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1991

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(in: Prehistory of Korea: Evolution and Change since the Middle Pleistocene Proceedings of the 14th Congress of the Indo-Pacific Prehistory Association).

Bulletin of the Indo-Pacific Prehistory Association, **10**:83-91, 4 figs.

YONGGUL CAVE: PALAEONTOLOGICAL EVIDENCE AND CULTURAL BEHAVIOUR

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INTRODUCTION

Yonggul Cave is situated about 200 km southeast of Seoul. It is relatively narrow, only 2-3 m wide, 12-13 m long, and contains 4-6 m of sediments, mainly limestone debris and materials of exterior origin. The cave lies at the bottom of a 30-meter-high precipice of semi-circular form which constitutes a natural sediment trap.

From this cave, abundant faunal remains with numerous bone tools have been recovered. The study of the animal bones, pollens and sediments has provided us with much information on environmental and ecological conditions during the Upper Pleistocene period in Korea. Bone fragments, ash, charcoal and burnt limestone debris all contain information on the bahaviour of early humans and their adaptations to ecological conditions.

STRATIGRAPHY

There are 7 layers altogether in the cave, from the surface soil downwards (Fig. 1):

Layer 7: surface soil, black humus (Munsell 10YR 4/1-4/2), 30-100 cm in thickness. This layer contains decorated potsherds and polished bone tools of the Neolithic period.

Layer 6; clay with 25% limestone debris, dark grey (7.5YR 4/6) in the upper part and dark brown to brown (7.5YR 4/4) in the lower part, 62 cm in thickness. A carbon date of 13,000±700 BP has been obtained from this layer (Korea Atomic Energy Institute).

Layer 5; sandy clay with 22.8% limestone debris, dark brown to brown (10YR 4/3-3/3), 86 cm in thickness. Uranium series dating (U/Th/Pa) has yielded a date of 66,000+30,000—18,000 BP. (Gif-sur-Yvette by Yokoyama).

Layer 4: clay with 18% limestone debris, reddish brown (5YR 4/4), 47cm in thickness.

Layer 3: clayey sand with 17.8% limestone debris, moderately sorted, pale brown (10YR 6/3), 90 cm in thickness.

Indo-Pacific Prehistory Assn. Bulletin 10, 1991:92-98 (P. Bellwood ed., *Indo-Pacific Prehistory 1990,* Vol 1)

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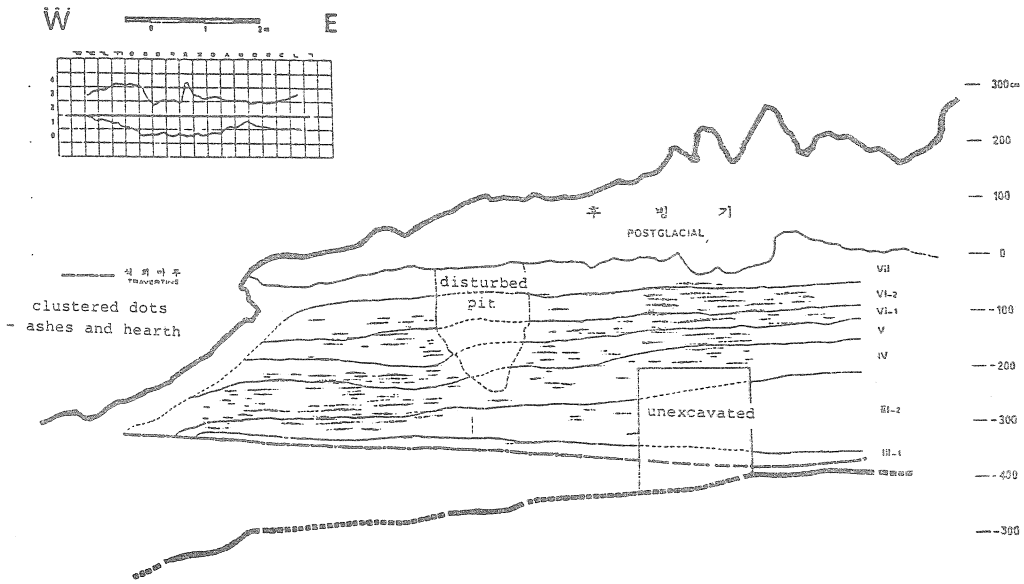

FIGURE 1: PROFILE OF THE YONGGUL CAVE DEPOSITS

Layer 2: travertine layer, brown (10YR 6/6), 3-10 cm in thickness, dipping very gently to the exterior of the cave. Archaeologically sterile.

Layer 1: coarse pebbles, rounded to subrounded, poorly sorted, with a very fine matrix of silt and clay, 20-150 cm in thickness. Archaeologically sterile.

FAUNAL AND FLORAL EVIDENCE

Pleistocene faunal remains excavated in layers 3,4,5 and 6 are mainly of mammals with a few birds and amphibians (*Rana* sp., *Bufo* sp.). There are a few human remains (2 metatarsals and 1 phalanx) from layer 6. The contents of each layer are now briefly listed.

Layer 3

The most important animal species are *Cervus* sp., *Capreolus capreolus, Mustela* sp., *Martes* sp., *Vulpes vulpes, Panthera* sp., and *Ursus* cf. *spelaeus*. Examination of charcoal shows that coniferous trees were dominant at this time. The floral and sedimentological evidence suggests that this layer was laid down under conditions of moderately cold and humid climate.

Layer 4

The most important species in this layer include *Macaca* cf. *robustus, Hyaena* sp., *Coelodonta antiquitatis, Bison priscus, Equus caballus, Panthera* sp., *Panthera* cf. *leo, Ursus*

arctos, Lutra lutra, Martes sp., *Mustela* sp., *Nyctereutes* sp., *Cervus* sp., *Capreolus capreolus, Microtus brandtioides, Microtus epiraticeps* and *Dolomys* sp. From these faunal remains a coexistence of warm fauna such as *Macaca* and cold fauna such as *Coelodonta antiquitatis* seem to have existed. However, a sort of transitional climatic situation can be posited from the pollen evidence and the dominance of charcoal from broad-leaved trees. Layer 4 was probably deposited during a warm phase immediately after a short period of climatic transition.

Layers 5 and 6

In these layers the mammalian fauna contains *Vulpes vulpes* and members of the genera *Hyena, Panthera, Ursus, Meles, Mustela, Microtus, Allocricetus* and *Apodemus*. The presence of *Allocricetus bursae chommaalensis* represents a cold fauna. Charcoal remains show a gradual augmentaion of coniferous trees in these layers., which seem to have developed during a cold and humid phase according to the sedimentology.

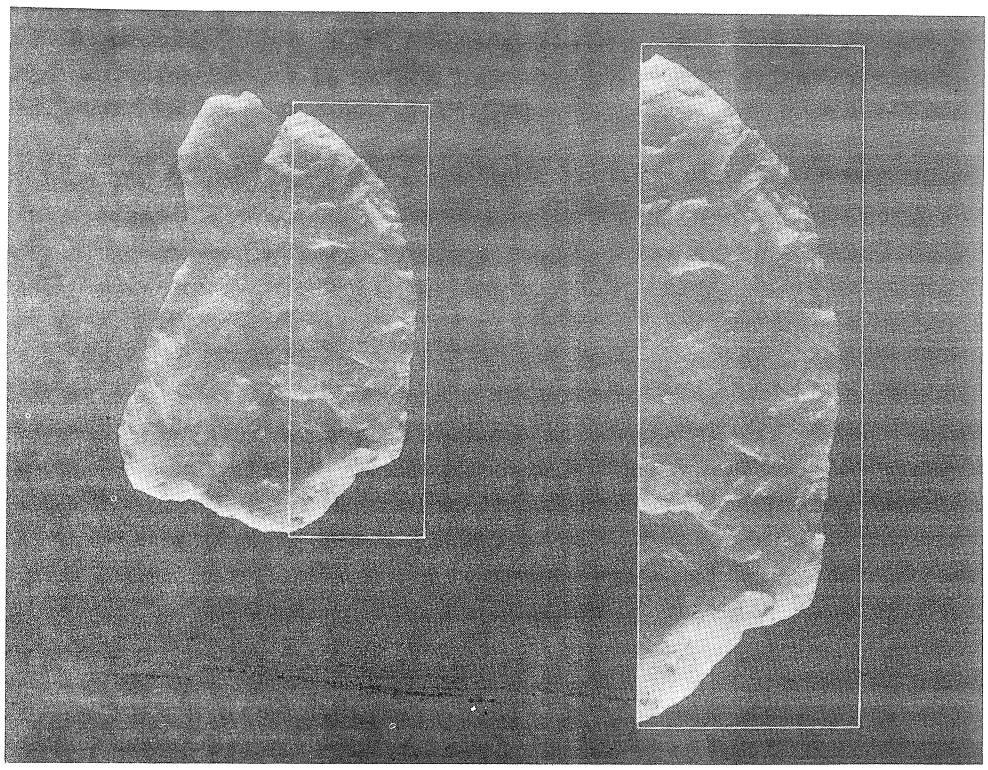

FIGURE 2: SIDE SCRAPER FROM YONGGUL CAVE

Among the various species hunted around Yonggul Cave the Cervidae, especially *Cervus nippon hortulorum*, were the most abundant, although some musk deer (*Moschus moschiferus*), water deer (*Hydropotes inermis*), roe deer (*Capreolus capreolus*) and Manchurian wapiti (*Cervus elaphus*) were present in small numbers as well.

STONE TOOLS

Stone artifacts are scarce in all layers of Yonggul Cave, but a number of pebbles of external origin are found in all fossil-bearing layers. These weigh mostly 200 to 300 grammes and could possibly have been used as hammerstones in bone flaking. Sharp limestone debris might also have been suitable for some cutting purposes. Otherwise, it is interesting to note that neither cores nor debitage have been found in this cave, a circumstance which suggests that stone tool flaking was not performed here. The emphasis seems instead to have been on bone flaking. However, one unique retouched quartz side-scraper was found in layer 6 (Fig. 2).

Bone tools

Experimental bone flaking was carried out in order to compare fracture patterns of known origin with those uncovered in each archaeological layer. Both fresh and weathered bones were used for these experiments, although the fresh bones were the most easily flaked and show similar features to the archaeological bones. Broiled bones were found to be unsuitable for tool making.

From the experiments it is evident that the Yonggul archaeological bones were flaked with both direct and indirect percussion, and also subjected to retouch. Examination by SEM (scanning electron microscope) proves that the bone materials of Yonggul cave were intentionally modified (Fig. 3).

Incision on bone

On a left radius of *Coelodonta antiquitatis* (woolly rhinoceros) found at Yonggul cave a human face has been incised with a stone tool (fig. 4). This piece comes from layer 5 with its associated date of *c.*66,000 BP (see above). According to SEM examination the eyes have been delineated by punching and incising, and the mouth has been incised with a repeated parallel action. The incisions are interrupted by limestone staining, but they are still discernible and the intentionality of the strokes is evident.

HUNTING BEHAVIOUR

In layer 3 we uncovered a punctured left parietal bone of a deer. Nearby, scattered broken antlers and a weathered limestone pick were found in an area of 50-60 cm in diameter. We were able to detect that the puncture was made by the limestone pick - a naturefact rather than an artefact. The punctured hole just coincided with the pick-end and it is assumed that it was the result of human hunting behaviour.

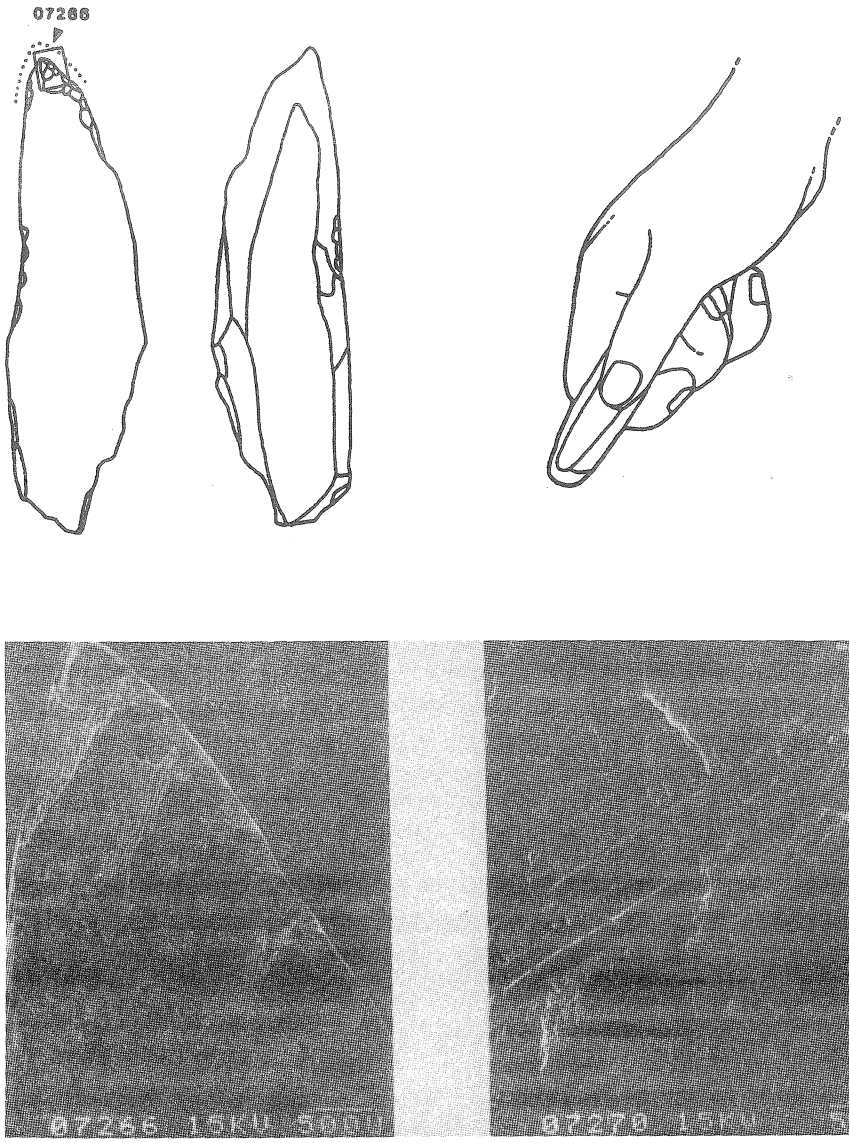

FIGURE 3: MICROWEAR TRACES ON A BONE TOOL FROM YONGGUL CAVE (SEM PHOTOS)

Also found in layer 4 at the cave entrance was the left lower jaw of a bear, the ramus of which had been shaped to form a point. The resulting tool has the shape of a halberd. Perhaps it was used as a protective weapon at the cave entrance.

More information relating to hunting practices can be elicited from the dental morphology of the killed animals. Many of the deer were juveniles ranging from 4 to 8 months in age, which suggests that they were hunted between autumn and winter.

The overall behaviour of early humans can thus be reconstituted in part.

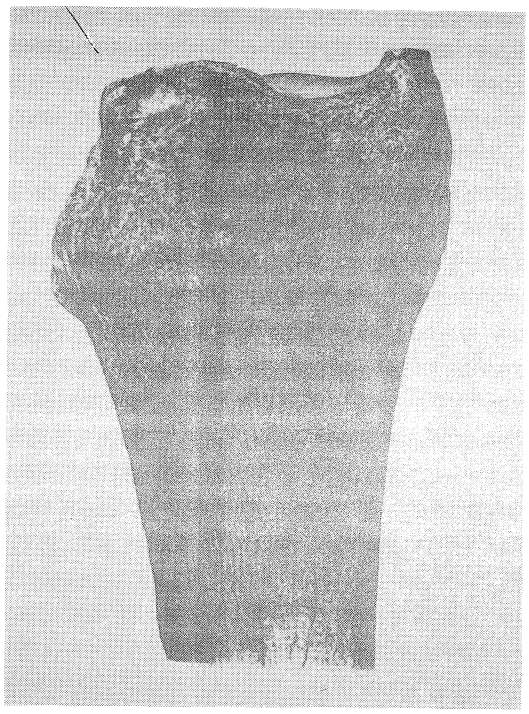

FIGURE 4: HUMAN FACE INCISED ON THE LEFT RADIUS OF A WOOLLY RHINOCEROS

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