ENVIRONMENTAL CHANGE AND HUMAN CULTURE
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Culture and environment between the Sahara and the Nile in the Early and Mid-Holocene

Introduction

In approaching the subject of culture and environment, the archaeologists of today cannot leave out of consideration the significance that any of these themes have assumed in our discipline. These require reference to the principles of cultural ecology and of geoarchaeology. Culture – and by this I mean the group which expresses such culture – lives in interaction with the natural environment: not only aspects of material culture but also economic choices and the characteristics of settlement and demography are determined by the environment.

The emphasis placed by functionalist archaeology upon the processual concept of culture, that is culture as a product of systemic functioning, has pushed to the fore certain research strategies. Firstly, assessments have been made of the spatial dimensions of phenomena. This have involved the abandonment of the traditional unit of the site, and the projection of research onto a wider, regional scale. Secondly, attention has been paid to processes of sedimentation, of archaeological site formation and destruction (closely dependent upon palaeoclimatic oscillations) and to the stratigraphic contexts and post-depositional dynamics. To these considerations should be added the need for studies of the distribution of resources (water, plants, animals, raw materials), for this also is closely related to the character of the environment.

These last points, especially, have been developed within geoarchaeology, the discipline which has shown archaeology the ways in which to apply quantitative principles and techniques, particular to environmental studies, to archaeological research. As has been noted, the works of K.W. Butzer (1971; 1982) represent a major development of the principles of functionalist archaeology,

and provide a quite firm basis for archaeological research, aiming to supply not only the theoretical tools but also the technical ones required by the archaeologist. An example of this is given by the concept of culture which in Butzer's view does not assume the "metaphysical" value of system, an idealized model of the behavior of a society, which was developed within the field of cultural ecology. However, in both cases a change may be seen, interest moving from the artifacts and their typological classification, to transformations in behavior: that is, to the "dynamics by which people order their existence through their interaction with others and their cultural, physical and metaphysical environment" (Hassan 1983: 15). The most obvious transformation in the behavior of the Saharan groups of the Early to Mid-Holocene may be seen in the first experiences of food production: that is, in the passage from a position of dependence upon the environment to one of actually organizing and producing resources. The production of food may be viewed as an effect of adaptative dynamics, produced by man's selective and informed exploitation of the environment.

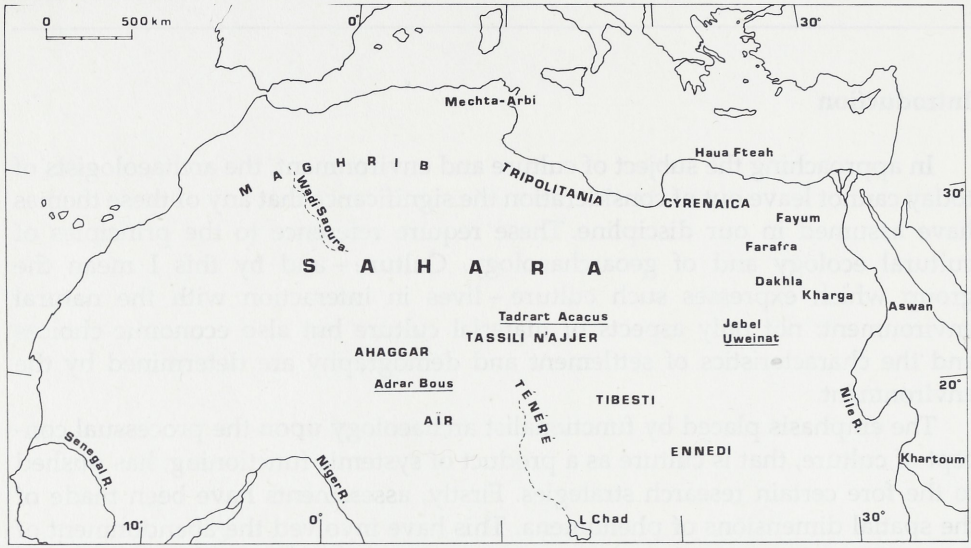

Fig. 1. Map of the Central Sahara.

Although it could be observed that the systemic functioning and the correlated adaptation concepts bring about a mechanistic explanation of cultural phenomena which excludes individual participation (Hodder 1985), we cannot deny that the systemic concept has allowed us to reach a degree of control and of data quantification that could not be obtained in the traditional paradigm. In dealing with human society, we are agreed that change may be caused not only by the environment but also by other factors such as demography and symbolism-ideology. However, in desert situations the impact of the environment must have been decisive in determining a group's decisions. In the Early Holocene the opportunities for choice on the part of groups were still quite numerous: the flourishing of civilization specifically along the water courses

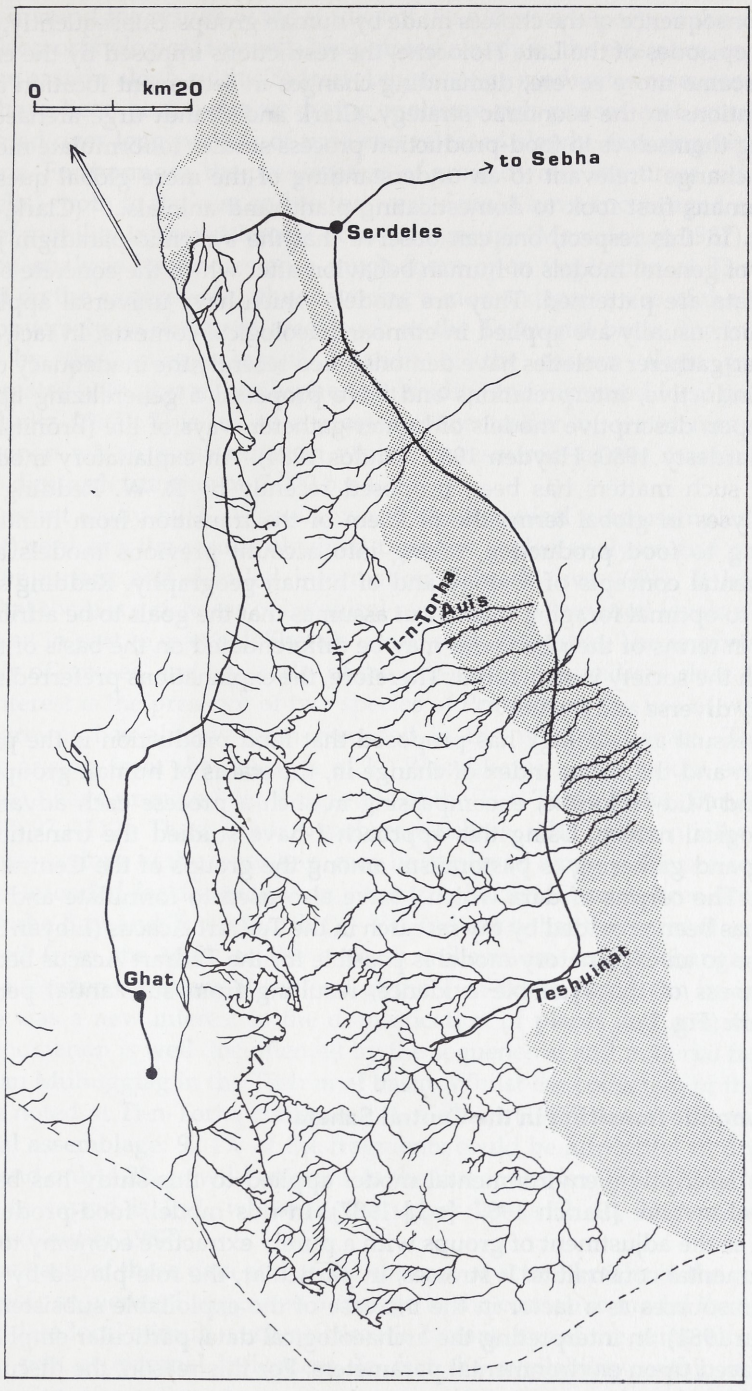

Fig. 2. Tadrart Acacus, Libyan Sahara. Regions mentioned in the text.

was a consequence of the choices made by human groups. Subsequently, during the dry episodes of the Late Holocene, the restrictions imposed by the environment became more severe, demanding changes in settlement location and the modifications in the economic strategy. Clark and Brandt urge archaeologists devoting themselves to food-production process studies to formulate models of culture change "relevant to an understanding of the more global question of why humans first took to domesticating plants and animals..." (Clark, Brandt 1984: 2). In this respect, one can observe that the systemic paradigm justifies the use of general models of human behavior, after which the concrete observational data are patterned. They are models which have universal application, and which usually are applied in ethnoarchaeological contexts. In fact, studies of hunter-gatherer societies have demonstrated recently the inadequacy of traditional, inductive, interpretations and have proposed a generalizing approach based upon descriptive models of hunter-gatherer ways of life (Bronitsky [ed.] 1983; Hardesty 1980; Hayden 1981; Rindos 1984). An explanatory model concerning such matters has been proposed recently by R. W. Redding (1988). He analyses in global terms the problem of the transition from hunting and gathering to food production, taking into account previous models and the fundamental concepts of ecology and of human geography. Redding's model returns to optimal foraging theory but assumes that the goals to be attributed to groups in terms of their behavior may be differentiated on the basis of the way in which the society is structured. Therefore, the explanations preferred must be similarly diverse and flexible.

Processual archaeology has proposed that food production is the principal factor, in and the major index of change in, the status of human groups in the Early and Mid-Holocene, encompassing in such a process each advance of a technological nature. Using this approach I have studied the transition from hunting and gathering to pastoralism among the groups of the Central Sahara (Fig. 1). The corpus of data which I have also used to formulate and test the model has been provided by my research in the Tadrart Acacus (Libyan Sahara). Recourse to an explanatory model is possible for the Tadrart Acacus because of the richness of the available evidence, resulting from substantial periods of fieldwork (Fig. 2).

The economic transition in the Central Sahara

The descriptive, environmental model applied to this study has been discussed elsewhere (Barich 1987; [ed.] 1987). In this model, food-production is viewed as the adjustment of groups with a purely extractive economy to special environmental constraints. It stresses, in particular, the role played by fluctuation in resources as a factor in the increase of the exploitable subsistence base (Hayden 1981). In interpreting the archaeological data, particular emphasis has been placed upon environmental parameters. For this reason, the discussion of the artifactual evidence and of change in the economic strategy has been shaped,

bearing in mind the results of the studies of the different aspects of the environment. Geomorphological research has pointed clearly to the existence, especially along the eastern slope, of the Tadrart Acacus, of groundwater resources. These would have been accumulating during moisture-rich phases and would have been stored over long periods of time and released slowly, favoring vegetation and fauna. Furthermore, the preservation of groundwater resources only in the outer belts – both to the east and to the west – could have encouraged a certain degree of mobility in the settlement of human groups (Marcolongo 1987).

Pollen analysis has indicated a much more open vegetation at Ti-n-Torha (situated on the eastern side), thus favoring a more extensive use of the land by man. Conversely, in sheltered areas such as the Teshuinat basin, the influence exerted by the hydrogeological location of the eastern slope provided microclimates with greater atmospheric humidity and increased local precipitation (Schultz 1987). This led to a greater concentration of water resources, a phenomenon which persisted even when the resources of the marginal belts began to diminish (starting *ca.* 7,000 b.p.).

The recent study by K. Wasylikowa of the botanical macrosamples (seeds and fruit) confirms the results obtained from the pollen analyses and provides further important and detailed information (Wasylikowa 1993). It has been shown that there is a richness of botanical material in occupation levels which is due at least in part to man's deliberate use of such resources. The importance of the family of grasses, and especially of the sub-family *Panicoidae* is clear. Of particular interest is the presence of two species of *Pennisetum*, the use of which by human groups has already been recorded in the Western Sahara. The new evidence arising from the research of K. Wasylikowa confirms the economic model that I have proposed for the groups of the Ti-n-Torha facies (Barich 1984; [ed.] 1987: 97 - 112). These hunters-gatherers-fishers, who preferentially settled on the eastern slope of the mountain, may have played a role in the pre-selection of species intended for domestication. Stratigraphic evidence at three sites, Two Caves, Torha East and Torha North (V - VI), indicates that this form of exploitation lasted from the tenth to the seventh millennium b.p. A change in the original subsistence pattern at the end of the Ti-n-Torha phase can be inferred for there was a new interest in the domestication of plants and animals. This new phenomenon is well documented by the sequence at and material from the site of Uan Muhuggiag in the Teshuinat basin. Whilst the collection of the same plants as noted at Ti-n-Torha continued, A. Gautier (1987) noted differences in the faunal assemblage: 92.4% of the fragments could be attributed to domestic animals and only 4.2% to wild animals. In the two lower levels (2d - 2c) the ratio of cattle to caprid is 1 : 1, whilst in the upper levels (2, 1a, 1) caprids were dominant (Gautier 1987).

On the basis of these data and of the absence of actual breaks in the regional stratigraphic sequence, I suggested a change in the economic model that would accommodate local stimuli, such as climatic factors, but at the same time minimize the role of external influences. In fact the availability within a rather limited region of a series of complementary micro-environments would allow

the counterbalancing of the effects of unfavorable climatic developments and the consequent stress upon resources, through the exploitation of new zones.

This type of economic transition, recognized in the Tadrart Acacus, may be taken as an example of an ideal sequence, and may be extended to other areas of the Saharan region for which unfortunately such rich sources of data are not available.

The Farafra Oasis, Western Desert, Egypt

The research in the Farafra Oasis begun by the University of Rome in 1987, has as its aim the reconstruction of the social and economic context. In addition the environmental considerations which inspired the research in the Libyan Sahara are relevant. Although ultimately as research progresses we may be able to attain a level of explanation just as detailed as that which proved possible for the Tadrart Acacus, at present our work has the following more immediate objectives: firstly, a comparison of the nature of the contexts of an oasis with the general Saharan model; secondly, the verification of the existence of exchange between the oases and the Central Saharan region; and thirdly, an assessment of the role which the oases assumed as mediator between the Sahara and the Nile Valley (Fig. 3). Professor F.A. Hassan is responsible for the geological and palaeoenvironmental work whilst the present author is in charge of the archaeological research. The possibility of integrating geological and archaeological studies seems particularly promising in a playa region in which human occupation during the Holocene was strongly influenced by the lake basins. During the 1987 field-season we carried out an extensive survey of the Farafra territory, extending to the small Ain Dalla Oasis. Work during the 1988 field season concentrated on the investigation of Bahr Playa, on top of the El-Quss Abu-Said Plateau, for this appears to be an extremely interesting area in terms of occupation. As this investigation is still in progress, the results presented here are preliminary: they will be summarized here with reference to the general lines of research.

Archaeological survey has shown that the territory was densely occupied, there being numerous concentrations of finds and *in situ* deposits related to playa formations. Within the depression, over an area of approximately 60 sq. km, we identified a total of fourteen areas of artifact concentration. Some of these, such as Aine-Raml and Bahr Playa are true sites, the latter having also evidence of long-term occupation; others are represented by small surface clusters of material, generally still in their original positions, and are the remains of short-term camps (Fig. 4). The assemblages recovered around Qasr Farafra (FA II, FA IV and Aine-Raml, for example) may represent the first phase of occupation. Two radiocarbon dates of 6,950 ± 60 (R-1894) and 6,670 ± 95 (R-1895) place these sites at the beginning of the moist phase which Hassan (1986; Barich and Hassan 1987) suggests occurred at the Early and Mid-Holocene. The manufacturing techniques as revealed by the debitage, involving single and opposed platform cores, and the tool types have affinities with those at Baharya

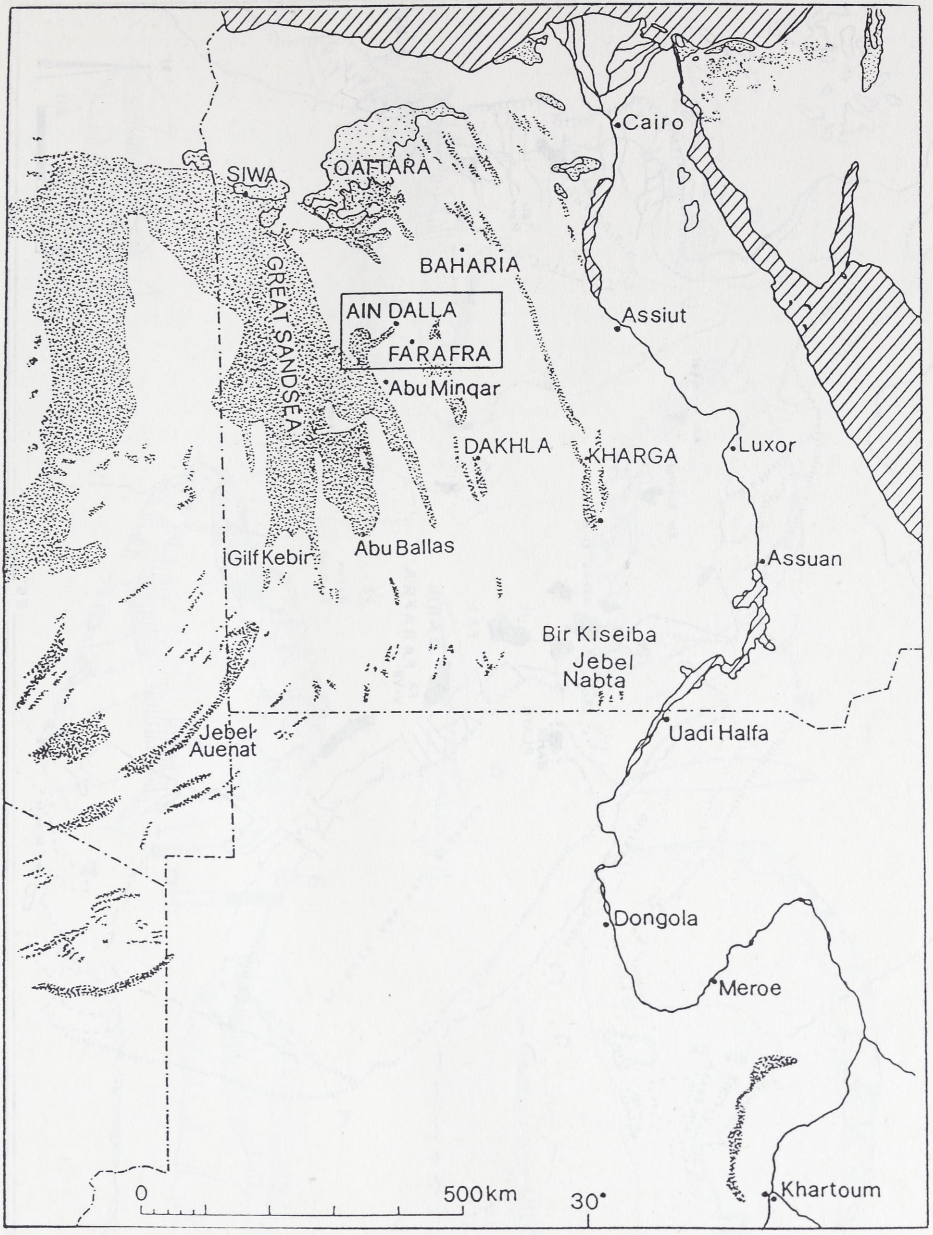

Fig. 3. Farafra Oasis, Western Desert, Egypt. Location map.

(Ain Khoman: 6,940 ± 140 B.P.; Fig. 5). This first phase probably coincides with the final phase of this occupation for this period as described for Baharyia (Hassan 1978) and also, in greater detail, for Siwa (Hassan and Gross 1987). It is

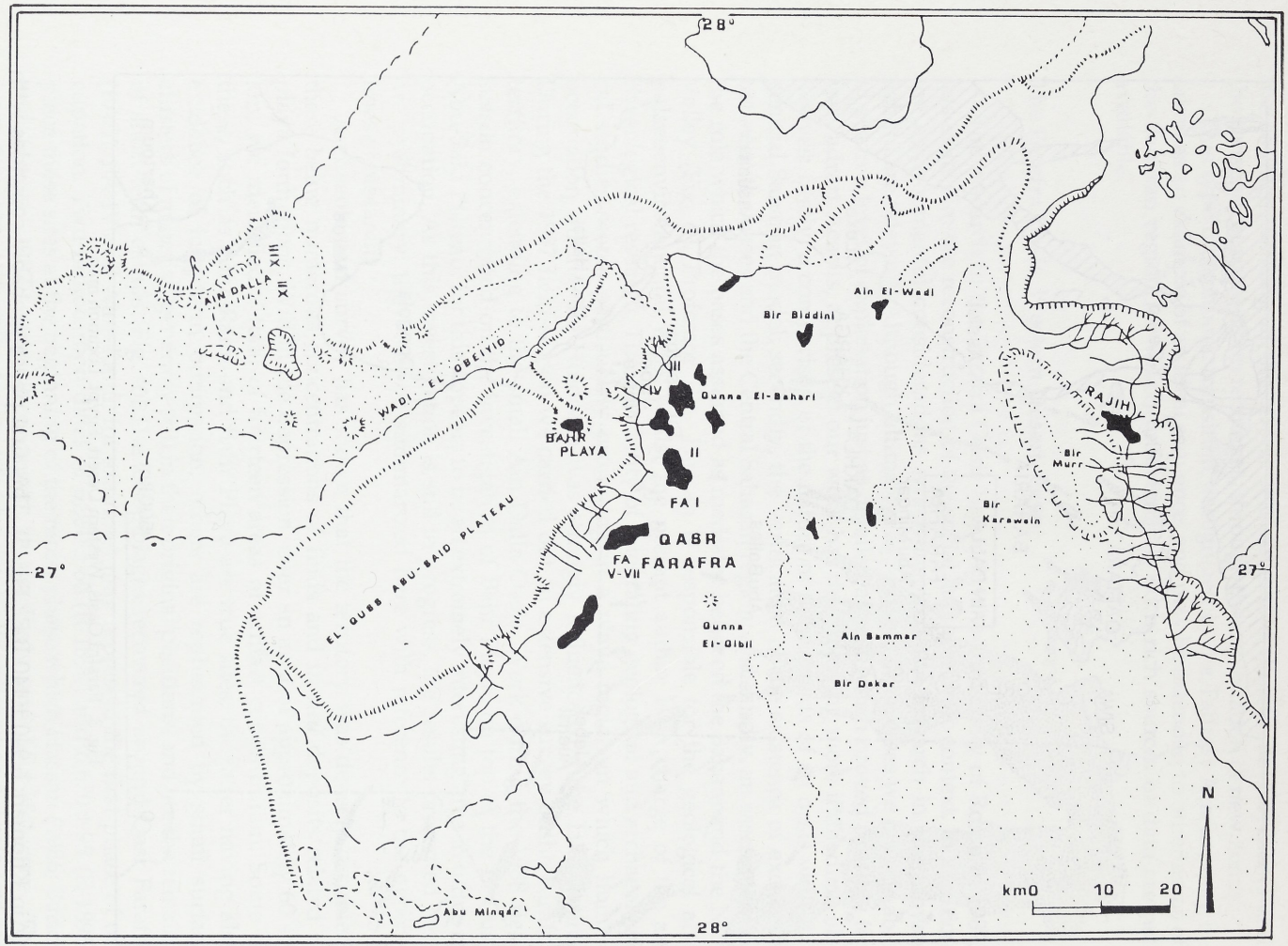

Fig. 4. Farafra Oasis, Western Desert, Egypt. Map showing regions mentioned in the text.

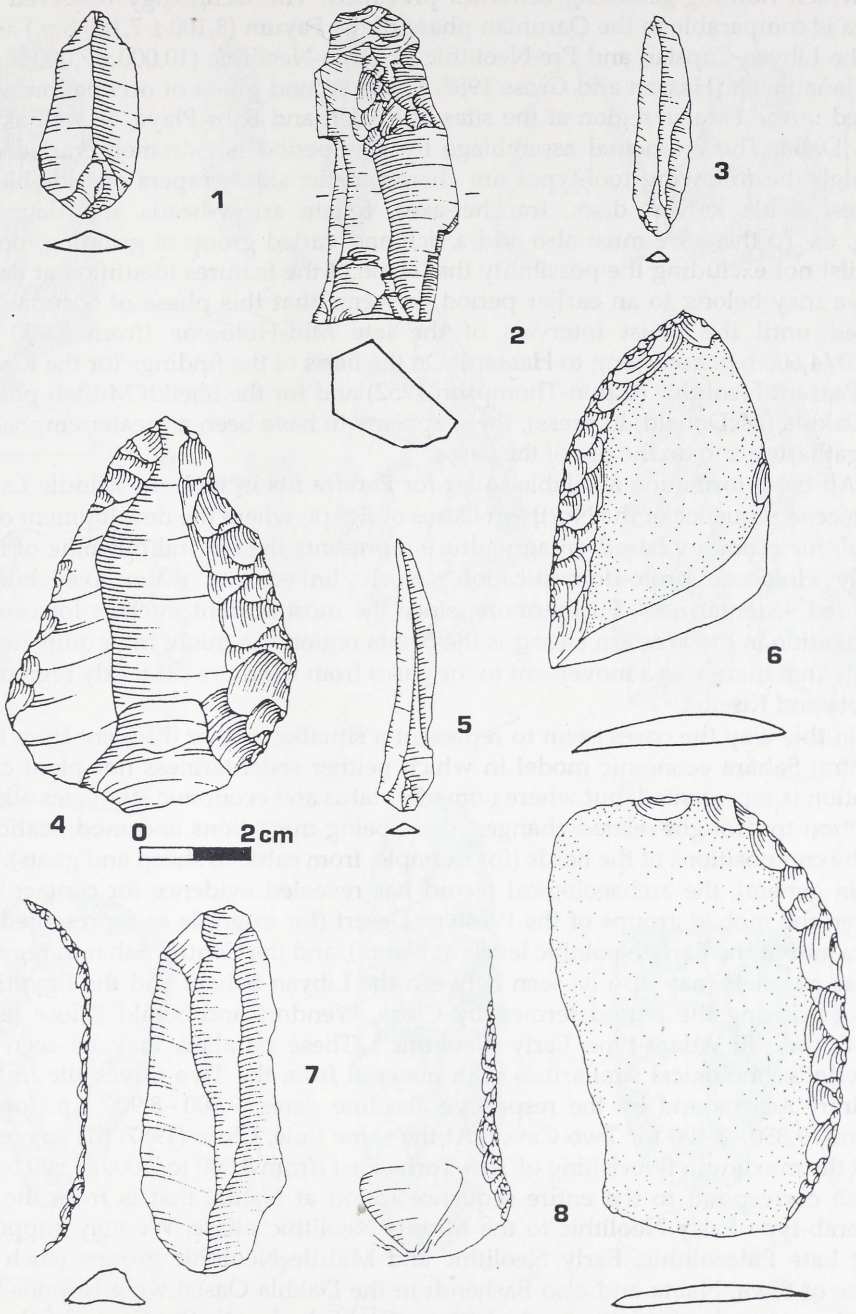

Fig. 5. Farafra Oasis, Western Desert, Egypt. Stone artifacts from Qasr Farafra.

datable to the Final Palaeolithic and corresponds to the Early Holocene moist phase, in which hunting-gathering activities prevailed. The technology observed at Siwa is comparable to the Qarunian phase of the Fayum (8,100 ± 7,140 b.p.) and to the Libyco-Capsian and Pre-Neolithic or Proto-Neolithic (10,000 ± 7,000 b.p.) at Haua Fteah (Hassan and Gross 1987: 87). A second phase of occupation was noted in the Farafra region at the sites of FA VII and Bahr Playa, as well as at Ain Dalla. The artifactual assemblage for this period is extremely varied although the following tool-types are characteristic: side-scrapers on side-blow flakes, sickle knives, discs, tranchet-axes, foliate arrow-heads and daggers (Fig. 6). To these we must also add a rich and varied group of grinding tools. Whilst not excluding the possibility that some of the features identified at Bahr Playa may belong to an earlier period, it seems that this phase of occupation lasted until the moist intervals of the late Mid-Holocene (from 5,900 to 4,800/4,600 b.p. according to Hassan). On the basis of the findings for the Kharga Peasant Neolithic (Caton-Thompson 1952) and for the Sheikh Muftah phase of Dakhla (McDonald, in press), there appears to have been a greater emphasis on gathering and on the use of the oases.

All the information available so far for Farafra fits in with the Middle Late-Holocene sequence of the Northern Oases of Egypt, where the development of a Neolithic economy based on agriculture represents the natural outcome of the Early Holocene proto-domestication, which, linked into water availability, favored sedentariness. Furthermore, since the most ancient nucleus for cereal cultivation in the Western Desert is the Nabta region, we might infer quite justifiably that there was a movement to the oases from the more southerly region of Nabta and Kiseiba.

In this way the oases seem to represent a situation rather different from the Central Sahara economic model in which neither sedentariness nor plant cultivation is represented, but where nomadic status and economic strategies allow reaction to drought-related changes, there being migrations and modifications in the compositions of the herds (for example, from cattle to sheep and goats).

In general, the archaeological record has revealed evidence for contact between the mobile groups of the Western Desert (for example as represented at Siwa and in the Early Neolithic levels at Nabta), and the Central Saharan region. Close parallels may also be seen between the Libyan Sahara and the Egyptian Sahara during the period termed by Close, Wendorf and Schild (Close [ed.] 1984) the "El Adam-type Early Neolithic". These parallels may be seen in precise technological similarities with material from the Two Caves site in the Tadrart Acacus and by the respective absolute dates: 9,800 - 8,900 b.p. for El Adam, 9,350 - 8,400 for Two Caves. At the same time, Close (1987: 81) suggests that the maximum flourishing of Ti-n-Torha East (from 8,500 to 7,000/6,500 b.p.) could correspond to the entire sequence found at Nabta, that is from the El Ghorab-type Early Neolithic to the Middle Neolithic phase. We may suppose that Late Palaeolithic, Early Neolithic and Middle Neolithic groups (such as those of Siwa, Nabta and also Bashendi in the Dakhla Oasis) were responsible for the network of relations which were established with the Central Sahara. This is indicated by the diffusion of elements of the lithic industry and by

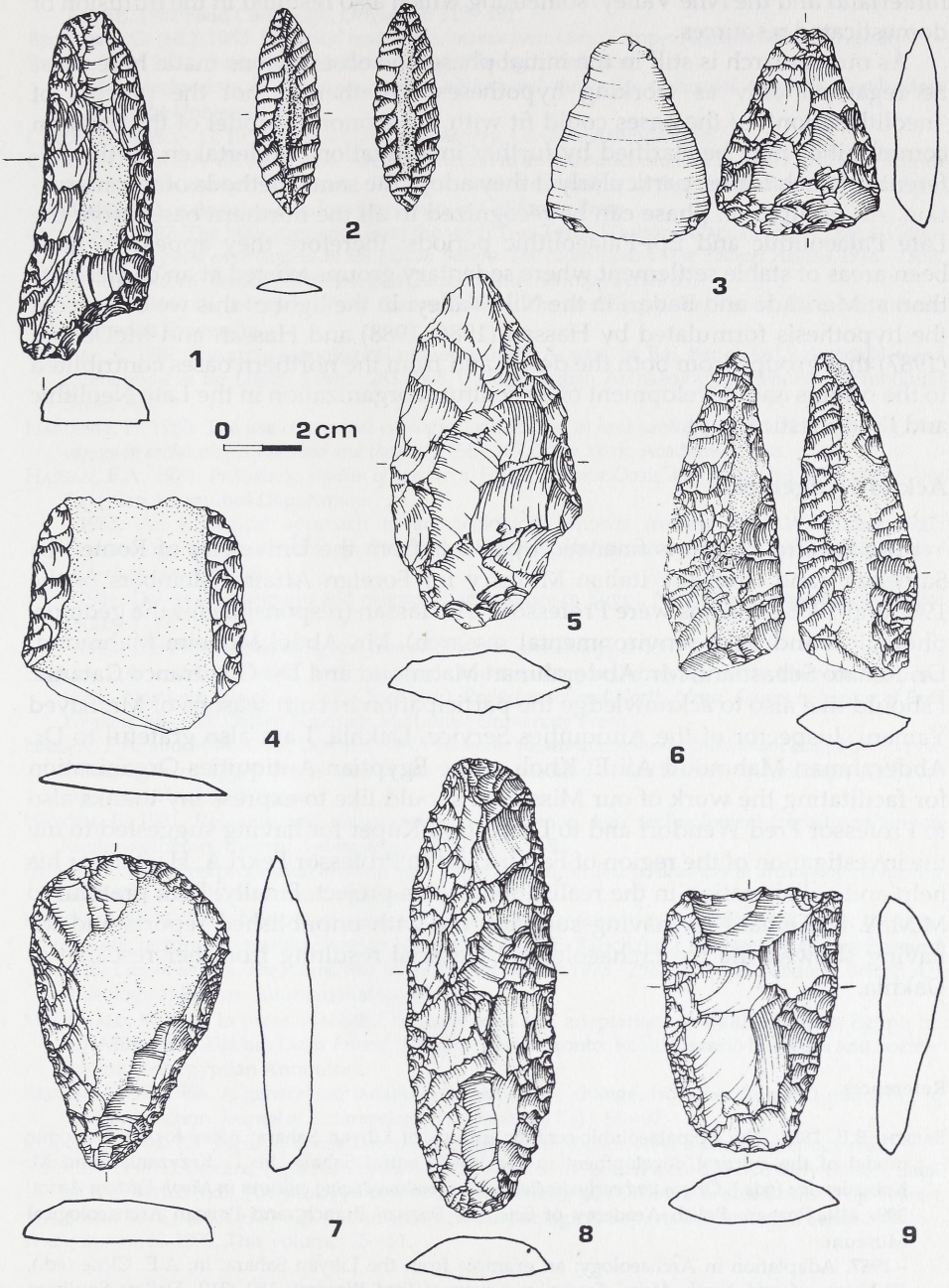

Fig. 6. Farafra Oasis, Western Desert, Egypt. Stone artifacts from FA VIII (1 - 4) and Bahr Playa (5 - 8).

decorative motifs on ceramics. We can atribute to these mobile groups of hunter-gatherers and early pastoralists the role of mediator between the Saharan hinterland and the Nile Valley, something which also resulted in the diffusion of domesticated resources.

As our research is still in the initial phase, the observations made here must be regarded only as working hypotheses. Whether or not the process of "neolithisation" of the oases could fit with the economic model of the Saharan communities may be clarified by further investigations undertaken by the different research teams, particularly if they adopt the same methods of reconstruction. An occupation phase can be recognized in all the northern oases from the Late Palaeolithic and Epi-Palaeolithic periods: therefore they appear to have been areas of stable settlement where sedentary groups existed at an earlier date than at Merimde and Badari in the Nile Valley. In the light of this we can accept the hypothesis formulated by Hassan (1986; 1988) and Hassan and McDonald (1987) that groups from both the desert and from the northern oases contributed to the origins and development of agricultural organization in the Late Neolithic and Predynastic Egypt.

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References

BARICH, B.E. 1984. The Epipalaeolithic-ceramic groups of Libyan Sahara: notes for an economic model of the cultural development in the West-Central Sahara. In: L. Krzyżaniak and M. Kobusiewicz (eds.), *Origin and early development of food-producing cultures in North-Eastern Africa:* 399 - 410. Poznań: Polish Academy of Sciences, Poznań Branch, and Poznań Archaeological Museum.

– 1987. Adaptation in Archaeology: an example from the Libyan Sahara. In: A.E. Close (ed.), *Prehistory of arid North Africa. Essays in honour of Fred Wendorf:* 189 - 210. Dallas: Southern Methodist University Press.

– (ed.). 1987. *Archaeology and environment in the Libyan Sahara. The excavations in the Tadrart Acacus 1978 - 1983.* Oxford: British Archaeological Reports International Series, 368.

BARICH, B.E. and F.A. HASSAN. 1987. The Farafra Oasis Archaeological Project (Western Desert, Egypt). 1987 Field Campaign. *Origini* 13: 117 - 191.

BRONITSKY, G. (ed.). 1983. *Ecological models in economic prehistory.* Tempe: Arizona State University.

BUTZER, K.W. 1971. *Environment and archaeology.* Chicago: Methuen.

– 1982. *Archaeology as a human ecology: method and theory for contextual approach.* Cambridge: Cambridge University Press.

CATON-THOMPSON, G. 1952. *Kharga Oasis in prehistory.* London: Athlone Press.

CLARK, J.D. and S.A. BRANDT. 1984. An introduction to an introduction. In: J.D. Clark and S.A. Brandt (eds.), *From hunters to farmers. The causes and consequences of food production in Africa:* 1 - 4. Berkeley, Los Angeles, London: University of California Press.

CLOSE, A.E. 1987. The lithic sequence from the wadi Ti-n-Torha (Tadrart Acacus). In: B.E. Barich (ed.), *Archaeology and environment in the Libyan Sahara. The excavations in the Tadrart Acacus 1978 - 1983:* 63 - 85. Oxford: British Archaeological Reports International Series 368.

– (ed.). 1984. *Cattle-keepers of the Eastern Sahara. The Neolithic of Bir Kiseiba.* Dallas: Southern Methodist University.

GAUTIER, A. 1987. The archaeozoological sequence of the Acacus. In: B.E. Barich (ed.), *Archaeology and environment in the Libyan Sahara:* 283 - 308. Oxford: British Archaeological Reports International Series 368.

HARDESTY, D. 1980. The use of general ecological principles in archaeology. In: M. Schiffer (ed.), *Advances in archaeological method and theory* 3: 158 - 187. New York: Academic Press.

HASSAN, F.A. 1978. *Prehistoric studies of northern Egypt. Baharia Oasis and West Delta.* Report to the Egyptian Antiquities Department.

– 1983. An ecological approach to archaeological contexts (review of: K.W. Butzer 1982. Archaeology as human ecology. Cambridge: Cambridge University Press). *The Quaterly Review of Archaeology* 4 (2): 15.

– 1986. Desert environment and origins of agriculture in Egypt. *Norwegian Archaeological Review* 19(2): 63 - 76.

– 1988. The Predynastic of Egypt. *Journal of World Archaeology* 2: 135 - 185.

HASSAN, F.A. and G.T. GROSS. 1987. Resource and subsistence during the Early Holocene at Siwa Oasis, Northern Egypt. In: A.E. Close (ed.), *Prehistory of arid North Africa. Essays in honour of Fred Wendorf:* 85 - 103. Dallas: Southern Methodist University Press.

HASSAN, F.A. and M.M.A. MCDONALD. 1987. *Holocene palaeoenvironments and human adaptations in the Western Desert, Egypt.* Paper read at the Annual Meeting of the Society of American Archaeologists in Africa, in Toronto.

HAYDEN, B. 1981. Research and development in the Stone Age: technological transitions among hunter-gatherers. *Current Anthropology* 22 (5): 519 - 548.

HODDER, I. 1985. Postprocessual archaeology. In: M.B. Schiffer (ed.), *Advances in archaeological method and theory* 8: 1 - 26. New York: Academic Press.

MARCOLONGO, B. 1987. Natural resources and palaeoenvironment in the Tadrart Acacus: the non-climatic factors determining human occupation. In: B.E. Barich (ed.), *Archaeology and environment in the Libyan Sahara. The excavations in the Tadrart Acacus 1978 - 1983:* 269 - 282. Oxford: British Archaeological Reports International Series 368.

MCDONALD, M.M.A. In press. Neolithic cultural units and adaptations in Dakhleh Oasis, Egypt. In: A.J. Mills (ed.), *Dakhleh Oasis Project. Interim report.* Toronto: Royal Ontario Museum and Society for Study of Egyptian Antiquities.

REDDING, R.W. 1988. A general explanation of subsistence change: from hunting and gathering to food production. *Journal of Anthropological Archaeology* 7 (1): 56 - 97.

RINDOS, D. 1984. *The origins of agriculture: an evolutionary perspective.* New York: Academic Press.

SCHULZ, E. 1987. Holocene vegetation in the Tadrart Acacus: the pollen record of two early ceramic sites. In: B.E. Barich (ed.), *Archaeology and environment in the Libyan Sahara. The excavations in the Tadrart Acacus 1978 - 1983:* 313 - 326. Oxford: British Archaeological Reports International Series 368.

WASYLIKOWA, K. 1993. This volume: 25 - 41.