THE PALEOLITHIC ARCHAEOLOGY OF THE GOBI DESERT, MONGOLIA

*1998 FIELD REPORT**

A Preliminary Description of Activities of the
Joint Mongolian-Russian-American Archaeological Expedition (JMRAAE)
in 1998

by

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Abstract

A multidisciplinary approach to the investigation of Mongolia's earliest prehistory, including the application of the latest available remote sensing technology, has again this year yielded a range of archaeological, paleoecological, paleogeographic, and geological data that collectively describe a complex, changing pattern of prehistoric human occupation of the Gobi. The Joint Mongolian-Russian-American Archaeological Expedition (JMRAAE) carried out four principal activities during its 1998 field season in the Gobi Desert: (1) excavations were continued in Tsagaan Agui Cave, ongoing since 1995, (2) excavations were completed in Chikhen Agui rockshelter and sub-surface testing of a nearby open-air artifact concentration initiated, (3) archaeological survey was conducted of previously unexplored areas of western Bayan Hongor and southern Gov'-Altai *aimags* (provinces), and (4) ground-truth studies were initiated of remotely-sensed radar imagery of ancient strand lines associated with the currently saline lakes, Böön Tsagaan Nuur and Orog Nuur. Available chronometric dates for Tsagaan Agui define a sequence of Paleolithic materials extending back to perhaps as much as ca. 60,000 years ago (Blackwell et al. in press). Paleomagnetic determinations from strata near the bottom of the cave sequence reveal reversed (presumably Matuyama [R] chron) sediments, ca. 730,000 years old. Current ^{14}C dates for Chikhen Agui indicate at least two periods of occupation; one between ca. 8,000-11,000 years ago and another around 27,000 before present. The open-air lithic artifact assemblage near Chikhen Agui tested this year provides an excellent basis for comparison with materials excavated in the rockshelter as well as with the rich prehistoric quarry-workshops on the south face of the Arts Bogd Uul range investigated in 1995 and 1996. The expedition's 1998 reconnaissance of the Black Gobi and adjacent outlying ranges of the Mongolian Altai massif yielded scattered surface traces of prehistoric occupation that warrant further investigation.

Introduction

From May through August 1998 the Joint Mongolian-Russian-American Archaeological Expedition (JMRAAE) continued a program of Paleolithic field research initiated in 1995. The preliminary results of the 1995 and 1996 expeditions have been published as trilingual monographs (Derevianko, Olsen, and Tseveendorj 1996, 1998).

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A total of six American, 10 Russian and 11 Mongolian participants (including eight Mongolian university students) took part in the 1998 expedition. This configuration allowed the 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 1998 was to once again reinitiate excavations in Tsagaan Agui Cave (N 44°42'32.6", E 101°10'08.8") in the 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.

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. In 1996 and 1997 Tsagaan Agui's innermost chambers were also tested. Wood charcoal collected beneath and in contact with a stone slab feature of indeterminate function (altar?) yielded an AMS ^{14}C date of 3,820 ± 55 radiocarbon years before present (rcybp), 2δ calibrated to 2460-2049 BC (AA-23159), suggesting late Neolithic or early Bronze Age use of the cave's deep interior, perhaps as a regular pilgrimage spot by the Buddhist period. Bedrock and large blocks of dolomite debris occur at depths of as much as four meters below the present surface of the cave interior. An open chimney in the roof of the main rotunda and the presence of sporadically active streams within the cave complex itself have allowed erosional episodes 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 simpler 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. This year, all excavation work at Tsagaan Agui was concentrated in the lower grotto. Sediment analyses conducted in conjunction with the 1995-1997 excavations suggested that the lower grotto contains principally materials redeposited from elsewhere in the Tsagaan Agui

complex. Expanded excavations of the lower grotto this year seem to confirm this hypothesis. The lower grotto appears to be a complex network of fissures and channels, some of which may well connect directly with the cave's main rotunda.

More than 2,800 stone artifacts were recovered in the Tsagaan Agui excavations in 1995-1997 in addition to perhaps twice that many pieces of débitage and unused flakes. This year, almost 9,000 stone tools were recovered from approximately 25 cubic meters of sediment removed from the lower grotto alone, suggesting that the lower grotto deposits likely represent concentrated redeposited material rather than a primary context assemblage. While all artifacts were preliminarily classified in the field, at this writing only a small fraction have been thoroughly analyzed. Preliminary data from the 1998 excavations at Tsagaan Agui reinforce several general conclusions drawn from analyses of archaeological materials from the three previous field seasons: (1) 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 stone tool 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 débitage 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 at the Zoological Institute of the Russian Academy of Sciences in St. Petersburg by Professors G. F. Baryshnikov (large vertebrates), A. K. Agadjanian (microfauna), and A. Pantelyev (avifauna). A wide range of mammal and bird species has been identified thus far, many with important paleoecological implications, including the Chiru or Tibetan Antelope *(Pantholops hodgsonii)* which is currently restricted in its distribution to the Qinghai-Tibet Plateau, numerous rodents, and 17 species of birds including Saker Falcon *(Falco cherrug),* Blue Hill Pigeon *(Columba rupestris),* Pallas's Sandgrouse *(Syrrhaptes paradoxus),* Horned Lark *(Eremophilia alpestris),* and Rock Sparrow *(Petronia petronia).*

Six accelerator mass spectrometer (AMS) radiocarbon determinations are currently available for the main chamber in Tsagaan Agui Cave:

AA-23158: (wood charcoal from Quadrat A'23, top of Stratum 3, 355 cm above zero datum):
33,840 ± 640 RCYBP

AA-23159: (wood charcoal from Quadrat A26, Stratum 4, 274 cm above zero datum):
32,960 ± 670 RCYBP

AA-26586: (wood charcoal from Quadrat A22, Stratum 1, Horizon 3, -334 cm):
931 ± 65 RCYBP

AA-26587: (wood charcoal from gravel layer, Quadrat A21, lowest Stratum 2 just above Stratum 3, -430 cm):
33,777 ± 585 RCYBP

AA-26588: (wood charcoal from Quadrat A'21, surface of Stratum 3, -436 cm): **33,497 ± 600 RCYBP**

AA-26589: (wood charcoal from Quadrat A'22, surface of Stratum 4; probably derived from Stratum 3, -390 cm): **30,942 ± 478 RCYBP**

One additional infinite radiocarbon date (>42,000 rcybp, MGU-1449) was obtained using conventional methods on a wood charcoal sample from Stratum 5, about mid-way down the stratigraphic section of the cave's ramp-like entryway. More AMS dates are forthcoming, perhaps before the end of the year, based on additional samples collected in 1998. Paleomagnetic samples collected from the lower grotto are undergoing analysis in an attempt to help resolve the depositional history of that accumulation.

Completed Excavations at Chikhen Agui

Chikhen Agui rockshelter, 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 tested in 1996. In 1997 and 1998, more extensive excavations were undertaken, producing a thin but clearly stratified sequence of cultural materials in the rockshelter itself and on the adjacent talus slope. Ranging from aceramic microlithic materials at the top of the sequence to Levallois-like 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 (Aitkin *et al.* 1993; Klein 1995; Nitecki and Nitecki 1994).

Seven conventional ^{14}C dates generated by the Russian Academy of Sciences and three AMS determinations performed at Arizona on samples from the upper culture-bearing strata suggest a range of ca. 8,000 to 11,000 rcybp for the microlithic component of the assemblage. At present, only one AMS date for the lower culture-bearing strata is available (AA-26580). This date suggests a much greater antiquity for the lower horizons:

AA-26580: (wood charcoal, Quadrat Д/3, -112 cm): **27,432 ± 872 RCYBP**

AA-26581: (wood charcoal, Quadrat E/3, -65 cm): **8,540 ± 95 RCYBP**

AA-26582: (wood charcoal, Quadrat Д/4, -84 cm): **8,847 ± 65 RCYBP**

AA-26583: (wood charcoal, Quadrat Г/2, -85 cm): **9,040 ± 85 RCYBP**

GX-23893: (composite organic matter, Quadrat Д/6, Stratum 1, -12 to -21 cm): **6,870 ± 105 RCYBP**

GX-23894: (composite organic matter, Quadrat Д/6, Stratum 3, -27 to -34 cm): **8,770 ± 140 RCYBP**

SOAN-3569: (wood charcoal, Quadrat Г/6, Horizon 2, Hearth 6, -36 cm): **8,940 ± 100 RCYBP**

SOAN-3570: (wood charcoal, Quadrat Г/6, Horizon 3, Hearth 10, -43 cm): **11,110 ± 60 RCYBP**

SOAN-3571: (wood charcoal, Quadrat Г/6, Horizon 3, Hearth 10, -54 cm): **11,160 ± 160 RCYBP**

SOAN- 3572: (wood charcoal, Quadrat Г/5, Horizon 1, Hearth 4): **8,055 ± 155 RCYBP**

SOAN-3573: (wood charcoal, Quadrat Г/8, Horizon 2, Hearth 5): **8,600 ± 135 RCYBP**

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, *sensu* Okladnikov 1986 and Alekseev 1990).
2. The large blade complex with Mousterian-like points recovered from Cultural Horizon 4 in Stratum 3 is best considered transitional—perhaps Middle-Upper Paleolithic.

An additional dozen samples from Chikhen Agui have been submitted for AMS radiocarbon determination at Arizona. Results of these tests should be in hand by early 1999.

After completion of excavations in the rockshelter itself, JMRAAE team members tested an open-air scatter of artifacts southeast of Chikhen Agui above a narrow canyon leading to an active spring. The small sondage that was opened yielded stratified stone tools similar to those recovered from Stratum 4 in the rockshelter and mammal (*Gazella*?) bones to a depth of at least 30cm. This locality, reported as Locus 2 in JMRAAE's 1996 expedition report (Derevianko, Olsen, and Tseveendorj 1998: 100), holds great potential for future excavation.

Results of Archaeological Reconnaissance in Western Bayan Hongor & Southern Gov'-Altai Aimags

During the 1998 field season an eleven-day reconnaissance was undertaken of potential archaeological localities in western Bayan Hongor *aimag* and southern Gov'-Altai *aimag*, the latter in

close proximity to the Mongolian-Chinese border; the farthest southwest in Mongolia JMRAAE has surveyed thus far.

Expedition members Derrold W. Holcomb of Atlanta-based ERDAS Incorporated and Goro Komatsu of the University of Arizona's Lunar and Planetary Laboratory prepared a series of high-resolution radar images of the 1998 reconnaissance territory from data generated by the SIR-C imaging system aboard NASA's Space Shuttle. These images allowed our team to navigate precisely with the aid of global positioning systems in areas previously unexplored by the joint 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 rock types and depositional regimes, including buried stream channels. 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 1998 reconnaissance of the southwestern Gobi focused on the extensive alluvial surfaces of the so-called Black Gobi (Shargiin Gov') and the isolated mountain ranges of the Azh Bogdyn Nuruu and Eezh Hayrkhan Uul. Throughout this extensive, largely depopulated, territory the SIR-C images reveal buried drainages and limestone outcrops that, upon ground examination, yielded surface traces of prehistoric human occupation, including typologically early Paleolithic stone tools such as large bifaces recovered near Shorvog Toirom in Gov'-Altai *aimag*. Logistical considerations (inclement weather, locally unavailable water and fuel) prevented us from investigating reports of a large cave in the Eezh Hayrkhan Uul.

Archaeological and Paleogeographical Reconnaissance in the Valley of Lakes

In June 1998 JMRAAE members devoted a week to the reconnaissance of ancient beaches associated with the currently saline lakes, Orog Nuur and Böön Tsagaan Nuur in Bayan Hongor *aimag*. Ground-penetrating Shuttle Imaging Radar provided key evidence of partially buried strand lines, the extent and configuration of which were confirmed on the ground. The Gobi's Valley of Lakes has long been known as a potentially rich region for prehistoric remains but the limited previous reconnaissance of the region has focused exclusively on archaeological materials in association with easily visible lake features of the valley's several major saline lakes. The application of SIR-C imagery this past summer allowed us to trace strand lines with current surface relief of 1-2 meters over much larger areas as well as identify previously unrecorded beach features invisible on the surface. Although scattered artifacts representing Paleolithic through Historic activity was found in association with these ancient lake stands, time constraints prevented us from conclusively determining the extent to which these archaeological remains are more than mere surface occurrences.

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 Ulaanbaatar will allow artifacts and other samples to be thoroughly analyzed before our next field season in 1999.

The joint expedition's goals for 1999 include continued excavation, possibly to completion, of Tsagaan Agui's main chamber and lower grotto as well as more extensive excavation of the open-air buried complex ("Locus 2") near Chikhen Agui rockshelter. The very positive preliminary results of our reconnaissance of ancient beaches associated with Orog Nuur and Böön Tsagaan Nuur encourage us to pursue our search for additional archaeological complexes associated with those extinct lake features in 1999. The report of a large cave in the isolated Eezh Hayrkhan Uul range will be investigated in 1999 for potential archaeological significance. Results of chronometric 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. Expedition co-leader Olsen's May 1998 election as one of less than a dozen foreign Academicians of the Mongolian Academy of Humanitarian Sciences bodes well for the continued successful implementation of JMRAAE's research design.

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