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AGHRAM NADHARIF

THE BARKAT OASIS (SHA'ABIYA OF GHAT, LIBYAN SAHARA)
IN GARAMANTIAN TIMES

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Chapter Thirty-Eight

Overview of Garamantian history in the Wadi Tanezzuft

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ABSTRACT: The evidence from the Aghram Nadharif excavation, with other information from fieldwork by the Italian-Libyan Joint Mission, makes it possible for the first time to sketch a history of the Wadi Tanezzuft during Garamantian times. The periodization advanced here, and to an even greater extent its chronological definition, are subject to revision as fieldwork and study progress; however, the general trajectory already seems sufficiently clear. The main phases are: (1) “Formative Garamantian Period”, c. 850 to 400 BC, in the Ajal known from Zinkekra, and in the Tanezzuft still obscure but probably backwards in comparison; (2) “Mature Garamantian Period”, c. 400 to 50 BC, in the Ajal represented by Jarma and the centralized kingdom, and in the Tanezzuft known from the Fewet village, probably belonging to the still-independent Atarantes; (3) “Classic Garamantian Period”, c. 50 BC to 200 AD, the period of Aghram Nadharif, of the expansion of the Jarma kingdom to dominate the Tanezzuft as well, and formal trade relations with the Roman provinces; (4) “Late Garamantian Period”, c. 200 to 550 AD, a period of decline in the Tanezzuft from the beginning of the phase and in the Ajal only after 430 AD. Finally, the environmental context of the rise and fall of the Garamantes is connected with the dendrochronological diagram obtained by Mauro Cremaschi from Tassili *tarut* wood.

KEY WORDS: Periodization; State formation; Centre and periphery; Roman impact; Decline; Collapse; Dendrochronology.

A full treatment of the history of the Garamantes would be out of place in this volume, which is the final publication of only one Garamantian site. However, the results of the Aghram Nadharif excavation provide important additions to the topic, and especially make it possible to better develop this history not only in time, but also in space, by complementing – and in some cases contrasting – developments in the core of the kingdom (the Wadi el-Ajal) and those in a peripheral area such as the Wadi Tanezzuft (Liverani 2004: 196-199). A brief overview of our interpretation of developments taking place from the Final Pastoral to the Late Garamantian phases is presented in Tab. 33.XIII above (in basic agreement with that already presented by di Lernia and Merighi, 2006, table 1).

1. THE TRANSITION FROM LATE PASTORAL TO GARAMANTIAN SOCIETY

The transition from the Late Pastoral (c. 5000 to 3500 bp: Cremaschi and di Lernia 1999) through the Final Pastoral (c. [3500 bp =] 1500 BC to c. 850 BC) to the Formative Garamantian horizon (c. 850-400 BC) represents an important instance of the emergence of important and well-nucleated settled communities (in the oases) out of an undifferentiated (agro-)pastoral society, with the parallel development of a more specialized pastoral component at the margins of the agriculturalist communities (cf. Cribb 1991: 12-14; partly based on Lees and Bates 1974). We can interpret this transition in terms of increased complexity, and more precisely as marking the emergence of “heterogeneity” (distribution of population between social groups), but not yet, or not necessarily, of “inequality” (different access to material and social resources within a society) (McGuire 1983).

This transition was very poorly understood until fairly recently, and even now the label “siècles obscurs”, once applied to the Islamic conquest (Gautier 1952), or to the entire pre-Islamic period (Mauny 1970), or to the entire first millennium AD (Holl 1985: 109), seems better fitting with this particular phase of central Saharan and West African history (most recently Breunig and Neumann 2002) – obviously reinterpreting the “siècles obscurs” as an important evolutionary transition towards a more complex social organization (McIntosh and McIntosh 1988).

Evidence from the core area is particularly scarce, due to the specific features of the Wadi el-Ajal environment (a huge oasis, whose earlier remains have been largely obliterated by heavier later settlement), and to the research strategy developed in the area by earlier and recent missions (Cremaschi and di Lernia 1999). The Wadi Tanezzuft provides better opportunities. On the one hand, the geoarchaeological surveys carried out by Mauro Cremaschi (Chapter 2; previously Cremaschi 2001; 2005; pending the detailed publication of the entire survey) have clarified the modes and timing of the rise of the nucleated oases from a more widespread “Tanezzuft oasis” (already assumed from the distribution of funerary monuments: Cremaschi and di Lernia 2001; di Lernia and Merighi 2006), on geohydrological and palaeoclimatic grounds. These results, though specific to the Tanezzuft area, can be also partly applied – with due qualifications – to the main trends throughout Fezzan. On the other hand, the archaeological research on funerary structures carried out by Savino di Lernia (di Lernia and Manzi eds. 2002; di Lernia and Merighi 2006), has clarified the cultural trajectory and stressed the complexity of the transition, with Late/Post-Pastoral groups interacting (even at a fairly late date) with the fully urbanized Garamantes. The final chapter of *Sand, Stones and Bones* (di Lernia and Manzi eds. 2002: 281-302) remains the best avail-

lable treatment of the subject. The Aghram Nadharif evidence provides substantial confirmation only for the latest phase analysed there.

Additional research and evidence would obviously be welcome, but we can already correlate the emergence of nucleated oases, stable (stone-built) settlements and large cemeteries as three aspects of the same historical phenomenon. The “transitional” period, tentatively dated to between *c.* 1250 and 850 BC, is characterized by the persistence of the “extensive oasis” in the Tanezzuft (almost the whole *wadi* bottom according to Cremaschi: cf. Pl. VI) and presumably in the other major *widyan* of Fezzan; by the emergence of local communities that tend to become more and more settled, as evidenced by more stable encampments (in the Final Pastoral phase); and above all by the emergence of concentrations of burial tumuli (e.g. site 96/129, *c.* 1000 BC, in di Lernia and Manzi 2002: 116-156) within the “extensive oasis” horizon, in contrast to earlier tumuli, isolated and dispersed over the entire territory. According to di Lernia and Merighi (2006), the Final Pastoral phase is characterized by incipient sedentarism, the emergence of elites, funerary treasuring, long-distance trade.

In parallel with evidence on the changing palaeo-environment and settlement system, literary evidence suggests that we should also consider a parallel development in socio-political terms, namely the rise of larger kin-based groups, previously described as “tribes”, although this term is not devoid of ambiguities and implications (Whittaker 1978: 332-334, 343-344). Even in the 13th-12th centuries BC, from the inscriptions of Merenptah and Ramses III describing the massive (30,000 and 20,000 people) Libyan invasions, we obtain a picture of a fairly complex society (O’Connor 1990): tribes (a dozen) and minor clans, “towns”/villages and many cattle (from the “extensive oases”!), a socio-political elite and charismatic chiefs, metal weapons and (a few) chariots.

Obviously this picture refers to the “Eastern Libyans” (Bates 1914 still deserves appreciation) in close contact with Egypt and the Aegean harbours in Marmarica and Cyrenaica. Fezzan, very distant from the more developed culture of Egypt and the Mediterranean basin, may have achieved the same development slightly later, at a slower pace and on a smaller scale. Consider however that, if the Tjemhu and Tjehnu tribes were located along the line of the Egyptian oases, the Meshwesh and Libu pushing them eastwards must have inhabited Libya proper; the Meshwesh probably lived in the Jaghub/Awjila/Sirt area and the Libu in Fezzan. O’Connor (1990) seeks a suitable area only along the coast, but the oases are a far better option.

2. THE ATARANTES AND THE “FORMATIVE GARAMANTIAN” PHASE

The “formative” phase of Garamantian culture can be dated to *c.* 850 to 400 BC, and is primarily known from the Zinkekra excavation (Daniels 1968) and

from Herodotus’ description of Libya based on 6th century information. Note that the escarpment site of Zinkekra, though the only one excavated, is part of a substantial set of similar sites on the southern edge of the Wadi el-Ajal, all along the escarpment of the Messak (Daniels 1973; 1989: 48-49; Mattingly ed. 2003: 137). Besides the permanent villages with stone-built houses, the cemeteries also became much larger and long-lasting than in previous periods (Reygasse 1950; Camps 1961 for early studies; but now di Lernia and Manzi 2002 and Castelli *et al.* 2005 for more recent approaches to the Tanezzuft area). The task of properly exploring the earliest Garamantian cemeteries is as urgent as the task of excavating additional villages.

We can suggest a series of mutually independent (and potentially competitive or even hostile) communities, not yet unified into a “kingdom”, but identified as “peoples”: according to Herodotus these were the Garamantes (in the Wadi el-Ajal) and Atarantes (in the Wadi Tanezzuft), with the more distant Nasamonnes (from the Awjila and Jaghub oases to the Sirt coast) and Atlantes (in the Hoggar). We can adopt the ethnic label Atarantes with reference to this period of independent development in the Tanezzuft. Note that Desanges (1962: 253-254; and still in id. 1989) includes the Atarantes among the “tribus sans localisation” – while the passage from Herodotus locates them exactly half-way between Jarma and the Hoggar, i.e. in the Ghat area (Liverani 2000c; but already Lhote 1958: 218-219).

The botanical remains from the lower levels of Zinkekra demonstrate that the oases were already intensively cultivated in this period, with date palms and cereals of Mediterranean origin (van der Veen 1992). These remains are mostly dated to the period *c.* 850-600 BC (Liverani 2005; based on Mattingly, Edwards & Dore 2002: 10-13; and Chapter 3, § 4). In the Tanezzuft we have no excavated sites for this period, and it is possible that the Final Pastoral tradition was more persistent in this area, as already suggested on the basis of funerary evidence (di Lernia and Merighi, 2006). However, pottery from the earlier phase of the Fewet cemetery (Gatto 2005; Castelli and Liverani 2005: 91) is comparable to that of the late levels of Zinkekra (*c.* 600-400 BC) and implies the presence of stable villages in the Tanezzuft area as well, at least in the second half of the “Formative” phase.

The Garamantian rock paintings and carvings, with the famous representations of horses and chariots, also originate in this period and testify to the existence of a military kin-based elite, with some kind of “aristocratic” ideology of prestige (Camps 1989; 1993; cf. MacDonald 1998; di Lernia *et al.* 2002; and Chapter 36, § 7.1). At this point, besides heterogeneity, we must also assume a good deal of inequality (McGuire 1983), implying higher levels of social complexity. The emergence of this elite seems to be linked to the beginnings of trans-Saharan trade: though the volume of this trade must be assumed to have been fairly modest, the passage of Herodotus (IV 181-185; Liverani 2000c with previous literature) forces us to accept that

the main caravan route from Siwa to the Niger was already known during the 6th century BC.

Summing up, separate tribes or “peoples”, nucleated oases, large cemeteries, fortified hilltop villages with stone-built houses, oasis horticulture, and the opening of the trans-Saharan routes are the main characteristics of the Formative Garamantian period. With reference to the settlement pattern, while the Late/Final Pastoral period was still characterized by a single level of settlements (seasonal encampments), the Formative Garamantian period is characterized by a two-level pattern: fortified hill-top villages (of the kind represented by Zinkekra) and seasonal encampments – implying a functional bipartition of the local groups into pastoralists and agriculturalists resulting from the beginnings of intensive horticulture in the oases.

We can also assume that the denser settlement and cultivation of the nucleated oases brought about a population increase. It is true that in the Pastoral period transhumant groups exploited the entire territory, including the well-watered areas of the “enlarged oases”, whilst with the advent of nucleated oases they were confined to less favourable areas. As a whole, however, the dense settlement of the oases means a certain increase of the total population. Unfortunately it is not yet possible, on the basis of the evidence currently available, to advance more precise estimates for the various periods. Assuming as acceptable our estimate of the Wadi Tanezzuft population in the fully-fledged Garamantian period, as including some 1200 people (Chapter 35, § 2), 25% (i.e. 300) being herders; we can suggest *c.* 500 people for the totally pastoral population in pre-Garamantian times and a mixed (fifty-fifty) population of *c.* 400 herders and 400 farmers in the “Atarantes” period.

3. THE “MATURE GARAMANTIAN” PHASE AND THE RISE OF THE KINGDOM

The “Mature Garamantian” phase (*c.* 400 to 50 BC) is characterized in the Wadi el-Ajal by the partial abandonment of fortified hill-top villages for valley-bottom settlements, and in particular by the transformation of the already existing (?) Jarma into the capital city of a unified Garamantian state – be this a “complex chiefdom” or already a true kingdom. The date of Jarma’s foundation falls within the period 400-300 BC according to the radiocarbon dates currently available (Mattingly, Edwards & Dore 2002: 10-14). The kingdom presumably extended over most or all of the Wadi el-Ajal, while we have no evidence for its domination (already in this period) of the adjoining areas of the Wadi Shati to the north, Wadi Barjuj and Murzuq to the south-east and Wadi Tanezzuft to the south-west. On the basis of the funerary evidence, di Lernia and Merighi (2006) have suggested the idea of a later inclusion of the Tanezzuft in the Garamantian kingdom, originally centred in the Ajal. In the Tanezzuft, the site of Fewet (village) provides an excellent idea of the local settlement and community structure

during this period: a community of three or four extended families, each in its own fortified compound. The site is still under study, but at first sight seems quite different from the Wadi el-Ajal tradition, pointing to political separation as the most probable solution.

In the Wadi el-Ajal, the population increase, the need for a centralized authority and the increase of available wealth were probably connected with technological and economic advances: (a) the intensification of horticulture following the introduction of the *foggara* network (Mattingly and Wilson 2001; cf. also Shaw 1984), presumably from the Egyptian oases (Wuttmann 2001; Cruz-Urbe 2003), (b) the intensification of trans-Saharan trade, following the introduction of the dromedary and (c) a modest iron-working activity. Although the internal chronology of Garamantian rock art is not yet understood in detail, we can guess that scenes of oases and caravans (with the first introduction of the dromedary) may belong to this phase. At the very end of the period, Roman sources describing Cornelius Balbus’ expedition provide evidence for a unitary Garamantian kingdom extending also to the Wadi Shati and perhaps throughout Fezzan.

We can also assume that the Old Libyan writing used in Garamantian territory was a novelty of this period, most probably in imitation of the fairly similar (albeit not identical) Old Libyan writing systems then in use in the more northerly territories. Examining the geographical distribution of the northern inscriptions (Ghaki 1995; Camps 1996), and considering their chronological range (dated inscriptions go back to the 3rd and 2nd centuries BC), it seems probable that those alphabets were created in the 3rd century BC by the Early Berber kingdoms of Mauritania and Numidia (from Massinissa to Juba II) to compete with the Carthaginians and Romans. It is therefore reasonable to assume that the Garamantian variant is in turn a slightly later (1st century BC?) and secondary imitation. Note that the similar phenomenon of Meroitic writing underwent a parallel development (lastly Edwards 2004: 176-179): originating in *c.* 150 BC for similar reasons of national self-identification and prestige, and going out of use in *c.* 350 AD.

Summing up, again with reference to the settlement pattern, in the Mature Garamantian period we have evidence for a three-level pattern: the “capital” settlement of a cantonal state (not identified in the case of the Tanezzuft, but most probably Ghat); the village community of the kind represented by Fewet; and seasonal encampments. The more advanced development of the Wadi el-Ajal as compared to the Wadi Tanezzuft may be (at least in part) connected with different systems of water management: *foggaras* require a more centralized (“bureaucratic” in Chambers’ 1980 words) organization, while wells and springs can be managed by individual households or local communities. Note that a three-level (or tiered) settlement is commonly considered the mark of an “early (or archaic) State”, although Flannery has more recently (1998: 16) suggested that a three-level pattern still belongs to a chiefdom, and only a four-level settlement pattern can be ascribed to a state.

4. THE “CLASSIC GARAMANTIAN” PHASE AND THE IMPACT OF THE ROMAN EMPIRE

The impact of the Roman Empire (Chapter 36, § 7), in addition to internal developments, brought about an increase of the burden of the state structure on tribal communities. This is the “Classic Garamantian” period (c. 50 BC to 200 AD), best documented by excavations in the town and surrounding cemeteries at Jarma and related sites (like Saniat Jibril). The Late Garamantian level of Jarma (level 6) and the abandonment level (level 5) can be dated to c. 200-450 and 450-500 respectively (Mattingly *et al.* 2002: 14), while dates from the earlier Garamantian levels (levels 7-10, Mattingly *et al.* 2001: 136-139) have not yet been published. Several of the *qusur* in the Wadi el-Ajal were also founded in the Classic Garamantian phase, although they continued to be used in Late- and Post-Garamantian times.

The first and major occupation of Aghram Nadharif belongs to this phase (c. 50 BC to 150 AD) and marks a notable innovation in town planning and domestic architecture (in comparison to Fewet). The new “citadel” is not an isolated instance, since the Imassarajen and Adad castles were also founded at the same date, giving the impression of a genuine programme. This sudden development in the Tanezzuft can be explained as a consequence of the valley’s inclusion in the enlarged Garamantian kingdom centred on Garama/Jarma. In this phase the Garamantian culture (and presumably kingdom) also extended south-east to the Wadi Barjuj, the Wadi el-‘Utba (Sharaba, Qaşr Mara, Tsawah) up to Murzuq and beyond, to Gud-duwa and Zawila (Edwards 2001). The Wadi Shati to the north is poorly known, but must also have formed part of the Garamantian kingdom.

Border organization (with the desert castles, also built during this period) and possibly trade control, provide an image of a fully-fledged kingdom, and Roman sources speak of a king (*rex*) of the Garamantes and formal diplomatic relations and treaties (Chapter 36, § 3). The ashlar masonry and rich and exotic grave goods in the “royal” burials near Jarma are totally new to a central-Saharan culture, and imply a notable degree of centralization of military, diplomatic and commercial revenues. We do not know if internal taxation and formal administration existed, but writing did exist, although it is attested only in rock carvings¹. Iron working had already been introduced. A truly complex society (based on intensive agriculture and long-distance trade) was at work, carrying out a policy of aggression in the entire Saharan area and up to the Mediterranean coast – something that can be hardly paralleled by later similar polities in the Saharan desert.

Relations with Rome underwent two distinct phases (Chapter 36, § 7). The first phase, from Cornelius

Balbus’ expedition (20 BC) to Valerius Festus’ treaty (70 AD), was mostly hostile in nature, the flourishing kingdom of Garama being willing and able to intervene in Tripolitania, seizing the opportunity presented by Gaetolian and Tacfarinas revolts, and the conflict between Oea and Leptis. The second phase, from the peace treaty to the building of the Severan *limes tripolitanus*, was peaceful and therefore poorly documented by Roman historians. Throughout both phases, trade relations between Garama and the Roman provinces remained lively.

As for the settlement pattern, the Classic Garamantian period is characterized by a four-level pattern: the regional capital (Jarma); the oasis citadels (best represented by Aghram Nadharif); the village with castle (best represented by the Imassarajen and Adad sites); the seasonal encampments of pastoralists (and possibly peasants’ huts in the oases). In anthropologically oriented archaeology, this is no doubt a State (Flannery 1998).

Apart from paralleling the Roman Empire, the development of the Garamantian kingdom also parallels that of Meroe (Edwards 2004), as part of more general historical trend. More specifically, it has long been noted (e.g. Ayoub 1968: 61) that the pyramid-like burials in the Khara’iq cemetery near Jarma seem to have been influenced by the (far more impressive) Meroitic pyramid burials, especially those of the later period, built in mud bricks and no longer in stone.

5. THE “LATE GARAMANTIAN” PHASE AND THE DECLINE OF THE CENTRALIZED KINGDOM

For reasons not yet fully understood, the building of the *limes tripolitanus* by Septimius Severus around 200 AD marked the beginning of a troubled period in the north, and the decline or even interruption of Roman imports in the south. The evident crisis of Aghram Nadharif and the Akakus castles in around 150-200 AD, followed by partial recovery in the 3rd-4th centuries, may be connected with a possible interruption of the Wadi Tanezzuft’s political dependence on Garama. In Jarma, by contrast, the period c. 250-430 is the best represented, with no apparent evidence of a major crisis. However, the recurrent nomadic raids against the Roman provinces would be easier to understand if the hegemonic role of the Garamantian kingdom was fading away.

The Hoggar region, too, hardly included in the extended Garamantian kingdom of the “Classic” phase, seems to enter a phase of development in the “Late” phase. The diffusion of chariot representations, writing and monumental burials are important proxies

¹ The Fezzanese variant of Old Libyan writing, probably introduced to the Jarma area during the “Mature” phase, may have reached the Akakus/Tanezzuft area only in the “Classic” phase, following political unification, to disappear in post-Garamantian times, lasting some four centuries (c. 50 BC to 350 AD) at most.

for a spread of Garamantian culture (Maitre 1976: 759-766) and the Tin-Hinnan monument (Camps 1965; Camps 1997; Baistrocchi 1990; Beltrami 1996) indicates complex socio-political developments in the area. The Tin-Hinnan monument was originally (3rd century AD) a fort, and the date of the burial in the second half of the 4th century (Grébénart 1994; Camps 1997) makes it certain that it belongs to the Late Garamantian period.

With the early 5th century AD, generalized collapse affected the whole Garamantian territory, this time including Garama and its surroundings (Saniat Jibril, late frequentation of Zinkekra, etc.). Short-lived episodes of limited reoccupation (both at Jarma and Aghram Nadharif) in c. 450-500 do not affect the general trend. The peripheral state-run castles that in the Akakus area had ceased to exist from the first crisis, in the Wadi el-Ajal now became the seat of extended families. Deprived of their economic elite and political organization, the local communities most probably reverted to a level of kin-based “egalitarian” organization, possibly until medieval Islamization. The small kin-groups, no longer restricted by the “integral power” of the state (in Blanton’s 1998 words), were free again to pursue their own strategies.

The period remains poorly known, but the impression of increasing disruption of the Garamantian kingdom and of inter-regional trade is most probably correct. In the Tanezzuft the settled population seems to decline, with possible increase of full-time (camel-using) nomads. This trend seems widespread, to judge from the increase in nomadic raids on the northern margins of the desert (Mattingly 1983).

We should remember that Ayoub (1966-67) has suggested a long and late chronology for the royal dynasty at Jarma, c. 120 to 560 AD, based on the assumption (that Ayoub, a Sudanese, mimicked from Reisner’s study of the Napatan sequence) that tomb size is proportional to the length of reign. In the case of Jarma, however, even assuming Ayoub’s sequence to be correct (but the absence of burials for the period 50 BC to 120 AD makes this highly improbable), it is quite clear that the size of tombs simply declines over time – so that the “profile” of the sequence paints the portrait of a dynasty that had been once wealthy and powerful, and may have survived in an impoverished state (perhaps for another couple of centuries) in a different context.

The last historical mention of the Garamantes relates to their adhesion to Christianity in the mid 6th century AD (Rebuffat 1979: 229 with fn 12). At Tin-Hinnan in the Hoggar, a radiocarbon date 1480 ± 130 bp (calibrated: second half of 6th century BC) may also mark the end of the site.

6. EXPLORING COLLAPSE

The cause(s) of the collapse have partly been discussed with reference to trade (Chapter 37, § 8). In general terms, we can suggest natural factors (climate

worsening) and historical factors, the latter either fairly localized or belonging to a broader horizon. Ayoub (1968: 79-81) was already able to hypothesize climatic factors, general historical factors (the decline of the Roman empire), local historical factors (the arrival of camel-breeding tribes), without advancing a more specific solution. Note that the parallel phenomenon of the “Post-Meroitic Transition” (Edwards 2004: 182-185), taking place in the same period with similar characteristics (state collapse, end of royal cemeteries, end of local writing, squatters’ occupation of abandoned public buildings, etc.), seems to have been a highly complex and not yet satisfactorily understood process.

We cannot enter here into the complex problems of the interaction between natural and human factors: it would be overly simplistic to contrast these with one other, whilst their interaction can generate quite different scenarios in different historical instances (Barker 2002). From the historian’s point of view, natural (in particular climatic) factors are merely a background condition, a premise (albeit an important one), with specific adaptation strategies being our real concern.

Natural factors can be evaluated first, as is usual when dealing with prehistoric periods, but not yet common when dealing with “Roman” times (Shaw 1974; 1981; Burns and Denness 1985). The old idea of a progressive worsening of the climate (decline of rainfall and subsequent desertification) from 5000 bp has been refined by more recent research. First, the worsening is not progressive but punctuated by arid spells; and second, the underground water reserves in the mountains (the Tassili, in the case of the Wadi Tanezzuft) provided sufficient water over many centuries of minimal rainfall. Most recently a very precise set of data has been produced by Mauro Cremaschi (Cremaschi *et al.* 2002; di Lernia and Merighi 2006; but cf. now Cremaschi, Pelfini and Santilli 2006) on rainfall quantities, based on dendrochronological diagrams from Tassili cypresses (*tarut*).

An earlier non-calibrated version of the diagram (Cremaschi 2003, fig. 1.12) provided the impression of a meaningful historical development: fairly abundant rainfall in the period from c. 2500 to c. 2300 bp, then a progressive decrease in the period from c. 2300 to c. 2100 bp, and a definitive aridification c. 2100 bp and until today. Taking into account an approximate half-a-century *décalage* due to calibration, we would have the Formative Garamantian period falling in a humid phase c. 500-300 BC, the Mature Garamantian period coincident with the decrease phase c. 300-100 BC, and the entire Classic-Late periods after aridification (starting as early as c. 100 BC). In this case, the correlation of climatic conditions with historical developments would require a positive explanation for the fact that, while the earliest developments of the Garamantian civilization did profit by favourable conditions, its most impressive developments took place in the frame of a declining and finally severe environment. Two possible explanations can be advanced.

The first (noted by Cremaschi, Chapter 2) is that the amount of rainfall on the Tassili, which determines the width of the rings, does not coincide with available un-

derground water, which is far longer lasting in time. In other words, whilst the presence of surface water in the *wadi* bed is directly affected by rainfall, the water table in the oasis is not. We can imagine a still permanent (or semi-permanent) water course in the Tanezzuft during the Formative and Mature Garamantian periods, but no longer in the Classic period – whereas the water table feeding oasis agriculture underwent a more progressive (and delayed) decline. To my mind, this means that the agricultural economy of the former periods was still partly related to the exploitation of the *wadi* bed, while the agriculture of the later period was only possible in the oasis.

The second, properly historical, fact is that the decrease in rainfall in the Classic Garamantian period brought about a need for adaptation to new conditions. The evidence suggests that the first adaptation took the form of an intensification of oasis exploitation, an altered balance between pastoralism and agriculture, and an increase in trade activities. Only later do we have an adaptation in terms of the collapse of the more burdensome “state” and “urban” structure and a reconversion to a looser “tribal” (and camel-breeding) socio-economic structure.

A more careful elaboration of the *tarut* diagram, however, has been recently published (Cremaschi, Pelfini and Santilli 2006). According to the new diagram, in terms of calibrated BC/AD dates, a long period of alternating rainfall lasted from *c.* 1500 BC to *c.* 450 AD, followed by a decline period *c.* 450 to 750 AD. This second elaboration, obviously much more reliable in technical terms, has less precise historical connections: neither the rise nor the decline of the Garamantian civilization correspond to any meaningful climatic variation, while the “final” aridification arrived when the Garamantian state had already collapsed, and can provide the conditions for the subsequent (post-Garamantian) adaptations.

We cannot ignore the climatic evidence providing the environmental framework for the actual historical phenomenon. However, the historical phenomenon is subject to a delay in time, and to the selection of specific (and alternative) strategies. The collapse of the Garamantes should in any case be analysed as a matter of adaptation to new climatic conditions, and not simply as their automatic spin-off.

Obviously, climate change is especially important in a highly sensitive region like Fezzan, while it remains less decisive at more temperate latitudes in the Mediterranean basin. The Roman cities in Tripolitania suffered a significant economic crisis (Dore 1988; already Courtois 1955: 65-79; Goodchild 1967), and had to face nomadic intrusions (Mattingly 1983) from the desert. The statistical treatment of the oil amphorae demonstrates that the mid-4th century crisis of Tripolitania was not felt in Africa (Carthage), which resisted until the second half of the 6th (Panella 1986 on *amphorae*; also Carandini 1983 and Fentress and Perkins 1988 on the *sigillata*). We must therefore distinguish between a precocious crisis of the Tripolitanian cities due to their direct involvement in trans-Saharan trade; and

a later more general disruption of the Roman Empire and its markets.

However, the reverse effect must also be taken into account: the political and economic crisis of the Roman Empire also brought about the crisis of peripheral “client” kingdoms, with the loss of their major trading partner. The climate factor forms a background to this generalized crisis: in different ways, it made life harder in the central Sahara, and perhaps was also responsible for directing new “barbarian” peoples towards the Mediterranean basin.

It is possible, however, that the impact of climate change, and the subsequent cultural adaptations, did not affect total population numbers but rather settlement patterns. The emphasis may have shifted back from intensive horticulture to pastoralism, from crowded life in densely settled villages to the open spaces of nomadic encampments (cf. the theory of Knijt 2000), from insertion into a trans-regional network to a more local activity of transhumant goat and dromedary breeding. Only with the Early Islamic period will the pendulum swing back towards trans-Saharan trade and caravan cities.

The Nubian kingdoms underwent a parallel development: the earlier Napatan kingdom (760 to 270 BC) is chronologically parallel to our “Formative” Garamantian period; and the Meroitic kingdom (270 BC to 350 AD) to our “Mature” and “Classic” Garamantian periods. Although on a different scale (the Nubian kingdoms having a broader and wealthier background), the parallelism of political developments clearly indicates that local events must be framed in a wider (North African) scenario and its relations with developments in the Mediterranean system.

The later history of the Wadi Tanezzuft is not our concern here (for a history of Fezzan from the Islamic conquest to modern times cf. Thiry 1995: 15-291; more summarily Lethielleux 1948: 9-24). The area seems to have remained rather depressed until the rise of Ghat as a main caravan city in “Early Modern” times (Thiry 1995: 380-388). Yet the memory of formal kingdoms and flourishing cities in pre-Islamic times persisted in local tradition, fed and renewed by the impressive ruins still visible. The passage devoted by Idrisi (1150 AD) to the land of Waddan (Levtzion and Hopkins 2000: 122) could equally be applied to our Aghram Nadharif:

«The land of Waddan... in the past was the best populated and cultivated land, ruled by a hereditary kingship emanating from its own people, until the advent of the Islamic religion. The inhabitants feared the Muslims and in their flight they penetrated deep into the desert, where they dispersed. At the present, only the town of Dawud remains there, which is now in ruins, where only remnants of the Sudan lead a disturbed way of life in harsh conditions at the foot of Jabal Tantana.»

Other descriptions of abandoned cities can also be found in Idrisi (*ibid.*: 120 and 125). Obviously, the idea that these ruins originated with (and resulted from) the founding event of the Arab-Islamic conquest is normal in aetiological legends. In fact, the collapse of the old kingdoms preceded the advent of Islam by some three centuries.

