Gabriel Camps

THE YOUNG SHEEP AND THE SEA
EARLY NAVIGATION IN THE MEDITERRANEAN

Sheep and the sea! At first glance there would seem to be very little relation between the ovine species and the realm of Thetis. Certainly it would be gratifying to attempt to justify this somewhat Hemingway-like title by recalling the sheep of Panurge who were forced by their gregarious instincts to throw themselves into the sea, following their leader. I could also allude to the woolly-looking froth that the wind provokes on the crest of gentle Mediterranean waves. But of what value is such imagery? Instead I insist fully on the realism of the title. I really do intend to discuss sheep, young ones and not yet fully mature, and maritime travel. In short, I will show that the origin of the domestic sheep is closely linked to the question of early navigation in the Mediterranean Sea, particularly in its western basin.

In the not-so-distant time when Prehistorians, who viewed themselves as being simple and uncomplicated persons, were examining and resolving problems with positivist assuredness, the result of the difficult struggle throughout the 19th Century to bring about acceptance, first of all, of the existence of fossil man and

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then of his evolution, they established several peremptory equations based on data thought to be scientific but which were merely logical. Among these equations we shall note the one which closely associated Neolithic times with the origin of the domestication of animals and the one which linked equally closely sedentism, agriculture and the appearance of pottery in the course of this same Neolithic period. This was a blessed era which saw man change his condition. The ancient predator, hunter, gatherer and destroyer became husbandman, cultivator and producer. Marxist philosophy has long emphasized this "Neolithic revolution" that announced the first in a long list of promising tomorrows.

It would be incorrect to believe that this transformation had only economic implications, expressed by improved well-being, better nourishment and demographic growth. Society, and also mentalities and the life of the spirit, were changed at an equally rapid rate and in an equally radical manner. In a sense we are still Neolithic people. In fact it was at the end of the Epipaleolithic (or Mesolithic) age, between the 8th and 6th millennia, that man effected the most important mutation he had ever accomplished. But instead of being a physical mutation, like previous ones, this one was centered on his lifestyle and on society.

An hypothesis, whose logic seemed implacable, held sway concerning the origin and modalities of this radical revolution. Settling in one place, one of the characteristics of the Neolithic age, was considered to be the normal consequence of these economic transformations, due to abandoning the predatory way of life. The development of agriculture obliged man to remain near his fields, first to prepare the soil and to sow, then to watch over his growing plants and finally to harvest his crops. The production of sufficient quantities of food rendered unnecessary archaic roaming in search of rare nourishment. The flock, placed under the constant control of the group, provided meat and skins as needed, even before development of the use of wool and milk products. Since man was no longer required to move about a great deal and could stay near his fields, he began to organize his environment in a more permanent fashion. Instead of the crude one-day shelters or rudimentary seasonal huts of his Paleolithic forebears, he designed veritable abodes, lasting and of good size, better able to

resist the weather. Huts gave way to houses.

Since it was necessary to protect grain supplies, this house was more than just a shelter. Together with its accompanying structures, it became the material projection of a new social and familial organization in which each individual had his place and his role. Thanks to improvements in the way of life, demographic growth also occurred. Little groups of hunters roaming over a vast territory became populous communities anchored to a limited area. In fact rarely do we find an isolated Neolithic house; villages seem to be a direct result of the new economic organization.

We could continue listing the developments that accompany or follow this perceived change, according to the traditional point of view, as being exclusively economic in origin. According to this Marxist conception, cultural developments result from economic changes. Another tenet, maintained by Gordon Childe, held that this new economic system had been invented, or rather imposed, under the pressure of natural forces somewhere in the East and that it had spread from there to all parts of the inhabited world.

This once-classic conception has today been shattered by a new school that freed itself from traditional thinking in light of the spectacular results achieved in Oriental archaeology over the course of the last twenty years. Excavations by J. Perrot at Aïn Mallaha, by K. Kenyon in Jericho, by J. Cauvin at Tell Mureybet and by J. Contenson at Tell Asward and Tell Ramad have provided irrefutable and definitive proof that man had constructed villages to live in permanently well before modifying his nourishment strategy and becoming farmer and husbandman. The data of the traditional equation were inversed. It is because he settled in one place that man turned to agriculture. In this case at least, the economic change is a result of the cultural one. It is not drought that facilitated domestication, as Gordon Childe had imagined; it is not cultivation of the land that made man remain in the same place. To the contrary it was the act of settling, a cultural and social fact, that reduced man's moving about, encouraging him to gain mastery over and retain nearby the stock of future domestic species and to seek out seeds from species of plants chosen for their nutritional value.[1]

[1] These ideas are developed in J. Cauvin, *Les premiers villages de Syrie-Palestine*

At the same time the primacy of the Orient, as indispensable origin of all economic or cultural progress, was called into question. Ceramic ware, one of the archeological criteria of the Neolithic age, which had been thought to have originated in Syria between 8000 and 7000 B.C. and then, after a long eclipse, to have spread almost instantaneously throughout the Near East and Mediterranean countries beginning in 6000 B.C., is no longer cited as one of the proofs of the uniqueness and intensity of the Oriental source. Today we know that ceramic ware was invented, at different periods and in regions too isolated (such as Central America) or too remote from one another (Japan, the Near East, the Sahara), for it to be possible to believe in the diffusion of a unique technique born in the Near East. At the present state of knowledge, the oldest forms of pottery are not found in Syria or Anatolia, but in the southern Sahara (Tagalagal, Aïr 7400 B.C. in C 14 chronology).[2]

Why should it not be the same thing for other Neolithic techniques? Did not Pre-Columbian Amerindians invent, in their regions, the cultivation of corn, of beans, of tomatoes and of many other products, without borrowing anything from Near Eastern sources? These same peoples also domesticated the llama.

But let us return to our sheep. It is important first of all to recall that relations between man and animal at the end of the Mesolithic period reached such a level of ambiguity that both archaeological and zoological experts have great difficulty in distinguishing those that may have been domesticated from those that were not. In truth the opposite would be surprising, since nascent domestication

du IXe au VIIIe millénaire avant J.-C., Maison de l'Orient méditerranéen, Lyon, 1978.

[2] The expression "C. 14 Chronology" refers to dates established through measurement of the amount of radiocarbon (isotope 14) contained in specimens. These dates are given by laboratories as BP (Before Present, in fact before 1950). To calculate the date BC (Before Christ), 1950 must be subtracted from the BP date. However, these "dates" are not actually exact. To obtain calendar dates, it is necessary to correct them (specialists use the term "calibrate"), taking into account data from dendrochronology. To avoid all error in interpretation, in the text of this article both BP and BC dates will be provided, recognizing that these do not correspond to absolute dates, which, for the period of interest to us here, are significantly earlier. Thus a specimen whose C 14 date is 6200 ± 160 BP or 4250 BC corresponds to a calender date between 5360 and 4925 BC. Since dendrochronology calibration cannot go back further than 7240 BP, it is preferable to continue using traditional C 14 dating in order to avoid any confusion.

could not have already sufficiently modified the morphology of animals. The closer we are to the origins of domestication, the more difficult it is to distinguish between a domestic animal and the wild species from which it issued. This is a fact; it is important that it not be forgotten.

Some have attempted to get around this difficulty by using statistics. Since it is relatively easy to determine the age of a mammal by an examination of teeth or from the degree of ossification of cartilage, we can trace the age curves of slaughtered animals by archaeological levels and compare them to the curves of a hunted natural herd. A very high proportion of young or immature animals would be an indicator of domestication. The affirmation of the domestication of sheep at Zawi Chami Shanidr in the Zagros Mountains around the 10th millennium is based on this hypothesis. Today this affirmation is widely questioned. It must be said that the question of the origins of the domestic sheep is incessantly raised and repeated. It is obviously a question of the greatest interest, one that touches on the very structures of the Neolithic age; but it is a question that must be raised without beclouding the data and without preconceived ideas. It is likewise essential to delimit the question in time and in space.

By selecting as framework countries bordering the western Mediterranean, this inquiry can be articulated around three questions:

– Does there exist in the western Mediterranean region, that is in southwest Europe, the isles and northern Africa, one or more indigenous ovine species capable of having been the source or sources of the domestic sheep?

– Does there exist a presumption for the raising of sheep prior to the 7th millennium, the era in which exchanges begin to be organized and to become possible throughout the Mediterranean region?

– What did the ancient Neolithic sheep look like?

The Most Ancient Sheep in the West

Many writers, in many different periods, have expressed the idea that the European domestic sheep could have had an indigenous

origin.[3] This opinion is based on the existence of a wild ovine species that would have found in the Mediterranean region a particularly favorable biotope. In fact remains of wild sheep discovered in Paleolithic sites are often cited. But although these sites are often noted, their number, and especially their osseous remains that would allow such an identification, are extremely rare. We can count around ten such Paleolithic sites that have yielded such remains, four belonging to Riss (Caune de l'Arago, Lunel-Vieil, Lazaret, Grotte de l'Observatoire), one dating from Wurm I (Pech de l'Azé), two from Wurm III (Grotte de Lestalles, Grotte de Montardit), three from the late glacial period (Balme du Glos, Abri Pagès, Vallorgues). Most frequently only the genus can be identified. The existence of wild sheep during the Paleolithic era is only probable at best, and F. Poplin places it very much in doubt.[4] It is necessary to add that there is no characteristic allowing us to establish an indubitable filiation between these ovine animals and the domestic *ovis aries*. We are consequently quite reserved with regard to the conclusion of M. Boule: "Domestic sheep, then, would have a polyphyletic origin, and their various varieties would have been formed in the very countries in which their wild ancestors lived".[5] By following such a line of reasoning, we would have to affirm the autochthonous origin of the domestic horse in our regions since the wild horse flourished there during the Upper Pleistocene period and even at the very beginning of the Holocene period.

Of these wild ovine species perhaps present in the Paleolithic period, there remains only the moufflon (*Ovis musimon*) from Corsica and Sardinia. The other animal, incorrectly called the

[3] M. Boule and L. de Villeneuve, *La Grotte de l'Observatoire à Monaco*, Archives of the Institut de paléontologie humaine, I, Paris, Masson, 1927.
– P. Ducos, "Le gisement de Châteauneuf-les-Martigues. Les mammifères et les problèmes de la domestication en France", *Bulletin du Musée d'anthropologie préhistorique de Monaco*, t. 5, 1958, p. 119-133.
– *Id.*, "Quelques documents sur les débuts de la domestication en France", *La préhistoire française*, t. II, 1976, p. 165-171.
– J. Murray. *The First European Agricolture, a Study of the Astrological and Botanical Evidence until Two Thousand BC*, Edinburgh, University Press, 1970.
– J. Courtin, "Les animaux domestiques du Néolithique provençal", *L'élevage en Méditerranée occidentale*, Aix-en-Provence, CNRS, 1977, p. 67-76.
[4] F. Poplin, "Paléontologie du mouton", *Les débuts de l'élevage du mouton*, Colloque d'ethnozoologie, Alfortville, 1977, p. 9-10.
[5] M. Boule and J. de Villeneuve, *op. cit.*, p. 49.

"moufion à manchettes" (*Ammotragus lervia*), found in North Africa, is not an ovine animal and can in no way be numbered among the sources of the domestic sheep, despite the even more incorrect name of "barbary sheep" applied to it by English-speaking peoples. The barbary sheep, closer to the caprines than to the ovines, forms the genus *Ammotragus*, of which it is the sole species. In the Maghreb it occupies the same ecological niche as the ibex (*Capra ibex*) in Europe.

The only moufflon still existing in the west, the *Ovis musimon*, has the same karyotype (54 chromosomes) as the Asiatic moufflon (*Ovis orientalis*) and, of course, the domestic sheep (*Ovis aries*) which descended from it. The question of the *Ovis musimon* was recently the subject of research by F. Poplin and J.D. Vigne[6] who reached the conclusion that this moufflon was derived from domestic sheep introduced by man, certain elements of which had returned to the wild state. In a word, the moufflon would be nothing more than a sheep that had taken to the bush. Running back to the wild is a well-known fact and especially frequent in deserted or less-frequented islands. The case is often cited of wild goats who are the offspring of domestic goats intentionally abandoned on the islands by foresighted or altruistic sailors. In fact Robinson Crusoe was not especially surprised to find some on his island! The arguments of F. Poplin and J.D. Vigne are solidly constructed. They rest principally on the absence of fossils pointing to this species in Corsica; and, according to J.D. Vigne, these arguments are part of a revolutionary thesis holding that, when man arrived on Corsica, there were only small terrestrial mammals on the island, the largest of which being the "rabbit-rat" (*Lagomys* or *Prolagus sardus*), and that all the mammals present on the island today were intentionally or unconsciously introduced by man in the course of his travels between Corsica and the continent.[7]

This thesis, the scope of which is surprising, is in complete agreement with observations made concerning the fauna of other

[6] F. Poplin and J.-D. Vigne, "Observations sur l'origine des ovins en Corse", *Congrès préhistorique de France*, 21st session, Montauban-Cahors, 1979, p. 238-248.

[7] J.-D. Vigne, *Les mammifères terrestres non volants du Post-Glaciaire de Corse et leurs rapports avec l'homme; étude paléo-ethnozoologique fondée sur les ossements*, Thesis, Paris VI, 1983, 3 t.

large islands in the western Mediterranean, apart from Sicily, which was attached to the continent several times during the course of the Quaternary. Terrestrial mammals, in both the Balearic Islands and in Sardinia would owe their presence, just as in Corsica, solely to the intervention of man.

Nevertheless, this thesis suffers from the limited representativity of the lists of fauna in a land like Corsica, where there is a predominance of acid soils unfavorable to conservation of bones. Moreover, there is an especially delicate example, the ovine and swine remains found in layer XVIII of the shelter of Araguina-Sennola (Bonifacio), dated 6570 B.C. ± 150 B.P., which is a pre-Neolithic Level.[8] We can only see two answers to this problem:

– Either these bones, which show traces of burns confirming that they were part of the food eaten by the pre-Neolithic occupants of the shelter, are the remains of domestic animals, sheep and pigs; but in this case they would, by a great deal, be the most ancient proofs of archaic domestication, preceding by a good millennium other indicators of the domestication of sheep in the West.

– Or else these bones are those of moufflons and of wild boars, and in this case the thesis of a domestic species returned to a wild state could no longer be accepted, for it would cast the introduction of sheep and pigs back to an even more distant past, back to a time before Corsica had even been populated!

There is another explanation that would reduce these difficulties. That is that these new osseous fragments found in layer XVIII were introduced by infiltration from layer XVII, which belongs to the ancient Neolithic period beyond any possible doubt.

H. Duday, who excavated the burial forming level B of this layer, never mentions these osseous fragments; to the contrary he specified that he found no trace of food offerings.[9] I would add that the frequency of Prolagus burrows in the site could also be used to explain the penetration of Neolithic bones into the underlying layer.

[8] F. de Lanfranchi and M.-Cl. Weiss, "Araguina-Sennola. Dix années de fouilles préhistoriques à Bonifacio", *Archeologia Corsa*, Nr. 2, 1977.

[9] H. Duday, "Le squelette du sujet féminin de la sépulture prénéolithique de Bonifacio (Corse)", *Cahiers d'anthropologie*, Laboratoire d'anatomie des Saints Pères, Paris, 1975.

Apart from the example of the Corsican moufflon, do we have on the continent, at the time when man was likely to have domesticated animals, traces of wild sheep that would buttress the thesis of indigenous origins for the domestic sheep? We must answer this question negatively.

Let us now look at the case of these sheep that strayed into the Mesolithic milieu. In Brittany, the Téviec site[10] yielded but one sheep's tooth, an isolated incident that does not provide a valid argument. Could it be that this very late Mesolithic site (5th millennium) is at best contemporary with the Mediterranean ancient Neolithic period, which introduced sheep into southern France? The same remarks concerning the inconclusive nature of the documents and the quite recent age of the deposits containing them can be repeated for all the other examples referring to the Atlantic regions: Cabeço da Armoreira in Portugal,[11] Cuzould de Gramat (Lot), Martinet (Lot-et-Garonne), Rouffignac, in Dordogne.[12]

The facts are more complex in the Mediterranean regions. Sheep thought to be domesticated have been pointed out in the pre-Neolithic layers of four sites: Châteaneuf-les-Martigues (Bouches du Rhône), Gramari (Vaucluse), la Grotte Gazel and the Dourgne shelter (Aude). However, it seems difficult today to accept the two sites in the Provence region.

We know the importance and the great interest of the Grand Abri of Châteauneuf-les-Martigues, which allowed M. Escalon de Fonton to establish a stratigraphic sequence going from the Mesolithic to the middle Neolithic period. Remains of sheep were found by this author in the Castelnovian layers belonging to a regional Mesolithic culture that immediately preceded the Neolithic cardial period. Using these excavation data, P. Ducos was able to posit the existence of an autochthonous wild sheep or

[10] M. and St-J. Péquart, M. Boule and H.V. Vallois, "Téviec, station-nécropole mésolithique du Morbihan", Archives de l'Institut de paléontologie humaine, 18, Masson, Paris, 1937.

[11] A.A. Mendes Correa, "Les nouvelles fouilles à Muge", XV Congrès international d'anthropologie et d'archéologie préhistoriques, I, p. 357-372.

[12] J. Roussot-Larroque, "Néolithisation et Néolithique ancien d'Aquitaine", *Bulletin de la Société préhistorique française*, t. 74, 1977, p. 559-582.

the domestication of this animal in that era;[13] later he opted for the second position. But a new excavation campaign, under the direction of J. Courtin in 1979,[14] modified these data significantly.

In the first place, no remains of sheep were found in the Castelnovian levels; and the very meticulous excavation made possible the observation that neither lacunae nor indications of abandonment of the site could be found between the most recent Mesolithic occupation and the most ancient Neolithic levels. This quasi contemporaneity is likewise confirmed by a new series of datings that situate the final Castelnovian era between 7630 ± 150 BP or 5680 BC and 6720 ± 140 BP or 4770 BC, and the ancient Cardial era between 6900 ± 100 BP or 4950 BC and 6200 ± 100 BP or 4250 BC. Even if the 1970 excavations did confirm the presence of sheep in the Castelnovian period, we should not forget what this animal actually represented for the economy and the feeding of the group. Counting the osseous remains makes an evaluation possible. Sheep represented only 2% of the meat consumed by the Castelnovians of Châteauneuf while rabbit reached a level of 95.5%. However, at the beginning of the Cardial era, the data change: sheep 27.6% and rabbit 65.3%. In the levels from the developed Cardial period, the figures show sheep to be largely dominant at 61.8% with rabbit falling to 3.9%. The Castelnovian sheep, if it ever existed, thus seems to be more of a curiosity than a fundamental element of the economy.[15]

Sheep have also been found at Gramari, an open-air site near Méthamis (Vaucluse), but the chronological data[16] are so inconsistent and contradictory, no doubt because of disturbances in the ground at the unsheltered site, that it is difficult to apply this example.

Pre-ceramic Languedoc sites yielding sheep remains are not any

[13] P. Ducos, "Le mouton de Châteauneuf-les-Martigues", *L'élevage en Méditerranée occidentale*, CNRS, Aix-en-Provence, 1977, p. 77-85.

[14] J. Courtin, J. Evin, Y. Thommeret, "Révision de la stratigraphie et de la chronologie absolue du site de Châteauneuf-les-Martigues (Bouches du Rhône)", *L'Anthropologie*, t. 89, 1985, p. 543-556.

[15] P. Ducos, *loc. cit.*, 1977.

[16] Th. Poulain, "Le camp mésolithique de Gramari à Méthamis (Vaucluse). Etude de la faune", *Gallia préhistoire*, t. XIV, p. 121-131.

older. As a result of the work of J. Guilaine and of D. Geddes[17], the Gazel cave and the Dourgne shelter are well known. We can note the following facts: in the Gazel cave ovine remains are present from the Mesolithic triangle period, at the beginning of the 6th millennium (7760 ± 75 BP or 5810 BC), and at this time sheep represent 20% of the species. At Dourgne a similar phenomenon can be noted, with sheep appearing in level 8, which also encloses a Mesolithic triangle industry; there sheep represent 38% of the species. This proportion decreases to 29% in level 7 dated 6850 ± 100 BP or 4900 BC.

Pre-Neolithic sheep in the Aude region are thus contemporary with domestic sheep from the ancient Neolithic period of Basi in Corsica (7700 ± 150 BP or 5750 BC), of Praia a Mare in southern Italy (7555 ± 85 BP or 5605 BC), of Cova Fosca in Spain (7640 ± 70 BP or 5690 BC), etc.

In short, we can consider it proven that sheep appear abruptly in France, in the Mediterranean regions, at the end of the Boreal and never before 6000 B.C. It is possible that they preceded slightly the introduction of the ceramic technique, even though the rare Mesolithic levels yielding sheep remains seem to us contemporary with the first manifestations of the ancient Neolithic with pottery, whether this be smooth, with cardial decoration, or stamped or incised. We must also take into account an element whose importance has not yet been sufficiently noted. During the 7th and 6th millennia, sea water had not yet reached its present levels. Consequently sites located along the shore of that period are submerged today. It is only by chance dragging operations that such sites are discovered, like Leucate-Corrège, discussed in a recent publication.[18] However, it is evident that it is among these underwater sites that we will find those that were the most likely to have been the first to acquire Neolithic techniques and products by sea travel.

To our knowledge, the problem of Mesolithic sheep has not been raised in any other western Mediterranean country. In Italy as in

[17] D. Geddes, "Les débuts de l'élevage dans la vallée de l'Aude", *Bulletin de la Société préhistorique française*, t. 78, 1981, p. 370-378.

[18] J. Guilaine, A. Freises, R. Montjardin *et al.*, *Leucate-Corrège, habitat noyé du Néolithique cardial*, Toulouse-Sète 1984.

Spain, the sheep is considered to be an imported domestic animal. H.P. Uerpmann has demonstrated that in Spain the presence of sheep is indicated only during the Neolithic period, affirmed as using ceramics and cultivating grain plants.[19] The supposed domestication of the goat in the Epipaleolithic levels of Cova Fosca (7510 B.C.) still requires demonstration, the abundance of bones from this species possibly being an indication of selective hunting,[20] as is the case of the bubal antilope among the Capsians of North Africa, to whom domestication of this animal has been attributed.

In North Africa, as a matter of fact, the small number of modern excavations does not allow more than a limited amount of knowledge about the ancient Mediterranean Neolithic period. Some important elements, however, have been recorded:

– The absence of all ovine species, wild or domestic, in Pre-Neolithic levels. The remains that are sometimes attributed to such sheep have proven to be those of female barbary sheep.

– The presence of sheep in the cardial Neolithic period in the region of Tangiers both in the caves of El Khril[21] and Mugharet es-Safia, Mugharet el Khaïl and Mugharet el-Aliya.[22]

– The absence or the extreme rareness of sheep in the Neolithic period with stamped or incised ceramic ware from the Oran caves.

On this shore, then, the appearance of the sheep is associated with the arrival of the cardial ceramic Neolithic period, also of exotic origin. Inland, in the vast region where the brilliant Capsian civilization developed several millennia earlier, there came to light the Neolithic culture called the Capsian tradition, which seems more recent than that of the central Sahara. After the 5th millennium, the raising of sheep and of goats is well documented (Capeletti Cave or Khanguet Si Mohamed Tahar: 6800 ± 250 BP or 4850 BC).[23]

[19] H.P. Uerpmann, "Élevage néolithique en Espagne", *L'élevage en Mediterranée occidentale*, Aix-en-Provence, CNRS, p. 87-94.

[20] C. Olaria de Gusi, J. Estevez Escalera and E. Yll, "Domesticación y paleo-ambiente de la Cova Fosca (Castellon), *Le Néolothique ancien méditerranéen*, Colloque international de préhistoire de Montpellier 1982, p. 107-120.

[21] A. Jodin, "Les grottes d'El Khril à Achakar, province de Tanger", *Bulletin d'archéologie marocaine*, t. III, 1958-1959, p. 249-313.

[22] A. Gilman, "A Later Prehistory of Tangier, Morocco", American School of Prehistoric Research, *Bulletin*, Nr. 29, 1975.

[23] C. Roubet, *Economie pastorale préagricole en Algérie orientale. Le Néolithique*

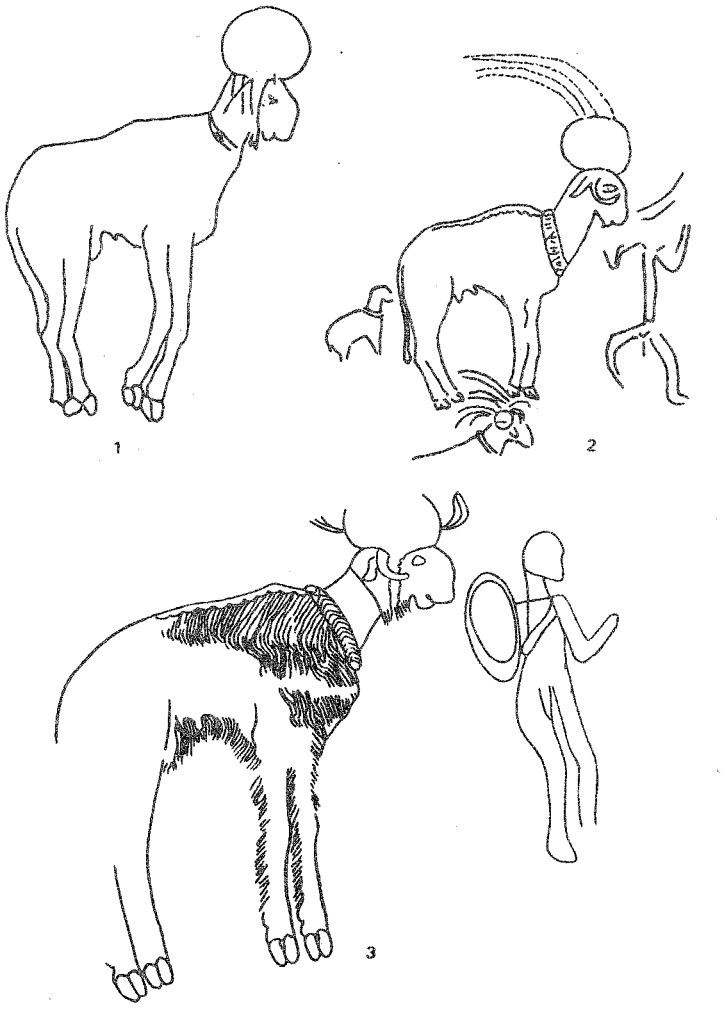

FIG. 1. "Spheroid" rams of the rock drawings of the Saharan Atlas. 1: Hadjerat Sidi Bou Beker. 2: Guelmouz el Abiod. 3: Bou Alem. Leather cap with chin strap, with or without ornaments, neck or shoulder collar, spinal decoration.

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But the Neolithic Capsian tradition had the particular merit of having left behind on the clay walls of the Saharan Atlas many drawings of this archaic sheep, featured as part of a very rich bestiary. These sheep are represented so realistically that it is possible to identify their breed.

All the figures so faithfully reproduced in these images make it possible to identify sheep belonging to one or more varieties of woolly sheep of the type *Ovis longipes* Fitzinger, which today has disappeared from the Maghreb but which still exists in the Sahel, from Mauritania to Chad.[24] These short-haired sheep are representatives of a very old domestic breed that Egypt possessed up to the Middle Empire. It is the so-called Mendès ram (*Ovis palaegyptiaca*), distinguished from the one represented in the Atlas caves by corns with laterally developed loose spirals, a characteristic that still endures in certain Sahel varieties (the peul type of Samburan in particular). The finery that decorates many capped rams ("spheroid" ram), enhanced by feathers and palms, collars and drapes, proves not only the domestic nature of these animals but also confirms their cultic importance.[25]

Although the sheep of the Saharan Atlas, likewise represented but a little later in the wall paintings of Tassili n'Ajjer, has, like all domestic sheep, a near-eastern origin, unlike its neighbors from Tell or the Mediterranean countries, it seems to have been introduced from Egypt by a continental route, using the ancient road that ran along southern Cyrenaica to the little Syrtes and entered the Maghreb steppes. Throughout protohistory and history, this was the road followed by Oriental invasions. It is intersected by north-south axial routes coming from the western Mediterranean and the European peninsulas. It is pleasant to discover in the history of the Maghreb sheep this double constant that constitutes the special feature of the Barbary region.[26]

de tradition capsienne, CNRS, Paris, 1978.

[24] G. Doutressoulle, *L'élevage au Niger*, 1924, Id., *L'élevage au Soudan français*, 1952.

[25] G. Camps, *Les civilisations préhistoriques de l'Afrique du Nord et du Sahara*, Doin, Paris, 1974. *Id.*, "Le bélier à sphéroïde des gravures rupestres de l'Afrique du Nord", *Encyclopédie berbère*, édition provisoire, Cahier Nr. 22, Oct. 1978.

[26] G. Camps, *Aux origines de la Berbérie. Monuments et rites funéraires protohistoriques*, A.M.G., Paris, 1961. *Id.*, "Berbères aux marges de l'histoire", Toulouse, 1980.

Did sheep of the northern Mediterranean coast have the same appearance? Of course it is impossible to affirm this since it was not pictured; but it is absolutely possible to believe that these first domestic sheep did not yet have a sufficiently abundant coat of wool for Ulysses and his companions to hang from and thereby escape the wrath of Polyphemus. These primitive sheep must have had a short, coarse coat, perhaps more developed in Europe, as with the Corsican moufflon, than in Africa. This animal was not yet subject to continuous hair growth (characteristic of wool), but shed its hair, as certain primitive species and the moufflon still do. Man had not yet selected out the mutant varieties with the "angora" anomaly, which in fact causes the regular growth and development of the woolly fleece that can be spun.[27] I would be very tempted to see a parallel in the primitive nature of these sheep without wool and the absence in all Neolithic sites of the spindle-whorl, that small terra cotta ring placed at the end of the spindle whose rotating movement gives torsion to the strands of wool pulled from the distaff.

Early Navigation

Throughout this survey of the appearance of the domestic sheep in the west, we have presumed its introduction by sea because this explanation seems the most logical to us. However, now it is necessary to furnish arguments to buttress this hypothesis and to examine the conditions for this introduction more closely.

In the first place it is important to note that in western Europe the most ancient sheep were found in maritime regions or in those not too distant from the sea and located in the zone of the spread of cardial ceramic ware, whose maritime origins cannot be doubted. This initial observation excludes in a sense the possibility of a continental origin from the Anatolian plateau or from the Balkans where domestic sheep were raised from the 7th millennium. The Neolithic Danube region, therefore, cannot be credited with the introduction of the first domestic sheep. And yet

[27] J. Rouget, "L'évolution des caractères de la toison du mouton", *Les débuts de l'élevage du mouton*, Colloque d'ethnozootechnie, Alfortville, 1977, p. 25-32.

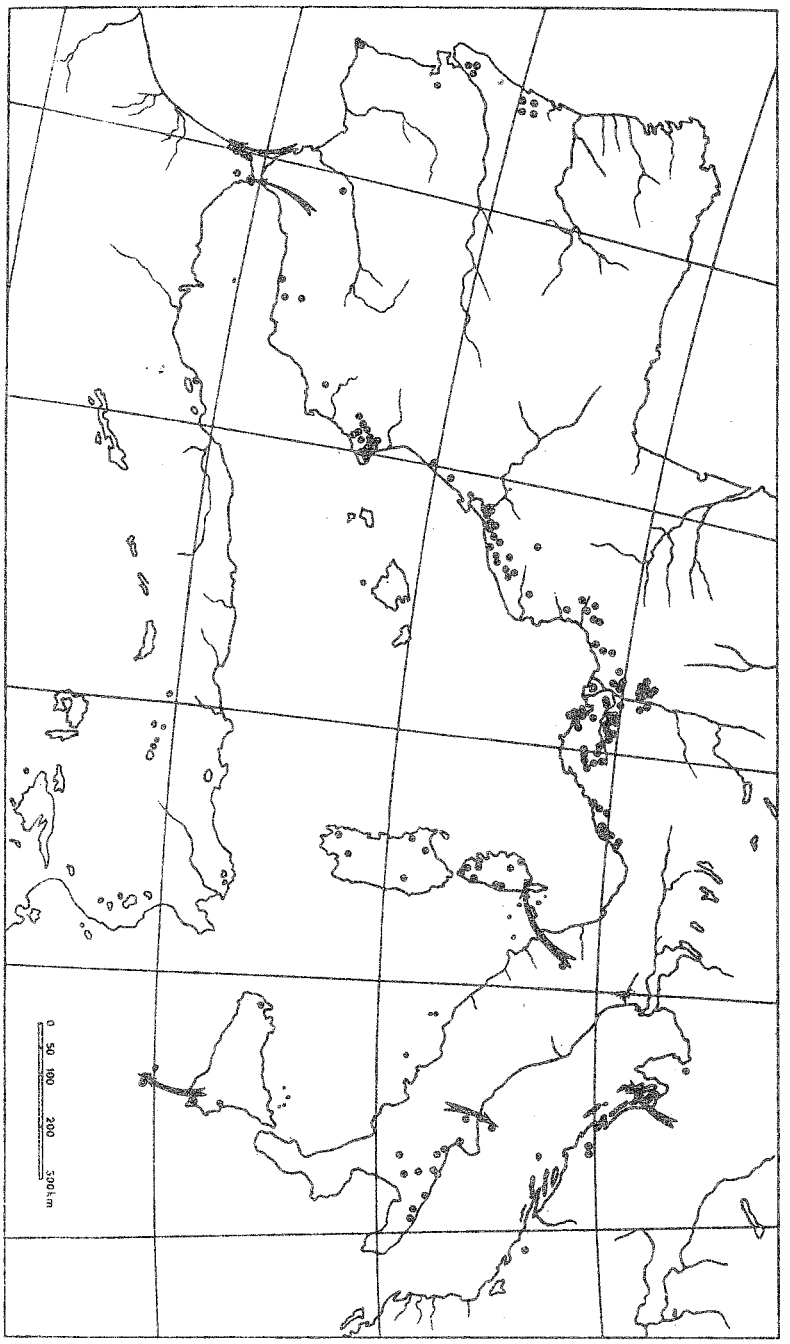

FIG. 2. Cardial ceramic ware in the western Mediterranean countries.

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these sheep, whose carotype is absolutely identical to that of the true moufflon (*Ovis orientalis*) from the Iranian plateau and the Zagros mountains, have an undeniably Oriental origin, confirmed by the absence of an indigenous stock in the west.

But did Mediterranean peoples know the art of navigation at a period as early as around 6000 B.C.? It is perhaps surprising how far back in time can be traced navigation along the Mediterranean coasts and between the islands and the continent. The desire or the necessity for man to travel by sea probably manifested itself quite early, if for no other reason than to fish and hunt in the sea, which the Magdalenians frequently pictured. However, the salmon and the seals represented are in fact those who swim up rivers. There is no indicator of the existence of true navigation in the Paoleolithic period, at least in Europe. But the same is not true everywhere. The settling of Australia, which occurred more than 35,000 years ago, could not have been possible without crossing the Torres Strait, a passage sufficiently wide and ancient to have allowed Australian marsupials to survive without competition from placental mammals.

It is quite evident that the term navigation can only be applied to maritime travel of a certain importance. To return to the Mediterranean region, crossing the Strait of Messina (at present three kilometers) cannot be considered as navigation. Moreover, the crossing of straits anywhere risks being contested by opponents of prehistoric navigation, who attempt to explain technical similarities discovered on two sides of a sea passage by the theory of relatively simultaneous coincidental inventions or the presumed necessity of such convergences due to constraints of natural conditions. This determinist concept of the development of prehistoric industries and cultures today seems outmoded, but it is no less true that the best proof of navigation is the visiting and, even more so, the settling of the islands, which since the Pleistocene era at least have been cut off from the continent. The spread of cardial ceramic ware and the obsidian trade are other tangible proofs.

During the course of the 6th millennium, perhaps even as early as the first half, ceramics appeared in cultures bordering the western Mediterranean. Among the oldest pottery there developed a quite particular decorative style, which gave it the name of

cardial ceramic ware. This decoration was achieved by impressing the unbaked clay with the crenellated edge of a sea shell, the *Cardium* (hence the name), a *Pecten* or some other bi-valved mollusk. But the spread of this type of ceramic ware is unique. It is quite extensive along a wide coastal strip that runs from the region of Alicante to Genoa. It is less widespread in Portugal, Andalusia and in the Italian peninsula. Another concentration of it appears around the Adriatic Sea, in certain islands of the Dalmatian coast and in Apulia. Corsica is rather rich in it, and a dozen sites scattered in all parts of the island have yielded cardial ceramics. An especially complex type of decoration called the Tyrrhenian style has been found both in Sardinia and in Tuscany (Pienza). Cardial decoration also exists in Sicily on certain vases in the Stentinello style; it was imitated, but without the use of seashells, in the Malta archipelago (Ghar Dalam). On the other hand, no cardial ceramic ware has been found in the Balearic Islands nor along the Algerian and Tunisian coast, proof that the appearance of this type of decoration cannot be attributed to a phenomenon of convergence. Cardium shells are just as plentiful along the north African coast as on the European side. If Neolithic man had been mysteriously but inevitably led to use this shell to decorate his pottery, he would have done so everywhere the shell can be found. Then too, along the northern extremity of Morocco, along the Strait of Gibraltar and in the region of Tétouan, we find around ten sites that have yielded cardial ceramic ware. Morocco owes knowledge of this technique to the proximity of cardial cultures in Spain.[28] In all cardial ceramic sites, with the exception of the most ancient levels in Apulia (Coppa Nevigata), the presence of the domestic sheep is duly attested to, both on the islands as well as on the continent.

The obsidian trade, which is a rather grandiose term to be applied to the very small amount of this substance transported and used, is another proof of the existence of prehistoric navigation. Obsidian is a volcanic rock, actually natural glass,[29] which can be

[28] G. Camps, "Les relations entre l'Europe et l'Afrique du Nord pendant le Néolithique et le Chalcolithique", *Praehistorica, Francisco Jorda oblata*, Salamanca, 1984, p. 187-205.

[29] The bibliography on the obsidian trade is quite abundant; see especially J.

easily carved and which has exceptional cutting properties. Consequently this stone was highly favored by prehistoric craftsmen. In the Aegean Sea, obsidian from the Island of Melos was being exported by the 11th millennium to the Peloponnesus (Franchti, the Argive). In the western basin the sources of supply are all insular and located in the Tyrrhenian Sea: the sites of Monte Arci in Sardinia, the island of Palmarola (in the Pontine Island archipelago), Lipari in the Aeolian Islands and Pantelleria in the Strait of Sicily. In the middle Neolithic period, if not before, obsidian from Sardinia and Lipari was being used in the Provence and Languedoc regions and even as far as Catalonia. Stone from Pantelleria was used in Tunisia and eastern Algeria, which also obtained supplies from Lipari; a silex chipper from this island was found in Tebessa (Algeria). But these are the most distant points to which this trade was extended. Previously, in the ancient Neolithic period, obsidian was widely used in the Italian peninsula, in Corsica and even on the island of Lampedusa, 145 kilometers distant from Pantelleria. At the same time, Ligurian vessels began to visit the Languedoc coast, bearing ceramic ware with impressed decoration and introducing several obsidian tools of Aeolian origin (Portiragnes site 6435 ± 125 BP or 4485 BC).

Just as in the Aegean Sea, it seems that obsidian was carried from the islands to the continent even before the Neolithic era. We can note the example of Arma dello Stefanin in Liguria, where level V, Mesolithic and dated by Carbon 14 to 8400 ± 100 BP or 6450 BC, contained a scraper and several shards of obsidian, apparently originating from the Lipari Islands.[30]

Courtin, "Le problème de l'obsidienne dans le Néolithique du Midi de la France", *Hommage à Fernand Benoît, I, Revue des Études ligures*, t. 33, 1972, p. 93-109; R. Hallam, S.E. Warren, C. Renfrew, "Obsidian in the Western Mediterranean. Characterization by neutron analysis and optical emission spectroscopy", *Proceedings of the Prehistoric Society*, vol. 42, 1976, p. 85-110; G. Camps, "La navigation en France au Néolithique et à l'Age du bronze", *La Préhistoire française*, CNRS, Paris, 1976, t. 2, p. 192-201; C. Perlès, "Des navigateurs méditerranéens il y a 10,000 ans", *La Recherche*, Nr. 96, 1979, p. 82-83; O. Williams Thorpe, S.E. Warren, L.H. Barfield, "The Sources and Distribution of Archaeological Obsidian in Northern Italy", *Preistoria alpina*, vol. 15, 1979, p. 73-92; O. Williams Thorpe, S.E. Warren, J. Courtin, "The Distribution and Sources of Archaeological Obsidian from Southern France", *Journal of Archaeological Science*, t. 11, 1984, p. 135-146.

[30] O. Williams Thorpe, S.E. Warren, L.H. Barfield, *loc. cit.*, 1979.

The settling of certain islands in the western Mediterranean is the third and most conclusive fact demonstrating the existence of prehistoric navigation. No longer is the occupation of these islands dated only to the Bronze Age. Of course we must exclude from our research the small coastal islands near the continent, many of which were attached to the nearby mainland when early navigation began, since the coastal separation had not yet been completed. Sicily, which is so vast and hardly insular, also represents a special case since it was inhabited from the beginning, with the Strait of Messina becoming an isthmus during each successive glaciation. It is not surprising to discover in Sicily Acheulean and Mousterian industries, examples of early Paleolithic wall art and a succession of exceptionally rich and diversified post-glacial industries.

Another and opposite situation is represented by the Balearic Islands, the large Mediterranean islands that are the most distant from the continent, even though Ibiza is visible when Cabo de la Nao begins to disappear. The result in this case is that the fauna is remarkably more specific (existence of the *Myotragus balearicus* up until the arrival of man), and human occupation took place much later.

Between these two extremes are found two groups; one, rather disparate but very important for our purposes, is formed of a broken ring around Sicily, including the Aeolian Islands, the Aegadian Islands, Pantelleria, the Malta Archipelago and, more southerly, the Pelagian Islands. The other group is formed of the two imposing land masses of Corsica and Sardinia.

We will examine successively the islands near Sicily, then the Balearic Islands and finally the Corsican-Sardinian unit, looking for the most ancient traces of settlement and bringing out the special characteristics of each island or achipelago.

Malta

The Malta Archipelago is made up of two islands: Malta and Gozzo, and several isles and large rocks such as Comino. It is about one hundred kilometers from Sicily and yet was inhabited during the ancient Neolithic period.[31] There can be found pottery in the

Sicilian Stentinello style and imitations of cardial ceramic ware. The most ancient date established until now, using Carbon 14 analysis, is that of a level of the Skorba site, which contained ceramic ware with stamped decoration of the phase called Ghar Dahm (4190 ± 160 BC), but there is every reason to believe that settlement or at least visiting of these islands goes back to much more ancient times. In any case, this was a well-established Neolithic foundation that raised sheep, cattle and pigs, and cultivated wheat, barley and lentils. During this period Malta received obsidian from Lipari (the Aeolian Isles). The middle Neolithic era (Grey Skorba and then Red Skorba phases) occurred during the 4th millennium, at which time relations with Sicily were reinforced. At the end of this epoch a remarkable development took place: in Malta there was the construction of extraordinary megalithic temples (Mgar and Tarxian phases, second half of the 3rd millennium). This artistic development is all the more meritorious for the fact that the Maltese of the Tarxian civilization were as yet unaware of the use of metal, which was not introduced on the island until the beginning of the 2nd millennium, no doubt by invaders who destroyed the temples around 1980 B.C.

The Pelagian Isles

Although the Malta Archipelago is well known, the same cannot be said for the archaeology of the tiny Pelagian Isles, scattered between Malta and Tunisia. The most notable fact is the discovery in Lampedusa[32] of an ancient Neolithic dwelling, which can be linked to Sicilian Stentinello culture (5th-4th Millennia). At the same time obsidian from Pantelleria (145 kilometers away) was being used. Lampedusa is especially isolated. Malta is 165 kilometers away, and the Tunisian coast 125 kilometers distant. This is the most isolated island in the Mediterranean, and yet it was one of the earliest visited.

[31] J.D. Evans, *The Prehistoric Antiquities of the Malta Islands*, Athlone Press, London, 1971.

[32] G. Radi, "Tracce di un insediamento neolitico nell'isola di Lampedusa", *Atti della Società toscana di Scienze naturali*, Pisa, 1972.

PANTELLERIA

Pantelleria is located at one of the most crucial points of the Mediterranean: in the Strait of Sicily, 70 kilometers from Cape Bon and around one hundred from Cape Granitola, to the southwest of Sicily. However, this volcanic island possesses important stores of obsidian, which was highly sought after. The earliest occupation of the island is not known, but already by the ancient Neolithic period, Pantelleria was exporting its obsidian toward four directions: Lampedusa, Malta, Sicily and Tunisia. Near Maktar (Tunisia) the site of Kef Hamda has yielded obsidian fragments, dated to the middle of the 6th millennium (7445 ± 125 BP or 5495 BC and 7610 ± 125 or 5660 BC), whereas another site, near Hergla on the coast, which also yielded obsidian shards, belongs to the Middle Neolithic period (5270 ± 140 BP or 3320 BC).

THE AEOLIAN ISLES

With a very ancient relationship to Sicily and Calabria, the Aeolian Isles owe their archaeological wealth to trade in obsidian from Lipari, the principal island in the archipelago. The acropolis of this island yielded a remarkable stratigraphy that revealed, even from the most ancient strata,[33] close connections with Sicily, whence came the first occupants to all appearances. Here too were found vases in the Stentinello style, with a variety of impressed decorations, some applied with cardium shells. In a later level was found fine paste pottery whose decoration is formed of motifs painted in red on a white slip. This ceramic style, of Oriental origin, is well represented in the south of the Italian peninsula, from where it spread to Sicily and the Aeolian Isles. From the 6th millennium, if not before, Lipari supplied obsidian to Sicily, Malta and Calabria (Grotta della Madonna at Praïa a Mare 7555 ± 85 BP or 5605 BC).

[33] L. Bernabo Brea, *Sicilia prima dei Greci*, Milan, 1958; M. Cavalier, "Ricerche preistoriche nell'archipelago eoliano", *Rivista di scienze preistoriche*, t. XXXIV, 1979, p. 45-137.

But this "trade" rapidly experienced considerable expansion. From the middle of the 5th millennium obsidian from Lipari was arriving as far as Portiragnes (Hérault); in the 4th millennium it was being exported in every direction, and it can be found in "*chasséens*" sites in the Vaucluse region as well as in the "*escargotières*" of the Neolithic culture of the Capsian tradition near Tebessa in eastern Algeria. The seat of brilliant civilizations during the Neolithic era, the Aeolian archipelago saw its importance diminish at the end of the Bronze Age when obsidian was less sought after.

AEGADIAN ISLANDS

The Aegadian Islands cannot be studied separately from Sicily; like the larger island they were inhabited during the Paleolithic period. In the cave of Levanzo many wall paintings represent horses, cattle and deer along with masked figures.[34] Several datings of the archaeological levels in relation to these artistic representations make it possible to place them in the 10th millennium, confirmed by stylistic indicators. It is certain that at that time these islands were attached to Sicily.

BALEARIC ISLANDS

Because of their greater isolation, the question of when the Balearic Islands were settled is more difficult than for the archipelagos near Sicily. Working from the best known, and hence the most recent, data, we can state that at the end of the Chalcolithic period, Majorca was certainly inhabited.[35] A series of datings (Cabane de Ca na Cotxera 1800 ± 110 BC, Cueva de los Muertos 1840 ± 80 BC) amply prove this, as do pre-talayot constructions of the *naveta* type and ceramic ware derived from the campaniform style.

[34] P. Graziosi, *L'Arte preistorica in Italia*, Sansoni, Florence, 1973.
[35] W.H. Waldren, "Balearic Prehistoric Ecology and Culture. The Excavation and Study of Certain Caves, Rock Shelters and Settlements", B.A.R. International Series, Nr. 149, 1982.

However, visiting of the islands at an earlier date would explain the presence of human remains in the La Muleta cave (Majorca) in a layer at *Myotragus balearicus*, dated 7130 ± 100 BP or 5180 BC. Unfortunately no recognizable industry accompanied these remains. We do know, however, that at this date Pantelleria and Lampedusa, whose location is equally isolated, were being visited. If we reject the possibility of the settling of the Balearic Islands in the 6th millennium, we still can note that in the same cave, at a depth of 1.5 meters, other human bones were dated to 5430 ± 110 BP or 3980 BC. In the same island of Majorca, a carbon layer from the shelter of Son Matge has been dated 5750 ± 150 BP or 3800 BC; a silex chipper was found there, along with the carbon the only trace of the presence of humans. These two datings lead us to place the beginning of the settlement of the Balearic Islands toward the end of the 5th millennium at the latest. It is unsettling to note that these islands do not seem to have known any production of ceramic ware until the Chalcolithic period. Majorca, like Corsica, thus provides proof that men ventured out on the sea without knowing the art of pottery, or at least without considering it necessary to use this technique known elsewhere at the same time. Still it is difficult to explain why this lack of knowledge of pottery in the Balearic Islands could have continued up until around 2000 B.C., as if after an initial settlement, the islands were once agoin isolated and deprived of all maritime contacts for a long period of nearly two thousand years. It is difficult to believe this, but it is also difficult to imagine that earlier examples of ceramic ware have not been uncovered, if such actually existed on these islands.

Corsica and Sardinia

Corsica and Sardinia are a special case, and we can consider these two islands as a unit, given the ease with which the Strait of Bonifacio can be crossed, either directly or by way of Lavezzi and Maddalena. Separated from the continent since the Pleistocene era, they are special because they are the only islands inhabited as early as the 7th millennium, if not before. Four sites in Corsica offer proof that it was occupied prior to the Neolithic era: Grotta Scrita and Strette, both near Saint-Florent in the northern part of the

island; Curacchiaghiu near Levie, and Araguina-Sennola at Bonifacio, in the south. At Curacchiaghiu, the pre-Neolithic level is dated 8560 ± 170 BP or 6610 BC and 8300 ± 180 BP or 6350 BC. At Araguina-Sennola the pre-Neolithic level is dated 7520 ± 150 BP or 6570 BC; this level lies over an even more ancient burial site that yielded a particularly well-preserved female skeleton,[36] the most ancient Corsican known. In a Sardinian site, under a clearly-established Neolithic level (pottery, domestic animals), the cave of Corbeddu[37] provided a layer containing burned Prolagus bones dated 9120 ± 380 BP or 7170 BC. Not only do these islands offer proof of the arrival of man by the sea before the Neolithic era, but they have also established particularly early dates for the ancient Neolithic period: Basi 7520 ± 150 BP or 5750 BC, Curacchiaghiu 7600 ± 180 BP or 5650 BC.

This exceptional example can be explained quite clearly by the proximity of the continent; the distance was less than 50 kilometers when the island of Elba was still a peninsula of the Tuscan coast. It should not surprise us that already at that period man was able to cross this expanse on a raft or in a pirogue. We need only recall the presence of obsidian on the island of Melos in the upper Paleolithic levels of the Franchti site, in the site of Arma dello Stefanin in Liguria and, even earlier, the crossing of the Strait of Torres, now 170 kilometers wide, by the first inhabitants of Australia, who were considered indigenous to such an extent that they were called Aborigines.

We must consider it proven, therefore, that, even before knowing how to shape and fire pottery, man did not hesitate to venture forth on the sea. Was it at that time too that the domestic sheep made its appearance, while the earliest exchanges across the Mediterranean were beginning to take shape, through a combination of a long series of coastal navigation and short crossing from island to island? This seems possible if we recall the

[36] H. Duday, "Le squelette du sujet féminin de la sépulture prénéolithique de Bonifacio (Corse)", *Cahiers d'anthropologie*, Laboratoire d'anatomie des Saints Pères, Paris, 1975.

[37] P. Sondaar, M. Sanges, T. Kotasakis, "Pleistocene vertebrate. Faunal Evolution and Man in Sardinia", *Early Settlement in Western Mediterranean*, Deya, Mallorca, 1983.

Castelnovian sheep of Châteauneuf-les-Martigues and the ovine remains from layer XVIII of Araguina-Sennola. But these two series of documents, along with the Mesolithic (?) sheep of Gramari, are disputed, whereas the constant association of domestic sheep and early pottery is proven, with one or two exceptions (Coppa Nevigata). As for the Mesolithic ovines of the Aude region (Dourgne, Grotte Gazel), they are contemporary with these first Neolithic sheep and seem even to have issued from them.

The spread of sheep by means of sea travel may surprise us; it is difficult to imagine carrying animals on fragile barks. But why should a pessimistic opinion and negative prejudices about the technical capacities of prehistoric man make us think of barks, and fragile ones at that? In fact, the kind of navigation necessary to reach the island of Lampedusa or Pantelleria or Ibiza already required good nautical knowledge and the possession of rather large vessels, more than a simple raft or a hollowed-out tree trunk. Unfortunately we have no remaining trace of these early boats other than the rare monoxylous pirogues used in rivers and estuaries, the oldest of which being the one recently discovered at Noyen-sur-Seine. It has been dated by Carbon 14 to the turn of the 9th and 8th millennia. It is not until the Aegean paintings of the 3rd millennium that we learn the appearance of these long boats, low in the water, propelled by paddles and by sails. At the same time the Egyptians were building boats with dovetailed planks, whose raised bow and stern are reminiscent of ancient pirogues made of sheaves of reeds.

During the few hours, or even exceptionally the few days, required for such navigation in the 7th and 6th millennia, it would have been less difficult than we might imagine to transport a few skins of water, some baskets of fruit and sacks of smoked meat along with a few lambs, which could have simply been hobbled and placed in the bottom of the boat. Like pottery, which made it possible to cook stews and soups, like obsidian, which could be cut so well, sheep, even very young ones, were a valuable product that was offered to Mesolithic tribes fully ready to fall under the sway of the charms of Neolithic culture.

We need only imagine the astonishment of the Western barbarians when offered meat on the hoof that did not have to be

hunted in order to comprehend the rapid spread of domestic sheep, come from the sea.

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