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THE ORIGIN OF THE STONE RAW MATERIALS FROM GAJIGANNA

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Abstract

This research work emanated from a joint research project between the Johann-Wolfgang Goethe-University Frankfurt am Main, Germany and the University of Maiduguri, Nigeria; as outlined in the Bilateral Agreement of July 21st 1988.[1] The research program is interdisciplinary in nature involving these areas: Archaeology, Geography, Linguistics and Historical Ethnology; all under the general theme of West African Savannah. Considerable research work has already been carried out in these areas by German explorers and scholars dating back to the mid-nineteenth century. The project is funded by the German Research Foundation. The present paper addresses itself purely to one and very important aspect of an archaeological campaign undertaken in the Chad Region of Nigeria in late 1990/1991 season. In consequence to reconnaissance survey and excavation conducted at a site called Gajiganna, abundant lithic materials were noticed and collected. The crucial question one poses to the site which lacks physical out-crops in and within the precinct of the settlement are, what could have been the source of the raw materials at the site? Were they transported from somewhere to the site? If so, why was it necessary for the materials to be brought to this site? These and other related questions posed a serious commodity problem for most sites in Borno with lithic materials.

Introduction

The Gajiganna site was brought to the attention of the archaeology team by H. Thiemeyer of the Geography team of the joint research. The main objective of the archaeology campaign was to complement an earlier work by Graham Connah. It concentrates on the holocene settlement history of the Nigerian Chad Basin with special reference to the later stone age archaeology, and to understand the mutual influence of culture and environment. Gajiganna is a small village lying about 60 km north of Maiduguri. It is a mound settlement with a height of about one meter and a diameter of c 150m (BREUNIG, GARBA, and WAZIRI 1991).

Due to periodical wind and water erosion prevailing in the area considerable amount of surface materials were revealed consisting of crouched burials and animal bones, stones, innumerable potsherds; mostly broken into small fragments which might be of different ages. (BREUNIG, GARBA and WAZIRI, 1991:4).

Archaeological landscape of the Chad Basin

The Chad Basin had been a depositional region almost continuously since the end of the Eocene and Lake Chad itself is a remnant of a much larger Pleistocene lake with a long history (CONNAH 1975: 76), with an enormous environment that could have supported animals and human life. The significance of the Chad Basin was appreciated by many authorities as a crossroad in the Centre of Africa. Some see it as a "bottleneck" in the middle of the Savannah corridor straddling the Sahel Zone. To some, the Lake Chad located in between the Savannah and Sahel Zones serves as a "Garden of Eden" with a wide range of ecozones which made life easier for human information.

Considering all the above models one could clearly see that the Chad Basin with all the opportunities it offered for animal and human life could be a fertile ground for archaeological research.

The Chad formation is mainly composed of sand and clay deposits with hundreds of kilometres of plain land. The region could effectively be divided into these ecozones:

1. On the northern part within the precinct of the Lake, there, one could find the Firki, mainly made up of lagoonal or lacustrine clays. Settlements were, and hitherto mostly are on mounds presupposing "Islands of Sand".

2. On the southern fringes are the clear plains with deposits of sands.

3. The southern uplands are made up of plateau areas of Mandara and Biu respectively. The Mandara and Biu plateaus are 135 and 185 km respectively away from the Chad formation proper. The area within the Chad formation does not have outcrops of any proportion, with the exception of volcanic plugs at Hadjer el Hamis located in the Republic of Chad on the edge of Lake Chad, 75 km north-east of Daima. It was probably the main source of rhyolite found at Daima. Waza is some 95 km south of Daima located in the Cameroon, and was probably the main source of syenite found at Daima.

4. The Yobe Valley is mainly sandy with an alluvial plain.

5. The pockets of islands dotted within the Lake Chad and its margins.

Of all the ecozones mentioned above within the Chad Region, with the exception of physical out-crops in Mandara and the Biu Plateau as well

as outcrops outside the Nigerian Chad Basin region, in todays Republics of Chad and Cameroons, there is at present no physical feature except hundreds of kilometres of flat plains which made the Gajiganna and Daima stone raw materials "intrinsic finds". The Gajiganna stone arrow-points are comparable only to the Aterian culture obtained in the Sahara. The most fundamental question regarding the site and the stone raw materials are: were these sites used as workshops? Or were workshops created close to stone sources and the desired artefact worked to specific size and need and brought to these sites? Could it not have been tedious for the prehistoric population to bring in massive rocks to be worked at these sites? These and other related questions are intended to form the basis of a paper at a later point in time.

The Gajiganna stone raw materials

The Gajiganna stone finds consist of flakes of volcanic rocks with ground parts. They are probably re-used fragments of ground stone axes. Some of the finds are made up of granite, basalt, pegmatite and microdiorite. Most common are broken pieces of grinding stones, pounders and axes, bifacial arrowheads with concave bases made up of basalt and silica of different sizes. These stone materials played an important role in the economy of the area. The grinding stones which had a long antiquity in the area is today used in most homes in the surrounding area. They are presently obtained from markets within the vicinity of Gajiganna. About 18 kilograms of stones were obtained from the site.

Geological investigation

The geology of the area south of Lake Chad is known in general outline (BAUDEN and DESSAUVAGRE 1972 and 1974 respectively noted by CONNAH and FREETH 1989:13). But the precise detail needed to identify the sources of individual stone artefacts or groups of artefacts has as yet not been published. In the investigation conducted at Gajiganna there is hardly any outcrop within the precinct of the settlement.

Realising the enormous role geology contributes to archaeological studies, the author of this paper thought it was worthwhile to consult the geology department of the University of Maiduguri to assist in petrologic analysis of the few rock samples collected from the site, though forming a true representation of materials obtained either on the surface or from the excavated strata.

The traditional geological techniques of cutting small slice (0,3 mm thick) of rocks for microscopic study was employed. Although most of

the rock components were affected by weathering due to the long-time exposure to atmospheric conditions, it was nevertheless possible to infer the original minerals from the alteration products. Four distinct rock types are identified and categorised into two petrologic groups. All of them are, however, igneous.

1. Granite	⎫	
2. Pegmatite	⎬	Group 1
3. Microdiorite	⎭	
4. Basalt	}	Group 2

Granite

In hand specimen the rock (stone) is leucocratic (light coloured with colour index 0.35) and medium to coarse grained (sample no. 1). It is made up of the minerals quartz, plagioclase and biotite with opaque minerals as accessories. This section study shows that the plagioclase is oligoclase and exhibits the characteristic polysynthetic twining. Occasionally they are deformed and cloudy. The quartz is commonly anhedral and clear in plane light but gives slight undulatory extinction under crossed polars. The biotite are usually broken down and observed as dark brown to reddish minute flakes.

Microdiorite

The microdiorite is a fine grained intrusive rock consisting of pyroxene, plagioclase and considerable hornblende. The plagioclase are andesine to bytonite and exhibit the characteristic twining. The pyroxenes are subhedral and prismatic with two sets of cleavage set at 90° right angles while the hornblende crystals are greenish, have two sets of cleavage set at 123° and 86° and anhedral with hardly terminated boundaries.

Pegmatite

Pegmatite are intrusive rocks with very large crystals (>15 mm in diameter). No thin section is necessary to identify a pegmatite. Large crystals of quartz measuring about 250 mm in diameter were obtained from the study area.

Basalt

Two basalt types are identified. The one is an 'equigranular basalt', dark, fine-grained and composes of plagioclase and pyroxene with glass and

opaque minerals as accessories. The other is textural different in that it is slightly porphyritic with large grains of pyroxenes and hornblende forming the megacryst (phenocrysts) set in a groundmass of dominantly plagioclase feldspar-laths, pyroxene and opaques. In both cases the plagioclase feldspars are labradorites - bytownites. In both cases the groundmass is made up of plagioclase feldspar-laths, pyroxene, olivine and opaque minerals and volcanic glass.

Probable sources of the raw materials

> The Savannah plains south of Lake Chad, in Borno, Nigeria consist of great expanse of lagoonal clays . . . The stoneless character of these plains, however, provided the prehistoric inhabitants of the last three millennia with a serious commodity problem, for stone was needed for processing the important cereal component of their diet, as well as for making edge tools prior to the availability of iron in the region. This problem was solved to some extent by the use of alternative raw materials but mainly by carrying stone from the nearest suitable outcrops of rock, which were a considerable distance away (CONNAH and FREETH 1989: 7).

The above remarks by Connah and Freeth sums up in totality the paucity of rocky outcrops in the plains of Borno south of Lake Chad which might not be unconnected with the sedimentation over the past millennia.

Having examined and analysed each component of the rock obtained at Gajiganna, it is pertinent to highlight these materials against the background of areas where such materials correlate in texture and petrologic properties to arrive at a meaningful point of provenance. As these rocks have earlier in this paper being analysed geologically, it is ideal at this juncture to advance in sequence the various stone raw materials with their probable sources in the following order:

The granites described here can more appropriately be termed 'leucocratic medium to coarse grained granite'. Most of the mineralogical and textural characters exhibited by this rock are in many respect identical to the medium to coarse grained granite described by Islam et al. (1989) in the northern tip of the Mandara Hills (Pulka and Kiva). This rock unit is in fact among the rocks currently being exploited on large scale for various construction purposes because of their low aggregate crushing values (BABA et al. 1991).

Microdiorite is not known to be a common rock type in Borno region. Recently, however, Baba and Islam (in prep.) described a microdioritic rock occurring as a minor dyke with the major granitic body forming the Mandara Hills. The microdiorite thus described is in most appearances similar to the one described here.

The basalts described in this paper are textually of two types, the equigranular type and the porphyritic type (sample no. 4). M. R. Islam (1986) described a fine grained equigranular basalt consisting of labradorite (plagioclase), pyroxene, magnetite (opaque) and volcanic glass from Tashangwa in Biu area similar in all characters from sample no. 3 in this paper. M. R Islam. (1986) also described a porphyritic basalt which is made up of large phenocrysts of pyroxene and olivine set groundmass of laths of plagioclase and smaller grains of olivine, pyroxene, magnetite, ilmenite and interstitial glass from Miringa (north of Biu). This description is identical with sample no. 4 of this work.

The importance of stone raw materials in the plains of the Chad Basin could be seen in the following remarks by Connah that the "coarse-grained stone was required to process the probable staple food before it could be eaten, and fine-grained stone was required for the vital edged tool that were necessary for the wood-working so important in construction and the making of halfted tools and weapons" (CONNAH 1975: 139). An ethnoarchaeological study of current stone usage around Gajiganna, Chingoa and Galaga revealed that the grinding stones which were frequently obtained from excavation at Gajiganna and a nearby site; Galaga revealed that the usage of the stone artefact is still common among the populace. Indeed even with the prevalence of mechanical grinding machines, the tradition of grinding sorghum and vegetal matters is still common practice. This stone artefact is important to the archaeologist because it establishes a traditional continuity of this functional utility from the unknown generation of the living one.

It must be noted that due probably to the paucity of stone raw materials at Gajiganna and Daima, there was a general tradition of a re-use of sherds which at least replaces the functional utility of stones.

Conclusion

Since the essence of this paper is to ascertain the probable sources of the raw materials, it is pertinent for one to look inwards and outwards to speculate based on the analysis arrived at in the laboratory, and the adequate usage of models which could explain culture contacts. This phenomenon is of paramount importance to the study of the protoprehistory of the Chad Basin region due to the unique nature of the ecozone which is largely plain as can be observed from the geological map of the region. This phenomenon is not particularistic to Gajiganna site alone but to Daima, a settlement mound where it revealed 483 stones from the main stratigraphy of cutting VII, on analysis 74% of the stones came from two spectacular isolated outcrops, 16% came from a distinctive source and the location is yet unknown, 9% had been assigned to specific areas and few

whose origins could only be given in vague terms (CONNAH and FREETH 1989: 12).

Before one jumps to a conclusion it is paramount to make use of two models which might throw light on movements in prehistory for either climatic reasons or some form of trading mechanisms which could yield information regarding the provenance of the stone raw materials in Gajiganna.

Two models might be useful in this discourse. One is the 'bellows model' where the contiguity of the Chad Basin with the Sahara Desert during climatic deterioration over the last 5000 years could have bellowed some of the prehistoric populations to move southwards with their tool kits; the provenance of such could have been the volcanic plug within the precinct of the Sahel and Sahara desert such as the Hadjer el Hamis 175 km as the crow flies from Gajiganna. The stone arrow points obtained from Gajiganna resembles a typical Aterian Culture, a fair attestation of the model. The 'contact-zone model' might be useful to explain prehistoric culture contact or trading connections. This model might not easily be proved from the inventories we possessed at present, as they are undergoing analyses by a specialist. As a result of geological analysis, the various stone materials were texturally described and collated with outcrops with the same components and properties to fit in their probable area of provenance.

Based on the above premise the study suggest the sources of the stone excavated from Gajiganna as thus:

1. The stone in group 1 (granite, pegmatite, and microdiorite) might have been brought from the northern part of Mandara Hills. However, the recent oil exploration activities in the area of study indicate that all the rocks identified in this group were encountered by drilling at various depths. It might, therefore, not be out of place to think of the possibility that one point in prehistory, some of these rocks cropped out and later got buried by the quick sediments of the Chad formation.
2. The most probable sources of the two basalts is the Biu Plateau.

Endnotes

1. Declaration of intent 1988. This forms part of the Joint Research Agreement entered between the University of Frankfurt am Main, Germany, and University of Maiduguri, Nigeria, where the intention of the project was spelt out.

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