

GONA PALAEOANTHROPOLOGICAL RESEARCH PROJECT FIELDWORK, FEBRUARY-MARCH, 2010

Report to the Leakey Foundation

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The Gona Palaeoanthropological Research Project continued its annual fieldwork and museum research in January-March, 2010. The result of the 2010 fieldwork was extremely successful, particularly with the excavation of the 2.6 million years old (Ma) OGS-7 archaeological site that has yielded additional large number of informative artifacts and associated fauna *in situ*. The first small excavation carried out ten years ago at OGS-7 has resulted in the discovery of the oldest known associated stone artifacts and fragmentary fauna dated 2.6 Ma. The 2010 excavation was successful with the discovery of a large number of cores (more than a dozen) showing previously undocumented sophisticated radial-working, including a small pick-like core, blade-like flakes and the first hammerstone ever to be recovered *in situ* from the 2.6 Ma time period. The stone assemblages have clearly shown that the good-quality, i.e. the fine-grained nature and the flakability of the raw materials accessible to the hominids played a major role in the refined nature of the artifacts, particularly for such an early age. Further, survey of the few pockets of 2.9-2.6 Ma deposits known at Gona has yielded several faunal remains, but continued fieldwork will be necessary to find traces of modified stones or bones from this critical time interval in human behavioral evolution. The research team undertook over 6 weeks of laboratory study of the materials excavated and stored at the National Museum of Ethiopia, just before and after the fieldwork.

I. ARCHAEOLOGY EXCAVATION

Ounda Gona South-7 (OGS-7), 2.6 Ma

OGS-7 is located in the Ounda Gona South, one of the tributaries of the Kada Gona River. The site was discovered in 2000 and the first small excavation (2.6 m²) carried out that same year yielded the oldest known associated stone artifacts and fauna securely dated to 2.6 Ma (Semaw et al., 2003). During the 2000 excavation more than 700 surface and *in situ* artifacts were recovered within a small area of OGS7. The 2010 larger excavation (6.3 m² area) doubled the number of stone artifacts and fauna, and especially the number of cores (7 both surface and *in situ* combined recovered in 2000, compared to 13 excavated this year), including 22 core fragments (or heavily-reduced cores), the first typical hammerstone (with clear pitting-marks) from any of the 2.6 Ma sites at Gona, 2 retouched flakes, and a large number of *débitage* and several unmodified cobbles. The recovery of additional fauna (though variably-and-mostly poorly-preserved) was important for demonstrating the function of the first stone artifacts.



OGS7: The excavation floor opened in 2010 with stone artifacts & associated fossil fauna dated to 2.6 Ma, all *in situ*. The first hammerstone recovered *in situ*, and dated to 2.6 Ma is shown above (insert top right); and more associated stone artifacts and fossil fauna (shown in the insert bottom right).

II SURVEY

Kada Gona, Ounda Gona South and Dana Aoule (2.6 Ma)

The archeology team undertook systematic foot-survey of the few pockets of sediments known in the 2.9-2.6 Ma interval at East Gona, Ounda Gona South, and Dana Aoule South and North areas. Although several days were spent surveying these areas, still no traces of flaked-stones were encountered, but several fossilized fauna were collected. The archaeology team will continue systematic survey of the 2.9-2.6 Ma deposits in these areas in the coming field seasons, because torrential rains expose materials, and there are chances to find (if any) modified stones/bones are present. The well-struck cores, the large number of 2.6 Ma sites currently known at Gona (more than 12 sites), and the very high-density of the stone artifacts (more than 6,000) suggests possible beginnings of ancestral hominid use of stones as tools prior to 2.6 Ma. Hominid use of modified stones prior to 2.9 Ma is unlikely because if such practices go further

back in time, traces of modified stones/bones should have been found by one of several projects in East Africa, including at Gona. Over the past four decades, a number of projects have been investigating fossiliferous deposits that are older than 3.0 Ma in East Africa, and no such traces have been reported, except by the Dikika project with claims of the discovery of 3.4 Ma cutmarked bones (McPherron et al., 2010; but also see Shipman 2010). However, the credibility and authenticity of the Dikika claim has been questioned (Dominguez-Rodrigo et al., 2010, 2011, *in press*). To date, there is no convincing data available to suggest any behavioral or anatomical indications for *A. afarensis* exploitation of meat in their diet using stones as tools. The lack of scientific credibility of the so called cutmarks from Dikika is further discussed below.

MID-LATE PLEISTOCENE ARCHAEOLOGY

Ya'alu South (YAS-1)

A number of Mid-Late Pleistocene artifact occurrences were discovered in the Ya'alu South (YAS) area in 2006. The sites were discovered as part of the annual monitoring of important sites known at Gona. The Ya'alu drainage is located south of the Gawis River, in the southern portion of the Gona Study Area. In 2006, the Gawis drainage yielded a nearly complete hominid cranium estimated to 400,000-300,000 years ago. In subsequent years the Gona team continued systematic survey south of the hominid site and found additional Middle Stone Age artifacts (with Levallois flakes, points, and blades and bladelets, all made of obsidian and chert) eroding at the site. We have now discovered laterally extensive deposits with artifacts and fauna which were observed freshly eroding out of an *in situ* horizon, including numerous blades and articulated small mammalian fauna. This site will be monitored during the coming field seasons, and we will put a firm plan to excavate the site in the coming years.

III MUSEUM WORK

Members of the Gona project worked at the National Museum prior and after the field season, helping in organizing the Gona archaeological and paleontological materials, and collecting data on the materials excavated in 2010 and during the previous field seasons. The materials collected from the field were transported to the National Museum in Addis Ababa where they were curated and stored, and finally handed-over to the care of the appropriate museum officials.

The Ethiopian Government has built an impressive five story building for storage, curation, and numerous study rooms for cleaning, restoring and study of faunal and archaeological materials. With the support of the Middle Awash Project, SS (the PI) moved the Gona collections to the new facility. The faunal and archaeological materials were properly organized and stored in high quality shelves (purchased with a grant subsidized by RHOI [NSF grant to Clark Howell & Tim White]).

NOTES: A recent claim for 3.4 Ma cutmarked bones from Dikika

The Dikika project (located south of Gona) recently announced 'cutmarked bones' from

deposits dated to ~3.4 Ma (McPherron et al., 2010). Despite such a huge claim and pushing the probable beginnings of early hominid stone artifacts (or the use of unmodified sharp stones) by almost one million years, the evidence provided by the Dikika project is unsubstantiated and unwarranted - because, 1) the so called cutmarked bones lack any definite evidence attributable to ancestral hominids (Dominguez-Rodrigo et al., 2010, 2011, *in press*; Njau, pers. Com; see also Shipman 2010 for a review of the McPherron et al., article), 2) none of the bones were excavated and their geological context totally unreliable, and 3) there were no modified stones recovered at the site – the closest source of stone raw materials calculated to a distance of about 6 Km from the site. The most likely agents for those marks are probably animal trampling or crocodiles, or both (Dominguez-Rodrigo et al., *in press*, Njau, pers. Com), and to date only the authors and the ‘anonymous reviewers’ for nature are among the ‘taphonomists’ who argue for the Dikika bones to show evidence of stone tool cutmarks.

To date, only the Gona sites have yielded undisputed evidence for the oldest stone artifacts which are dated to 2.6 Ma (e.g., Semaw et al., 1997, 2003). The Gona team believes in the likelihood of ancestral human beginnings of the use of stones as tools as early as 2.9 Ma. It is possible that the immediate descendants of *A. afarensis* (yet to be discovered) may have begun using stones between 2.9-2.6 Ma. After the disappearance of *A. afarensis* there is a major gap in the fossil and archaeological record until 2.6 Ma, which marks the beginning of ancestral human use of stone artifacts – as it is scientifically/archaeologically documented at Gona with proper excavations, and proper scientific dating. The fossil record also shows a number of hominid species making appearance at the same time (i.e. ~2.6 Ma). Therefore, if ancestral hominids used stones as tools prior to 3.0 Ma, the evidence should have also been traced in deposits dated between 2.9-2.6 Ma, and why the Gona research team has targeted this critical time interval in the human evolution. Currently, there is no convincing archaeological data for ancestral human use of stones as tools in the deposits that are older than 2.6 Ma. Therefore, the claim for the 3.4 Ma cutmarked bones by Dikika project is totally unwarranted.

GONA PUBLICATIONS (2010), including *in Press* (& *in submission*)

Semaw, S., Rogers, M. and Stout, D. (*submitted*) The Gona Palaeoanthropological Research Project: Major Discoveries and Contributions to Early Palaeolithic Studies in Africa. In M. Sahnouni (Ed.). A volume in preparation following the Algiers Conference ‘*L’Afrique, Berceau de l’Humanite: Decouvertes recentes*,’ October 26-28, Setif, Algeria.

Stout, D., Semaw, S., Rogers, M.J., & Cauche, D. Technological variation in the earliest Oldowan from Gona, Afar, Ethiopia. *Journal of Human Evolution*, **58**:474-491.

In press. Sahnouni, M., Semaw, S. & Rogers, M. The Acheulian: Archaeology and the further Evolution of the Genus *Homo*. In Oxford Handbook of African Archaeology, Peter Mitchell FSA (ed.).

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- Dominguez-Rodrigo, M., Pickering, T. and Bunn, H.T. 2011. A reply to McPherron et al.: Doubting Dikika is about data, not paradigms. *PNAS* 108:E117.
- Dominguez-Rodrigo, M., Pickering, T. and Bunn, H.T. (*in press*). Experimental study of cut marks with rocks unmodified by human flaking and its bearing on claims for ~3.4-Million – Year Old butchery evidence from Dikika, Ethiopia. *Journal of Archaeological Science*.
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- Shipman, P. 2010. The Cutting Edge. Can stone-tool marks on fossils be distinguished from tooth marks. *American Scientist*. <http://www.americanscientist.org/issues/num2/2010/6/the-cutting-edge/1>