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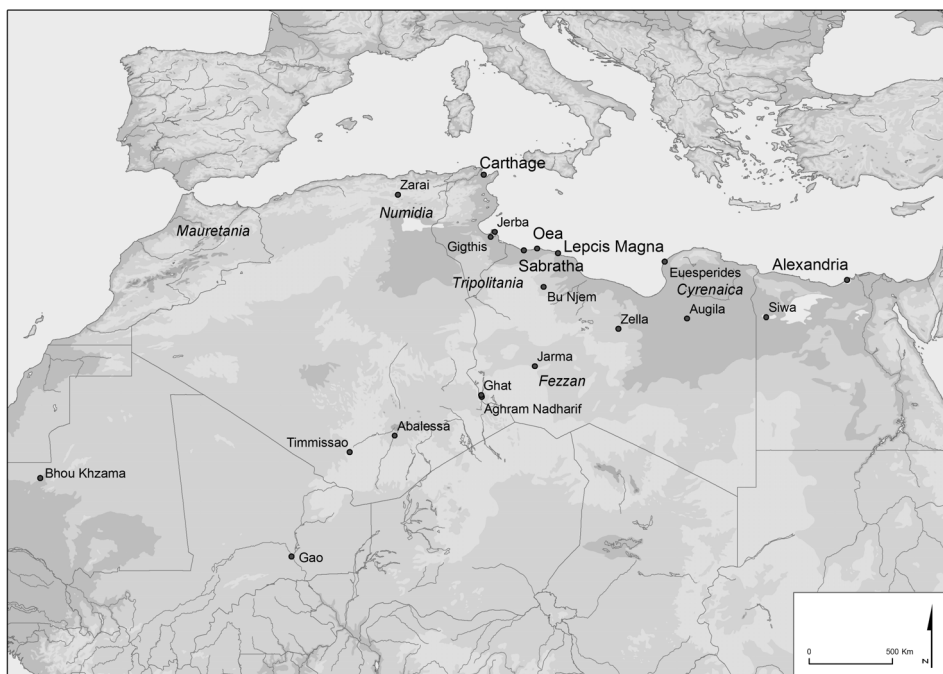
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SAHARAN TRADE IN CLASSICAL ANTIQUITY

Katia Schörle

In classical antiquity, the Sahara (whether called *deserta* or *solitudines Africae* in Latin, or *eremoi* in Greek; Desanges 1999a: 239) was constructed by Greek and Roman writers alike as a place of distinctive otherness. Exotic, empty, wild, or peopled by bizarre creatures, it served to represent the antithesis of the known civilized world (Liverani 2000a: 498; J. McDougall this volume). Yet, much like the classical Mediterranean as described by Horden and Purcell in *The Corrupting Sea* (2000), the Sahara is perhaps best imagined as constituted by shifting interactions, related microcosms, and overlapping networks than by rigid patterns: a network of hubs, central nodes around which activities revolved and which were involved in multidirectional exchange (Wilson 2009). Settled at the edges of the Sahara or in oases—*islands in the Saharan sea*—Saharan populations relied and thrived on interactions with their neighbors (Crawley Quinn 2009). This chapter's main emphasis is on the Libyan Sahara between the sixth century BC and the sixth century AD, a period that corresponds to the rise and fall of the Garamantian civilization and roughly to the classical Greek and Roman period in the Mediterranean.¹ The Garamantian kingdom (ca. 500 BC–AD 650), whose territories were centered on the oasis belts in the Fezzan region in southwestern Libya, communicated with both North Africa and sub-Saharan regions. The Fezzan is one of the few areas in the Sahara to have received much archaeological attention, and findings strongly suggest that it constituted a powerful center of trading activity within the Sahara (Mattingly 2003, 2007, 2010). Although there has been some past debate over the exact nature of these long-distance trading networks (see, for instance, Law 1967; Swanson 1975), more recent archaeological work in the Fezzan by both Italian and British teams dispels any doubt about their existence (Mattingly 2003, 2007, 2010; Liverani 2005). Goods from the Mediterranean or (to a lesser extent) from sub-Saharan Africa are found in burial sites associated with Garamantian settlements. These trading activities across various parts of the Sahara varied over time and

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Map 3.1. The Sahara in classical antiquity. K. SCHÖRLE 2010

space, both in the intensity of exchange and in the routes taken, showing a pattern that is much more varied and flexible than we might expect.

Rethinking the Sahara

Like the Mediterranean, the Sahara is best approached as an area of broad geographical connectivity. Such a framework makes it possible to understand far-reaching phenomena which previous historical frameworks have been unable to explain: the archaeological find of *Musa* genus banana phytoliths (microscopic silica plant bodies) in West Africa dating to the sixth century BC (Mbida et al. 2005) only makes sense within a wider context of complex trading relations that linked Africa to the Indian Ocean (Mitchell 2005: 106–108). Multidisciplinary and long-term historical approaches therefore allow us to affirm that, on the African continent as elsewhere, individual localities were connected on a large scale, most often via the intermediary of prominent trading nodes.² In the Sahara, these networks and hubs are remarkable for their fragility and artificiality. Water is abundant

underground, but rarely occurs naturally on the surface.³ When it does, it is often salty, as in the case of the lakes of the Libyan Great Sand Sea. Oases rely on elaborate irrigation systems to bring fresh water to the surface, and hence are the result of human intent and careful planning as much as of environmental suitability. Due to their vulnerability and the harsh environmental conditions in which they evolve, regional and transregional interactions and connections determine the existence of oases in an even more extreme way than in the Mediterranean, where a city or state can choose to enter into isolationist mode in ways that Saharan oases cannot: the survival of oases ultimately depends on their networks (see also Scheele this volume).

In the Mediterranean, research has been greatly influenced by Horden and Purcell's *Corrupting Sea* (2000).⁴ In William Harris's *Rethinking the Mediterranean* (2005), David Abulafia attempts to define regions with similar characteristics to the Mediterranean—and stumbles across the Sahara. According to Horden and Purcell's criteria, he writes, “the Sahara was a true Mediterranean in the sense that it brought very different cultures into contact, and across the open spaces they brought not merely articles of trade but ideas, notably religious ones, and styles of architecture appropriate to the Muslim culture they implanted on the northern edges of Black Africa” (Abulafia 2005: 75). Abulafia's point is well made (but see Horden this volume), but despite his tendency (also shared by Lydon 2009) to ascribe trans-Saharan connections to Islamic endeavors, commercial connectivity in the Sahara clearly predates the Islamic period; this bias must partially be attributed to a lingering reluctance to engage with, or lack of awareness of, the transregional patterns that emerged earlier.⁵ Since 2000, the research led by David Mattingly and published in three volumes as *The Archaeology of Fazzān* (2003, 2007, 2010) has provided a groundbreaking and thorough overview of the Fezzan and of the Garamantes. The current Desert Migration Project continues to investigate the Garamantian civilization through the analysis of burial contents, which include items such as Roman ceramics (fineware, coarseware, cooking pots), amphorae (mainly used for liquids such as wine, oil, and *garum*, or fish sauce, but which could also contain dried or salted goods), and beads or glass from the Roman Mediterranean (such as vessels, fruit bowls, drinking cups) (Mattingly, Lahr, and Wilson 2009).

Most of the Garamantian traffic passing through North Africa toward the Mediterranean and Rome was funneled toward the western coast of Libya and the southern tip of Tunisia to places such as Gighthis, Sabratha, Oea (modern Tripoli), and Lepcis Magna.⁶ The island of Djerba, which in the first century AD was connected by a bridge to the mainland, became another strategic terminus of the long-distance overland routes (Frachetti 2009: 57). The importance of these

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routes is confirmed by the presence of North African amphorae in burial sites in the Fezzan. The majority of these are from Tripolitania; some unusual ones, such as the late Roman Keay 62, are particularly big.⁷ The fact that the late Roman Keay 62 amphora is found both in burials and in settlements in the Fezzan (Mattingly et al. 2010: 122) suggests that the long-distance trade with Roman North Africa continued to flourish into the fifth and sixth centuries, despite a contraction from the mid-Roman period on (second–fourth centuries AD). Of those coastal termini, Sabratha and Lepcis are the only cities that have received considerable archaeological attention. Oea, which received support from the Garamantes—perhaps because of trading ties—during a conflict with Lepcis Magna over territorial boundaries in AD 68–69,⁸ is overlain by modern Tripoli, and has so far been understudied. A review of the available inscriptions of Roman Tripolitania gives a sense of the paucity of information we have concerning Oea: there are only 36 inscriptions, compared to 609 recorded for Lepcis and 230 for Sabratha. Moreover, some of these are now lost, and others are from funerary contexts located outside Oea itself. This issue of investigating the terminal cities of the Saharan trade is further complicated since, as suggested by Fentress (2007), we ought to be investigating archaeologically the large empty spaces (such as the one suggested for Gigthis) *outside* North African towns for the periodic marketplaces where trans-Saharan goods would have been bought and sold.

A few major issues still affect our understanding of Saharan trade in antiquity, including gaps in areas covered by archaeological work, and geographic specialization combined with scarce communications between specialists working on either side of the Sahara. Above all, international archaeological research in Algeria, in other Saharan regions, and along the North African coastline is much needed. The Zarái tariff, for example, which was found some fifty kilometers southeast of Sétif in Algeria, within the confines of “two large bioclimatic entities of complementary economies” (Troussset 2005: 355), namely the Tell and the pre-desert, gives us an idea of the kind of trade that occurred in this area in Roman times. This list of internal custom duties from the early third century AD details the various goods passing through this point, such as sponges; *garum* and wine carried in amphorae; hides and textiles; figs, nuts, and other goods. It also gives the prices of animals. Although a local rather than a frontier taxation document (see Troussset 2005), it indicates to some extent the movement of trade in the pre-desert zone: foodstuffs such as Roman wine or *garum* were probably going southward into the Sahara; and hides and textiles were probably traveling north.⁹

While the tariff remains a key epigraphic document concerning taxes in the Roman world and the movement of goods, the archaeological evidence to substantiate trade via Algeria in antiquity is still lacking. To date, two pieces of

archaeological evidence imply the potential for Saharan trading connections: the presence of underground canals (*fagāgīr*, sing. *faggāra*, elsewhere known as *qanāt*) in the greater Touat in southwestern Algeria, and imported goods found in the tomb of Tin Hinan in the Ahaggar mountains, in Algeria's extreme south near contemporary Tamanrasset. *Fagāgīr*, based on technology that was clearly imported into the region from farther east, channel water from higher-lying underground water tables to lower-lying settlements. Along with the *fagāgīr* in the Garamantian heartland of the Fezzan, the oases of the Touat, Gourara, and Tidikelt in the Algerian Sahara contain the highest concentration of *fagāgīr* in North Africa (Wilson 2006: 213). The suggestion that *faggāra* technologies spread in the early to middle years of the first millennium AD from the Fezzan to the Algerian oases is potentially interesting, yet so far these areas remain to be archaeologically explored and fully documented, and the hope is that urban expansion has not yet fully obscured or destroyed the evidence (Wilson and Mattingly 2003: 42). Nonetheless, if similar in date to the Garamantian ones, the sheer quantity of *fagāgīr* in the Algerian Sahara points to the existence of another major Saharan hub capable of maintaining a substantial population and affording yet another crucial stop for any long-distance commerce toward the Niger bend or the gold-producing areas of the western tip of Africa, while the commerce bound for Lake Chad presumably proceeded southward via the Ghat oases in contemporary Libya. The striking continuity of weights and measures remains an argument for trans-Saharan trade along these routes: it has been suggested that the *mithqāl*, the Arabic gold weight used in Saharan commerce, may have been based on the Roman standard, thereby indicating continuity with the late Roman gold trade with sub-Saharan Africa (Garrard 1982).

The tomb of Tin Hinan at Abalessa in the Ahaggar, at a distance of more than 1,500 kilometers from the Mediterranean coast, is another indicator of trade and contact but is so far not well contextualized within the wider patterns of connections and trading in this particular section of the Sahara; this will not change until further archaeological research is carried out in southern Algeria. This tomb, found together with twelve lesser surrounding tumuli (burial mounds) containing thirty individuals altogether, held the remains of a woman whose rich burial eventually associated her with a putative queen called Tin Hinan from the Tafilalet, according to local traditions.¹⁰ The burial site has a *terminus post quem* of AD 308–324, provided by a coin imprint on gold leaf, and contained various Roman goods, gold and silver bracelets, a Roman oil lamp, and fragments of glassware (Baistrocchi 1989: 94), pointing to long-distance trading connections with the Roman world and to the penetration of goods far into what is now southern Algeria. Several hypotheses have been proposed concerning the origins of the inhumed person and the nature of the tomb, including that it was part of a Roman outpost fort (which it was not),

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or the tomb of a traveler from northern areas who was marginal to the Roman empire (for a summary of these arguments, *ibid.*: 94, 98). However, the deceased woman was wearing a red leather garment, as well as one or several bead necklaces (*ibid.*: 92), which would rather point to an origin from outside the Roman empire. Her dress is also strikingly close to Garamantian traditional wear, as is her taste for red ochre (Mattingly 2003: 227), while the funerary assemblage, though richer in precious metals than most Garamantian tombs, shows some cultural affinities with tombs in the Fezzan.¹¹ Hence, the evidence so far may suggest another node of Saharan connections situated in the Ahaggar mountains. At Timmissao, which is 220 kilometers southwest of Abalessa, the presence of Roman coins (Mauny 1956) and a Latin inscription mentioning a water point (*lacus*) further advances the hypothesis that a route to the Adrar des Iforas and Gao was perhaps known in classical antiquity (Rebuffat 2004: 243, 253–257).

Fragile Environments and Adaptive Ecologies

In *The Corrupting Sea* (2000), Horden and Purcell describe ecological instability and frequent crises as key drivers to the creation of networks of exchange, the only way in which some degree of security could be achieved. A similar ecological instability has characterized the Sahara ever since it assumed its current state and climatic conditions, more or less 5,000 years ago. On the basis of research in the Wadi Tanezzufft, south of the Fezzan, on cypress (*Cupressus dupreziana*) tree rings, which serve as indicators of annual rainfall, Cremaschi, Pelfini, and Santili (2006) identify pronounced wetter periods with short dry phases from ca. 1570 BC on, and a final onset of hyper-arid conditions only occurring in ca. AD 450. If this evidence can be extrapolated more widely to the Fezzan, then we can expect it to have affected the Garamantes: the onset of hyper-arid conditions in particular coincides with the collapse of their civilization (Liverani 2003; Cremaschi, Pelfini, and Santili 2006). Whether the landscape farther north was similarly affected is debatable: the use and abandonment of farms in the Libyan pre-desert, as identified by the UNESCO Libyan Valleys Survey, cannot be simply attributed to climatic changes,¹² just as the final collapse of the Garamantian center may have reasons beyond climatic determinism.¹³ The solution probably has to be sought in the complex ecological interplay of climate and wider historical trends. All life in the Sahara is subject to the availability of fresh water: the Fezzan, for example, receives less than ten millimeters of annual rainfall (Mattingly 1995: 9), and the Garamantes could not have sustained such a large center of civilization without irrigation and hence *fagāgīr*. Although centers of power and directions of trade shifted from one network to another, in the long run, the feasibility, construction,

and maintenance of water points dictated the survival of centers of trade, trade routes, and travel in the desert. Thus the control of Saharan trade can be put in terms of who controls access to water: Pliny the Elder, writing in the first century AD, noted the ease with which water could be obtained if one knew where to look for it, but he also explained that trade routes through the Sahara were in part controlled by the Garamantes, who filled in the wells along the way to prevent their use by others, and thus prohibited any travel in the Sahara independent of their oversight.¹⁴ The tight control that the Garamantes had over the trading routes and their reluctance to allow the Romans any access to it at that time could not be more explicit. The Garamantes controlled and regulated one of the major Saharan routes between sub-Saharan Africa and the Libyan coast from the sixth century BC to the fifth century AD (Crawley Quinn 2009). The success of the Garamantes lay not only in their control of a strategic geographic area, but also in their ingenious management of available resources, whether new irrigation technologies or new crops. These probably enabled a Garamantian population boom: the estimate is some 50,000–100,000 inhabitants at its peak (Mattingly and Wilson 2003: 37). Their control and management of resources also helped them establish a center of food and water resources with sufficient surplus to allow trade. Aerial photographs showing lines of spoil rings placed at regular intervals over the stretch of the Wadi al-Ajal also emphasize the extensive use of canal systems bringing water from aquifers to various sites in the Fezzan during the Garamantian period. The more than 600 known *fagāgīr* surveyed so far in the Fezzan were used not only to supply the Garamantes' settlements with water for agriculture and drinking (Wilson and Mattingly 2003), but also to generate the surplus necessary to enable trade and the periodic stay of men and animals involved in long-distance commerce. If different breeds of camels, which are adapted to variations in climate, terrain, and food resources, were used for different sections of journeys through the Sahara in antiquity as they are today (Mikesell 1955: 234; E. A. McDougall this volume), we might expect that the necessary stopovers for trans-shipment were facilitated by the presence of a powerful center such as the Garamantian kingdom. The fragility of trans-Saharan trade meant striking a balance in the use of water points and trading centers, managing food resources for humans and animals, and communicating with traders and populations from throughout the Sahara.

Coping with Vulnerability

Several major events in the agricultural history of the northern Saharan oases had a long-lasting impact on their development in antiquity, and clearly point to established patterns of connectivity within the Saharan system, as well as to an

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ongoing search for ways of coping with the Saharan environment. The first change in cereal agriculture in the Fezzan consisted of a shift from hulled to free-threshing wheat crops in the late first millennium BC, a similar date to the change in Egypt (Pelling 2008: 57), while a comparable change occurred in the early first millennium BC in the Mediterranean. The shift to free-threshing wheat, as the name implies, would have significantly lowered the labor requirements associated with the harvest. This might reflect an early strong connection to Egypt. Second, the appearance of pearl millet (*Pennisetum glaucum*) and sorghum (*Sorghum bicolor*) in the archaeological record in the last centuries of the first millennium BC at Jarma in the Fezzan directly testifies to trading networks reaching the south of the Sahara, where these plants originate.¹⁵ The evidence of pearl millet and sorghum at Jarma is the earliest attestation of these crops in the northern Sahara, a fact that precludes it from coming from elsewhere: they are not found in the western oases of Egypt and only appear later, during the Roman period, at Qasr Ibrim in Nubia (Pelling 2008). The introduction of pearl millet and sorghum, which are summer crops, allowed for a biannual harvest, which in turn might have permitted an increase in trade, if we assume that more resources meant the ability to cope with more traders.

Barley, one of the most salt-tolerant species, and sorghum, which is also salt-tolerant, would have helped the Garamantes overcome some of the challenges posed by their salt-rich soil.¹⁶ While barley has the further potential to produce two annual harvests, sorghum has a lower water requirement, therefore making it a good supplement as feed and fodder. The introduction of pearl millet, which has even lower water requirements than either sorghum or barley, might have marked a period of agricultural expansion, and the grain could have been used to make marginal lands more productive. The discovery of small but constant quantities of cotton seeds (*Gossypium* sp.), showing signs of its harvest at Jarma by the third or fourth century AD at the latest (Pelling 2008: 58–59), is surprising as, unlike these food crops, cotton cultivation requires relatively substantial quantities of water and was thus only feasible through the use of *faggāra* technologies. It also hints at specialization in a crop cultivated on the basis of its high commercial value rather than for subsistence. Cotton, which probably originated in India or the Indian Ocean, possibly came through the Egyptian corridor, as it was found in the Dakhla and Kharga oases in Roman times (ibid.: 59; Van der Veen 2011: 89).

Equally, the poppy (*Papaver somniferum*) found in the Fezzan (Pelling 2008: 49) may have spread from the Mediterranean: originally a western Mediterranean domesticate, it may have been used as a condiment or as a narcotic/soporific, although too few samples have been found to confirm this. The presence of chickens in Mali by AD 500 (MacDonald and Edwards 1993) could indicate North African or Egyptian imports potentially via the Fezzan, where they are found in

the Garamantian period (Grant 2006: 181). Similarly, the continuous presence of pigs in the Fezzan in the Garamantian period and from at least 700 BC–400 BC (Van der Veen 2006: 173; Grant 2006: 181) is potentially another indication of transregional trade, given that the pig is not native to this part of the world (Albarella, Dobney, and Rowley-Conwy 2006). The first- or second-century AD terracotta figurine in the Ashmolean Museum (Oxford) of a camel carrying two live pigs, although from Syria, reminds us that live animals too could be carried over long distances in desert areas, although no traces of this traffic might remain in the archaeological record.

One of the more stifling concepts in the classical scholarship on Saharan trade has been the notion that trade was unidirectional (as noted by Liverani 2000b: 20). The presence of *fagāgīr* in the Fezzan can serve as evidence for trade via the oases systems to the east, probably the western Egyptian oases, where similar technology was used as early as the fifth and fourth centuries BC (Wilson 2006: 211). The claim that trade routes linked these areas to Egypt in the second half of the first millennium BC is therefore entirely plausible (Liverani 2000a). It is interesting to note the appearance both of new crop species and of irrigation technologies within a roughly similar time period in both areas, suggesting crop diversification and optimization, a search for competitive strains, or crops that were primarily cultivated for exchange (if we suppose that cotton was not only for local consumption). It is equally interesting to note a continued transregional interest in agricultural improvements, leading to the introduction of new sub-Saharan crops along with a shift to free-threshing wheat in alignment with changes in Egypt and the transfer of irrigation technologies. While we do have good archaeological data for crop species, the *fagāgīr* are still in the process of being more accurately dated: they were certainly present in the Fezzan by the classical Garamantian period, certainly between the first and fourth centuries AD, if not closer to the second century BC–second century AD date suggested by the Taglilt *fagāgīr* (Wilson 2006: 209–210). The connection from the Garamantian kingdom to places farther west remains difficult to assess. The problem of the current scarcity of research undertaken in Algeria has already been mentioned, and the argument for the spread of *fagāgīr* to Algeria (and perhaps Morocco) via the Fezzan remains key to identifying connections within the northern Saharan regions.

Transport Hubs, Commercial Emporia, and the Garamantian Kingdom

We ought to consider movement within the Sahara not only as more fragmented than is often assumed, involving various Saharan players such as the

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Garamantes (Wilson 2009), but also as multidirectional within the possibilities afforded by regional networks. In that sense the oases are “quite similar to ‘islands’ in a huge archipelago, which maintains strict unity disregarding its physical spread” (Liverani 2000b: 20). The desert hub is characterized by its insularity and its connections to the wider networks of trading. On an island, trade and goods can in theory come from any direction. Similarly, Saharan hubs can receive trade items from anywhere within the networks they are drawing on. This does not preclude preferential trade connections and hence general trends at one historic period or another, but we must be able to consider both the long-term preferential pattern and the short-term ability to trade with all.

In the Sahara, where the next stage of the journey might require weeks of traveling, trips are often fragmented, and undertaken step by step. Herodotus’s account from the fifth century BC of a trans-Saharan journey provides us with the earliest description. In a reevaluation (Liverani 2000a), it has been convincingly argued that his narrative represents the various stops and stages of a caravan route leading from the lower Nile to the Niger bend. As depicted by Herodotus, the concept is clear: the point of focus is always the next stop, rather than the end of the journey, just as time and space beyond that point become marginal concepts. Trade connections, and therefore knowledge, beyond the next stage may therefore not have been of interest from a local point of view: while Herodotus, as a historian, sought to explain the entire Saharan journey, from a trading perspective this may not have been relevant for those who held the monopoly over one particular section of the journey (see also E. A. McDougall this volume). Instead, it may be more useful to understand trading patterns from a local point of view (such as that of the Garamantes, for instance) and at the same time envisage different types, ranges, and lengths of focus of trading routes, of short-, medium-, and long-distance ranges (Wilson 2009). While some goods may have moved *across* the Sahara from one side to the other, the majority probably remained in the Fezzan.

Whereas the intensity of trade between the Garamantes and the Roman empire via North Africa is well attested through the abundance of Roman goods in both burials and surveyed settlements, evidence of sustained trading contact with sub-Saharan regions is less readily forthcoming. The amount of Roman material reaching Africa south of the Sahara seems to have been limited, and most Roman trading goods were probably used and consumed in the Garamantian heartland. Contact with the south, less apparent in the archaeological record, is better sought in different types of evidence, such as traces of agricultural changes and technology transfer across the Sahara and in the Garamantian corridor (crop imports, iron technology, or the need for a larger workforce for innovations in irrigation

techniques). It is also hinted at by occasional finds of sub-Saharan goods, such as a hematite lip plug found in a burial in the Fezzan, probably implying the sub-Saharan origin of the deceased person (Mattingly, Lahr, and Wilson 2009: 119). Slaves, ivory, animals such as rhinoceroses, and gold may have crossed the breadth of the Sahara from south to north, while goods such as wine and oil remained in the Garamantian territory, as attested by the material found in funerary contexts (Mattingly and Edwards 2003: 227–229). If we believe Herodotus, the Garamantes acted mainly as suppliers of slaves, probably taken from the southern areas of Lake Chad and the Niger bend. Fentress (2011) argues that the increase in the number of black slaves in the ancient world may be gathered from their representation in small bronzes and ceramic figures: the gradual shift from Africans' quite regal appearance on Attic pottery, to often grotesque and sometimes malnourished and maltreated children in later representations may be associated with increased African slave populations.¹⁷

Meanwhile, the Garamantes themselves must have needed a large number of slaves for digging the hundreds of kilometers of underground water canals on which the Garamantian kingdom relied (Wilson 2006: 210). We can begin to see the interplay of the various systems of trade: while adult male slaves were kept for digging *fagāgīr* in the Garamantian heartland, the slave children that Fentress identifies were sold to the Mediterranean markets.¹⁸ This minimized the risk associated with transport and maximized profit, since children fetched very high prices, as *deliciae* or *delicati* (luxury boys), but also due to their longer anticipated life spans, and their greater malleability and hence adaptive potential to the Roman world. Trade in slaves might reflect the realities of short- and long-distance trade in the Sahara more generally and the role played by the Garamantian trading platform. Although textual evidence is scant, a derogatory poem from Hadrumetum (modern Sousse, Tunisia) points to the presence of “Garamantian” slaves in North Africa though, as noted by Desanges (1999b: 236), the comment on the Garamantian slave's pitch-black color could have referred either to a Garamant, or to a slave from sub-Saharan Africa traded via the Garamantes.

Another indication of such multilateral networks is the possible spread of metallurgy from the Mediterranean to sub-Saharan Africa. At Bou Khzama (Tichitt, Mauritania), ironworking appears as early as the mid-first millennium BC, that is, roughly at the time of Herodotus's account of a trans-Saharan journey, but also at the time for which evidence of metal production is extant for Zinchecca in the Fezzan.¹⁹ One suggestion is that the technology at Tichitt was brought into sub-Saharan Africa from the north by Berbers (MacDonald et al. 2009). Another possibility would be through maritime or coastal routes. But given the evidence for metal production in the Fezzan in the early period, this raises a number of issues.

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Were iron technologies brought along or exchanged via established slave routes? If so, could the Fezzan, where much ironworking was needed in order to produce tools to dig *fagāgīr*, also be one of the potential areas of dissemination? One could indeed imagine the possibility that the Garamantes could have eventually found ways of negotiating alliances and hence had more sustained contact with tribes farther south: research south of Ghat identified another Garamantian fortified site at Aghram Nadharif, which controlled routes southward (Liverani 2005). These could have operated as part of the slave trade, thereby allowing the Garamantes to avoid risk taking and to unburden themselves of the logistical problems of the slave raiding which Herodotus ascribes to them.²⁰

From the imperial period on, Rome showed a clear desire to engage in trade with or even to control the northern part of the Sahara. The growing influence of the Mediterranean world is clearly reflected in the archaeological evidence in the Fezzan. Cornelius Balbus's campaigns against the Garamantes in 20 or 19 BC, during which he seized various places and tribes on the way to the Fezzan, mark an important initial phase of contact with the Garamantian kingdom and toward control of the edges of the desert. In the third century, the names of several localities were recorded in *ostraca* at the Roman fort of Bu Njem, located 200 kilometers due south of Cape Misurata and on the Roman frontier: *ostracon* 64 mentions the name Bubeius, one of the places conquered by Balbus on his way to the Fezzan (Pliny 5, 5, 37); *ostracon* 80 mentions a *filius Fezinis* (son of Fezin).²¹ The importance of Balbus's success²² goes some way toward explaining the triumph he was granted in the city of Rome, a remarkable honor both because of his non-Italian origins (from Cadiz, Spain, he was the first non-Italian to be allowed a triumph in the capital) and because he was the last private citizen ever to be granted one. The Saharan campaigns were intended as punitive expeditions aiming at territorial control over the pre-desert and border consolidation under the emperor Augustus (27 BC–AD 14), but may well have gone hand in hand with a search for luxury goods from the margins of the empire, such as ivory or exotic animals from Africa, gems or marbles from the edges of the Eastern Desert, or Indian goods, which flowed in from the Red Sea.²³ Balbus's success in the Garamantian territory, however, did not imply control or long-term pacification of the area, and, according to the archaeological record, trade with the Garamantes mainly intensified later, in the second half of the first century AD (Mattingly and Wilson 2010). From this moment on and well into the sixth century AD, goods such as *sigillata* ceramic ware from Italy or Tripolitanian wine amphorae are commonly found in graves (Fontana 1995), indicating continuous and sustained contact with Roman North Africa. The *ostraca* from the third-century AD Roman fort at Bu Njem also show

that the appearance of Garamantes with trading goods was part of the daily routine (Marichal 1992: 104n72).

The evidence from the Sahara of classical antiquity suggests that networks of contacts were established early on, if only to cope with the instability of the Saharan environment. Exchange occurred on different scales, and varied according to needs and preferential routes determined by trading alliances as much as by geography. The botanical record provides evidence of long-standing trade with sub-Saharan as well as northern Africa. Crops traveling through the Sahara led to agricultural changes that improved local living conditions, via the introduction of better adapted or less labor-intensive crops, and those planted essentially for trade, such as cotton. New technologies developed alongside agriculture, perhaps responding in part to commercial needs. The Garamantian kingdom provided a formidable point of contact in the Sahara, and its wealth is well attested in the abundance of goods, in particular those of Roman origin, found in burials and settlements. Garamantes routinely imported Mediterranean foodstuffs, such as oil and wine, as attested by the numerous finds of Roman amphorae in burials. Their presence in the majority of burial contexts excludes the hypothesis that imported goods were used by the elite only (Mattingly and Wilson 2010). Other imports included ceramic wares, cooking wares, and glass items, brought down directly from the Syrtes, the Roman world, and later from Egypt. It seems that, for reasons of infrastructure, goods destined for the Sahara had to transit via the Garamantian hub. Conversely, the Garamantes used sub-Saharan resources, such as manpower for digging *fagāgīr* or new drought-resistant crops, to produce a surplus for trading with the Roman world on a scale large enough that Roman goods are found in most of the burials in the Fezzan oases. Animals were probably traded as well.

Continued research in the Fezzan has gradually shown the extensive role played by the Garamantian community as a hub allowing access to places throughout the Sahara. The abundance of Roman goods found in the Fezzan certainly testifies to a strong link with the coastal areas of North Africa, but also implies the presence of less archaeologically visible trading items from the south. While archaeological and historical gaps remain to be filled, we can nonetheless say that the Sahara in classical antiquity was a space of vibrant interaction extending in all possible directions.

NOTES

1. I am grateful to Andrew Wilson and Josephine Crawley Quinn for reading various drafts of this chapter, and for discussions with Judith Scheele, in particular about camel changeover locations in the Sahara. I am equally indebted to Dorian Fuller, who kindly agreed to read and comment on the botanical section. Any mistakes, of course, remain my own.

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2. For examples from the wider Indian Ocean corridor, see the SEALINKS project (<http://www.homepages.ucl.ac.uk/~tcrndfu/sealinks/sealink1.htm>), and Boivin and Fuller (2009).

3. Three of the world's largest aquifer systems (water-bearing layers) are located underneath its surface; the Northwestern Sahara Aquifer System alone covers over a million square kilometers, and has an estimated reserve of thirty billion cubic meters of fresh water.

4. See, for instance, Harris (2005), and Malkin, Constantakopoulou, and Panagopoulou (2009).

5. Lydon's (2009: 52–54) rather pessimistic perception of the early Saharan trade seems to be due to her reliance on a somewhat limited bibliography on the Sahara in antiquity, which does not include archaeological research undertaken since the 1990s by David Mattingly and others.

6. See Fentress (2007: 132) for the suggestion that Gighthis may be second to Lepcis in terms of trade with the Garamantes.

7. A camel charged with a normal load (150–200 kg) would probably only have been able to carry two of these, especially over long distances.

8. Tacitus, *Hist.* 4.50.

9. See Baratta (2008) and Trouset (2005: 364, 363) for goods possibly traded via the Garamantes (slaves, and alum from Ghat, Kaouar, or Nefzaoua). While both suggestions are likely, they do not exclude other proveniences, alum and slaves being available from other areas. Alum may have come from the island of Lipari, for example, via the ports of the Lesser Syrtes, along with other coastal goods, such as sponges.

10. It is more likely that Tin Hinan was a *sharifa* (descendant of the Prophet Muhammad) from the Tafilalt who came to the Ahaggar in the seventeenth century, and whose story was superimposed onto that of the much earlier tomb (Baistrocchi 1989: 91).

11. Although gold has been almost absent from finds in the Garamantian tombs, probably due to the extensive robbing of wealthy burial sites, Mattingly has suggested on the grounds of similarities between the tomb of Tin Hinan (whose gold bracelets alone weigh 1.7 kg) and the Garamantian burials that the Garamantes may have had similar access to gold wealth in the Fezzan (Mattingly 2003: 229).

12. Gilbertson (1996).

13. Other factors, such as the over-extraction of available water resources, or the economic downturn and turmoil in North Africa starting as early as the mid-third century AD, are probably equally important.

14. Pliny, *NH* 5.5.38: "Hitherto it has been impossible to open up the road to the Garamantes country, because brigands of that race fill up the wells with sand—these do not need to be dug very deep if you are aided by the knowledge of the localities" (Loeb transl.).

15. Pelling (2008: 58). This introduction must have happened sometime in the mid-to late first millennium BC; these crops were not found at the earlier Garamantian site at Zinchecra (10th–5th century BC), while accelerated mass spectrometry dates them to 370–350 cal. BC (millet) and 390–110 BC (sorghum).

16. Herodotus, *Hist.* IV.183: "Men dwell there called Garamantes, an exceeding great nation, who sow in earth which they have laid on the salt" (Loeb transl.). This clearly refers to the salt-related issue in the agriculture of the Fezzan.

17. One *ostrakon* (inscribed pottery fragment; pl. *ostraca*) at Bu Njem also records Garamantes and Egyptians bringing letters and a fugitive slave (Marichal 1992: n. 71).

18. On Djerba, for example, one of the possible outlets for Saharan trade, an *ostrakon* mentions a *mango*, or slave trader, probably operating there (Fentress, Drine, and Holod 2009: 338). St. Augustine, writing at the turn of the fifth century, also comments on slave raiding (though on a more local basis) and slave shipments from the North African port of Hippo Regius (today's Annaba, Algeria) (*Epistulae* 10*).

19. On the Bou Khzama smelting furnace, see MacDonald et al. (2009). For Zinchechra, see Schrüfer-Kolb (2007: 457).

20. Herodotus, *Hist.* IV.183.

21. In Roman times, however, the area thus designated comprised districts much farther north than the region to which the term now refers (Marichal 1992). Adams (1994) has shown that the Latin extant at Bu Njem is that of Punic-speakers who have not fully mastered the Latin language.

22. Balbus's reconstruction of the harbor at Cadiz shows an understanding of the need to develop infrastructures to develop long-distance trade, and perhaps an anticipation of profits of some sort.

23. Virgil, *Aeneid* 6.791–796: “Augustus Caesar, son of a god, who will again establish a golden age in Latium amid fields once ruled by Saturn; he will advance his empire beyond the Garamants and Indians” (Loeb transl.)