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Outlining the Garamantian Kingdom, from Herodotus to the Satellite Images - by Amelia Carolina Sparavigna

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The Garamantes lived in the Fezzan, a south western region of modern Libya, which is now largely desert, broken by mountains, uplands and wadis. Here we shortly outline their kingdom, starting from the ancient Greek and Latin texts and ending with some recent discoveries obtained by means of high-resolution satellite maps.

The Garamantes were first reported by Herodotus' Histories, 5th century BC. In describing the populations in Libya, Herodotus tells that the first people one can find "after a ten days' journey from Thebes, are the Ammonians, ... Next to the Ammonians, along the ridge of sand, at the end of another ten days' journey, there is a hill of salt, like that of the Ammonians, and water, and men live round it; the name of this region is Augyla; and thither the Nasamonians go to gather dates. From the Augylae, at the end of another ten days' journey, is another hill of salt and water, and many fruit-bearing palm-trees, as also in other places; and men inhabit it who are called Garamantes, a very powerful nation; they lay earth upon the salt, and then sow their ground. From these to the Lotophagi the shortest route is a journey of thirty days... These Garamantes hunt the Ethiopian Troglodytes in four-horse chariots ... At the distance of another ten days' journey from the Garamantes is another hill of salt and water, around which a people live who are called Atarantes; they are the only race we know of who have not personal names". [1,2]

Pliny the Elder is telling about Garamantes in his Natural History too, giving their geographic position, when reporting of the caravans moving from Lebida, the ancient Leptis, to Berenice in Cyrenaica, crossing "deserts which present nothing but sand and serpents". After passing these sands, writes Pliny, "we come to forests filled with vast multitudes of wild beasts and elephants, then desert wastes, and beyond them the Garamantes, distant twelve days' journey from the Augylae". The desert wastes are those separating the mountains of Fezzan and Atlas from Cyrenaica and Barca. Augylae, now Aujelah or Awjila, was an oasis of Cyrenaica, one of the chief stations on the caravan route from Cairo to Fezzan [3]. Pliny is also telling that Garama (the modern Germa), was the most famous capital of the Garamantes. In the Figure 1, we can see a map showing the location of Germa [4].

As told by John Bostock in his translation of Pliny's text [3], the Garamantes, in the widest sense, "were all the Libyan tribes inhabiting the Oases on the eastern part of the Great Desert". In the stricter sense however, "the name Garamantes denoted the people of Phazania, the modern Fezzan, which forms by far the largest oasis in the Grand Desert of Sahara". Archaeological excavations and research indicate a quite long continuity of population in this region. Archaeological artifacts and stone tools discovered in various sites from Fezzan were definitely dated to 100,000 - 30,000 BC. As illustrated in the Germa Museum, local Libyan archaeological studies of prehistoric burial chambers suggest that the Fezzanian graves date from the Late Stone Age, that is around 50,000 years ago [5].

Around the year 19 BC, the Garamantes were brought under the Roman control, by the proconsul of Africa Lucius Cornelius Balbus. The Balbus expedition arrived across the Ubari sand dunes to the capital Germa [5,6]. After this attack, the Garamantes, eventually succeeded in expelling the Roman forces, however they never fully recovered: their kingdom began to decline and slowly disappeared. Concerning the expedition lead by Balbus, Pliny provided a list of tribes, towns and locations of Garamantes. "Cornelius Balbus was honoured with a triumph, the only foreigner indeed that was ever honoured with the triumphal chariot, and presented with the rights of a Roman citizen; for, although by birth a native of Gades, the Roman citizenship was granted to him as well as to the elder Balbus, his uncle by the father's side. There is also this remarkable circumstance, that our writers have handed down to us the names of the cities above-mentioned as having been taken by Balbus, and have informed us that on the occasion of his triumph, besides Cydamus and Garama, there were carried in the procession the names and models of all the other nations and cities, in the following order: the town of Tabudium, the nation of Niteris, the town of Nigligemella, the nation or town of Bubeium, the nation of Enipi, the town of Thuben, the mountain known as the Black Mountain, Nitibrum, the towns called Rapsa, the nation of Discera, the town of Debris, the river Nathabur, the town of Thapsagum, the nation of Nannagi, the town of Boin, the town of Pege, the river Dasibari; and then the towns, in the following order, of Baracum, Buluba, Alasit, Galia, Balla, Maxalla, Zizama, and Mount Gyri, which was preceded by an inscription stating that this was the place where precious stones were produced" [3]. As explained in [3], on the occasion of a triumph boards were carried aloft on "fercula," on which were painted in large letters the names of vanquished nations and countries. Here too models were exhibited in ivory or wood of the cities and forts captured, and pictures of the mountains, rivers, and other great natural features of the subjugated region, with appropriate inscriptions.

After 19 BC then, the Romans annexed Phazania, to the Roman Empire. In 666 the Arabs conquered Phazania and subjected it to Islam. Thereafter, the region was ruled by a succession of Arab and native dynasties, until it was made a part of the Ottoman Empire in 1842. Fezzan was amalgamated with Cyrenaica and Tripolitania under Italian rule in 1912. In 1951 a United Kingdom of Libya was proclaimed, and the three regions remained provinces until 1963, when Libya became a unitary state [5,6].

In Reference 7, Louis Werner describes in detail how the ancient Greek and Latin world saw the Garamantes. We have already seen the descriptions by Herodotus and Pliny. Let us add, after Ref.7, that Pliny also described the Garamantes guerrilla tactic of filling desert wells with sand when they were retreating. According to Tacitus, the Garamantes were an ungovernable tribe, engaged in brigandage against its neighbors. Lucian wrote that the Garamantes lived in tents and hunted apes. Werner includes the Roman poet Virgil too, who mentioned the Garamantes in the Book Six of the Aeneid, when Anchises speaks to Aeneas in a prophecy of the rule of Augustus Caesar, "who will renew a golden age in Latium and stretch his rule beyond the Garamantes,... a land beyond the paths of year and sun, beyond the constellations, where on his shoulders heaven-holding Atlas revolves the axis set with blazing stars." Strabo the Geographer concluded that most of the peoples of Libya were unknown and contacts with the natives from far inland rare and news from them not trustworthy or complete [7].

Our knowledge on Garamantes is then coming from the ancient Greek and Latin texts and of course from the several archaeological missions that worked in the Fezzan to gather evidence on Garamantes. Besides the work undertaken in the oasis of Ghat during the Colonial period and the first excavations in the ancient capital Garama by the Italians [8], during the 1960s and 1970s several archaeologists worked to complete the excavation of Garama and its fortress Zinchehra [6]. Figure 2 shows this fortress which dominates Garama. The archeologists that examined the Garamantes sites were Mohammad Ayoub, a Sudanese official in the Libyan Antiquities Department, and Charles Daniels. Ayoub's work in Old Garama established three sequences of construction: the topmost Islamic city, a middle level of dressed stone foundations, and a bottom level of salt-brick work that seemed to be pre-Roman [7]. Daniels's excavations at Zinchehra established the earliest date for its various defensive and residential walls as the ninth century BC [7,9,10]. From 1997, an Italian-Libyan Mission in the Garamantian kingdom concentrated a part of its efforts in the rediscovery of the proto-historical remains in the

region of the wadi Tanezzuft and Acacus mountain, which are located in the south-west border of Libya [8]. The Mission was directed by Mario Liverani, who opened this field of research in the region, and it is led, at present, by Savino Di Lernia [8]. In the same 1997, a British mission directed by David Mattingly of the University of Leicester started to work in Fezzan [7], dating organic remains in Old Garama, studying the irrigation tunnels known as foggara and documenting the Roman trade goods found in the area.

According to Sa'd Salih Abedelaziz, in 2004 director of the Garamantes Museum at Germa, the Garamantes were at the center of trades across Sahara of highly valuable, low-weight trade goods such as gold, salt, glass and precious gems [7]. "To the west is the oasis town of Ghat, the first in a string of caravan stages that lead first to Algeria's Tassili n'Ajjer and Hoggar mountains and on to the Adrar des Ifoghas in modern Mali, ending at the Niger River. To Garama's east, through the oases of Waddan, Augyla and Siwa, although not an easy trip, lies Egypt and the Nile. To the north is the Mediterranean coast, reached via the historically important city of Ghadames". And for this reason then, in AD 69, the Romans under Valerius Festus opened up a more direct route between Fezzan and the coast [7]. Werner continues "South of Fezzan, along the Chad border, are the Tibesti mountains. Looking at the map, one can imagine why the Nile, the Niger and the Mediterranean would be destinations of importance, but the Tibesti? If Pliny can be believed, Mount Gyri, source of the classical world's highly treasured carbuncle, or garnet stone, is to be found there".

During the second millennium BC, the Sahara's climate began to change from wet to the present extreme aridity, and therefore people adapted by changing their nomadic life of hunting and gathering to settled pastoralism and agriculture. However, agriculture requires water supplied by some irrigation works: in this region the irrigation is coming from a near-surface water table. Therefore, the Garamantes built several underground foggara, even from the sixth century BC. The foggara consisted of bricked and cemented galleries and vertical shafts at regular intervals, similar in design and function to the qanats of Persia, and like the irrigation system built in Egypt's Bahariyya Oasis and by the Romans centuries later in Tunisia and Algeria [7]. However, this huge foggara system required intensive labor for construction and maintenance, and therefore a well-organized labor and motivated workers. Probably, the work was organized by a central authority, that is by the Garamantes king. As told in [7], the water table continues to support the modern agriculture in these territories. "Pumps and pipes have replaced the network of stone foggara, or underground irrigation tunnels, that once may have totaled as much as 20,000 kilometers throughout the valley".

As remarked in [8], the Garamantes succeeded in developing a rich agricultural exploitation of the oasis environment, introducing large scale irrigation technologies. Moreover, they were able to create a complex trade network between the Mediterranean coast and the sub-Saharan countries, through the building of stages along their commercial routes. Garamantes then experienced "the emergence of a complex state formation in the middle of the desert" [8]. In fact, the Garamantian kingdom was as an insular kingdom, located on an archipelago of oases, in a sea of sand. According to Mario Liverani, the Garamantes' greatest legacy is their prowess in Saharan travel. "The measured routes, daily stages, mapped mountain passes and rough bypasses around such no man's lands as the basaltic Haruj al-Aswad were used by centuries of later caravaners, and many are still followed by today's truck drivers" [7].

In the Islamic period, the Fezzan's capital shifted one wadi south from Garama to Murzuk, because the north-south trade route between Tripoli and Nigeria had gained in importance, and Garama was off this main route [7]. Garama's most recent buildings date from 1557, when its kasbah, now in ruins, was built by Muhammad al-Fassi, from Fez, when returning from a pilgrimage to Makkah [7]. Al-Fassi's sons, al-Nasir and al-Muntasir, married locally and moved the capital to Murzuk. The paper written by Werner reveals then that the Garamantian kingdom was mainly based on two wadis: that of Garama and that of Murzuk, and it is near Murzuk that we have to move for the last part of our discussion, a part which is concerning the Google Maps.

The interest on Garamantes was renewed in 2011 by an article of the National Geographic [11], which was telling that by means of satellite images it was possible to locate hundred fortress settlements in Fezzan. "Researchers uncovered the Garamantes walled towns, villages, and farms after poring over modern satellite images - including high-resolution pictures used by the oil industry - as well as aerial photos taken during the 1950s and 1960s. The fortresses were confirmed based on Garamantes pottery samples collected during an early-2011 expedition. That field trip was cut short by the civil war", the article is telling. The researchers were from the University of Leicester, and found an area of 4 square kilometers containing at least ten village-size settlements.

An issue of the University of Leicester [12] tells that "a British team discovered more than 100 fortified farms and villages with castle-like structures and several towns, most dating between AD 1-500. ... The team from the University of Leicester (the leader is David Mattingly) has identified the mud brick remains of the castle-like complexes, with walls still standing up to four meters high, along with traces of dwellings, cairn cemeteries, associated field systems, wells and sophisticated irrigation systems. Follow-up ground survey earlier this year confirmed the pre-Islamic date and remarkable preservation.... The professor and his team were forced to evacuate Libya in February when the anti-Gaddafi revolt started, but hope to be able to return to the field as soon as security is fully restored". In Reference 12, we can see the elaboration of some images obtained from the Google Maps. This issue is not giving coordinates, but since we are aware of the location of the two capitals Garama and Murzuk in the two wadis where the Garamantes lived, we can easily search their sites in the Murzuq district (in fact, Ref.13 is telling that the sites are located in this district). A part of it can be observed in the Google Maps with a high enough resolution to appreciate the archaeological sites. In the Figures 3-7 we can see some of them. The satellite imagery is dated 2003, then we have not the current situation after the war.

To appreciate the details in the images, it is better to use a processing of them, for instance, the AstroFracTool, a program based on the fractional gradient calculus, to enhance the edges and produce an embossing effect, and the GIMP program, to adjust contrast and brightness [14-16]. Besides the images in Figs.3-7, I prepared a map of the site, which is available at [17]. The processing reveals many details, that are hardly visible in the original maps. It is then possible that a careful observation and processing of the Google Maps can help in preparing a satellite outlining of the Garamantian Kingdom, to visualize its network of fortresses for instance.

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