

***THE PALEOLITHIC ARCHAEOLOGY OF
THE GOBI DESERT, MONGOLIA***

1997 FIELD REPORT*

A Preliminary Description of Activities of the
Joint Mongolian-Russian-American Archaeological Expedition (JMRAAE)
in 1997

by

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Abstract

Four principal goals were achieved during the 1997 field season of the Joint Mongolian-Russian-American Archaeological Expedition in the Gobi Desert: (1) continued excavations in Tsagaan Agui Cave, ongoing since 1995, (2) expanded excavations in Chikhen Agui Cave, tested briefly in 1995 and 1996, (3) discovery and initial sampling of unstratified surface artifact scatters associated with flint sources near Chikhen Agui, and (4) survey of previously unexplored areas of southern Bayan Hongor *aimag* (province) in close proximity to the Chinese frontier. A multidisciplinary approach to the investigation of Mongolia's earliest prehistory, including the application of the latest available remote sensing technology, has yielded a range of archaeological, paleoecological, paleogeographic, and geological data that collectively describe a complex, changing pattern of prehistoric human occupation of the Gobi. Available radiocarbon dates for Tsagaan Agui define a sequence of Paleolithic materials extending back to ca. 33,000 BP, while paleomagnetic determinations from strata near the bottom of the cave sequence reveal reversed (presumably Matuyama [R] chron) sediments. Preliminary ¹⁴C dates for Chikhen Agui indicate at least one period of occupation between ca. 8,000-11,000 years ago, although other, as yet undated, archaeological materials from the rockshelter appear typologically and stratigraphically much older. The surface aggregates discovered near Chikhen Agui derive from an intensively utilized source of high quality flint and provide an excellent basis for comparison with the rich prehistoric quarry-workshops on the south face of the Arts Bogd Uul range investigated by JMRAAE in 1995 and 1996. The expedition's reconnaissance of the Ekhiin Gol and Tsagaan Bogd Uul regions of southern Bayan Hongor *aimag*, facilitated by the use of ground-penetrating Shuttle Imaging Radar, yielded scattered surface traces of prehistoric occupation that warrant further investigation.

Introduction

From June through August 1997 the Joint Mongolian-Russian-American Archaeological Expedition (JMRAAE) continued a program of Paleolithic field research initiated in 1995. The preliminary results of the 1995 expedition, including a brief history of the multinational project, have been published as a trilingual monograph (Derevianko, Olsen, and Tseveendorj 1996). A similar publication presenting principal results of the 1996 expedition (Derevianko, Olsen, and Tseveendorj in press) is expected to be released in spring, 1998.

Four principal goals were achieved this summer: (1) continued excavations in Tsagaan Agui Cave, ongoing since 1995, (2) expanded excavations in Chikhen Agui Cave, tested briefly in 1995 and 1996, (3) discovery and initial sampling of unstratified surface artifact scatters associated with flint

sources near Chikhen Agui, and (4) survey of previously unexplored areas of southernmost Bayan Hongor *aimag* (province) in close proximity to the Chinese frontier.

A total of seven American, 11 Russian and 11 Mongolian participants (including eight Mongolian university students) took part in the 1997 expedition. This combination of personnel allowed this year's expedition to conduct simultaneous excavations at two localities and undertake an extensive reconnaissance of prospective new areas in the south Gobi Desert.

Continued Excavations in Tsagaan Agui Cave

The expedition's priority in 1997 was to reestablish a base camp and continue excavations in Tsagaan Agui Cave (N 44°42'32.6", E 101°10'08.8") in the eastern Gobi Altai range of Bayan Hongor *aimag*.

The dolomitic limestone solution cavity called Tsagaan Agui (White Cave) consists of a narrow, inclining entryway, a lower grotto, a rotunda-like main chamber, and at least two smaller chambers behind the main rotunda. These innermost chambers were not systematically investigated during the 1995 field season but constituted one important focus of the team's activities at Tsagaan Agui in both 1996 and 1997.

In 1988 and 1989, joint Soviet-Mongolian expeditions excavated a 16 x 2 to 6 meter trench spanning the drip line along the south margin of the cave's inclined entryway (Derevianko and Petrin 1995). In 1995 we cut back the north profile of that trench an additional 50 cm and extended it two meters east into the cave's main chamber. In 1996, we expanded the sounding in the main rotunda to the east and west to determine the maximum depth of the culture-bearing deposits and resolve the degree to which post-occupational roof-fall has affected the underlying sediments. In 1997, JMRAAE's focus of activity in Tsagaan Agui was to link the original Soviet-Mongolian soundings of 1988-1989 and our own excavations of 1995-1996 to yield a continuous longitudinal profile of the cave's main chamber down to the bedrock floor of the solution cavity. Bedrock and large blocks of dolomite debris occur at depths of as much as four meters below the present surface of the cave interior. The open chimney in the roof of the main rotunda and the presence of sporadically active streams within the cave complex itself have allowed erosional events profoundly influencing the composition and distribution of the cave's sediments.

The cave's "lower grotto" was tested in 1995, yielding a small collection of stone tools typologically earlier than those recovered from strata within the cave's main chamber. Based on this suggestive evidence, more extensive excavations were conducted in the lower grotto in 1997, yielding

many hundreds of artifacts. Interpretation of this assemblage is problematical at the moment since some preliminary sediment analyses suggest that the lower grotto may contain materials redeposited from elsewhere in the Tsagaan Agui complex. We do not expect to resolve this issue until these analyses are complete and excavations in the lower grotto can be expanded during the 1998 and 1999 field seasons.

More than 1800 stone artifacts were recovered in the Tsagaan Agui excavations in 1995 and 1996. This year, an additional thousand artifacts were recovered in addition to, perhaps, twice that many pieces of *débitage* (manufacturing waste) and unused flakes. While all artifacts were preliminarily classified in the field, at this writing only a small fraction have been thoroughly analyzed. Preliminary data from the 1997 excavations at Tsagaan Agui reinforce several general conclusions drawn from analyses of archaeological materials from the two previous field seasons: (1) stone raw material appears exclusively local (obtained within just a few hundred meters of the cave entrance), consisting mostly of jaspers and other cryptocrystalline quartz, (2) a stratified cultural sequence representing the late prehistoric/early Bronze Age through Middle Paleolithic has been identified, (3) tools recovered from the deepest strata consist mostly of flake scrapers and comprise only a small portion (approximately 4%) of the lithic collection from these horizons, (4) flakes were derived from both prepared platform “Levallois” (*sensu* Okladnikov 1986 and Alekseev 1990) and polyhedral cores with primary reduction having taken place outside of the cave, principally at the source of the raw material. The limestone massif containing Tsagaan Agui Cave is littered with the waste products of lithic reduction. Jasper cobbles and boulders outcrop just above the cave entrance and many are surrounded by large primary flakes and smaller chips indicating in situ reduction. Detailed contour and scatter density mapping of this workshop was completed in 1996 and ongoing analysis of these data is proving instructive as regards the origins of raw materials encountered in the Tsagaan Agui stone industry.

The large and diverse faunal sample recovered in the Tsagaan Agui excavations is currently undergoing analysis. A wide range of mammalian and avian species has been identified thus far, many with important paleoecological implications (e.g., bison, gazelle, horse, and ostrich). In 1997, additional organic samples were collected from *Ochotona* (pika) and *Alticola* (vole) nests in the vicinity of the cave since chronometric determinations performed on the 1996 samples yielded ages of no more than 1,300 ± 140 BP (GX-22673). University of Arizona doctoral candidate, Jason Rech, is currently analyzing these and other rodent middens from JMRAAE excavations at Chikhen Agui Cave (see below) to provide a line of paleoecological inference supplementing faunal, palynological, sedimentological and similar data.

A series of absolute dates is now available for Tsagaan Agui, and more are expected before the end of the year based on additional samples collected in 1997. Stratum 3 in the cave’s main chamber has yielded an Accelerator Mass Spectrometer radiocarbon (¹⁴C) date on wood charcoal of 33,840 ± 640 BP

(AA-23158) and Stratum 4 is dated at $32,960 \pm 670$ BP (AA-23159), also on wood charcoal. An infinite radiocarbon date ($>42,000$ bp, MGU-1449) was obtained on a wood charcoal sample from Stratum 5, about mid-way down the stratigraphic section of the cave's ramped entryway. A paleomagnetic determination indicating reversed sediments (e.g., older than ca. 730,000 years ago) is associated with the bottom of this same sedimentary column. Paleomagnetic samples were collected from the cave's lower grotto this year in an attempt to help resolve the depositional history of that accumulation.

Tsagaan Agui's principal inner chamber was tested in 1996 and additional excavations were carried out this year. Wood charcoal collected in contact with and beneath a stone slab feature of indeterminate function (altar?) yielded a date of $3,820 \pm 55$ BP (2 δ calibrated to 2460-2049 BC; AA-23159), suggesting late Neolithic or early Bronze Age use of the cave's deep interior.

Expanded Excavations in Chikhen Agui Cave

An important rockshelter called Chikhen Agui, located in Bayan Öndör *suum* ca. 150 km west of Tsagaan Agui (N 44°46'22.6", E 99°04'06.4"), was discovered in 1995 and preliminarily tested in 1996. In 1997, more extensive excavations were undertaken, producing a stratified sequence of cultural materials in the rockshelter itself and in association with a nearby active spring vent. Ranging from aceramic microlithic materials at the top of the sequence to prepared core flake-based assemblages resembling early Upper Pleistocene sites in Siberia such as Denisova Cave, Kokorevo, and Kara Bom (Goebel and Aksenov 1995), the Chikhen Agui collections may contain technological evidence of the Middle-Upper Paleolithic transition associated with the emergence of anatomically modern *Homo sapiens*, perhaps as much as 100,000 years ago (Aitkin *et al.* 1993; Klein 1995; Nitecki and Nitecki 1994).

Five ¹⁴C dates recently generated by the Russian Academy of Sciences, all on wood charcoal samples taken from hearths, suggest a range of ca. 8,000 to 11,000 years ago for the microlithic component of the assemblage:

(SOAN-3572)	Quadrant Γ/5, Horizon 1, Hearth 4	$8,055 \pm 155$
(SOAN-3573)	Quadrant Γ/8, Horizon 2, Hearth 5	$8,600 \pm 135$
(SOAN-3569)	Quadrant Γ/6, Horizon 2, Hearth 6	$8,940 \pm 100$
(SOAN-3570)	Quadrant Γ/6, Horizon 3, Hearth 10	$11,110 \pm 60$
(SOAN-3571)	Quadrant Γ/6, Horizon 3, Hearth 10	$11,160 \pm 160$

These dates provide a basis for preliminary interpretation of the prehistoric materials excavated in Chikhen Agui, and two interim conclusions can be reached:

1. The microlithic industry recovered in the three upper horizons may be broadly defined as “Mesolithic” (i.e., terminal Pleistocene/early Holocene aceramic microlithic).
2. The large blade complex recovered from Cultural Horizon 4 in Stratum 3 might be best considered transitional—perhaps Middle-Upper Paleolithic.

Forty organic samples (mostly rodent midden fractions and wood charcoal from hearths) were extracted in 1997; approximately a dozen are currently undergoing ¹⁴C analysis at the University of Arizona and the Russian Academy of Sciences.

Discovery and Investigation of a New Open-Air Paleolithic Locality in Bayan Öndör Suum

During planned reconnaissance of the low mountain ranges in the vicinity of Chikhen Agui, JMRAAE members discovered an extensive piedmont surface at approximately N 44°44'15.2", E 99°11'11.6" upon which a lag deposit of chipped stone tools and waste products is distributed over an area of at least 1.5 x 4 kilometers. This locality, called Suuzh (Pelvis) after the local name of the nearest ridge, appears to be a spot where prehistoric peoples exploited a source of high-quality flint over a very long period. These surface occurrences will provide an excellent basis for comparison with the rich prehistoric quarry-workshops on the south face of the Arts Bogd Uul range investigated by JMRAAE in 1995 and 1996.

Results of Archaeological Reconnaissance

During the 1997 field season a nine-day reconnaissance was undertaken of potential archaeological localities in southernmost Bayan Hongor *aimag*, in close proximity to the Mongolian-Chinese border; one of the most remote regions in Mongolia today.

Research scientist, Derrold W. Holcomb of Atlanta-based ERDAS Incorporated, accompanied the expedition this year. Using ERDAS's state-of-the-art facilities, Holcomb prepared a series of high-resolution radar images of the 1997 reconnaissance territory from data generated by the SIR-C imaging system aboard NASA's Space Shuttle. These images permitted expedition members to navigate precisely with the aid of global positioning systems in an area previously unexplored by earlier Soviet-Mongolian expeditions. The SIR-C images display both surface and sub-surface features to a spatial resolution of approximately 20 meters, allowing discrimination of principal geological structures, including major extinct drainages. This technology has proven invaluable in the identification of specific areas of archaeological potential in environments that have been greatly altered since the period of prehistoric

human occupation. JMRAAE's 1997 reconnaissance of southern Bayan Hongor *aimag* focused on the Ekhiin Gol valley and the Tsagaan Bogd Uul range. Throughout this extensive, currently depopulated, territory the SIR-C images revealed buried stream channels that, upon ground examination, yielded surface traces of prehistoric human occupation, including early Paleolithic stone tools. In 1997, JMRAAE only tested the potential of this technology for our investigation of the Gobi. In 1998 and 1999, we plan to expand the use of such remote sensing imagery in the reconnaissance aspect of our work.

Conclusions & Prospects

The bulk of this summer's archaeological and other collections have been transported to Novosibirsk, Russia and Tucson, Arizona where better facilities than those currently available in Mongolia will allow artifacts and other samples to be thoroughly analyzed before our next field season in 1998.

The joint expedition's goals for 1998 include continued excavation of Tsagaan Agui's main and inner chambers, more extensive excavation of Chikhen Agui rockshelter, perhaps to completion, and additional investigation of the open-air localities discovered in Bayan Öndör *suum* this year. Results of dating and other analyses currently underway will refine these general goals in the context of strategic planning for JMRAAE's 1999 expedition as well as forming the basis for the extension of our current trilateral research agreement (1995-1999) for an additional five years to begin in 2000.

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