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ON THE STUDY OF LIBYAN AND SAHARAN STONE STRUCTURES AS A POSSIBLE MEANS OF RESEARCHING EARLY DESERT TRADE AND CONTACTS

If the descendants of prehistoric Berbers, or white Neolithic people of Capsian tradition, known to the Romans as Garamantes and Gaetulians (which latter may have been divided into three tribes (Law, 1978, 143)), have provided much leaway for speculation (Mercer, 1976, 65), it is difficult to accept that these alone, first chariot drivers and later intrepid horsemen, (Camps, 1974a, 347) will have built the large cultural/funerary monuments, some of which, in the Algerian Tassili-n-Ajjer, we are informed, reach huge dimensions.

Perhaps structures elsewhere in the Sahara are even larger. What is quite certain is that very little attention has been paid to them in recent years, especially those of the central Sahara, where, paradoxically, the existence of a number of differing types has long been known, i.e. by Kilian (1929), Monod (1932), Pervès (1945) and Reygasse (1950), to name but a few.

Faced not long ago with a date of 2440 BC for a drum-like "choucha" of Adrar Bous, northern Niger (Clark, 1973, 293), some prehistorians may have taken time off to consider the implications of structures (other than conventional tumuli, which can be age-old) built well before the apparent arrival of the horse on the scene.

As will be apparent throughout, the following remarks represent an attempt by prehistorians to interest themselves in – and also to learn from – the writings of their historical colleagues who deal with better-documented eras. It is hoped, however, to succeed in introducing some new ideas which may stimulate further research.

Whether or not there existed trans-Saharan trade during the first millenium BC, in the sense that goods were carried from one side to the other, it seems generally agreed that contacts will have occurred (cf. Law, 1978: Mauny, 1978). We shall have a good deal to say on the possibility of trade, even if some of it was clearly not trans-Saharan in the literal sense.

Take, for example, the modern salt caravans coming down from Amadror, Ahaggar (also known as Hoggar), to Niger (Keenan, 1977) or the annual "azalai" between Taodeni and Timbuktu, Mali: these do not effect a complete Sahara crossing. There will have been similar cases long ago, such as Garamantian dealings with the coastal settlements, although it is questionable whether a fine distinction is possible between their commerce with, and looting of, Teda/Tibu areas. Speaking as though to confirm contacts between these two human groups, Ziegert (1967, 303) evokes the need for more archaeological investigation, because it would be possible to write the history of Fezzan, which could have been of some importance for the cultural connections between the Mediterranean and the southern areas: in Tibesti especially he found some obvious similarities. If this situation is being steadily remedied nowadays, at least in the Fezzan (Daniels, 1969–70 onwards: 1970), the same is hardly true for many former French-occupied areas.

Meanhwile speculation has been rife as to the extent of contacts between the Mediterranean coast and the River Niger, even though few may deny the lack of hard evidence relating to actual commerce. If it should be that trans-Saharan trade did have its origins in territory now part of modern Libya, there are likely to have been considerable population movements during the first millenium BC (Clark, 1978, 86) and it is difficult to see how regular organised trade would have functioned under such circumstances.

Yet our own twentieth-century outlook may render us incapable of understanding – or, at least, of interpreting correctly – even some last-century accounts. Take the case of Caillié (1930, II, 66):– "The Tooaricks have, like all Mahometans, several wives. . ." Earlier, apparently speaking of Timbuktu, Leo Africanus (1600, 187), wrote that "all the women of this region, except maid-servants, go with their faces covered." Modern Tuareg are monogamous and their ladies are not veiled, even at Timbuktu. When written records cannot be taken literally, then the problems become enormous.

Prior to taking a look at the distribution of some of what may be the last resting places of despots with an interest in Saharan commerce, it is worth looking at a number of past opinions of historians about trade and contacts. Views expressed appear to vary a great deal.

The petroglyphs or rock engravings of horses and chariots in the Adrar-n-Ifoghas, Mali, are held by Norris (1975, XIII) to suggest that Tuareg occupied the central Sahara in the first millenium BC, reaching the Sudan by horse and later adopted the camel. Swanson (1975, 582) finds the suggestion of chariot routes, indicated by locations of Saharan paintings, startling: and so it would be, if only paintings were involved. The existence of rock carvings, apparently far outnumbering the paintings, seems to have been overlooked.

Law (1967, 198) sees gold coming from the Sudan, up the Niger and along the "chariot-route" to Abalessa, Ahaggar, where it presumably found its way into the "Tomb of Tin Hinan". The same passage records that near the skeleton of this mysterious "princess" were found pieces of gold leaf bearing imprints of coins of Constantine I. These remarks are presumably founded on a belief that the building was erected to dominate and secure a Garamantian route leading south-west to the Niger.

In fact Camps (1965, 74) was previously able to find nothing allowing him to suppose that the monument had been constructed for any purpose other than a funerary one: the burial was in the south-western part of the structure, with a number of seemingly useless rooms towards the north and eastern sides. The parallel drawn with "monuments à chapelle" further north (cf. Camps, 1974b) appears far-fetched. Nor are we entirely happy with the supposition of the existence of a corridor linking room 2 and room 5 in a "déambulatoire" context. The plan of the building made by Reygasse (1950) may be a somewhat confusing document. (Fig. 1)

Assuming that the relations of the Garamantes with the Sudan were as much predatory as commercial (Law, 1967, 198), with the evidence of Herodotus and Lucian that they could acquire black slaves and ivory without having to pay for

them, it is interesting to consider whether or not they needed to go all the way across the Sahara to obtain either of these commodities. Perhaps slaves could have been procured much nearer home, i.e, from the Teda/Tibu, or "Troglodyte Ethiopians" (Law, 1967, 188), in Carthaginian times: in the Roman period, slaves from Egypt as well as from the Fezzan are mentioned (Law, 1967, 196).

If the north African elephant became extinct by the fourth century AD (Mauny, 1978, 204), the journey of Julis Maternus to Agisymba (ca. 90 AD) may have been made so as to enquire about further supplies of elephants: he seems likely to have reached the western borders of Tibesti (Mauny, 1978, 300). A possible trade along the route from the Mediterranean via the Fezzan towards Lake Chad might have been circus animals, ivory, hides and a few slaves (Mauny, 1978, 290).

If, as seems likely to be the case, in the very broadest outline, the large structures on which our interest is centred prove to have been built in the 1500 years immediately prior to the arrival of Arabs (Mauny, 1976a, 166), then it behoves us to concentrate, so far as is possible in the light of existing evidence or theory, on the first millenium BC. A recent paper has tried to show that the so-called myth of trans-Saharan trade in Roman times (Swanson, 1975, 584) was due to three logical assumptions. The first was that the prosperity of Roman Africa must have been partly due to trade across the Sahara. Next was the demand in Roman Africa for West African products, which must have stimulated an effort to satisfy it. Last was the notion that the Romans had contact with desert peoples able to serve as intermediaries, thus gaining access to goods from the Sudan.

The source of the considerable wealth of Roman North Africa seems, however, to have been due to cultivation of barley, olives and wheat (Swanson, 1975, 584) rather than to any items transported northward from Black Africa: it is recorded that by 350 AD Africa had become virtually the sole source of grain for Rome.

So far as mineral resources are concerned, we can disregard Numidian marble (Swanson, 1975, 589) and concentrate briefly on the "carbuncle". It does appear strange that the Romans should have obtained it from the Garamantes, who in turn got it (according to Pliny) in the territory of the Nasamones, lying to northward of their own Fezzan zone. Whatever the carbuncle was, it came to Carthage through the intermediary of the Garamantes (Law, 1978, 127) and was re-exported to the Mediterranean world at vast profit. Mauny (1978, 204) records that the exact provenance of the carbuncle is not known.

What it seems not to have been, under any circumstances, was an emerald, as Monod (1974) has been to some pains to demonstrate. It appears that attractive clear green amazonite crystals have turned up in the Saharan Neolithic, with one large source being found in Garamatian territory: Monod located this site at Egueï Zoumma.

Weis (1967, 447) has noted that the "emeralds" occurring in Punic graves could well be identical with the amazonite from Monod's north-western Tibesti site, adding that Tubu use this material to-day for jewellery. We ware unaware whether anyone has yet physically compared, or analysed, both Tibesti amazonite and Punic "emerald" grave-goods. Roman carbuncle trade is recorded (Law, 1967, 191) direct

with the "Trogodytae". apparently in the mountains of Tassili-n-Ajjer: compare Swanson (1975, 599, note 120) for further uncertainties. J. K. Anderson has kindly mentioned (19 July 1979) "carbuncles" as a product of northern Nigeria, as well as the possibility of their passing northwards at the end of the Bronze Age. It is hoped to report further in a subsequent paper.

Wild animals abounded, according to Vitruvius, writing in the late first century BC. Many made their appearance in amphitheatres, providing sport and thrills for the onlookers, although some beasts had other uses. The elephant, for instance, must have been – to an uninitiated foe – just about as fearsome as a modern armoured fighting vehicle, while it tusks were also prized. During the last millenium BC it seems that climatic conditions underwent a period of improvement (Gabriel, 1977a, 66), allowing even elephants to live in the mountains and in the great plains. Whether rhinos could also exist there appears less certain: what is known, however, is that the two-horned rhino (Diceros bicornis) appeared on Roman coins just about the time that Julius Maternus undertook his journey down to Agisymba (Mauny, 1970, 124). From then on, the rhino was to cause a sensation in the arena, so that it is possible that rhinos were brought up through the desert – however difficult a task this may have been – to satisfy the Roman craving for sport.

There seem likely to have existed similar rhinos in the Atlantic Sahara in the last half of the first millenium BC, although we know not their function, if any, in relation to man, except as beasts to be hunted. If copper working around Akjoujt, west Mauritania, can be dated to around 700 BC (Lambert, 1975, 6), rock carvings not far away show, in one case, a metal axe in seeming association with a giraffe (Haas, 1977, Taf. IX). Another scene shows such an axe together with a small rhino (Milburn, 1973, 202, no. 14), while apparent Moroccan examples are shown by Simoneau (1971: 1976a).

We need not consider the camel here, since this was introduced later on, as far as can be determined. The reference to a camel-driver in an inscription at Dougga, Tunisia, in around 150 BC, is an early one and camels probably spread into the Sahara only after the start of the Christian era (Mauny, 1978, 288). We shall later have something to say on the subject of the ass.

If it is quite certain that the Carthaginians employed slaves and that they were a cruel and uncompromising people in the manner in which they treated their enemies, the actual percentage of slaves brought from the Sahara remains unknown: it is likely to have been minute. If texts are silent on this score, it will not, for once, be due to a Carthaginian wish for secrecy on trade matters, but simply due to the likelihood that the theme will have been supremely unimportant. Or so it would seem.

Yet it is interesting that one author (Harden, 1963, 165) considers that regular caravan routes existed between the north coast and Nigeria, as well as between Egypt and Mauretania, and that is was the Phoenicians who passed on the products of the area – "above all perhaps slaves" – to the civilized Mediterranean world. Mauretania, in this context, can hardly refer to the territory of modern times. Nor, as this text goes to press, have we been able to compare remarks in the latest edition

of this classic work on the Phoenicians. (Apparently no change. D. B. Harden, in litt., 22 Oct 79).

The fact of negroid skulls having been found in Punic cemetraries led Law (1967, 188) to suppose that these might easily have come from the Garamantes, who could obtain slaves by raiding "Troglodyte Ethiopians". Bovill (1968, 21) has further intimated the presence of very dark-skinned Africans, perhaps negroes, in the army of Carthage which invaded Sicily in the fifth century BC. He further considers that the Garamantes cannot have hunted the Troglodytes except in order to enslave them.

The background to the whole situation may, nevertheless, be rather different. While origins of the Tibu/Tubu of Tibesti (who call themselves Teda) remain obscure, a modern population dwelling in caves is unknown and cave-dwellings have not been discovered (Hagedorn, 1966, 59–60). It is thus difficult to assert descent from the Troglodytes of Herodotus' day, who were "exceedingly swift of foot." Yet a possible link between old and modern days may be shown by the report of Lyon (1821, 254–255), whereby the "Tibboo of Borgou . . . run with great swiftness, and when endeavouring to escape, use many successful and ingenious feints. The bare sight of an Arab" (a potential slave-trader), "especially a mounted one, is sufficient to put a number of them to flight."

If Borgoo can be identified with the modern Borku, this would imply a trade which, if it existed, can be counted as virtually trans-Saharan, in the full meaning of the term. Yet we do not know whether these "Tibboo" have always lived in Borku, whether they made huge journeys nor, above all, whether they or their ancestors have any record of living in caves. A glance at the current situation may help to foster some hypotheses.

An extreme example of human beings (and their herds) able to live permanently in zones where effective rain falls only once in 2–3 years at any one place are the Teda of the Libyan Desert (Cloudsley-Thompson & Duffey, 1975, Part I, 125). They will, until recently, have wandered in small groups across hundreds of kilometres of virtually lifeless country, accompanied only by a few sheep or goats. Effective rainfall occurs on a average of only once in 40 to 50 years, except on certain patches of high ground, where it can come slightly more often. Barth is reported as having been impressed by the Tibu ability to cover vast distances in the desert, either alone or in small groups, within a very short time (Hagedorn, 1966, 59). Their amazing efficiency on journeys and their love of travel can be seen even to-day. As to eating snakes and lizards and other reptiles and speaking a language like the squeaking of bats (Herodotus), compare Peel (1942, 83 & 85) for similar modern habits.

Apart from this, they seem to have come into conflict with the Tuareg from early on (Hagedorn, 1966, 60), competing with them in raiding and in the plunder of caravans. Is it possible that one of the causes of the evacuation of the town of Assodé, on the eastern fringe of the Aïr Mountains, Niger, was its lack of security from such Tibu raiders, even if these needed to cross the fearsome Tenere Tafessasset desert from Tibesti?

One may surmise, rightly or not, that Garamantes could have been subject to raids

by the ancestors of the Tibu, not only while engaged in their own travels south, but also within the Fezzan itself. May some of these raids have been born of dire necessity, something which is often overlooked but which is typical of certain such ventures, occurring even during the present century (J. Spruytte, personal communication)? And was the speed of execution likewise allied to total lack of planning, so that failure was a foregone conclusion?

If such raids took place, they would have caused much enmity: a good way to discourage them would have been to capture the fleet-footed assailants. However their Garamantian captors would have needed to remove them very far away from their homeland and to ensure that they ended up living under circumstances where they had no chance of escape. Perhaps they were simply murdered upon capture, as a matter of pure expediency.

The question of Tibu/Troglodytes being negroid or not, during the first millenium BC, is hard to fathom, although Mordini (1935, 355) postulates the probability of narrow relations between them and the ancestors of the Tuareg, with later contact with Sudanese negroes. Mauny (1978, 337) calls them a negroid people with some Berber admixture and is apparently referring to Teda of protohistoric times.

A source of negro slaves may have been the fortified villages along the Tichitt-Oualata escarpment in south Mauritania (Mauny, 1951). Dates of between 1400 and 380 BC are available (Mauny, 1978, 275) and one may surmise friction between sedentary negroid stock in the villages and Libyan-Berber pastoralists, these latter forced ever southwards by a combination of climatic change and the sad results of their own depredations on their environment in previous centuries. However it seems probable that slaves taken by the northern intruders – accounting for the fortification of the villages – will have been used for domestic purposes (Mauny, 1978, 339) and that distinction must be made between this practice and a later one, namely that of obtaining slaves for the trade to north Africa.

That ancient commerce in African gold has inspired profound speculation is an understatement: quite an enormous amount of time and thought has been invested in the question. Yet perhaps the answer, in terms of how and where the Carthaginians obtained it – possibly from western Africa – is simpler than we imagine.

Taking the case of the silent barter on the coast (Herodotus) and giving full credit to the remarks of Mauny (1968, 31–32), to the effect that gold from the Atlas may have been involved, rather than that of the Sudan, it is also interesting to note the supposition that the island of Cerné may be identified with that of Mogador-Essauira, Morocco (Mauny, 1976b, 329). Persuasive arguments in favour of this notion are that archaeology had discovered nothing further down the coast (Mauny, 1968, 34) and that it would have been impossible for early navigators to sail back, once they got below the level of Cape Bojador: an overland trip would have been obligatory (Mauny, 1970, 93: 1976b, 328–329). If not all authorities would accept the problem of sailing northwards (Law, 1978, 135), here, surely, is an excellent fact-finding project to be undertaken by enthusiastic and well-trained members of an enterprising body such as the Scientific Exploration Society.

Learning also that two recent investigations at Herne (off the coast of the Atlantic

Sahara and sometimes held to be identical with Cerné) have located no traces of occupation (Th. Monod & M. Pellicer, personal communication, 1978) and also accepting the assumption of Law (1978, 139) that the ultimate source of the gold is presumably to be found in the alluvial goldfields of Galam and Bambuk, around the Upper Niger and Upper Senegal, it can be stated that an overland trade from these regions up to Mogador would constitute a prima facie case of trans-Saharan commerce.

Mogador is not in the Sahara and later Carthaginian shipment of gold back to base would in no way detract from the magnitude of such an achievement. The earlier remarks of Law (1967, 189) on the chances fo Pharusii horsemen bringing gold to Cirta (Constantine) may presumably be explained by Carthaginian gold trade being by this time (late first century BC) firmly bound up with Spain (Swanson, 1975, 596), West African trade having been abandoned several centuries earlier.

Nonetheless, Pharusii and Mauri (whoever the latter were, if their name was as imprecisely-employed as nowadays) may have had access to African gold, although one suspects that they could have obtained it from Spain.

There is seemingly no evidence for trans-Saharan ivory trade in Carthaginian times (Law, 1978, 127), since a plentiful supply is supposed to have existed at this period in north-west Africa. Compare Gabriel (1977a, 66) for the elephant living in the eastern central Sahara during the last millenium BC. Swanson (1975, 597) considers that North Africa exported appreciable quantities in the first four centuries AD, a situation apparently not agreed by Law (1978, 127), who also states that the operation of the trans-Saharan caravans was normally left to the Garamantes, but that Carthaginian merchants may occasionally have travelled to the Fezzan.

On this possibility we have a charming story (Frison-Roche, 1975, 203–205) relating to the discovery of a rock carving depicting the Seal of Solomon, allowing a French journalistic party to deduce that an official in the service of the great king had passed, en route to the Sudan. The fact that the symbol is actually the Star of David does not detract one iota from the suspense. The Garamantes are also mentioned as being "des Noirs évolués": that they were Negroes had also been suggested by Murdock (1959, 129), in contrast to the illustrations of Daniels (1970), showing white-skinned "Garamantes".

However, as mentioned above, the relations of the Garamantes with the Sudan can have been as much predatory as commercial (Law, 1967, 198) and slaves and ivory could have been taken without payment: whether there was any need to go quite so far south is another matter. Remarking that no ancient authority actually states that caravan trade either from or via the Garamantes existed, Daniels (1970, 43) then notes a remark by Pliny, to the effect that elephants were produced, inter alia, by the "land of Aethiopia and the cave-dwellers." Further items which might have made up the caravan trade are given as gold-dust, precious woods, ebony, skins, ostrich feathers and eggs, and possibly slaves. Daniels also states (1970, 44) that gold was always in short supply in the Roman Empire, there being a continual drain of it to the East in return for imported luxuries. This is in contrast to the remarks of Swanson (1975, 593–596).

To indicate the degree of diverging opinions available and to try to round off the speculation as to actual trade items which might have been carried totally or partially across the Sahara, we shall cite Weis (1972, 410), who asserts that the most important Carthaginian harbours like Leptis Magna, Oea Sabratha, Carthage and Rusaddir (Melilla) were already start and end points for the long-distance routes which lead to the Niger and the shore of Lake Chad. Later on he evokes (1978, 118) the age-old shortest route between the Mediterranean and the Sudan, known as the Bornu Road and doubtless identical with the "Garamatenstrasse" (spelt in this manner) and travelled from time immemorial.

Weber (1978, 338) records that the Western, or Libyan, Desert assured liaison with the Oases, as well as with west and southern Africa ... traversed by very ancient caravan routes. Nonetheless it seems prudent to accept the suggestion of Law (1978, 133) to the effect that Carthaginian contacts across the Sahara were indirect, if they existed, passing through the Garamantes or other peoples of the desert. It seems to us impossible, in the light of current lack of definite information, to improve on this statement. We detect a tendency to be reticent, in seeming contrast to the balmy years a decade ago, when few had doubts as to the magnitude of trade across the Great Desert.

The question of trans-Saharan contacts, apart from those supposed to have come about through trade, appears simpler. Perhaps metal and chariots (represented solely by rock carvings and paintings in the latter case) are of great assistance. One obvious complication does, however, arise: if Cerné was in fact the island of Mogador-Essauira, then those inhabitants trading as described by Pseudo-Skylax (ca. 340 BC) still possessed, at this relatively northern latitude, no more than weapons whose points were hardened by fire (Law, 1978, 145), a situation later to be noted in the Canary Islands (Astley, 1745, I, 534).

This is troubling when compared with the presence at Oukaïmaden, High Atlas (Malhomme, 1959: Mauny, 1978, 319) of rock carvings showing daggers and axes similar to bronze ones of the Argaric culture (1700–1200 BC). Yet we have – though in different zones and not at the same time – the anomaly of bronze weapons captured from "Libyans" in the reign of the Pharaoh Meneptah (1236–1223 BC) and the seeming use by a Libyan contingent, serving in the Persian army in 480 BC, of wooden spears with the points hardened by fire. Herodotus records that the Adyrmachidae, who were probybly the people in question, lived close to Egypt "from the border as far as the port called Plynus." We shall see later that no cases yet exist in which it has been possible to definitely identify metal objects in Saharan carvings and paintings of chariots.

Although there has been a suggestion (Law, 1978, 145) to the effect that people in what is now Morocco and Mauritania obtained a knowledge of copper from the Chalcolithic cultures of Spain, with scarcity of supplies limiting the impact, it must be observed that the typical carved daggers and halberds of the High Atlas (Mauny, 1978, 320) are not known so far in Mauritania, whose assemblage appears to date from a later period than the Argaric culture (cf. Lambert, 1975, 6). The north Morocco sites will have been, geographically-speaking, more accessible to Cartha-

ginian prospectors (who will have been established for some time, not too far away either) than the remoter Mauritanian mines (Mauny, 1978, 321), without losing sight of the navigational problem cited above, namely that of sailing northwards from below the latitude of Cape Bojador.

Numbers of copper artifacts have occurred in the Tichitt-Oualata escarpment, which also possesses numerous Neolithic villages and along which plentiful chariot carvings exist. Postulating that this was on a line of penetration from south Morocco to the Niafunké-Goudam region of modern Mali, Mauny (1978, 321) suggests that it was from there that arose the civilization responsible for constructing the great tumuli and megaliths at Tondidarou (cf. Mauny, 1970, 133–136: Milburn & Köbel-Wettlauffer, 1973, 138).

Regardless of what may still be in the melting-pot, in terms of forthcoming facts and datings, some recently-published radiocarbon and thermoluminescence dates for West Africa (Calvocoressi & David, 1979) provoke much thought. In the Sekkiret region near Azelik, north Niger, three occupation-phases have been recognised: – Neolithic sites, others with furnaces of elongated form for copper-smelting, plus a third phase, in which the furnaces are round in plan. Calibrated dates of 1662± ? and 1175± 117 BC are considered remarkably early: if confirmed, they would imply either Libyan-Egyptian influence (rather than Phoenician) or independent invention of metallurgy in the Sahara (for which one should perhaps substitute "Sahel"). The authors furthermore consider that three dates from the Termit massif, south-eastern Niger (Posnansky & McIntosh, 1976, 184) deserve reconsideration, in the context that metallurgical techniques of Azelik and its region may have served as preparation for more complex processes of smelting iron. The dates are held to support the opinion that the technology of iron came to West Africa from the north.

A date of 2940± 120 BC from a "pre-Islamic" burial at Hidden Valley, Adrar Bous, Niger, given earlier as 2440 BC (Clark, 1973, 293), is later reproduced as 2490± 120 BC in the same article (Calvocoressi & David, 1979, 10 & 25): on the earlier page cited it is recorded that the date is presumably for wood used for the probable funeral fire. The authors note, in another case, that the wood might have been old when used as charcoal. A less-astonishing date – thought to be the first ever obtained for an archaic Saharan paved monument, pear-shaped in plan and situated in Libya – was 4095± 210 BP (Gabriel, 1977b, 70).

In the summary, there are recorded two important possibilities: firstly, there is now strong evidence of a centre of copper metallurgy in Niger (Azelik region) in the first millenium BC (cf. 1662± ? and 1175± 117 BC given above), which may have facilitated the spread of iron working to Nigeria. Secondly, new dates from Mali could indicate a second route of diffusion through the western Sahara. No new dates for Libya are published in this article.

In the light of this somewhat fluid situation, occasioned by constant new finds and dates on the southern fringe of the desert, it should nonetheless be recorded that Mauny (1978, 335) considers it reasonable to suppose that iron-working knowledge was transmitted across the Sahara, probably from the Gulf of Syrtis and Morocco (connected in the latter case with the copper workings at Akjoujt), passing

through the desert both earlier and faster than once believed. About the fifth century BC it will have become established among the Neolithic negroid farmers of the southern savannas, adequately provided with the requisite ore (laterite) and fuel. He further mentions (1978, 331–332) the improbability of independent iron-working in Africa. Meanwhile we feel quite unable to comment on the remarks of Velikovsky (1977), placing the reign of Ramses III. in the fourth century BC, with all the complications which this would imply.

Coming now to the controversial "chariot-routes", Mauny notes (1978, 322) a conjunction of three factors around western Aïr, as at Akjout, Mauritania: these are copper-mining, finds of copper weapons and carvings of chariots, indicative of hitherto unsuspected trans-Saharan contacts that suggest some active exploration from the north. We ourselves have very little idea when the chariot first began to be used in southern Libya, anyway not prior to ca. 1550 BC, a date traditionally bound up with the Hyksos. And worsening desert conditions, once the horse did come into service, will surely have rendered its use more and more difficult.

To re-cap briefly on the "routes" along which chariot rock art (both painted and carved in some cases) has been observed, there was one running from Fezzan towards Gao on the Niger bend, Mali, passing en route the massifs called Tassili-n-Ajjer, Ahaggar and Adrar-n-Iforas/Ifoghas. (Noting that "Tassili" means "mountains, plateau" and that "Adrar" denotes "hill(s), mountain(s), peak, ridge" – these details being taken from the Official Standard Names Gazetteer (1972) – it is wise to specify which Tassili/Adrar is meant, especially when writing for those unfamiliar with Saharan geography). Two recently-recognised flanking lines run, firstly, towards Tibesti and Djado and, secondly, towards Aïr.

A second route leaves the Oranais and southern Morocco towards Goudam, to north-west of the Niger bend, passing through the Zemmour district and the Mauritanian Adrar, then along the Tichitt-Oualata escarpment. These details feature in Mauny (1978, 280–282), including an illustration, in which a dotted line indicates "probable itineraries of the chariots".

One modern atlas (Freeman-Grenville, 1976, map 17) clearly depicts two major trans-Saharan trade routes in Graeco-Roman times. Another (Fage, 1978, map 5) shows the axis of chariot drawings, with Agysmba clearly labelled as being in Tibesti. At map 15, the first-cited work illustrates the word "Hoggar" as a tribal name mentioned by Herodotus, an anomaly which R. Mauny has kindly confirmed (personal communication, 1979) as incorrect.

One of us having spent some time in and around Aïr, the question of chariot carvings has been kept in mind while travelling. It is mentioned (Lhote, 1976, 235) that the chariot circulated in the region, although the carvings (Lhote, 1972, 192) may allow no theory to be offered as to whether horses or other animals were used.

While this reservation may still hold good for western Aïr, the situation is clearer, in at least one zone of the eastern part of the massif, bordering on the Tenere Tafessasset: here Roset (1971: 1976) has found four vehicles in the Kori Tagueï, apparently horse-drawn. These, in the opinion of their finder, prolong considerably towards the south the itineraries of the Libyans of Tripolitania and

Fezzan during the first millenium BC. In fact there may now be other finds, since both papers were written long ago: that published in 1976 was written five years earlier.

Recently one of us came upon a very "schematic" chariot a short way to the north-West, in Kori Agamgam: no animal was featured harnessed to it. Taking the route proposed by Mauny (1978, 282) from Djado towards Kori Tagueï, the distance in a straight line looks like being around 350 kilometres, while that to Agamgam will be marginally less, through what was probably a waterless zone at the time. Yet in this century a case is recorded of a Teda raider walking home, from Aïr, a distance of over 1000 kilometres, living on the flesh of one goat and water carried in its skin (Peel, 1942, 83). Just how horses, oxen or asses would have fared under such conditions is unknown to us.

In a previous work, an effort was made to explore some of the problems of chariot operation (Milburn, 1979: cf. Mauny, 1976a: 1978, 277–284). The remarks were based very much on observations made by Spruytte, both in print and by kind personal communication: they applied to the route purporting to lead from Tripolitania down towards the bend of the Niger. It will be useful to summarise them briefly below.

1. Metal horse-shoes were probably unknown before the eight century AD (cf. Spruytte, 1977, 77, note 1). If about one quarter of the way leads over easy going, the rest was made hasardous by stony plains, rocky mountains or dune formations.
2. The water problem would have been considerable, assuming only that, in a straight line, the total distance would have been some 2300 kilometres. Watering-points would have been needed, placed not more than 20–30 kilometres apart. Did humans of those days require 4.5 litres per day (Mauny, 1970, 120)?
3. In the context of the "flying gallop" vehicles, the only type relevant here (cf. Spruytte, 1977, 77, note 2), it was thought that no useful load could have been carried, this in sometimes murderous terrain and with hoof-wear limiting a daily trip to a maximum of about 15 kilometres. A picture of two adult human males riding in such a vehicle speaks for itself (Spruytte, 1977, 98). Further, an estimated time of about seven months would need to be allowed for the journey.
4. Granting that practically no fodder nor water could be carried in the vehicle, both presumably had to be found along the route.
5. If navigation was a problem, did a series of guides exist and, if so, how did they travel?
6. What were the relations of the charioteers with the inhabitants of the territory through which they passed? Were they a caste of chiefs (cf. Camps, 1974a, 347: Mauny, 1978, 283) or were they obliged to pay a toll, like medieval travellers in country infested with Tuareg?

Remarking that observation of certain details visible in chariot paintings of the "flying gallop" variety in the Tassili-n-Ajjer allows one to note their difference from those of Egypt and Greece, Spruytte (1977, 71) offers no hypothesis regarding origin. Those with a square platform, two wheels and several poles (as in the Fezzan)

do not have the same mode of traction and are deemed to be of quite a different epoch (Spruytte, 1977, 77, note 2). It may be of interest to compare the "flying gallop" vehicles with a carving illustrated by Littauer (1977, 243–244 & fig. 15), showing a chariot of not dissimilar general appearance, found in the Pamirs at 3800 metres altitude.

Elsewhere it has been noted that Spruytte took the trouble to construct a chariot of leather and wood: in case the builders of those days had no metal, he employed stone tools for this project, something which deserves admiration.

In spite of numerous carved, and some painted, chariot pictures depicting various types, nothing, so far as we know, allows a categoric statement to be made to the effect that chariot-users possessed metal. We are grateful to K. H. Striedter (Frobenius-Institut) for his opinion on this point. The problem is partly caused by prehistorians of past decades exhibiting a marked preference for sketching, rather than photography. Indeed it is little short of a tragedy that so few concrete details are to hand: take, for instance, the interesting painting at Tiror, Tassili-n-Ajjer (Lhote, 1955, 72) not only on account of the spear depicted – which might well have a metal tip – but also for the "headdress" of the charioteer, which has been elsewhere compared with that of painted rock art in southern Spain. In a previous work, Lhote (1953, 1174) showed likenesses in the dress of the charioteer's womenfolk and that of women at Cogul, in the Lérida province of north central Spain. Yet another tantalising example is that of Djorat (Lhote, 1953, 1165, no. 5), published by numerous authors, in which a charioteer – armed with two metal-tipped (?) spears – seems to be in the act of chasing a horn-headed (horn-helmeted?) individual, also possessing a spear.

Other types of chariot/cart found along these "routes" have presumably still to be studied, although their seeming "schematisation" may not render this easy. Cf. Lhote (1953, 1165, no. 6) for a southern ox-cart. Libyco-Berber art tends in general towards somewhat rudimentary shapes and, on these grounds, it may be supposed that paintings of chariots at the flying gallop represent an older type. Indeed the whole question of Saharan wheeled transport is fraught with speculation.

Returning to some remarks of Mauny (1976a, 167–169: 1978, 280–286), who has devoted a great deal of time to the study of such vehicles, further interesting ideas come to light. Strabo mentioned that the purpose of chariots, apart from carrying archers, was to spread panic in the ranks of the enemy. Possibly this is just what the "Garamantean" vehicles of Herodotus' day succeeded in doing among the "Troglodytes", who may then have needed to be physically rounded up by men on foot, possibly with the use of dogs. Further, the possession of horses, thus of chariots, must have been an attribute of chieftaincy, due to the presumed difficulty of maintaining horses in the desert. The same chariots are not presumed to have served for one complete journey, probably having not the structural stamina to survive more than a few hundred kilometres of difficult terrain. The "tracks" will have been areas of country through which the chariot concept and the techniques needed to produce them had become established.

A further suggestion is that these vehicles were probably used for warfare,

pleasure (dazzling the girls) and trade as well. Military use will have been limited, while racing or hunting will have been possible in suitable country. However it is stressed, in contrast to what has been written in prior decades, that it seems unlikely that horses served to promote or facilitate the trans-Saharan carriage of trade goods on chariots drawn by them. Perhaps this is the most important statement of all (Mauny, 1978, 283).

As one apparent difficulty, however, the problem of oxen pulling carts for some 500 kilometres between the Mauritanian Adrar and the Zemmour to the north is self-evident (Mauny, 1976a, 169), even if they used carts of greater strength than is obvious from "schematic" rock art, possibly dating from ca. 500 BC (cf. Lhote, 1976, 235: Mauny, 1978, 279–280). The most that can be envisaged is thus that caravans of oxen or donkeys could have been accompanied by chiefs or rich traders, travelling in their chariots to do business on behalf of Carthaginian or Roman merchants.

Before the arrival of the camel, movement in the desert must have been essentially on foot with pack animals (Mauny, 1978, 276). Most conveniently, Bovill (1968, 17) quotes A. J. Arkell as saying that the small Sudan donkey can do 85 miles (136 kilometres) between watering places, if heartened after the first 50 miles (80 kilometres) with a single bowl of water. Journeys with caravans of donkeys (Mauny, 1978, 276) could have been made towards the central Sahara, following the establishment of organised governments along the Mediterranean coast, i.e, by the Phoenicians after 1100 BC, the Carthaginians after 800 BC and by the Greeks of Cyrenaica after 600 BC, J. Spruytte is cited by Mauny (1978, 278) as speculating on whether animals harnessed to Egyptian war chariots may not be crosses between ponies and Nubian donkeys. An apparent "boeuf porteur" is illustrated in the Atlantic area (Astley, 1745, II, Pl. XII) under the title "The Arabs and Moors riding on their Camels, Oxen and Horses, with Gum-Arabic and other goods to sell at Sanaga River," demonstrating survival of a very ancient custom.

In spite of our not having to hand many details of asses, beyond those mentioned above, it has been intimated (Cloudsley-Thompson & Duffey, 1975, Part I, 96–97) that the wild ass of north-east Africa can manage without much water, being thoroughly at home in arid surroundings and able to tolerate a considerable degree of dehydration without damage to its body tissues. It can also make up its water loss very rapidly. As well as being surefooted, it resembles the camel in one respect, this being an ability to tolerate a water loss of up to 30 % of its body weight. Within a few minutes it is able to ingest one quarter of this weight. Normally such asses do not sweat, although they appear to lose water faster than camels do. We are unable to comment on the probable degree of wearing-down of asses' hoofs on long trips, such as trans-Saharan ventures during the centuries around the time of Christ, as envisaged by Mauny (1970, 127 & 129).

Having previously speculated on the identity of the "Garamantes" (1979), a few remarks can be added. First and foremost, it was noted that the bulk of the "flying gallop" specimens exist within the Tassili-n-Ajjer, with the nearest painting apparently some 300 kilometres distant from Germa (Garama). The people are gracefully-

clad individuals and their chariots are far from "schematic". If it should prove to be the case that Equidian rock art commenced around 1200 BC, with "schematic" examples being notionably datable to the last five hundred years BC, especially those further to west and south (Mauny, 1978, 279–280), then we may have some hundreds of years between "flying gallop" and "schematic" types.

Ever cautious, Spruytte (1977, 77, note 2) inclines towards the "flying gallop" type being of a totally different epoch from chariots with a square plattform, two-wheeled and with several poles. Such models are reproduced by Graziosi (1942, 96) in Libya, of which some have four horses and, of necessity, two poles. Most platforms visible are square or oblong. No. 12, reduced to the barest "schematisation", could reasonably have been found in the Atlantic Sahara or even in Aïr. Broadly-speaking, these Libyan chariots are all closer to Germa than the "flying gallop" ones. Our contention is, therefore, that a likelihood exists that these will have been the chariots used by "Garamantes" to hunt "Troglodytes", regardless of the exact identity of both hunters and hunted.

In speculating on Romans, Garamantes and trans-Saharan trade, Swanson (1975, 598–600) mentions that throughout classical literature the Garamantes are portrayed as a semi-nomadic group, at least some of them being settled agriculturalists (possibly along the same lines as the present Harratín within the Ahaggar, with their unenviable social position vis-à-vis the lordly Ihaggaren?): he continues to the effect that the remains of the classical Fezzan lack distinction, their general poverty being suggestive of purely incidental trade and contact between Romans and Garamantes. Perhaps there was a minimal Roman presence in the Fezzan, partly to bar the path of raiding nomadic Garamantes towards the north and partly to offer protection to others who were settled and friendly.

Hubac (1948, 184–189) has painted a vivid picture of what can occur when nomads smell the chance to enrich themselves, either in terms of obtaining fresh pastures occupied by sedentary agriculturalists or by looting those too weak to oppose their depredations. There also seem to exist manoeuvres by which the nomad entrenches himself, gaining strength over a period, ready to inflict a death blow upon whomsoever becomes ripe to receive it. Perhaps this was partly the situation prevalent around the capital city of German, especially in the time of their early contacts with Roman armed might.

The semi-nomad and transhumant has been evoked by Faegre (1979, 4), along with Old Testament accounts of famines driving a nomadic people to take refuge among the settled. Mori (1978, 36) conjures up vividly the survival instinct becoming absurdly heightened by terror lest territorial usurpation, loss of a part of the food reserves, and diminution of prestige lead to a lowering of the threshold of vital security.

Perhaps, as has been elsewhere suggested, "Garamantes" was a name applied to a whole host of differing human groups, especially by those far enough distant from them not to be immediately concerned with supreme accuracy of description. For instance, the Romans up on the coast could well have come into this category. Maître (1976) mentions Garamantes within the Ahaggar. Within the last few centuries, the

people of Bornu, Nigeria, had a tendency to refer to the Tuareg of Aïr as "Kindin": possibly this is just one more case of a handy "label" being found and applied to people distant enough from everyday life to be classed as one entity. We have also wondered whether the name Kindin be connected with that of the Gindanes of long ago, or that of Keshkesh (Kashka), former foes of the Hittites (Sandars, 1978) with Ikashkeshan (Barth, 1857, I. 227). These latter were to demonstrate their piratical tendencies amply in Niger during the second decade of this century (Fuglestad, 1973).

The "flying gallop" charioteers seem to have possessed small stools (Spruytte, 1966, 320), perhaps a strange circumstance for nomadic people: cf. some shown by Frobenius (1963, 68). Yet paintings attributable to them have been found at Tim-Missao, well beyond Ahaggar to the south-west and astride one or our "chariot routes". It is tempting, however, to locate these people basically within the Tassili-n-Ajjer, where most paintings in this style have so far been found.

Seen from above, the mighty keyhole tombs, or "monuments en trou de serrure" (Milburn, 1978b, 36 & 40), bear a troubling ressemblance to the Sardinian sacred well at Santa Vittoria di Serri, apparently datable not earlier than the seventh century BC. This well, like its fellows, does not seem to be orientated, while keyhole tombs always are, in common with numerous other Saharan types. In 1967 Lhote postulated a similarity in the distribution zones of keyhole tombs and paintings of chariots at the "flying gallop", something which cannot be contested. If Equidian rock art dates from ca. 1200 BC, then possibly the paintings are somewhat older than keyholes, regardless of the small likelihood of the obtention of dates for either, to judge only by the current rate of progress. It may even be that neither have anything to do with the Garamantes: we have no record of a single keyhole being found in Libyan territory, plus only very few chariot paintings in the Acacus Mountains.

In addition to frequent exhortations of Mauny for serious study and excavation of stone structures, we may here echo the words of Vallet (1960, 239), who noticed that if monument types are numerous, and sometimes mixed together, certain regions are particularly rich in one type. The "tumulus tronconique" is thus mentioned for the Adrar-n-Ifoghas, while the chubby crescentic structure is cited in respect of the Tassili-n-Ahaggar (note the use here of the word "Tassili"). Each type, the author felt at the time, should correspond to a certain belief or a particular race. Study of zones of concentration, with outliers, are suggested as being likely to tell us something of human movements long ago. It is with this fascinating project that our last few remarks are concerned.

Clark has suggested (1978, 86) that possession of metal weapons and chariots by the northern pastoralists, after 1500 BC but especially in the period 1000–500 BC, enabled these nomads to occupy large tracts of the central and southern desert, at the expense of the late Neolithic negroid population. To this must be added Mauny's sad account, reproduced here in some detail, of the reasons why such a move became necessary (1978, 274–276): these were a change in climate, added to which was the lack of pasture caused by centuries of misuse of the environment by humans and their herds. Cf. the twentieth century destruction of trees around Arlit, the Niger

uranium-producing town, involving wood needing to be fetched in lorries over increasing distances. From ca. 3000 BC onwards, the Sahara will have begun to exercise a constraining influence on man's movement within it.

Forde-Johnston (1959, 133) records post-Neolithic populations moving into the uplands as the Sahara began to dry up, possibly bringing with them the practice of tumulus-building, which we may take to mean construction of stone monuments of many types.

Areas of complete desert entailed people withdrawing virtually in toto, since it is mentioned that metal tools were needed to dig wells. Secondly, there were dry zones (the great southern plains, medium altitude plateaux and the edges of the true desert), allowing residence and cultivation in depressions that would contain temporary moisture. Lastly there were the semi-arid regions, with seasonal rainfall causing vegetation and feeding surface water-holes or shallow wells in the beds of wadis. These latter were to be encountered in the mountain massifs and it is recorded that even sedentary life was possible. As desiccation continued, however, important population movements will have caused major confrontations between desert folk and people onto whose land they encroached (Mauny, 1978, 277).

Nowadays it is said that Arab nomads in the northern Sahara are dependent on the presence of flourishing oases in their general area of transhumance. Until recently, they are noted as having had a long history of warfare, raiding and bloody feuds (Cloudsley-Thompson & Duffey, 1975, Part I, 118 & 128). Perhaps this was also true during the movements of the first millenium BC.

To this picture we are forced to add further, if only in respect of what little may be found nowadays to remind us – and to inform us – of the past. Practically only stones and pottery are left (Smolla, 1978, 168), bones and other organic material being only exceptionally available. Graves were robbed long ago. High humidity plus acid soils do not provide the best conditions for the preservation of bones and skeletons of any age are most likely to turn up in caves and rock shelters, in artificial shell-mounds or in deep graves protected from moisture by, for instance, a layer of roots (Mauny, 1978, 337). Mauny further notes that graves of the pre-Islamic period have been constantly pillaged and corrosion would have destroyed most iron-work they might have contained (1978, 334).

The age of certain engravings or paintings can be ascertained, if occurring in a suitable – though hitherto rare – archaeological context (cf. Mori, 1974 & 1978: Milburn, 1978a). The situation could, however, be far, far worse. What is tragic is the lack of excavation deep inside the Sahara, this when it must be recognised, since some years back, that practically all our knowledge of these protohistoric human groups is likely to stem from their graves and their rock art.

The interpretation of rock art occupies a large part of the time of certain specialists, while a smaller number of researchers goes out to hunt for more "fuel for the fire". The difficulties and dangers of hasty identification and/or interpretation are therefore quite enormous. (Figs. 2 & 3)

Some time ago, interested in the suggestion of Lhote (1967, 124) as to a similarity in zones of distribution of keyhole tomps (op. cit.) and "flying gallop" chariots,

it was noted that we seem to have no record of one single keyhole in modern Libyan territory (Milburn, 1978b, 22–27). An effort was made to establish, from literary sources, the apparent geographical limits of the region where they are found. It was apparent that there may exist some connection between the tumulus on a platform and the keyhole, this supposition being based on the occurrence of one type close to the other in certain cases. Another interesting factor, apart from the much wider zone of distribution of the tumulus on a platform (right across into the Atlantic Sahara and down into the Aïr), was the lack of orientation of the species, compared to the definite easterly headings of the keyhole.

The tumulus on a platform, however, may sometimes be found on an east-facing forward slope, visible from afar. Elsewhere an attempt has been made to indicate the apparent likely position of various types of structure in relation to high ground (Milburn, 1977, 164), while at least two known cases exist where a conscious effort may have been made to orientate a platform on which a tumulus stands. The first concerns a very large example, some 80 kilometres from Tamanrasset, Ahaggar, almost beside the track leading towards Niger, where one may observe a segment missing from the platform a about south-south-east from the tumulus. The second is near In Amguel, Ahaggar, where a carving of a rhino is carefully set into the border of the platform at about 120° from the tumulus: it is not intended to suggest that this carving is contemporary with the stone monument into which it is incorporated. In the immediate vicinity of the structure, however, are numerous rock carvings, as well as five large V-shaped paved structures, set in a line running about north-east to south-west and each with a differing easterly orientation. There has been previous speculation of the possible association of such edifices with adjacent rock carvings (Maître, 1966, 103) of Ahaggar.

In the Takolokouzet region of eastern Aïr have been noted structures which may, in some cases, be held to show affinities with tombs further north, while others seem to be regional types. The tumulus on a platform does occur there: yet sometimes the central tumulus is missing, in which case the result is a platform, which may or may not be bordered. One of us has observed this identical local type very close to Iferouane, Aïr. (Fig. 4)

The small standing stones found by Lhote (1973) at Tadeliza, within the Aïr massif and five in number, appear to have parallels in the same region. We are inclined to think that they generally occur in groups of four, although another group may be placed less than 100 metres distant. In one case there may have been a sizable lump of whitish quartz deliberately situated close to one of these stones. Inhabitants of Tadeliza were unable to offer any explanation for the presence of the standing stones right inside their village.

A further regional type consists, again within the Aïr massif, of a small circular space enclosed by small, flattish stones on end and embedded in the ground: something similar is shown by Frison-Roche (1960, Pl. 87) at Tazolé. Most noticeable, in some cases only, are whitish quartz pebbles, strewn around on some graves of a group, yet not upon others. Another strange feature is the occasional use of a relatively-large flattish rock slab, placed horizontally upon the stone border,

although we cannot say that this represents an attempt at orientation, since insufficient consistently-placed slabs have so far been observed.

It is appears that the centre area for another type of structure may have been the former Rio de Oro, in the Atlantic Sahara, where we find lines of standing stones orientated roughly north to south, with a tumulus set to the west side or even lying beneath the line of standing stones itself (Milburn & Köbel-Wettlauffer, 1973, 143–144: Nowak, 1971, 57). Sometimes the line is straight and sometimes curved towards the east at either end: there may be rock carvings on the central – and highest – stone (cf. Mauny, 1961, 78–79). These structures reach north, south and east, extending over a few hundred kilometres only.

In a modern Libyan context our attention has been drawn, notwithstanding the comparative silence of specialists (on other matters, in most cases), to the occurrence of a little-known type of monument, whose zone of distribution seems, however, to be quite enormous, although few examples may have been recorded so far.

Sometimes the illustrations are not such as to enable exact structural details to be determined. Seen from above, we gain an impression of a low, circular, cake-like monument, bordered by small stone slabs 10–20 centimetres higher than the "cake" itself. From the east side protrude two symmetrical arms, one towards north-east and the second running south-east, resulting in an overall easterly orientation of the whole. The arms, like the central "cake", may be bordered by small slabs, their interior zone filled with a scatter of small stones or "paving" (cf. Frobenius, 1933, 623 and see Fig. 5).

The list of known specimens, probably not exhaustive, can be resumed as follows:

a. Somewhere in the Fezzan (Frobenius, 1933, 623).
b. Tin Abunda, Uadi el Agial, Fezzan (Pace, Sergi and Caputo, 1951, 385, fig. 172).
c. Oued Amded, near Silet, west Ahaggar (Denis, 1959, 298, fig. 4). The circular part is stated to be paved, with a possible fallen standing stone just to east.
d. Near Tamanrasset, Ahaggar (Pervès, 1945, no. 17). Listed as the only example seen: the border appears to be missing in between the points where the arms join the body of the "cake".
e. In Zize, between Bidon V (Tanezrouft) and Ahaggar (Bessac, 1953, Pl.XX, no. 6.). There are apparently two monuments together at this site, one to west-south-west of another, as indicated by a photocopy of contemporary notes kindly provided by H. Bessac. We are not aware of other instances of such an occurrence.
f. Oued Afara (Reygasse, 1950, 57, no. 65).
   A Oued Afara-n-Imnes is shown to exist at 2435N 0956E, not far west of the Tassili-n-Ajjer. The apparent southern arm is given as being 50 metres long.
g. Tassili-n-Ajjer, well to south-west of Illizi (Personal observation). Two single examples, non-conspicuous and not sited in such a way as to indicate possible relationship to other structures.
h. Seguiet el Hamra, Atlantic Sahara (Nowak, unpublished).
i. A further example, probably in the Tassili-n-Ajjer, is believed to be reported by Bernard (1886), whose publication has not been available to us so far.

j. Edjéré, in the Amguid region of Algeria (Voinot, 1908, Pl. XIII, Fig. 3).
k. "About 25 kilometres from Bir Mathendous" (G. Jacquet, personal communication, 26. 7. 1979).

The body of this specimen is shown by its finder as being some 5 paces east-to-west diameter, with a south arm some 72 paces in length. There is reported to be a larger standing stone at the end of each arm.

Two more, apparently coming in a similar category, through rather less well built and not standing so high above ground level, are known in a southern context: –

l. Falazlez, ca. 120 kilometres west-south-west of Djanet (Hugot, 1962, 155, fig. 3: see Fig. 6).
m. At the eastern limit of a kori leading from Takolokouzet into the Tenere Tafess-asset (personal observation). (Fig. 7)

To end the list on a highly speculative note, we have added a final monument (n), published by Frobenius (1916) and later studied by Camps (1961). It is to be found at Sila (Aïn Riram), far north in the Constantine region (Camps, 1961, 175 & 179: Frobenius, 1916, 42 & Taf. 2).

Camps records that the niche contained between the two arms might indicate influence form the south, adding that everything allows one to surmise that the niche is of African origin. It is, in any case, on the south side of the monument, which means that the structure is orientated to southwards, rather than to east. Horse bones found in both previously-robbed burial chambers allowed Frobenius (1916, 60) to deduce that they had belonged to the original grave-goods.

The twin examples found by Bessac (op. cit.) are the sole case of which we have heard in which two such structures are sited close to one another. Otherwise we should have assumed that they were invariably found alone, removed even from other types, as though to honour some departed chief by giving him a site all of his own.

Without wishing to comment on any possible relationship between the Frobenius monument, in the far north of Algeria, and central Saharan examples, except insofar as overall architectural plan (though not orientation) is concerned, it may just be feasible that nos. l. and m. are later southerly copies of their more elaborate forbears further north. This would fit in with the movement south of peoples over the centuries of Saharan desiccation (cf. Camps, 1974a, 346: Clark, 1978, 86).

Perhaps something similar may be inferred from the existence of "Garamantian" stelae of northern Niger (Milburn, 1978b, 27–28): from 1976 onwards, one of us came across a number of robbed tombs of western Aïr, almost always possessing steale propped against the outermost border (Milburn, 1976, Pl. I: 1978b, fig. 5). The same phenomenon is known in Libyan Fezzan, propped up against the eastern side of squarish stepped monuments which should not be confused with circular stepped chouchât (Daniels, 1970, 41 & fig. 9).

While there may be thousands of Saharan and Sahelian monuments employing large or small standing stones, firmly embedded in the ground, we are aware of only these two instances of types where stelae are leaning against the east side of a complex. They will not be, in the case of our Niger specimens, the most archaic structures

present, as evidenced by a line of associated small auxiliary towers (stone piles) cutting across the periphery of a low circle of earlier days (Milburn, 1978b, fig. 4).

Camps (1955, 196) states that Garamantian influence was considerable across the Sahara, right down to the Niger, which leads us to express the fervent hope that French archaeologists will lose no further time in excavating some roughly similar structures located south of Agadez (Grébénart, 1978, 7 & fig. 3); these are at a hill known as Kel Ouerou (= "ceux d'autrefois") and are said to be intact.

The description is slightly different from what we should have expected, being "bazinas encircled with a complete circle of standing stones which are higher on the east side." It looks as though the stones will be embedded in the ground, rather than leaning/propped up. However the westerly niche and small stone towers in line on the eastern side are reassuring. The hope of undertaking an excavation during the winter of 1979 (Grébénart, 1978, 7) had apparently not come to fruition as at the end of January 1979.

Perhaps the grave-fields of Zoui, Tibesti (Gabriel, 1974, Abb. 10), noted as possessing structures of widely variable dimensions and probably built . . . about the time of the Garamantes invite further comparison with those of Ghat (Weis, 1978, 105). The typology appears generally no more than variations on a theme, some specimens might qualify as low chouchât or high platforms.

The crescentic form, so often recounted in Saharan literature in relation to stone monuments, appears on Punic stelae of the fourth and third centuries BC (Harden, 1963, Pl. 31, 32 and 35), together with a disk in each case. Allowing that the principal deity of the ancient Libyans, the ram-headed god Ammon, was adopted by the Greeks of Cyrenaica and the Phoenicians of Carthage (Law, 1978, 115 & 145), it has also been mentioned that the Carthaginian moon-goddess, Tanit, is borrowed from the Libyans too (Law, 1978, 146). Perhaps it is not totally by chance – although it may be – that we find a crescent and discs pattern formed by the plan of some crescentic monuments of Ahaggar (Régnier, 1961, fig. 13), in each case allied to four small stone piles set in a line to east of the crescent.

In respect of the crescentic dunes found in Mauritania (J. Spruytte, personal communication, 20. 7. 1979), known in the singular as "barkane", the same name has been applied by French investigators to crescentic structures made of stone in these regions. It seems, however, that the Moors used the word prior to the arrival of French colonial might. The word "barkhan" listed in Russian dictionaries and kindly checked by C. R. Bawden (personal communication, 26. 6. 1979) is given as meaning a "sandhill in the Kirghis steppe", with a Kirghis origin.

In conclusion, the overall task of investigation has hardly started. Nor will it prove easy. We shall need to work far from the beaten tracks, probably covering large distances on foot in a reconnaissance role. We must also hope to be able to put into practice wise suggestions for enlisting the aid of powerful organisations (Mauny, 1976a, 170), failing which we are condemned to the limited research known by previous generations.

Nor will the research work be glamorous. A degree of cooperation between African states is also indispensable. The act of dismantling a large crescentic monu-

ment of Niger or even a circle of the type of Enneri Mokto, Chad (Mauny, 1962, Pl. I) would be considerable, even if the former could be tackled within a few hundred metres of the comforts of a European-type settlement such as Arlit, Niger. Yet Gabriel (1977b, 79) suggests 150–200 working hours as being necessary to construct one large Libyan monument which he excavated. Meanwhile small monuments seem to attract excavators – who may not always be archaeologists – which is perhaps the reason why we have not a single dating for a keyhole tomb.

The desert still probably guards a myriad secrets, only to be revealed to those who possess a keen sense of curiosity, a degree of luck and a willingness to pay heed to modern scientific technique. Libya indubitably will have inherited her share of such ancient sites. May specialist study of the distribution of stone monuments and rock art – both of which exist in far greater quantities than most of us imagine – plus EXPERT excavation and evaluation, especially of datable material, one day yield up indications of commerce in pre-Roman times?

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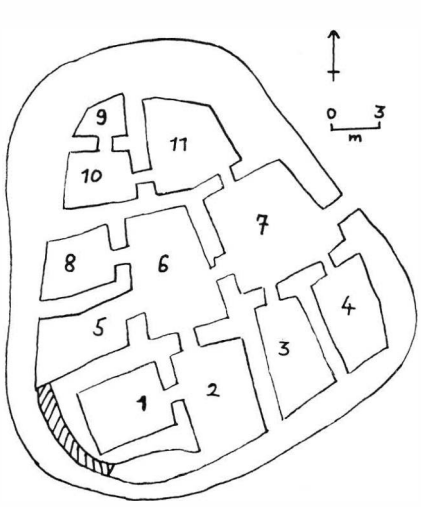

Fig. 1: Sketch of the "Tomb of Tin Hinan" (After a plan by Reygasse, 1950). Notes made at the time of a recent visit indicate that the supposed "passage", linking rooms 2 and 5 deemed to pass to west of room 1, does not exist in the zone marked with parallel black lines.

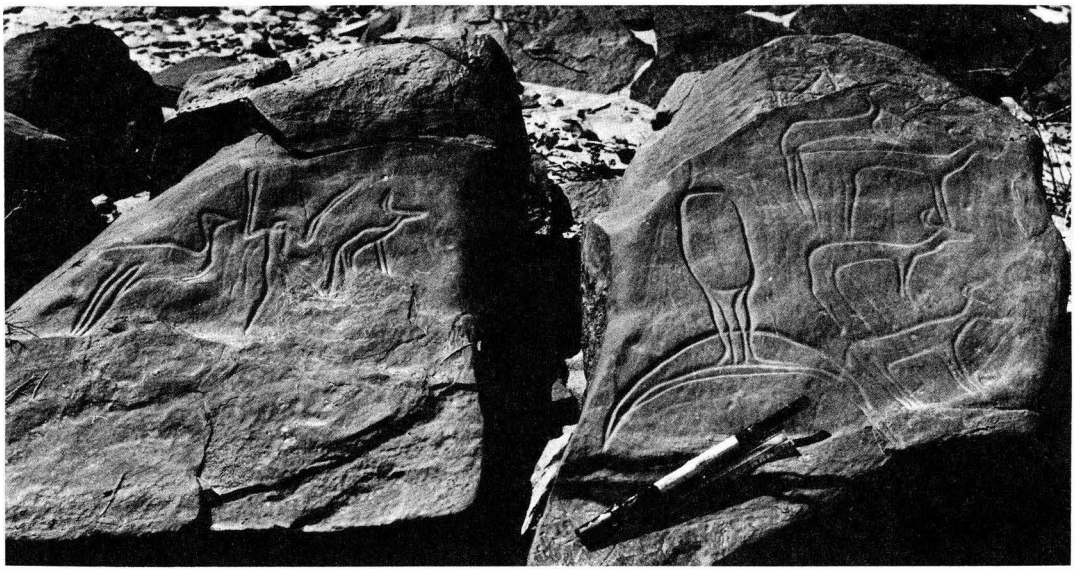

Fig. 2: This enigmatic symbol, found by A. Simoneau in 1974 in Marocco, apparently linked to the four animals to right of it, has been variously interpreted as a "trap" or a "net". Along with others of the area, it happens to resemble a type of phallic sheat of ancient times, illustrated in Stern (Heft Nr. 32, 2 August 1979, page 11). Just why such a symbol should appear on rocks, often close to animals of the chase, illustrates the problems of identification and interpretation of rock art.

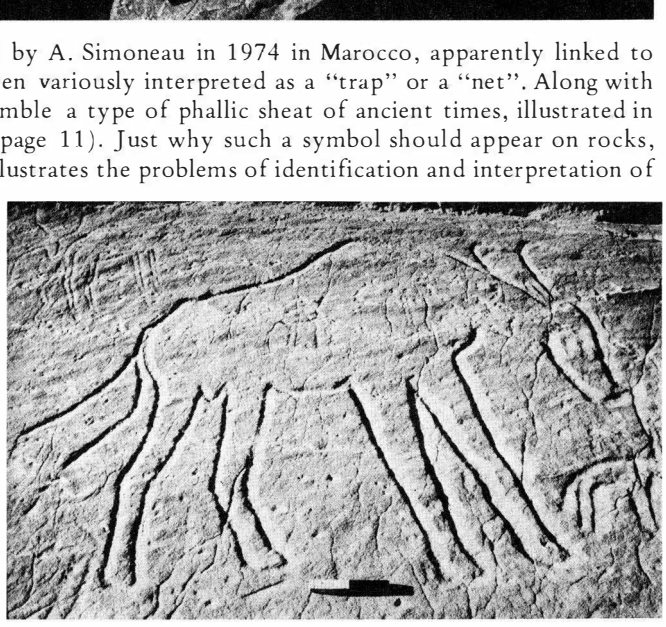

Fig. 3: This large beast, almost two metres long, after examination by two experts, has been provisionally identified as a wild buffalo, for want of a more satisfactory explanation. It was found in south Algeria.

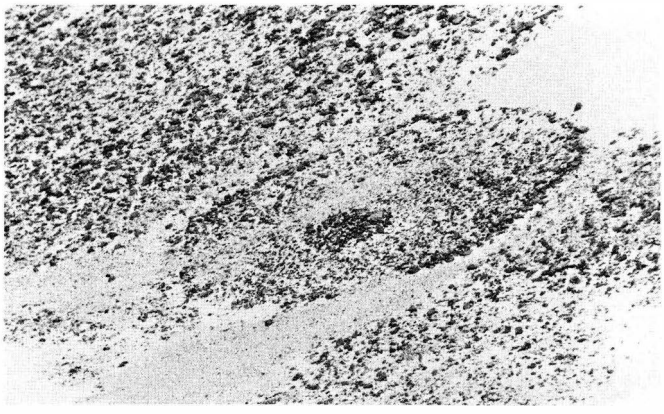

Fig. 4: A tumulus on a platform in eastern Aïr. The method of construction is rough and similar to a local type possessing no tumulus at the centre of a bordered or unbordered platform.

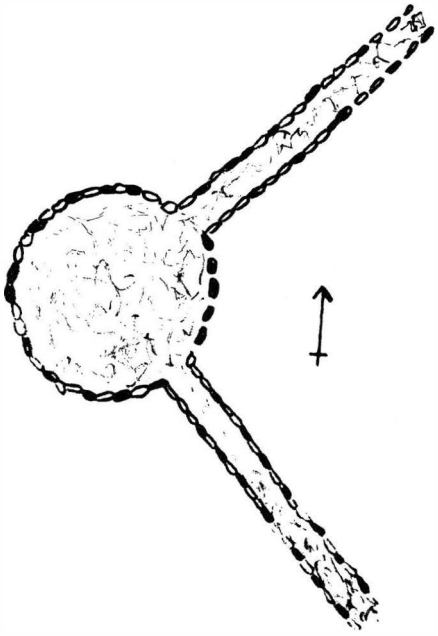

Fig. 5: A type of monument with arms. Its distribution should be the subject of wider research: perhaps it exists in far greater numbers than currently known.

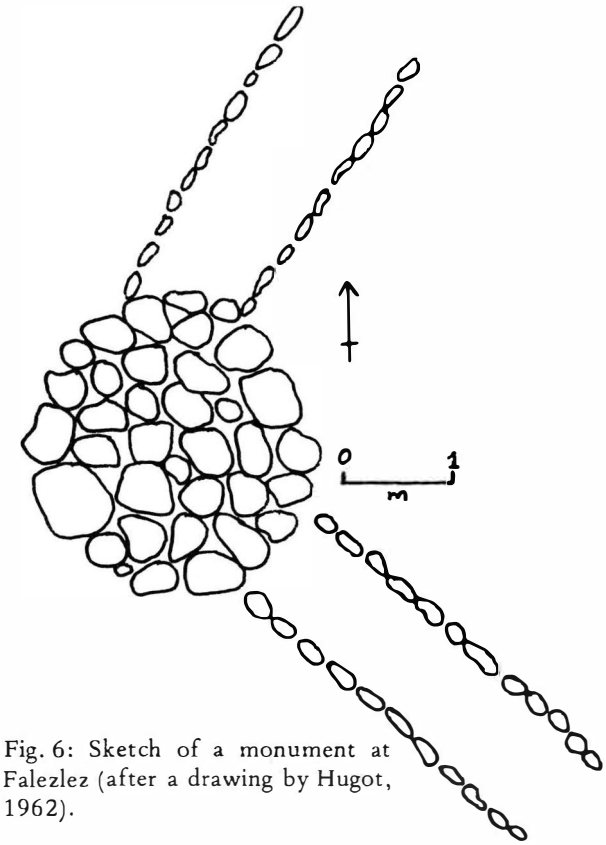

Fig. 6: Sketch of a monument at Falezlez (after a drawing by Hugot, 1962).

Fig. 7: Possibly a southerly relation of the structure shown in Fig. 5.