might argue for either set of dates as being correct. The older dates correspond well with dates for comparable lithics in the Levant and Europe, and leave less room for a temporal gap between the Middle and Upper Paleolithic, as suggested for Shanidar (Solecki, 1963, p. 188). On the other hand, Warwasi, Ghar-i Khar, and Gar Arjeneh lack any stratigraphic break between Middle and Upper Paleolithic, as one would expect if some 10-20,000 years separated them. Adjusting the Middle Paleolithic forward in time does not seem possible in view of radiocarbon dates of greater than 40,000 years from Kunji Cave.

If the early Baradostian is as late as 22,000, it is in the midst of the LGM, when it seems unlikely that the Zagros supported much human activity (van Zeist and Bottema, 1977). An argument for an even later date for the end of the Baradostian is that it appears to develop into the Zarzian, a final Paleolithic industry. Again, there is no apparent stratigraphic break between the Baradostian and Zarzian at the three sites where it has been excavated and reported.

Terminal Paleolithic-Zarzian. The terminal Paleolithic in western Iran is known as the Zarzian, after the cave of Zarzi in Iraqi Kurdistan (Garrod, 1930). The hallmark of the Zarzian is small blades (microlithics), many of which in the latest Zarzian are chipped into geometric forms such as triangles and trapezoids (Hole and Flannery, 1967b; Wahida, 1981). The reduction in size of tools that started in the early Baradostian reached its climax with the Zarzian, and this change required the development of the single platform core from which the little blades were struck (Hildebrand, 1996).

Radiocarbon dates from Shanidar and Palegawra, also in Iraqi Kurdistan, indicate a Zarzian presence by 17,000 years ago, and it is generally assumed that it lasted until the advent of the Neolithic about 10,000 years ago. This date range would allow for settlement of the Zagros in the millennia after the LGM when conditions improved sufficiently to allow the spread of vegetation back into the higher elevations. This date does, however, imply a considerable gap with the Baradostian, even if we use the latest dates for that industry. Shanidar Cave was abandoned during the LGM, as were sites inIranian Paleolithic northern Afghanistan and Central Asia, and a similar hiatus may

have occurred in Iran (Davis and Ranov, 1999; Smith, 1986, p. 28), although stratification in the sites does not show it (Olszewski, 1993b; Hole, 1967, no. 7737).

With climatic amelioration throughout the world following the LGM, there were opportunities for the movement of people out of warmer zones into the mountains, making use of camps outside caves and shelters. The primary Zarzian sites are Ghar-i Khar, Gar Arjeneh, and Pa Sangar, where small bands of hunters observed game on the plain below and brought the meat back to eat. A number of other caves are known in the Holaylān valley, along with open-air sites (Mortensen, 1974a, b, 1975). Situated at a lower elevation, Holaylān may have been a cool or winter season camping area.

Based on scant information from the excavated sites of Pa Sangar, Palegawra, Zarzi, and Shanidar, there was little change in hunting practices from previous periods in that goats and onager were still the main quarry. However, there was an increased emphasis on small game, including partridge and duck, as well as freshwater crabs, clams, turtles, and, for the first time, fish. At both Zarzi and Shanidar excavators found quantities of land snails among the Zarzian debris. Flannery characterized this diversity as the broad spectrum revolution, in which the range of species hunted was greatly expanded from previous periods (Flannery, 1969). Mary Stiner attributes the diversity, in part, to dietary stress, which forced people to collect smaller animals, because the larger ones were no longer available either through over-hunting or environmental changes (Stiner, 1993). In the absence of human skeletons from this period, we cannot assess how humans may have been affected. At Palegawra we have the first indication of domesticated dog (Turnbull 1974). It would be interesting to know whether people were eating much plant food during the Zarzian, presaging an agricultural diet, as occurred in the Levant.

There are few Neolithic artifacts from these sites apart from bone awls. At Pa Sangar, two large saltwater scallop shells lay side by side, and bits of red ochre were also recovered (Hole, 1987).

Beyond the Zagros, lithics attributed to the Epipaleolithic, but not specifically Zarzian, have been reported from a number of places in southern Iran. Lithics at rockshelters on the shore of Lake Maharlu near Shiraz were reported by Henry Field (Field, 1939, p. 445). In the Marv Dasht valley, Rosenberg found a handful of sites with Iranian Paleolithic geometric microliths that he attributes to the Zarzian or a variant of it (Rosenberg, 1988, p. 458*).* Surveys on the Izeh

(Iḍa), Dasht-i Gol (Dašt-e Gol), and Iveh (Iva) plains have also revealed a number of sites with microlithic blades but apparently not geometrics, leaving open whether these are early Neolithic or Zarzian (Smith, 1986, p. 31; Wright, 1979).

Two sites along the southern Caspian coast have stone tools resembling those of the Terminal Paleolithic. The Caspian region, along the Māzandarān plain, was probably attractive to people because of its mild climate and rich resources, but there is no archeological evidence of their presence before the Terminal Paleolithic. Belt (Ḡār-e Kamarband; Coon, 1951, 1952, 1957), and Ali Tappeh (ʿAli Tappa) I (McBurney, 1968) have lithics similar to the Zarzian. During the Pleistocene, the Caspian Sea was at a higher level than today, and Ali Tappeh was just above its shoreline. As the sea receded, Belt and Hotu became accessible and were occupied. People living along the coast took advantage of the resources of the sea, the coastal marshes, and the mountain slopes. The fauna show an interesting change. Early there is a predominance of gazelle and seal, with some ox and deer, but later gazelle predominate, with some goat or sheep (McBurney, 1968). One may speculate that an environmental change led to the shift in diet. These sites give hints of the potential of the region for further exploration and excavation using modern methods.

The Terminal Paleolithic took place during a period of rising temperatures until about 13,000 BCE, when the region suffered a rapid reversal to near glacial conditions (the Younger Dryas period)—a shock that must have decimated many populations. Perhaps because people abandoned the Zagros during this time, there is no site that gives convincing evidence of continuity with the proto-Neolithic cultures that follow. In the eastern Mediterranean, agriculture began just after the Younger Dryas climate had shifted into one even more agreeable than today's, but it was a thousand years or more before agriculture reached the Zagros (Hole, 1998).

This review has highlighted the dearth of solid information. Iran has immense geographic variability, but our knowledge of the Paleolithic comes largely from the Zagros mountain zone. We need investigations of the plateau and desert regions, especially around the playa lakes that formed during wetter periods. The southern coast, with its potential for a maritime adaptation focused on sea mammals and fish holds much Iranian Paleolithic promise for all periods. We also need accurate determinations of ages using modern techniques, and finally we need an accurate assessment of climate changes

and their effects on the humans and other species. With new focused field research, Iran holds the promise of yielding substantial new discoveries of all periods.

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