

# Provoking lactation by the insufflation technique as documented by the rock images of the Sahara

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## KEYWORDS

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milk, cattle  
breeding, domestication

The Saharan rock art iconography shows that the first diffusion of cattle in Africa came with several milking techniques, which contradicts for this continent Sherratt's hypothesis which considered milking as a "secondary revolution" which would have allowed a better exploitation of animals in arid zones.

## RÉSUMÉ

*Provoquer la lactation par insufflation selon l'iconographie rupestre saharienne*

L'iconographie rupestre saharienne montre que la première diffusion des taurins en Afrique s'est accompagnée de diverses techniques de traite, ce qui contredit pour ce continent l'hypothèse de Sherratt considérant la traite comme une « révolution secondaire » qui aurait permis une meilleure exploitation des animaux en zone aride.

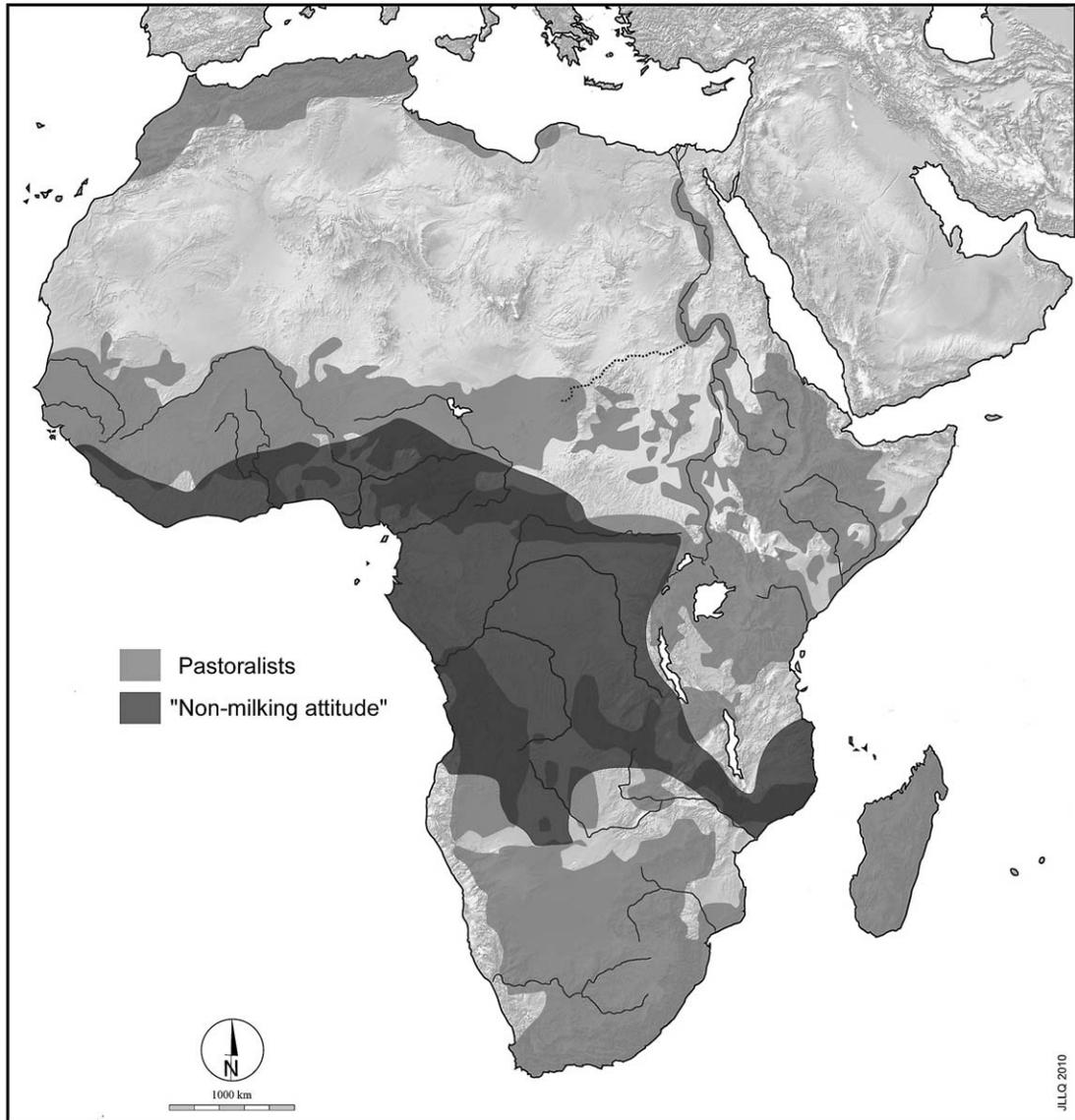
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## MOTS CLÉS

Sahara, art rupestre  
Préhistoire  
lait, bétail  
élevage, domestication

## INTRODUCTION

The ancient pastoralists of the pre and protohistoric Sahara left us innumerable images of themselves and their herds. Paintings and engravings show these herders moving with their cattle or carrying out everyday activities in their camp. In particular, one sees them looking after their animals, but one question remains: did they drink the milk of their cows? There is no immediate response because, in today's world, the distribution of pastoralists does not coincide with that of milk-drinkers (Map 1), and there are even pastoralists for whom the very idea of such a drink is perfectly repugnant. In cultures which have such a «non-milking attitude», milk is sometimes even seen as a kind of disgusting animal secretion, and there is no question of drinking it (Simoons 1954, Bernot 1988).



Map 1. – Distribution of pastoralists and "non-milk drinkers" in today's world.

Moreover, according to the hypothesis put forward by Andrew Sherratt, milking is a "secondary product" that makes possible a better exploitation of animals, particularly in arid areas (Sherratt 1981). In that archaeologist's model, originally hunters could only hunt wild bovinds for the immediate use of their carcass (meat, hide, tendons, bones, etc.), and a first

advance came with domestication, which made it possible to keep animals as a mobile source of meat. Later a second "revolution" consisted of the idea of using living animals rather than dead ones, milking being a fundamental factor in this new progression.

Consequently, prehistorians are trying to identify evidence of milk usage in Saharan rock

art. However, indisputable depictions are rare. Some possible images of skin-vessels (?) have been interpreted as milking material, either for preserving milk or for making butter by shaking a hanging skin used as a churn, as is still done today. It has even been claimed that certain images in the Libyan desert could represent blocks of butter or cheeses laid out on trays (Espérandieu 1954: 554), but none of these claims can prove beyond doubt the consumption of milk or dairy products.

Another kind of argument looks at the volume of cows' udders. Yolande Tschudi used this criterion in her chronology of the paintings of Tassili-n-Ajjer: "In the earliest phase" — she wrote — "cows are rarely depicted, and their particular attribute — that is, the udders — is drawn quite summarily, contrary to what occurs in the recent phases" (Tschudi 1956: 19)... but she wrote these lines at a time when no indisputable milking scene was yet known in the Sahara. Although only a few have been found since then, they nevertheless henceforth rule out this kind of theory. And yet, in the mid-1980s, Jan Jelínek was to attempt in vain to save this viewpoint, even though the magnificent milking scene from Wadi Tiksatín (Fig. 10) was already known. For the Czech prehistorian, this engraving was the exception that proved the rule: "this fact fits in with the situation that in the early phases of domestication in the Epipalaeolithic period the role of the cattle as a living reserve of meat continues, together with the use of bulls as beasts of burden. According to our present knowledge of Saharan prehistory, the milking of cows appears later, in more advanced stages of cattle domestication" (Jelínek 1985: 269).

Where the Libyan desert is concerned, W.B. Kennedy Shaw thought that in the rock paintings of Jebel el-'Uweynât, "the prominence given to the udders is noticeable and suggests that the production of milk was an important feature" (Shaw 1954: 176). Ten years later, Karl Butzer wrote the exact opposite: since depictions of udders were not too common, the painters were clearly more interested in meat than in

milk (Butzer 1964: 453-454) — an opinion that was soon corrected by Francis van Noten who was to point out that "Butzer did not have knowledge of numerous paintings discovered by the Belgian expedition that clearly show a dairy economy" (Noten *et al.* 1978: 32).

Finally, the criterion of depiction of udders was again used very recently to distinguish two periods in the pastoralist art of the Libyan desert: an early one in which udders were not depicted and which corresponds to a phase of meat consumption; then another characterized by the depiction of udders, which is evidence for Sherratt's secondary products revolution (Becchauss-Gerst & Keding 2007: 28-29).

However, as these images are not photographs and are based on graphical canons which may be very different from our own<sup>1</sup>, it seems delicate only to use this kind of criterion, even though certain examples of very large udders are known (Huard & Allard-Huard 1978: 33), which show the interest sometimes taken by the artists in this part of the body of the animals they depicted. Nevertheless, it remains true that, everywhere in the Sahara, the udders were generally rarely represented. Moreover, a huge number of ethnographic examples prove that many varieties of cows raised today by African pastoralists have udders that may be almost invisible, and yet this in no way prevents milking (as, for example, among the Dinka and the Nuer). This must have been *a fortiori* the case for the primitive bovine races raised by prehistoric people.

In Saharan rock images, the use of milk is only perceptible with certainty in a few rare scenes that clearly illustrate milking, or that show people drinking directly from udders. The list is not long and, in fact, a few of the documents relied upon by early authors are scarcely convincing (see *infra*). However, one needs to add another kind of image to the list, those alluding to the fact that,

1. Need one recall that at Ti-n-Terirt (Tassili-n-Ajjer) a large engraved cow with a collar (L = 310 cm) has swollen udders, curiously bearing eleven teats? (Lhote 1970: fig. 4, No. 8).



Fig. 1. – Ochre painting in the site known as "the Children's shelter" at Sefar (Tassili-n-Ajjer) considered by Henri Lhote to depict "a man milking a cow" (after Lhote 1973: 254 & pl. 50).

in bovines, the reflex release of milk normally requires the presence of the calf. Through selection, herders have progressively eliminated this reflex in most of the present-day races of milk cattle: as is known especially in Europe but also still in Africa, the disappearance of its calf seriously compromises the milking of a cow (Kroll 1928, Balasse 2003). Two techniques are therefore utilized by milkers (of either sex) to achieve their goal. Either they trick the cow by presenting it with a fake calf (*e.g.* Livingstone & Waller 1875: 55, Cunynghame 1880: 127, Révoil 1882: 245, Tangye 1896: 290, Roscoe 1907: 95-96, Schultze 1907: 257, Roscoe 1911: 419-420, Crawford 1913: 33, Meyer 1916: 44, etc.) or they trigger the reflex by a different method: the introduction of products into the cow's vagina (*e.g.* Roscoe 1907: 95-96, Roscoe 1911: 419), and direct or indirect insufflation into the animal's vagina. The first procedure will not be examined here, as it seems impossible to recognize a fake calf or a real calf in a rock art image. On the other hand, we shall see that the second technique is perfectly recognizable in rock art, and it can thus provide us with highly valuable information.

## THE SAHARAN ICONOGRAPHIC DOSSIER

First of all, Leo Frobenius published the water-colour copy, made by the draftsman Agnes Schulz, of a red-ochre painting at Ido (Tassili-n-Ajjer, Algeria) in which one can see three people next to a bovine, and especially three vessels, one of which is placed beneath the animal's stomach (Frobenius 1937: pl. 84, No. 1482). Although this painting is sometimes evoked in studies of milking techniques in the Sahara (Simoons 1971: 437), the supposed cow in it does not have the slightest indication of udders, and none of the humans is shown in a position that might suggest milking.

Another possible scene of milking a cow was published in 1965 by Fabrizio Mori who had spotted it in the left part of a pastoral depiction at the site of Teshwinât in the massif of the Tadrart Akukas in southwest Libya (Mori 1965: 190, fig. 105). The published document does indeed seem to show a human seated amid a herd, and perhaps holding a large vessel between the knees. Gaetano Forni considered this fresco to be "*interessantissima*" and made the following comment: "*mentre un pastore sta*

*mungendo (peccato che le mammelle non risultino qui evidenti) in un enorme vaso, un vitello osserva, avido di succhiare. La presenza di un vitello durante la mungitura costituisce una tecnica raffinata e tuttora valida per aumentare la secrezione latte della vacca attraverso un gioco di riflessi condizionati*” (Forni 1963: 57). However, despite the presence, near the habitation, of several vessels, one of them placed on a one-legged stand, the interpretation of the scene as “*individuo che munge una mucca*” (Mori 1965: 139) is not very convincing. Gaetano Forni regretted that the udders were not clear, and that is indeed the least one can say. Moreover, the available tracings show that the supposed milker is actually standing close to a hornless animal, which looks more like a calf than a cow. Since these are tracings, one should also be very wary of the interpretations, but the current state of the panel is such that photographs do not enable one to do any checking, even by using high-powered computer techniques like DStretch on ImageJ. A new tracing, made recently by the team of the Italo-Libyan mission, is highly revelatory in this respect, as it bears even less resemblance to a milking scene than that of Mori (Lernia & Zampetti 2009: 137, fig. 7.14.2). So this document should be treated with great caution, and cannot be considered with any certainty as a proof of milking, as was done by Frederick Simoons (Simoons 1971: 436, Simoons 1978: 22), although this is still the position of Savino di Lernia and Daniela Zampetti, who describe this painting as a “*scena di mungitura*” (Lernia & Zampetti 2009: 136).

Henri Lhote, who made famous the rock painting of the Tassili, wrote that they included “several paintings showing [...] the organisation of the camps, the huts in which are the women and children, the calves close by and, fastened, farther away, the herd of adult animals, especially the cows around which several men are busy milking” (Lhote 1973: 225). However, the only document that he ever published in this regard is an ochre painting from the shelter “of the

Children” at Sefar, which he claimed to depict “a man milking a cow” (Fig. 1). Subsequently, this same document was again called on to prove milking among the Bovidians of the central Sahara (Simoons 1971: 436, Simoons 1978: 22, Huard & Allard-Huard 1978: 26) although one cannot see in it either the animal’s udders or the vessel for collecting the milk. Therefore it is hard to retain this scene as a depiction of milking, and Frederick Simoons was already highly critical of it, writing that it showed: “a human figure crouched behind a cow; his hands are extended toward where the cow’s udder, which is not depicted, would be. Nor is a pot visible beneath the animal, though nearby there is an enclosure or hut in which are pots of various shapes, together with a reclining man and child. Although this may indeed be a milking scene, as Lhote claims, the human figure may instead be assisting at the birth of a calf (the cow looks pregnant). Or he may be blowing up the uterus, which then, as in present-day Africa, may have been done to encourage a cow to give milk. If so, the scene depicts a preliminary to milking, but not milking itself” (Simoons 1971: 437).

One of the paintings at Tasigmet, in the Wadi Djerat, recorded by members of Lhote’s team (Lhote 1982: 88-89, Balasse *et al.* 2000), shows two cows being milked by a human in the presence of their calf (Figs 2 & 3) but the style of these images (especially the way of depicting hooves) denotes their relatively recent nature. The whole of this scene is of the Caballine age, and it is interesting to note that several wheeled vehicles are attached to cattle.

A search of the literature shows that only one really convincing document from North Africa was published in the early days. Located in Djorf Torba, a region of southern Oran which today is desert, it was the result of excavations carried out hurriedly during the winter of 1948-1949 in a pre-Islamic necropolis, by Captain Villalonga, but unfortunately no precise description was given of its context (Lihoreau and Lhote 1993: 22). It is a triangular limestone block bearing

an engraving of a cow close to two small incised scenes (Fig. 4). The veterinarian G. Espérandieu described “seated on a stool, a milker is positioned beneath a cow’s belly, facing the unhobbled back legs [and who] is milking the animal while the calf is very close to its mother’s head” (Espérandieu 1953: 184 & fig. 4). The deposition of this kind of element in the funerary monuments of Djorf Torba probably dates back to the V<sup>th</sup>-VI<sup>th</sup> centuries CE (Camps 1995: 2486), and this relatively recent date makes them of little use to our subject.

Finally, the only really “eloquent” documents are those which were discovered in the Libyan Messak after the late 1970s, when Gérard Jacquet revealed the extraordinary engraved panel of Wadi Tiksatin (Jacquet 1978). A general view presents a moment in the life of a camp at milking time (Figs 5, 6 & 10). Cows and calves are grouped together close to some big forked poles carved from the trunks of indeterminate trees (*e.g.* Figs 7-9) and, among the people who are busy in the vicinity, two in particular attract one’s attention: one is busy milking a cow (Figs 10 & 11), and the other is attaching to the fork of one of the trunks a vessel which one can imagine is full of milk (Fig. 9). The milking scene, meticulously engraved in the style associated with the “Messak culture” (Le Quellec 1996) has a less carefully-made counterpart on a nearby wall at the same site (Fig. 12), perhaps a preliminary sketch (Fig. 13). This engraving has been subjected to an unfortunate attempt at casting, which has damaged much of it. Nevertheless, one can clearly recognize the same type of cow as in the previous scene, with swollen udders, and the eye drawn with the double line that is characteristic of the local artists’ handiwork, but the milker can only be recognized through comparison with the other figure. In the background one can see the same forked poles used for attaching vessels that are fully comparable to the others. Also in the Messak, but farther north, in Wadi Eghahar, a third engraving takes up the same theme of the human milking a cow

close to a forked support on which are fastened vessels containing the product of the milking (Fig. 14). The milker (Fig. 15) closely resembles the one from Wadi Tiksatin (Fig. 11): same way of sitting, same high pointed hair style, same pointed beard, same milking technique.

The only other engraving that is even vaguely comparable to the previous ones is also in Libya, at Ilalen in the region of the Aramat, and its existence was reported to me by Yves Gauthier, who was kind enough to send me a photograph. Although its front part is somewhat hard to read, it clearly represents a cow with voluminous udders whose four teats are well indicated, and under which an anthropomorph is sitting. In front of the animal, a few lines may indicate the presence of a calf, and the whole thing is very strongly evocative of a milking scene or its preliminary phase (Fig. 16).

In the Immidir (massif of the Ahaggar, in Algeria), an assemblage at I-n-Sebuk shows people resting in enclosures around which a herd is grouped (Fig. 17). Although this painting — probably from a late pastoralist period — is not very naturalistic, several elements relevant to our subject attract one’s attention. To the left of the enclosures five cows with udders depicted are in a vertical line, the traditional way of showing that they are attached. The three lowermost have their calves facing them, and beneath at last four of them there is a small human who is either reaching for their udders or handling the teats (Fig. 18). Under the enclosures, three other cows facing left are in contact with small humans who are likewise in contact with their udders (Fig. 19). In this group, the figure located at lower right particularly attracts one’s attention. Not only is the seated person handling a teat in each hand, but one observes that another anthropomorph, this time standing up, is behind the animal in an intriguing position: one of its hands reaches towards the udder while the other seems to be moving the tail aside, just under the base of which the man’s head is clearly coming into contact with the cow. This

curious posture can be understood through examination of another image, located beneath the preceding ones. Here one can again see a cow with udders, the four teats of which are well drawn. It is facing its calf, and surrounded by people, one of whom repeats the gesture of the previous one, but with a variation: although he too is directing his hand towards the animal's udder, he is using the other not to hold the tail aside but to raise it very high, which allows him to place his face just at the location of the animal's vulva (Fig. 20).

One can recognize in this a technique that is well known to ethnologists, and which consists of blowing into cows' vaginas, either directly from the mouth or by means of a tube, in order to provoke the "milking reflex". We shall see below that it has been reported in Africa among the cattle-raising Tuaregs of Niger, as well as among the: Wodaabe, Fulbe (Niger, Mali), Bana, Teda/Daza (Chad), Suma, Anuak, Dinka, Nuer, Shilluk, Baggara (Sudan), Bedouins (Egypt), Afar, Kafirsho, Oromo, Somali, Surma (Ethiopia), Maasai (Kenya), Wagogo, Warimi, Turu, Ziba (Tanzania), Herero, Namaqua (Namibia), Rolong (Botswana), Tswana, Nguni, Nama, Korana, Gonaqua, Khoekhoen of the Cape, !Xosa (South Africa) (*cf.* references in the appendix).

These data can be compared with a rock engraving at Wadi Imrâwen in the Messak (Libya) which depicts a hornless bovine held by a human who is kneeling in front of it. The line joining the latter's hand to the animal's neck leaves no doubt about this (Fig. 21). Behind the animal, another human figure is bending forward until its face is in contact with the part immediately under the base of the tail, which is held up in the air (Fig. 22). It is most probable that this is once again a depiction of the technique of insufflation used to provoke lactation. In another valley of the Messak, that of Tin-Sharuma, a block is decorated with numerous engravings of bovines (Fig. 23) one of which could be linked to another illustration of the same technique because one can see that, here

again, a human seems to be busy beneath the animal's tail (Fig. 24). A third document, published by Yves and Christine Gauthier, appears somewhat unconvincing. The animal is atypical, its tail is not visible, and three of the four people surrounding it are armed; moreover, one of them is wearing a zoomorphic crested mask: it is hard to believe that this merely depicts a way of forcing a recalcitrant cow to give its milk (Gauthier 1994, fig. 3).

In the Ennedi, a milking scene, reported by Gérard Bailloud at Gaora Hallagana IV, was considered quite late by its discoverer, who placed it in his "Koko style", and hence at the end of the first millennium BCE (Bailloud 1997: 147). Two comparable images, from the same region — including one at Shekitiye in the heart of the Ennedi — have been attributed to the local "early Bovine" phase (Jesse *et al.* 2007: 48, fig. 5) which dates back to ca. 3000 BCE (Lensen-Erz 2007: 52). Both of them show a human handling the udder of a cow whose horn is being held by another human in the second case (Figs 25 & 26).

Where the Libyan desert is concerned, it has been said that the paintings of Jebel el-'Uweinat include a milking figure (Noten *et al.* 1978: fig. 171), but the image in question shows two small anthropomorphs drinking directly from the udders of a cow behind which a couple are standing: perhaps two children and their parents (Fig. 27). Although in a poor state of preservation, another painting in the same region shows a cow licking its calf, tied by the leg to a bush, while a human — unfortunately not very legible — is drinking directly from the udder (Fig. 28). Several paintings in the same massif can be linked with these images (Le Quellec *et al.* 2005, fig. 896, 897, 890, 893) in particular that of Wadi Sura which represents an archer pushing a calf away with one hand, while bending towards its mother's udder (Fig. 29).

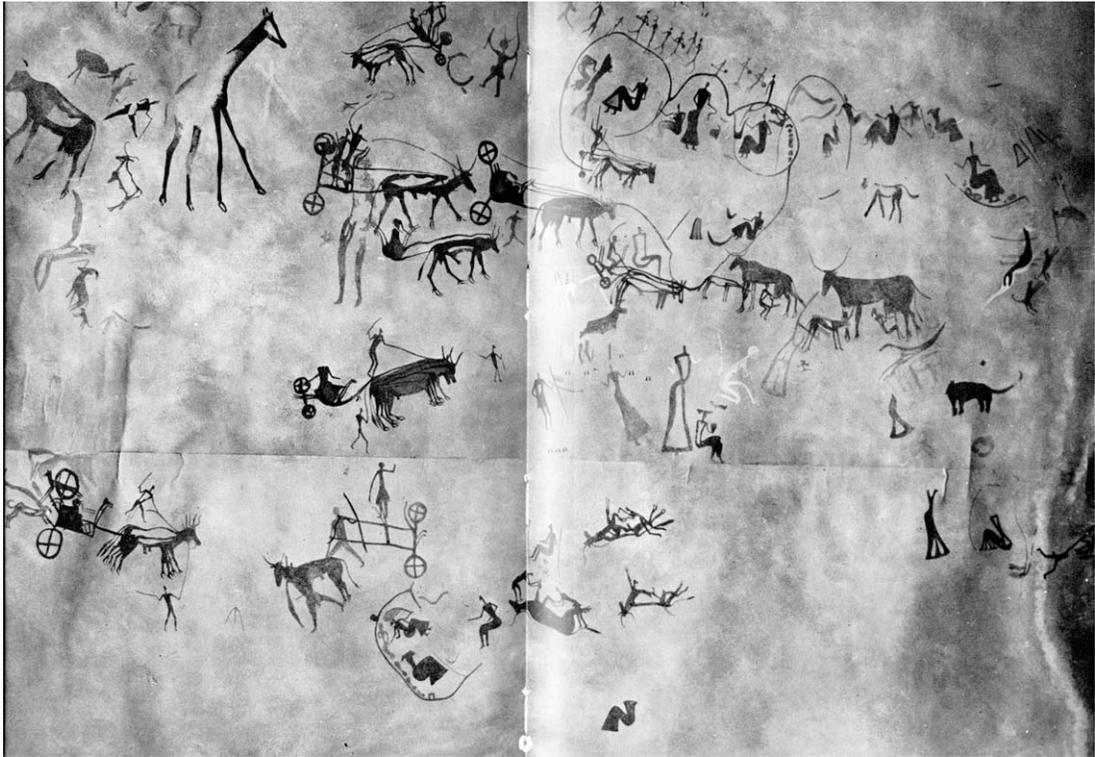


Fig. 2. – Rock paintings in a rock shelter at Tasigmet, in the Wadi Djerat. Among the numerous scenes presented here, the milking of cows is depicted (Tassili-n-Ajjer) (after the tracing published by Lhote 1982: 88-89).

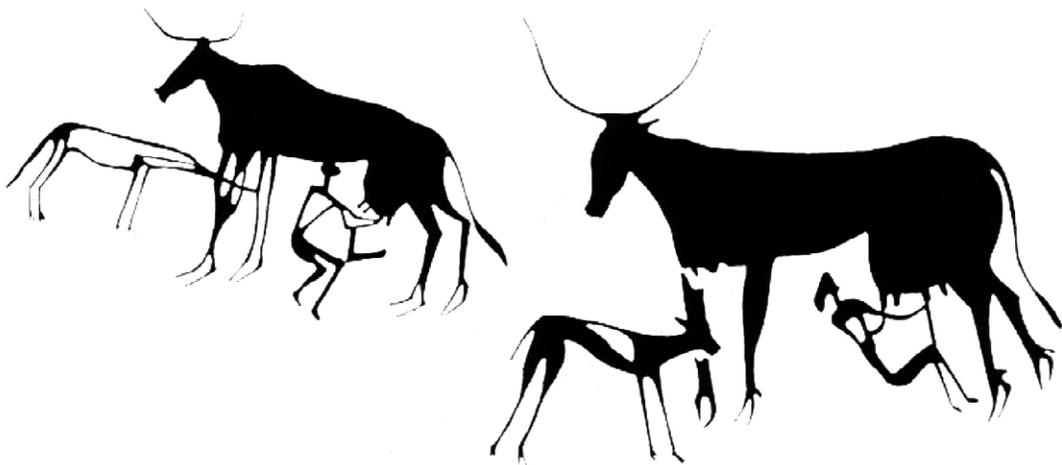


Fig. 3. – Detail of the milking scene from the previous tracing (after the tracing by Balasse *et al.* 2000).

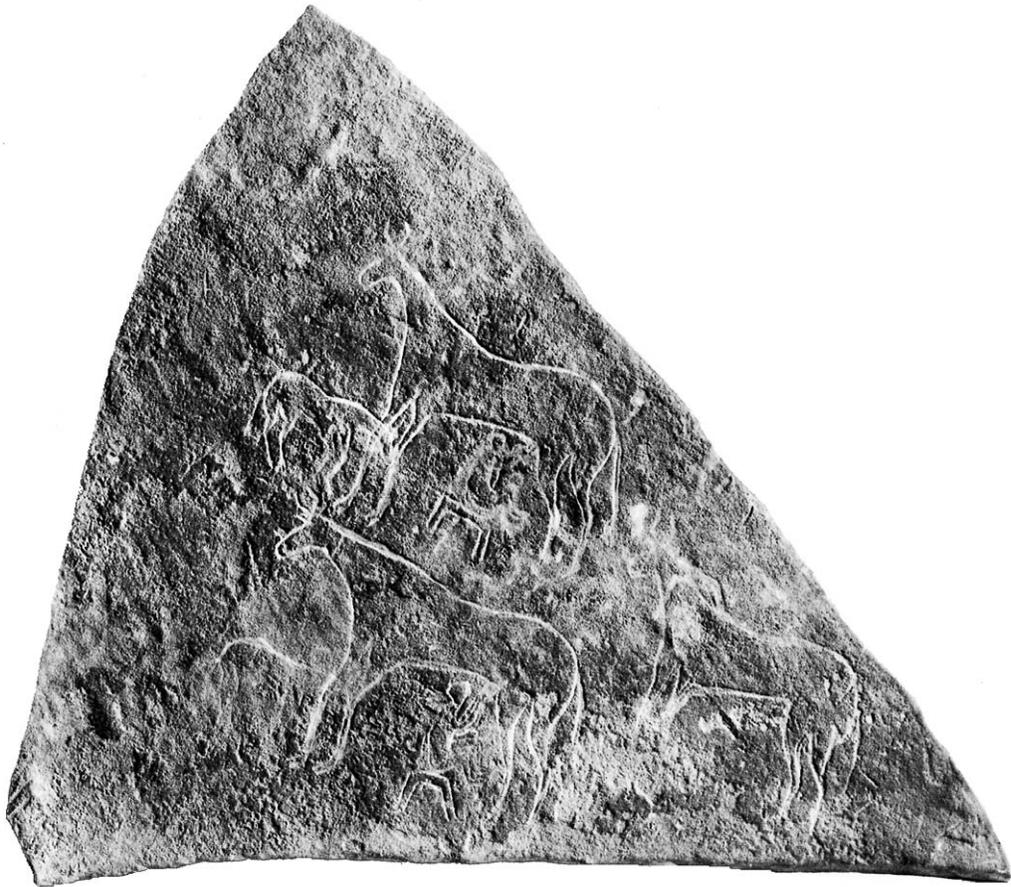


Fig. 4. – Milking scene engraved on a limestone block from Djorf Torba in the southern Oran region (Algeria) (after Balout 1958: 167).



Fig. 5. – Camping scene engraved in Wadi Tiksatin in the Messak, in Libya (Photo JLLQ).



Fig. 6. – Tracing of the previous scene, after Albada 1996: pl. 4.



Fig. 7. – Forked pole used for hanging vessels on, in the previous scene (Photo JLLQ).



Fig. 8. – Other poles to which vessels are attached, from the same scene (Photo JLLQ).



Fig. 9. – Human attaching a vessel to one of the poles in the previous scene (Photo JLLQ).



Fig. 10. – The milking scene from the engraved panel in the Wadi Tiksatin (Photo JLLQ).



Fig. 11. – Detail of the milker, from the same scene (Photo JLLQ).



Fig. 12. – Panel close to the previous scene, also including an engraved milking scene (Photo JLLQ).



Fig. 13. – The other milking scene in Wadi Tiksatín, unfortunately damaged by a clumsy attempt at casting. The milker is more difficult to recognize than in the previous scene (Photo JLLQ, detail of Fig. 12).



Fig. 14. – Another milking scene in the Messak, this time in Wadi Eghahar.  
A careful examination reveals that a vessel is attached to a forked pole set up in front of the animal (Photo JLLQ).



Fig. 15. – Close-up view of the milking scene in Wadi Eghahar: the person milking the cow (Photo JLLQ).



Fig. 16. – Rock engraving at Ilalen in the region of the Aramat (south-west Libya) depicting a seated human milking a bovine (Photo Yves Gauthier).



Fig. 17. – Camping scene in a rock painting at I-n-Sebuk in the Immidir (Ahaggar, Algeria)  
(Tracing after Gauthier & Lluç 1999: 125, fig. 6, 5).



Fig. 18. – Photograph of the left part of the previous scene.  
Note the small schematic humans manipulating the udders of the bovines (Photo Yves Gauthier).



Fig. 19. – Another detail of the scene at I-n-Sebuk. Small humans painted in a different shade of red are milking bovines (Photo Yves Gauthier).



Fig. 20. – Another detail of the same scene, showing a human insuflating a cow (Photo Yves Gauthier).

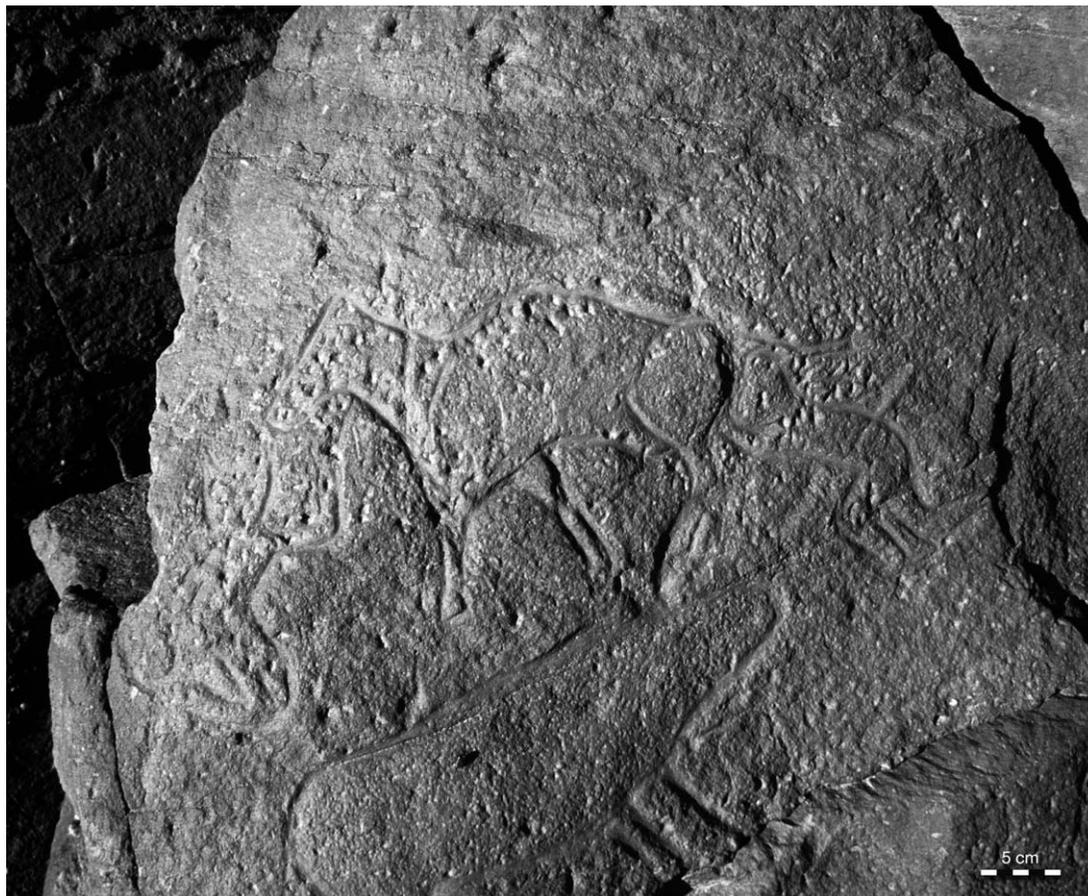


Fig. 21. – Engraving in Wadi Imrâwen in the Messak (Libya) depicting a bovine between two humans, one of whom seems to be insufflating (Photo JLLQ).



Fig. 22. – Detail of the previous engraving, showing the human's position and attitude (Photo JLLQ).



Fig. 23. – Rock with numerous bovines engraved on it, at Wadi Ti-n-Sharûma in the Messak (Photo JLLQ).



Fig. 24. – Detail of the previous engraving, showing the human's position and attitude (Photo JLLQ).



Fig. 25. – Painted milking scene in the Shekitiye region in the Ennedi (Photo Tilman Lensen-Erz; digital treatment JLLQ).

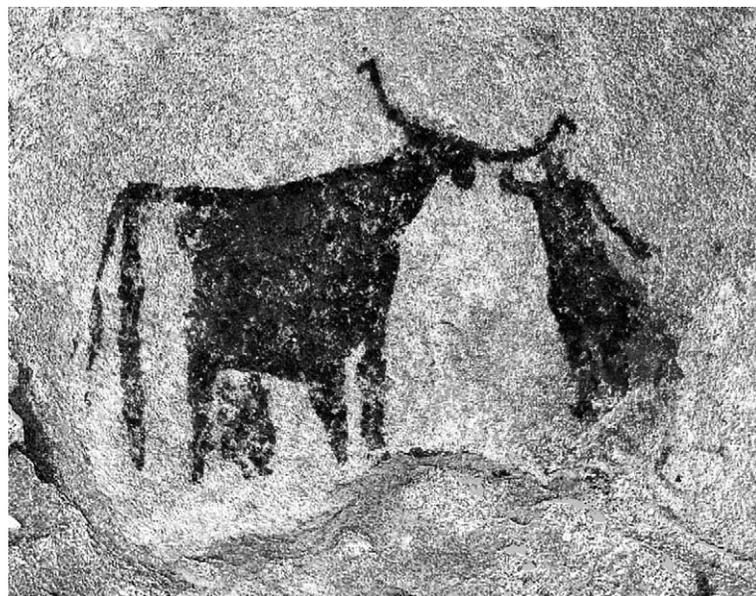


Fig. 26. – Another painted milking scene near Shekitiye in the Ennedi (Photo Tilman Lensen-Erz; digital treatment JLLQ).

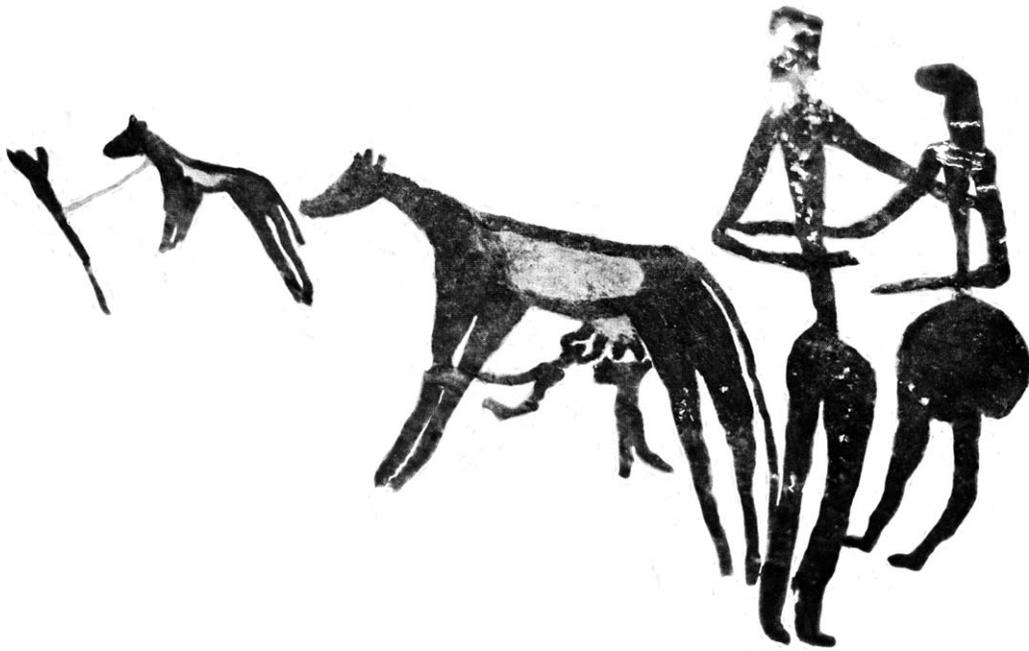


Fig. 27. – Rock painting from Jebel el-'Uweynat (Libyan desert) described as a milking scene by Noten *et al.* 1978: fig. 171.



Fig. 28. – Small human drinking directly from the udder, in a rock painting at Jebel el-'Uweynat, in the Libyan desert (Photo. JLLQ).



Fig. 29. – Rock painting at Wadi Sura depicting an archer pushing away a calf with one hand, while bending down to its mother's udder (Photo JLLQ).

## HISTORICAL AND ETHNOGRAPHIC DOCUMENTATION

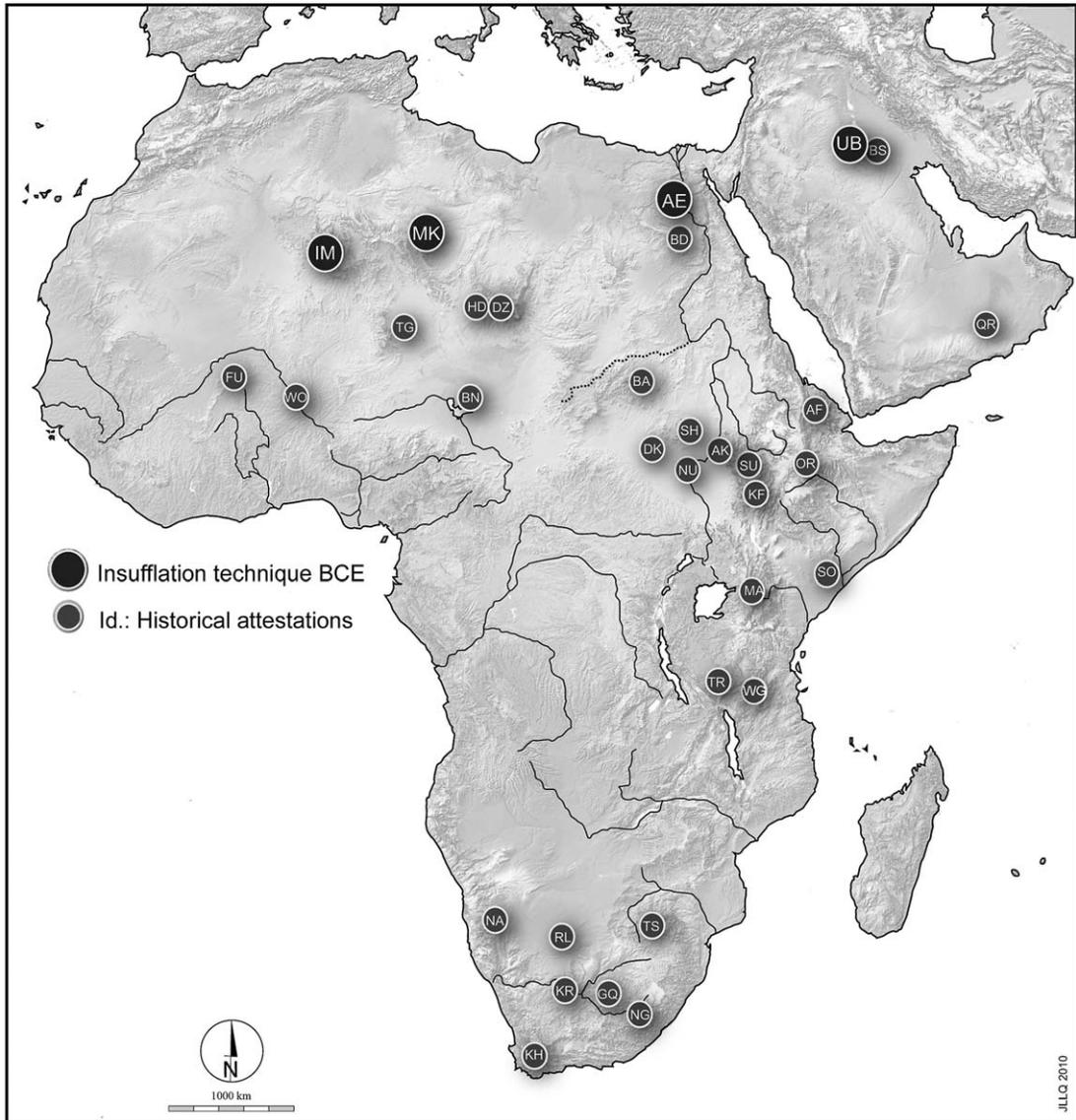
These images raise several questions. In particular one would like to be able to explain the distribution of claims for the technique of insufflation to provoke lactation (Map 2).

This technique has often been described since its first mention by Herodotus among the Scythians who, he wrote: “blind all their slaves, to use them in preparing their milk. The plan they follow is to thrust tubes made of bone, not unlike our musical pipes, up the vulva of the mare, and then to blow into the tubes with their mouths, some milking while the others blow” (IV-2, translation by G. Rawlinson). It has been suggested that the existence of the same technique, used for milking cows among the Kirgiz (Menghin 1931: 529) and on the banks of the river Tung, in XX<sup>th</sup>-century China, must have a historical connection with the custom presented by the Father of History (Huston Edgar 1924). In addition, it is known in a few other parts of Asia. In the XVIII<sup>th</sup> century, when Johann Eberhard Fischer was to carry out some research among the Yakuts (Siberia), Gerhard Friedrich Müller instructed him (Müller 1900, Bucher 2002) to examine “how the Yakuts blow into the uterus of their cows to make them give more milk” (“*wie die Jakuten deren Kühen in den Uterus blasen, damit sie mehr Milch geben*”), according to a tradition that he had probably observed himself during a sojourn in 1735 (Plischke 1954: 1). In the course of travels to the land of the Kalmuks in the mid-XVIII<sup>th</sup> century, the same Gerhard Friedrich Müller later noted this method of overcoming a recalcitrant cow: they “forcibly insert from behind a smooth bung of carved wood, so that, in its desire and its efforts to get rid of it, the cow releases its milk at the same time” (Pallas 1801: 182). In India, this custom, known as *Phooka* or *doom dev* is forbidden by the “Prevention of Cruelty to animal act”, passed on 21 March 1890 which specifies that “*Phooka* or *doom dev* includes any

process of introducing air or any substance into the female organ of a milch animal with the object of drawing off from the animal any secretion of milk”. It had already been denounced by Gandhi, who considered it “loathsome”, and it was described as follows by the secretary of the Anti-Phooka Association of Calcutta: “Twice a day, at each milking session a piece of bamboo is introduced into the uterus of the cow to blow air into it and to distend the walls. The resulting inflammation causes pressure on the glands, enabling the milker to extract milk to the very last drop until blood starts to flow from the udder. Even though it is illegal, this practice, which has been common in India for a long time, still persists” (Burgat 2004: 237).

The technique is not unknown in Europe, where it was practiced in the XIX<sup>th</sup> century by the peasants of Hungary and Bosnia, who blew into the vagina of their cows by means of a small tube (Parau 1975: 30). It also existed in Ireland, since in 1681 Thomas Dinely mentioned it in his journal in a somewhat picturesque way: “In Milking of Kine when milk doth not come freely [...] with their mouthes to blow in as much wind as they can, with which doing they many times come off with a shitten nose” (Lancy 1999). In France, it was reported in the XIX<sup>th</sup> century in Alsace (Keller 1894) and it is still practised today in Aubrac (personal communication by André Balladier, herdsman, 7 May 2010).

Apart from these sporadic mentions, it is in Arabia and especially in Africa that this custom has been observed most often. The Eurasian zone poses particular problems, and henceforth we shall only deal with Arabian and African claims, which are remarkably frequent. In the XVIII<sup>th</sup> century, Ferdinand Carsten Niebuhr wrote about what he had observed at Basra in Iraq: “I heard it said, and saw for myself at Basra, that when an Arab milks the female buffalo, another sticks his hand and arm up to the elbow in the vulva, because they claim to know from experience that, being tickled in this way, they give more milk” (Niebuhr 1779: 231).



Map 2. – Distribution of claims for the technique of insufflation to provoke lactation.

The German naturalist Peter Kolb illustrates a comparable practice in his description of the “Hottentots” of the Cape published in 1719 (Kolb 1719: 468) (Fig. 30), and describes it as follows: “They can no longer obtain milk from such a cow [whose calf is abandoned] except by taking the trouble to tie its back legs, so that it can no longer kick, and then blow into the pla-

ce from which the calf came out. Because they have discovered that they could nevertheless obtain milk by this method. This is work that can be done by either men or women, and I have seen it done by both” (*Ibid.*: 468 — translated from the German edition). A XVII<sup>th</sup> century engraving preserved in the Cape Library gives a faithful depiction of it (Fig. 31) accompanied



Fig. 30. – Engraving from the book by Peter Kolb illustrating a comparable practice in his description of the “Hottentots” of the Cape (after Kolb 1719: 468).



Fig. 31. – XVII<sup>th</sup> century engraving preserved in the Cape Library and providing another depiction of the same practice (after Smith & Pheiffer 1993: 54).

by this description: “The Hottentots blow into the vagina of the cow with the mouth or a bamboo, to obtain more milk.” In 1726, the Dutch naturalist François Valentijn was astonished: “It is an unusual thing, which I have noticed only among the Hottentots, that when one of them will milk a cow and is busied therewith, another Hottentot usually blows into the beast from behind, judging that thus the milk will flow to the udders much sooner and more abundantly than otherwise” (Valentijn 1973: 75). On the date of 10 September 1779, another Dutch explorer, Robert Jacob Gordon, would likewise note in his journal, about the same people: “after milking for a while, they grasp the labia of the cow with both hands and blow between them strongly. Shortly afterwards the cow urinates and they continue milking it. They say they do this if the cow keeps the milk in” (Gordon *et al.* 1988: 285).

Since then, this practice has often been described again for the Khoekhoe, for example by Leonhard Schultze at the start of the XX<sup>th</sup> century: “If a cow without calf does not want to give her milk, the Hottentot successfully blows into its intimate parts, or he tricks it with the hide of the dead calf” (Schultze 1907: 257). Other authors referred to it by reporting their own observations, like A. Bogaerts for the “Hottentots” (Bogaerts 1731) (Fig. 32) and James Edward Alexander for the Nama: “The cows, whose calves had died, were blown in an extraordinary manner, to make them let down their milk, as described by Kolbe in his strange work on the Cape” (Alexander 1838: 146). As for Hugo von François, he noted with regard to the Nama and Damara that “The Hottentots blow air into the animal’s vulva, and the animal then readily accepts the milkmaid” (von François 1896: 258).

In the XX<sup>th</sup> century, mentions of this technique multiplied. Some people occasionally associated it with others, like the Turu of Tanzania among whom “if a cow refuses to give milk, then a magician (*mbaha-ñgombé*) cooks a remedy, the com-



Fig. 32. – Another engraving of the same subject, taken from the chapter in A. Bogaerts’ book on the “Hottentots” (after Bogaerts 1731).

position of which is a secret, and smears it on the periphery of the cow’s vulva. Then he takes a little of this concoction in his mouth and blows it as hard as he can into the vagina, while holding the lips apart with his fingers. The cow reacts to this treatment by bending its back and urinating on the magician’s face, though this does not seem to bother him. Next, a little boy puts on the calf’s hide, smeared with the same secret mixture, and stands in front of the cow. As soon as the latter feels it, she licks it and calmly lets herself be milked” (Sick 1916: 17-18).

Hugo Bernatzik reports the same thing among the Nuer (Fig. 33): “A little to one side stands a cow who is said to give too little milk. Now, girls and boys take turns to place their mouth against the animal’s anus and vagina and blow

as hard as they can. This does not seem to please the cow, which has to be held” (Bernatzik 1930: 112). This author specifies that the same occurs among the Dinka (Fig. 34): “As for the cows which have no calf but can nevertheless give milk, the Dinka, like the Nuer, blow as hard as they can into their anus and their vagina” (Bernatzik 1929: 93). Moreover, the example of the Dinka is regularly cited (Fig. 35) (Parau 1975: 30, Castiglioni 1977: 159), and the photos taken by Evans-Pritchard during his sojourn among the Nuer show the insufflation technique (Fig. 36) and its association with that of the presentation of a fake calf (Fig. 37)<sup>2</sup>.

Among the Peul Wodaabe, milking is generally women’s business, but the man intervenes in difficult cases by blowing air into the cow’s vagina (Dupire 1962: 86). An observation comparable to that made by Niebuhr in Iraq was reported by Hermann Rhese among the Ziba of Tanzania where, “to be able to profit from milk for longer, either they give the cow another calf, or they force it artificially to give milk. Two methods are then possible: they blow into the cow’s anus, or they stick the hand and arm up to the elbow into there. In most cases, after that, the cow then gives milk” (Rhese 1910: 49).

In the Sudan, the Baggára Arabs of Kordofan and Darfur also practise insufflation, according to MacMichael: “I remember being told in Darfur in 1916 that the late Sultan Ali Dinár, when defied the previous year by Musa Madibbo, the powerful sheik of the Rizeiqát Baggára, addressed a letter to his troublesome subject with rather unfairly began ‘*Ya nafáh el buqquer*’ [‘You blower-up of cows!’]” (MacMichael 1924). In Chad, the Bana of Logone also know it (Rühe 1938: 216 apud Plischke 1954: 4), perhaps after being borrowed from the Arabs (Lagercrantz

1950: 50). It is also attested among the Maasai (Menghin 1931: 529).

In the Horn of Africa, where the custom is known among the Danakil (Lagercrantz 1950: 48), it has been reported that “in the south of Galla country [...] they milk cows, which receive no other food than grass, in the morning after a brief graze, when the cow will give about three litres of milk; and at night when it gives from 4 to 5 litres. For the milking they put a calf’s hide on their head. While the cow is licking it, it is possible to milk it quietly. If the milking is not done rather quickly, they blow violently into the vagina of the goat or the cow, in the Sudanese way” (Paulitschke 1893: 266). Another indication, given for “Abyssinia” in general is provided by J.-Maria Hildebrand: “If a cow holds back its milk, as it often does when it has lost its calf, the latter’s body is stuffed and placed close to the mother at the moment of milking, or it is presented with another cow’s calf which has previously been smeared with the urine of the dead calf. She licks it and accepts it, believing that it is her own calf. At the same time the real mother continues to suckle her little one, so that it often happens that two or three cows share the same calf. But if, despite these stratagems, a cow still refuses to give its milk, they tie its back legs together and they blow hard into its vagina. The labia of the vulva are separated, and the herder blows some brief blasts directly into the vagina. Rapidly withdrawing his head, he manually closes the labia of the vulva, so that the vagina remains distended by the air. This operation is repeated as many times as is necessary to force the cow to stay quiet and to be milked” (Hildebrandt 1874: 331). Among the Somali, “Milking is men’s work. If a cow refuses to give milk, the natives use a very original method to obtain it. A man holds the cow’s head, another pulls its tail, and a third blows as hard as he can into its anus, after which the animal willingly gives its milk” (Keller 1901: 135).

2. Morton, Chris. “Treating Nuer cow” Southern Sudan Project (in development). 03 Jan. 2006. Pitt Rivers Museum. Accessed 01 May. 2010. <http://southernsudan.prm.ox.ac.uk/details/1998.355.447.2/> et <http://southernsudan.prm.ox.ac.uk/details/1998.355.353.2/>.



Fig. 33. – Photo published by Hugo Bernatzik illustrating the same technique among the Nuer (after Parau 1975: 30).



Fig. 34. – Photo of the same, illustrating the technique among the Dinka (after Bernatzik 1929: 93).

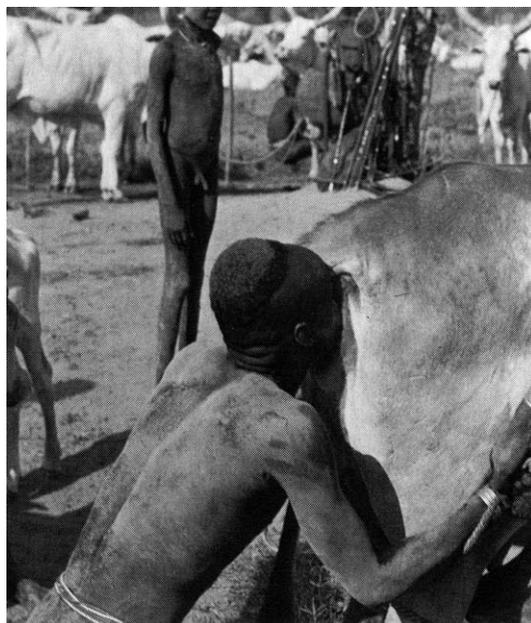


Fig. 35. – Another attestation of the same technique among the Dinka (after Castiglioni 1977: 159).



Fig. 36. – Photos taken by Edward Evan Evans-Pritchard during his sojourn among the Nuer and showing the practice of insufflation (after <http://southernsudan.prm.ox.ac.uk/details/1998.355.447.2/> all rights reserved).

In East Africa, among the Wagogo, “if the calf dies, milk production ceases immediately. So the cow is tricked in the following way: the hide of the calf’s head and neck is stretched over a gourd. This naturalised head is brought close to the cow from behind, she licks it, thinks she recognizes her calf, and lets herself be milked. Another method consists of blowing air into the animal’s vulva” (Clauß 1911: 13).

In southern Africa, the custom of insufflation has been mentioned among the Nama (Alexander 1838: 146), Tswana (Wilman 1925), Korana, Gonaqa, Herero, Nguni, !Xosa and Rolong (Lagercrantz 1950: 49-50).

In the Congo, the Banyamulenge state that, to milk a cow, they first try to massage it while speaking to it, singing it songs, giving it salt, and if none of those things works, they insert into its vagina certain herbs which are supposed to



Fig. 37. – Another photo from the same source, showing the association of this technique with that of the fake calf (after <http://southern Sudan.prm.ox.ac.uk/details/1998.355.353.2/>, all rights reserved).

make milk flow (information obtained *in situ* by Nicole Poissonnier, *in litt.* 17-iv-2010). A similar technique (along with others) is found, as we have seen, among the Turu of Tanzania (Sick 1916: 17-18), but also in Uganda among the Bahima (“The men know numerous herbs for doctoring their cattle, and administer some herb by injection into the uterus to make a cow yield milk when its calf has died; this has to be done with care, and not too often, or it causes the ani-

mal to become barren” — Roscoe 1907: 95-96) and also among the Baganda (“The herdsmen knew a medicine, which they could insert into the uterus of a cow that had lost its calf, with the effect of making her give more milk for a time; but if the operation was repeated, it caused sterility” — Roscoe 1911: 419).

In these latter cases there is no insufflation, but the act of placing herbs into the vagina should, if need be, be recognizable in some detailed rock images.

## THE OLDEST KNOWN CLAIMS

For reasons presented elsewhere (Le Quellec 1998), the engravings of the Messak can be placed in the fifth-fourth millennia BCE. The paintings of Immidir, although not precisely dated, are undoubtedly more recent although, for climatic reasons, they cannot be later than 2000 BCE (Le Quellec 2006).

The technique of insufflation in Ancient Egypt has been mentioned by Philippe Gouin, who unfortunately does not indicate his source (Gouin 1993: 140, n. 29). However, a detail of fresco recorded in a V<sup>th</sup> dynasty tomb (ca. 2500 BCE) attracts one's attention (Fig. 38). This image is one of those which show that the ancient Egyptians took advantage of the presence of the calf to obtain the milk, and here the little animal has a competitor in the form of a young boy who is suckling the udder directly. But what is the adult doing who is just behind the cow? He seems to be placing his right hand under the animal's tail, as if to stimulate it manually just as the Dinka do when they practise insufflation. Although it is not absolutely convincing, this image therefore seems to contribute to our dossier, for want of a more precise illustration. However, such an illustration may exist in the form of the decoration of the tomb of Oukhhotep at Meir (XII<sup>th</sup> dynasty) in which one sees (Fig. 39 left) a scene which Jacques Vandier described in these terms: "The cow waits placidly, without taking care of its calf, which must have recently been weaned and which stands quietly in front of its mother. A man, squatting on bent legs, wraps his arms around the cow's back legs, obviously to immobilize it. His companion, squatting in the same way close to the animal, is bending forward with his head raised. If one goes by the drawing, the herdsman is not yet actually milking, he is just placing in the correct position the vessel into which the milk must flow. This vessel is no longer visible, but it certainly existed, and the man, with his arms

lowered in parallel, was busy putting it exactly under the udder of his animal, before beginning his work" (Vandier 1969: 228-229, concerning his fig. 103, No. 2). This description is perhaps not as faithful to the work as it might seem from the first reading. For example, if the calf is in front of the cow, this is obviously to facilitate lactation, as is common everywhere, especially in ancient Egypt (Figs 40 & 41). In the tomb of Oukhhotep, the person located under the mother is small, and thus is probably a child or an adolescent learning to suckle directly from the udder, as is always common in Africa. It is therefore normal that no vessel is visible, and pointless to imagine that it has disappeared. As for the adult located behind the cow, why would he be seeking to immobilize the animal by girdling its legs, which would be fairly risky, and even dangerous, when it would be so simple to hobble it, something the Egyptians knew very well how to do? For example, one can see this clearly in the decoration of the tombs at Saqqara (Figs 40 & 42). More likely, judging by the animal's markedly raised tail, it is far more probable that this human is preparing to blow into its vagina, having already knelt down to do this, adopting a posture that is often used by the Dinka and the Nuer today (Figs 34, 36 & 37).

In our inventory, the easternmost location is that of the so-called "dairy" panel discovered to the left of the entrance staircase at the temple of Nin-hursag. This monument was built at Tell el-'Obeyd (southern Mesopotamia, in present-day Iraq) by king A-aNe-pada, in the Sumerian language (Fig. 43, and reconstruction Fig. 44). In this decoration, the position adopted by the milker — from behind — is customary for milking ewes and goats, but is surprising in the case of a cow because, says Philippe Gouin, it "obliges the man to work with arms outstretched and his face confronting the animal's rear end, which prevents him seeing what he is doing. Moreover, the cow's powerful tail is a nuisance, and its droppings are at risk of falling in the milk. Nevertheless, this method of milking is

found on a cylinder-seal in the Louvre [...] whose general decoration is, moreover, very close to that of the frieze of el-'Obeid as well as on a small fragment of a relief at Ur. In fact, the milker thus places himself before milking, in order to be able to blow into the cow's uterus" (Gouin 1993: 140). This document shows that the Sumerians knew this technique by the early Dynastic III B, around 2500 BCE. Although

incomplete, a fragment of bas-relief at Ur clearly shows a man using the same technique as the milkers of Tell el-'Obeyd, by squatting, like them, without a seat behind the animal (Fig. 45). To the elements of comparison that have just been cited, one can also add a seal of the Final Bronze Age discovered at Knossos by Sir Arthur Evans (Fig. 46 after Davis 1987, fig. 7.7).

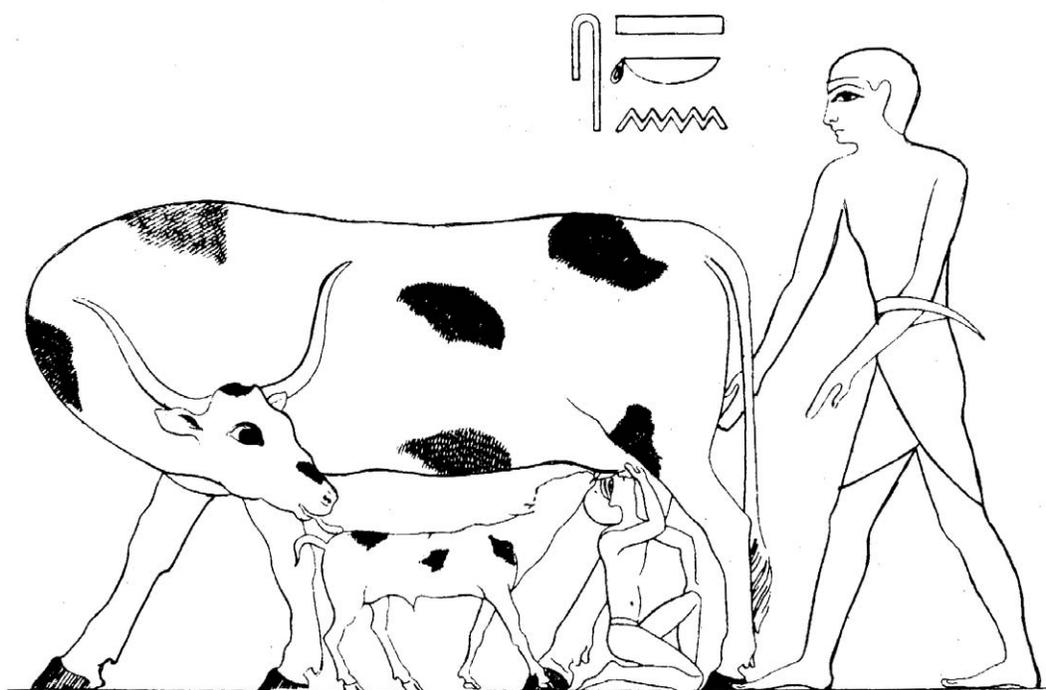


Fig. 38. – Fresco traced in an Egyptian tomb of the V<sup>th</sup> dynasty (after Héry & Enel 1993: 158, fig. 193).

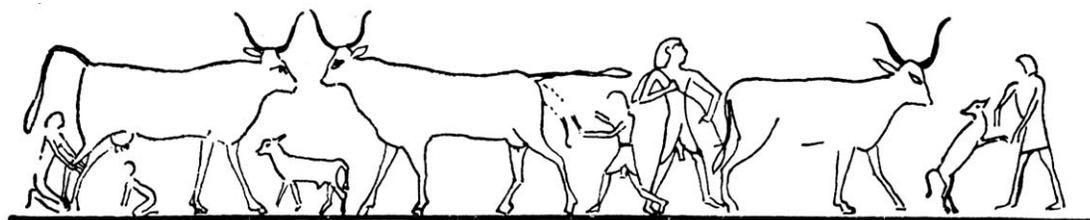


Fig. 39. – Fresco in the tomb of Oukhhotep at Meir (XII<sup>th</sup> dynasty) (after Vandier 1969: fig. 103, No. 2).

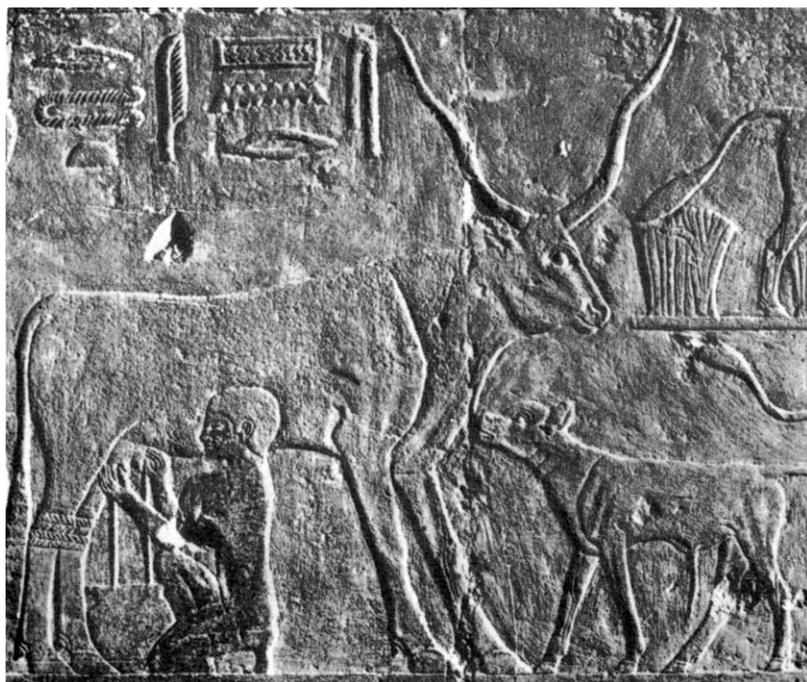


Fig. 40. – Another milking scene at Saqqara (after Parau 1975, fig. 12).

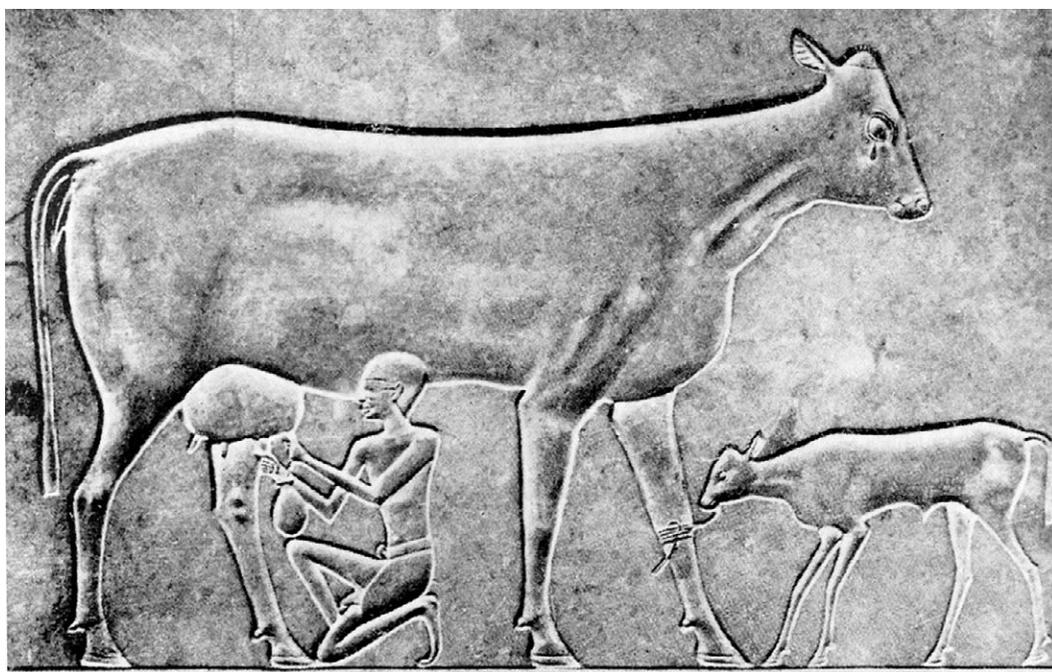


Fig. 41. – Milking scene at Saqqara (after Boessneck 1988, fig. 107).

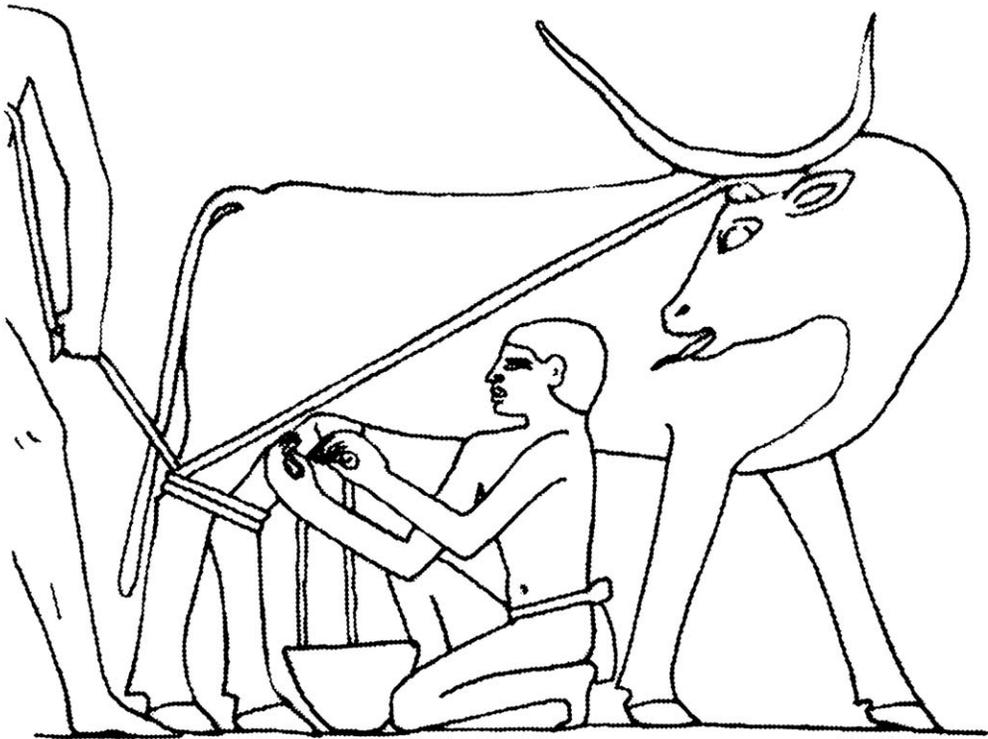


Fig. 42. – Milking scene from the mastaba of Kagemni, Old Kingdom (after Dunand & Lichtenberg 2005, fig. 14).



Fig. 43. – Panel known as “the dairy” decorating the temple of Nin-hursag at Tell el-'Obeyd (southern Mesopotamia, in present-day Iraq) (after Parau 1975, fig. 9).



Fig. 44. – Reconstruction of the previous panel. (After Simoons 1971: fig. 2).



Fig. 45. – Fragment of the bas-relief of Ur showing a man using the same technique as the milkers of Tell el-'Obeyd – crouching, like them, without a chair, behind the animal (after Woolley 1974, pl. 45-f).

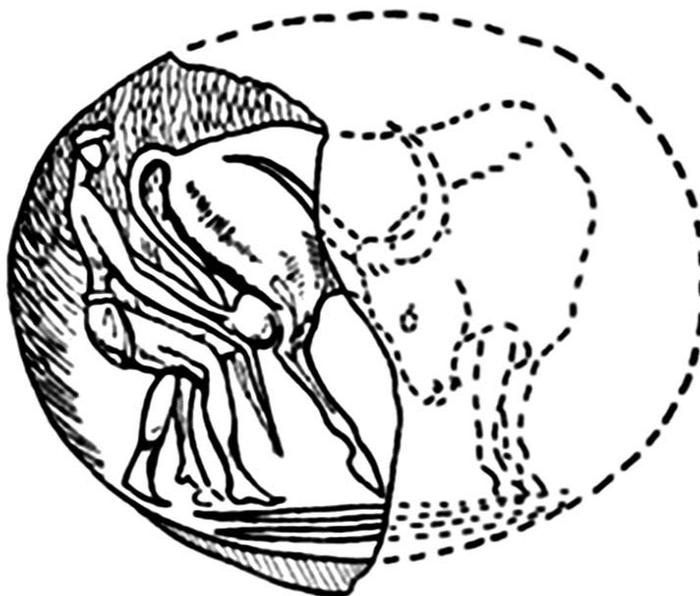


Fig. 46. – Final Bronze Age seal discovered at Knossos by Sir Arthur Evans and showing milking from behind (after Davis 1987, fig. 7.7).

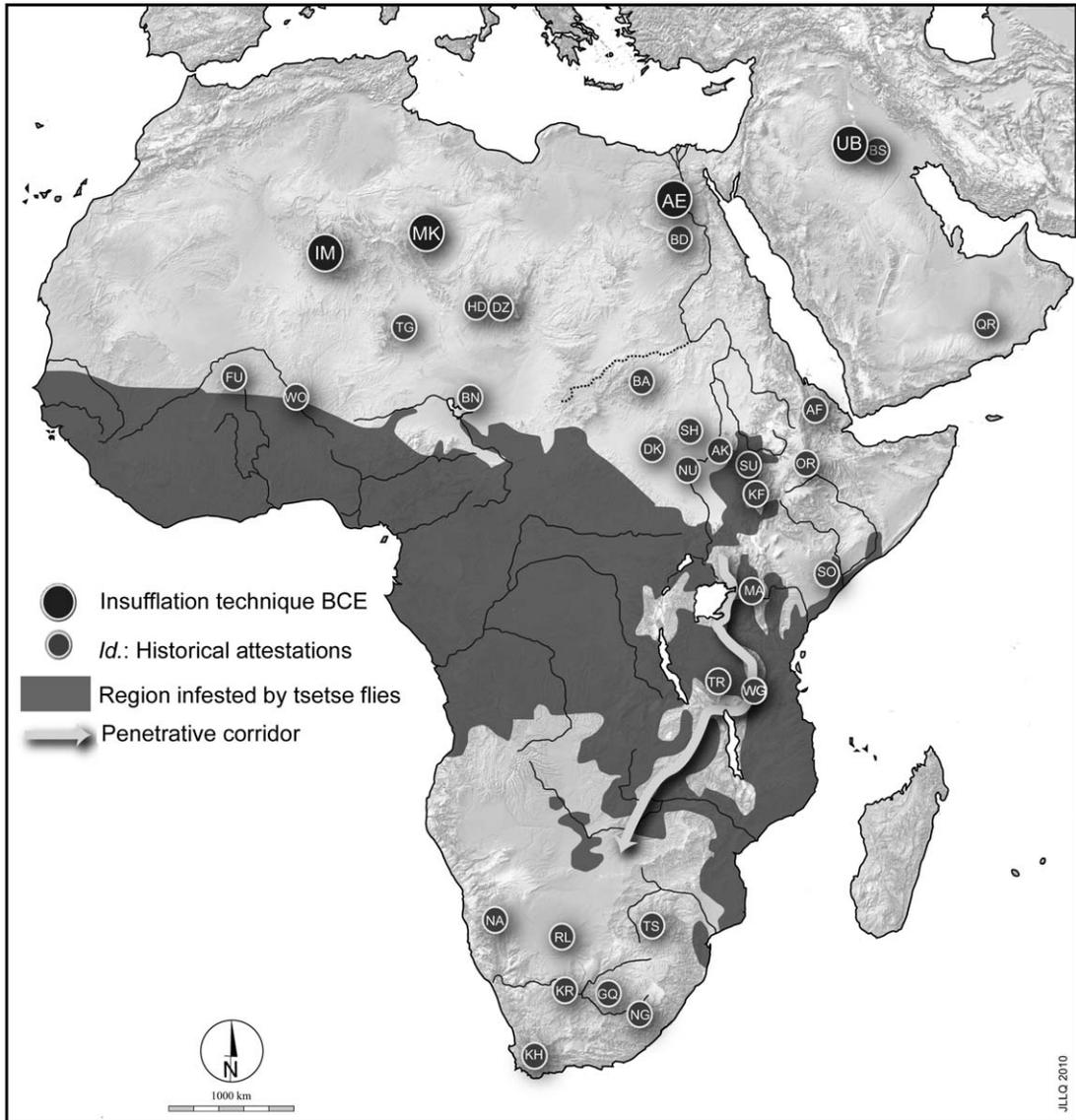
## ORIGIN

At first sight, the majority of known claims seem to be located outside the region infested by tsetse flies (“fly that kills cattle” in the Tswana language), but several cases (SU, KF, MA, TR, WG) seem to contradict the hypothesis of an explanation of avoidance of the area of infestation (Map 3). Since no relationship can apparently be established with any ecozone, it is the idea of a cultural motivation that springs all the more readily to mind since the technique of insufflation is not systematically linked to pastoralism (the majority of pastoralist societies do not seem to know it) and because the repeated invention of such a specialized and not very obvious process appears to be far less probable than its transmission. François-Xavier Fauvelle-Aymar sees in it a cultural trait comparable to the raising of war cattle, another technique that is also not universal among pastoralists, and both form part of a “complete pastoralist package including certain highly specialized herding techniques” (Fauvelle-Aymar 2004, 2007 & 2008). The distribution area of war cattle has not been well studied for the moment, but this subject is worthy of further study, especially as the prehistorian Oswald Menghin already thought that the technique of insufflation was a typical trait of what he called the “warrior-pastoralist culture” (*Sie ist ein typischer Zug der Hirtenkriegerkultur* — Menghin 1931: 529).

The most economical hypothesis is that which supposes that this trait spread at the same time as domestic bovines; it appears that their arrival is best documented in the northern half of the continent, even if many uncertainties remain, especially where their ultimate origin is concerned. This may result from an introduction from the east, or from a native domestication of the African aurochs (Loftus *et al.* 1994, Bradley *et al.* 1996, Hanotte *et al.* 2002, Gautier 2002: 198-201). The second

possibility is not currently favoured by most archaeologists (Wengrow 2003), and the idea of an introduction from the east is generally preferred, on the one hand because the archaeozoological data do not confirm the hypothesis of an African domestication centre, and on the other because of the very early dates (8300-8200 BCE) obtained not only from the Cypriot preceramic site of Shillourokambos (Guilaine *et al.* 1996) for big bovines transported by boat, but also in Syria for a diminution of the sexual dimorphism of the aurochs from the final levels of the early PPNB, which indicates its probable domestication around the same period (Arbuckle 2005). Whatever precision can be brought to this subject by future research, the situation remains clear in the central Sahara: bovines were introduced here from the east, before spreading westwards (Map 4). However, the classic diffusionist model of domestic bovines arriving in the subcontinent, as presented especially by Ronan Loftus and his collaborators (Map 5), does not really take into account their presence in the central Sahara, and is essentially based on two sites which should be treated with caution; because the date of 7000 BP (i.e. ca. 5900-5800 BCE) given for domestic bovines at the first of these sites, Haula Fteah in Cyrenaica (Clark *et al.* 2008: 366), in reality comes from problematic bones — scholars cannot decide whether they are from a small aurochs or domestic bovines (Klein and Scott 1986: 526). As for the documentation extracted from the Capelletti Cave (Roubet 1979), the second site that is often invoked, it only proves a possible presence of domestic cattle after 4600 BCE (Muzzolini 1983: 270).

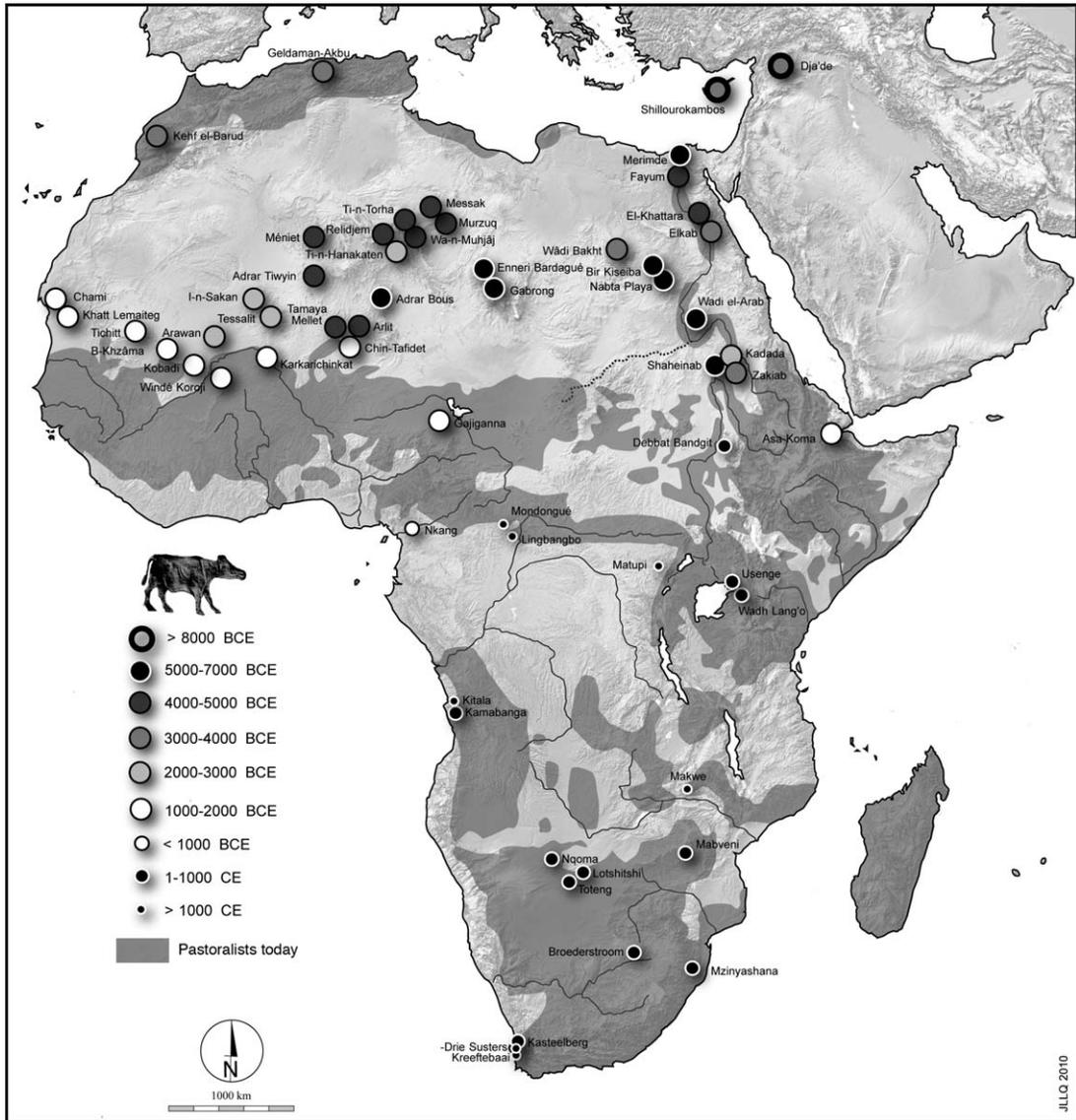
Without getting trapped by the shortcomings of a systematic identification of language and race, one can legitimately wonder if the distribution of the facts in question, as they may have appeared until the XIX<sup>th</sup> century — hence before the process of reification of ethnic groups denounced by various ethnologists and historians (Chrétien



Map 3. – Distribution of claims for the insufflation technique, compared to the zone infested by tsetse flies. The arrow shows the "penetration corridor" probably followed by the pastoralists.

& Prunier 1989, Amselle & M'Bokolo 2005) — should not be considered from the viewpoint of the relationship between archaeological data and the diffusion of speakers of the great families of African languages (Map 6). An approach of this kind has been applied to Saharan rock art by several linguists and prehistorians since the

1990s (Muzzolini 1992, Ehret 1993, Muzzolini 1993). The conjunction of the acquired knowledge of historical linguistics and archaeological data "is most likely to succeed [...] when there has been a significant physical expansion of population" (Blench 2001: 171), which means that if ever there was a place where one could

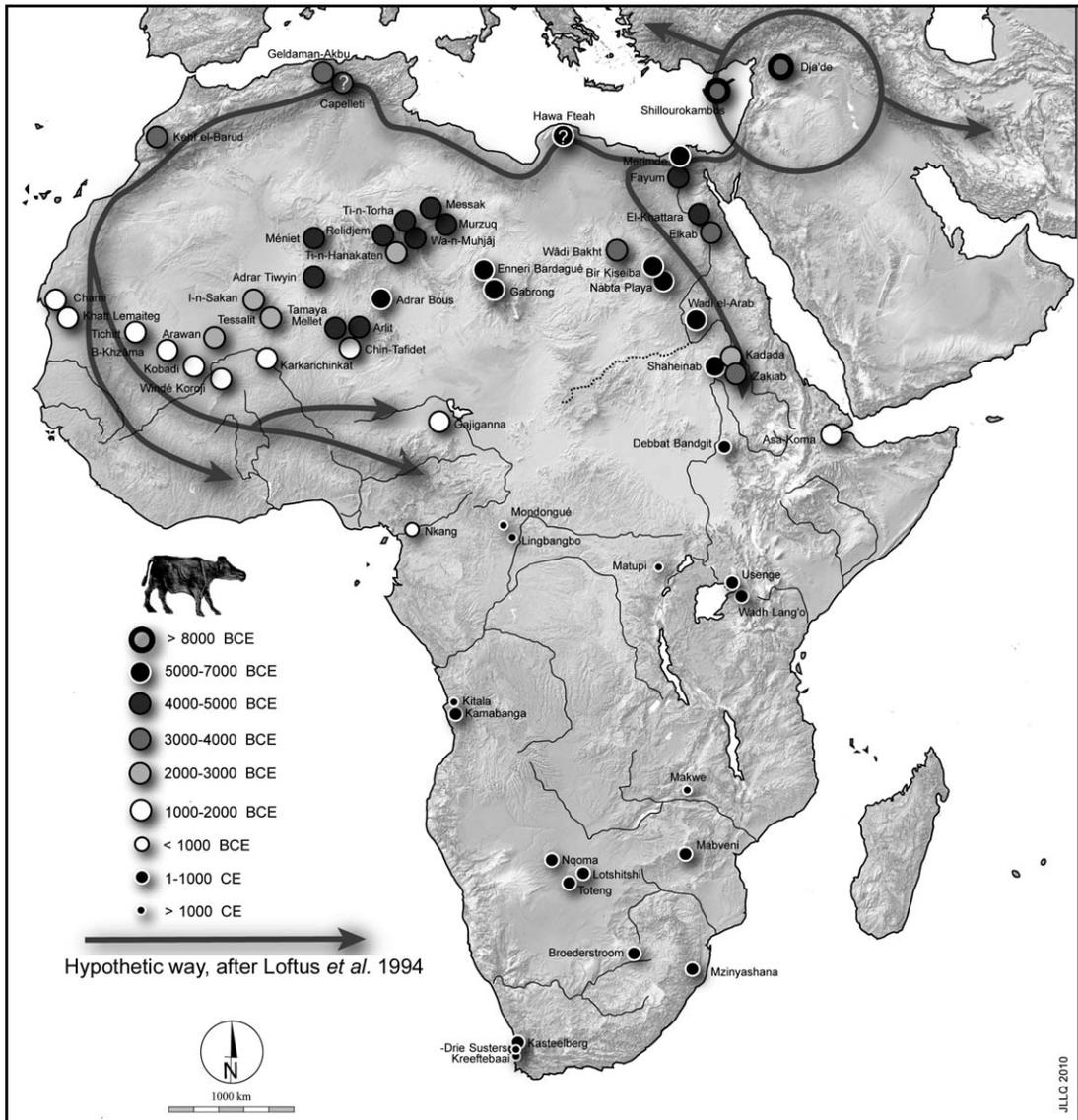


Map 4. – Oldest domestic bovines in Africa. An origin in the NE of the continent is the best fit to the data.

apply this method, it is indeed the Sahara, where it has been well proved that such “demic diffusions” were provoked by the climatic hazards (Le Quellec 2006).

It appears that the oldest evidence of the technique being considered here is to be found in the heart of the area of Afrasian languages.

Where the cases found in the prehistoric Sahara are concerned, it seems probable that the technique of insufflation, introduced at the same time as domestic bovines, came with the speakers of a language belonging to this phylum (Ehret 1999a, Ehret 1999b). The best documented expansion within this family is that

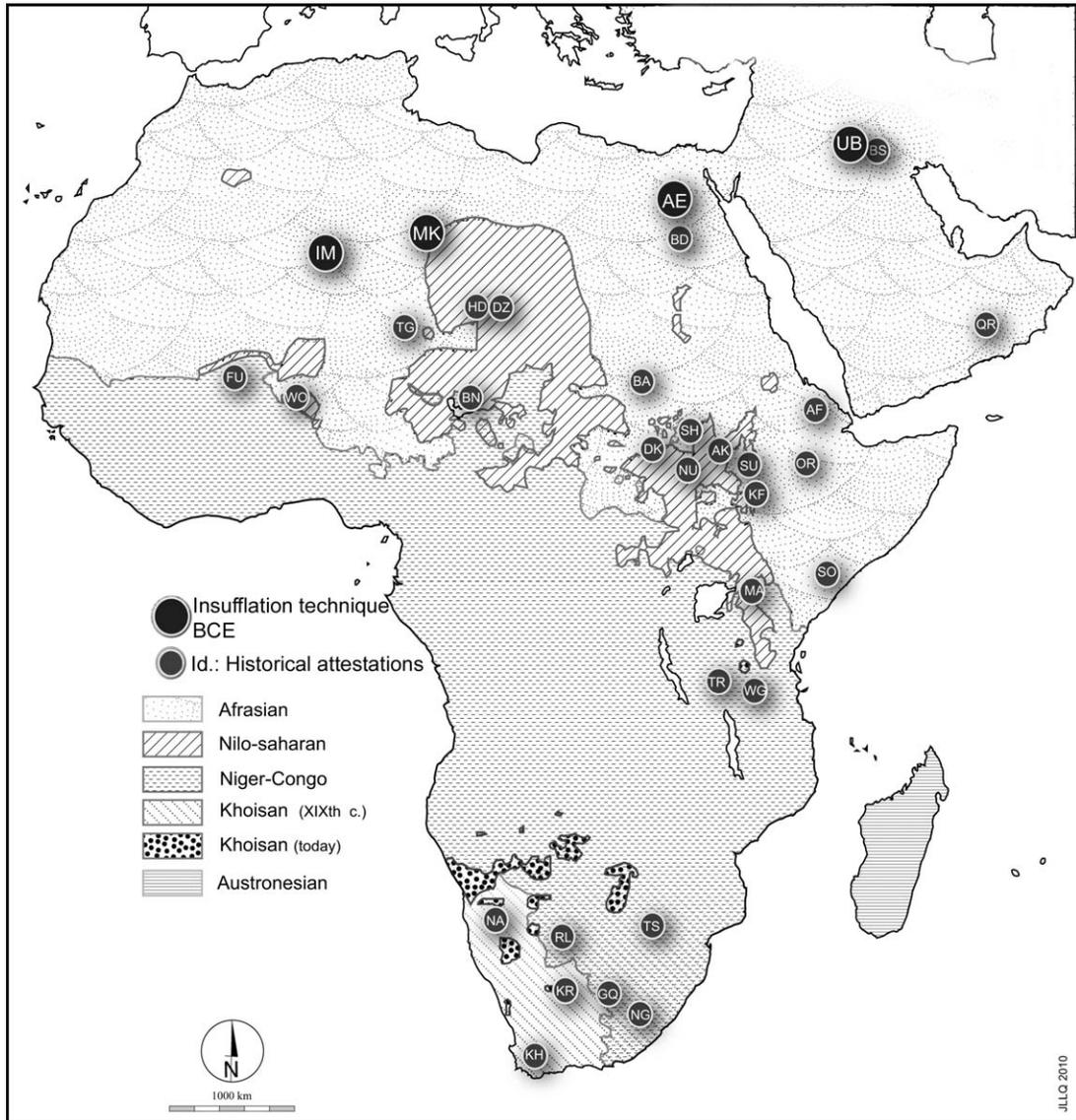


Map 5. – Loftus' model for the spread of domestic bovines in Africa.  
This hypothesis does not fit to the data recently gathered in the central Sahara

of Berber, where the linguistic comparison of the cultural vocabulary of stockrearing (especially the words for “goat”, “billygoat”, “sheep”, “ewe”, “flock”, “cow”, “calf” and “milk”) proves that its speakers, who were herders, dispersed in a westward direction after 5000 BCE (Blench 2001, Louali & Philipsson 2004) — a result

that is perfectly compatible with the data from rock art.

Where Mesopotamia is concerned, it should be noted that King A-aNe-pada died around 2485 BCE and that a century and a half later, in 2334 BCE, the conquests by Sargon of Akkad marked the end of the archaic Dynastic period.



Map 6. – Distributions of claims for the insufflation technique, compared to linguistic areas in Africa.

It was then the Akkadian language, which is the oldest Afrasian language to have been noted, which prevailed. The first archaeological evidence of Akkadian is the proper names noted in Sumerian texts dated to 2800 BCE, but whereas the first texts entirely written in Akkadian only multiply after 2500 BCE, the language itself seems to have appeared around

3750 BCE (Kitchen *et al.* 2009). Consequently, the existence of the technique of insufflation at Tell el-'Obeyd could very well result from Akkadian influence. Hence, in the present state of documentation, all the points that mark out the practice of this technique during prehistory should really be linked to the dispersal of herders belonging to the Afrasian linguistic group.

## DIFFUSION

What about historical claims?

The diffusion of Afrasian and Nilo-Saharan languages and the dispersal of their speakers contributed to the pre- and protohistory of the Sahara and Sahel. The geographic and chronological proximity of the original sources of the two great families of Afrasian and Nilo-Saharan languages, and then the contiguous nature of several of them after their extension and until today shows that borrowings took place regularly (Becchauss-Gerst & Keding 2007: 31-35) but unfortunately it is impossible to study them for the case that interests us here since, apart from among the Tuareg of the Ayer who call it *askuf* (Nicolaisen 1963: 51), the practice of insufflation does not have names whose evolution it might be possible to follow.

According to a hypothesis by Roger Blench, the group of Chadic languages (from the Afrasian phylum) is the result of a westward movement of Kushites during the V<sup>th</sup> millennium BCE (Map 7, after Blench 2008: 15-16). An identification of this migration can be sought in the gradual occupation of Wādi Howar (North-Sudan) by the bearers of a particular type of Middle and Final Neolithic pottery with a decoration known as “Leiterband” (Jesse *et al.* 2007, Becchauss-Gerst & Keding 2007). It is in this level that a curious ceramic object was discovered (Fig. 47) which Birgit Keding tried to compare with the “tuyères” used in traditional African metallurgy, but without success (Keding 1997: 202-203, and pl. 78). After having ruled out the possibility of such a function, she concluded that this object has no known equivalent. However, its resemblance to the mouth of a tool made of shell and used (in XIX<sup>th</sup>-century Hungary) for blowing into cows’ vaginas (Fig. 48) may not be fortuitous (Berger 2001: 47). Although such a usage is very difficult to confirm archaeologically, it is not theoretically impossible, and it will be recalled that the bone tubes discovered in the tombs of the kurgans of

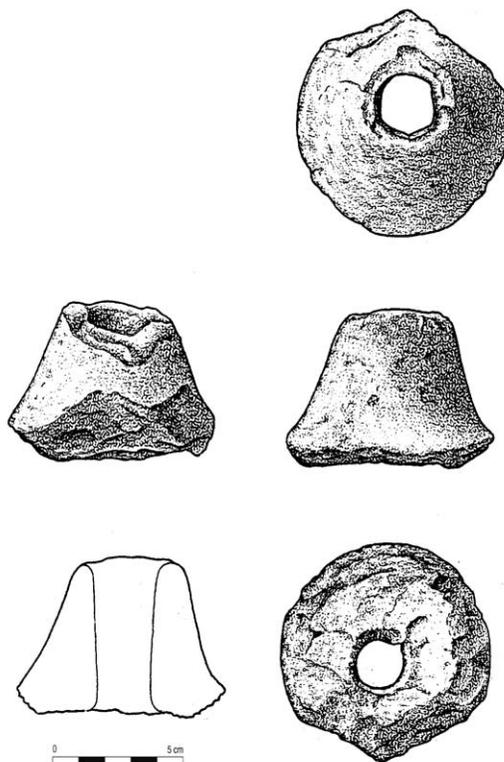


Fig. 47. – Ceramic object discovered in Wadi Hawar (northern Sudan) in the level with middle and final Neolithic ceramics, and with so-called “Leiterband” decoration (after Keding 1997: 202-203, and pl. 78).

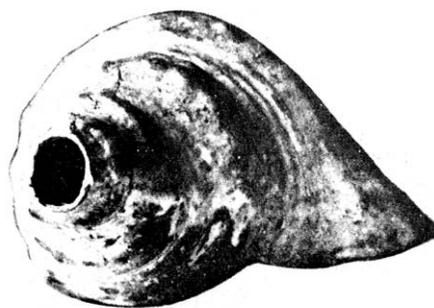


Fig. 48. – Shell used in XIX<sup>th</sup> century Hungary for blowing into cow vaginas (after Amoroso & Jewell 1963, pl. XIV-b).

southern Russia have been interpreted in this way, with a high degree of probability (Галкин Galkin 1975).

The diffusion of our technique towards the south of the continent is clearly attributable to speakers of languages of the Nilo-Saharan and Niger-Congo phyla, the pastoralists having used a “corridor” that remained free within the zone of infestation by tsetse flies (Map 3). The higher density of historical cases in these linguistic areas allows one to suggest that the very off-centre cases that have been noted outside them in southern Africa could indicate an ancient connection between Nilo-Saharan (more specifically, East-African or Nilotic) and the Khoekhoe populations in question.

This hypothesis may enjoy two items of support. On the one hand, a “syndrome of Nilotic customs” has been noted among the Nguni of west Zimbabwe and the northern part of South Africa, who apparently acquired it in the X<sup>th</sup> or XI<sup>th</sup> centuries (Wilson & Thompson 1969: 130) through a process of “Nilotic infiltration” confirmed by Roland Oliver for Zambia and Zimbabwe (Oliver 1982). This observation did not escape the attention of François-Xavier Fauvelle-Aymar, who mentions it in support of a possible connection between Nilots and Khoekhoe (Fauvelle-Aymar 2008), but the dates mentioned are very late. Moreover, the recent area study of haplogroup E3b1f among thirteen populations in East and South Africa is compatible with the hypothesis of a demic diffusion of pastoralism out of East Africa towards a zone of southern Africa located at the present boundary of Angola and Namibia, independently of the Bantu migrations about 2000 years ago. The authors of this work conclude that the population which introduced pastoralism into southern Africa had a Nilotic linguistic affiliation (Henn *et al.* 2008: 10697). However, some research work that was independent of the one just cited, concerning the C-14010 mutation associated with the persistence of lactase (and hence the digestive tolerance of cow’s milk) — the frequency of which is particularly high

among the Nilo-Saharan populations of Kenya and Tanzania — proves that this mutation is found, at lower frequencies, in southwest Africa and among the Bantuphone populations of the Namib Desert (Ovimbundu, Ganguela, Nyaneke-Nkhumbi, Kuvale). The authors deduce from this the existence of a link between these zones and East Africa, probably after migrations that preceded the Bantu expansion (Coelho *et al.* 2009). Two possibilities can be envisaged concerning the transmission of the mutation in question from East Africa to the Namib region: either direct, through migration, or indirect with a first contact between Nilo-Saharan pastoralists and Khoekhoe, then a transfer to the Bantu populations of the Namib following interactions of the Khoekhoe with the latter.

Hence the totality of the available data tends to link the insufflation technique with the diffusion of cattle rearing by populations with Afrasian languages in the northern half of Africa, and with Niger-Congo and Nilo-Saharan languages in the southern half.

## RECONCILIATION OF THE DATA OF DIFFERENT TYPES

North Sudan and the Libyan desert form part of the original zone of two of the big African linguistic groups — Afrasian, Nilo-Saharan — which appeared around 10.000 to 12.000 years ago. This was a contact zone (located somewhere between present-days Sudan, Egypt and Ethiopia), and the exchanges that occurred in this period would help explain the vague “family likeness” that has been observed several times between the iconography of the central Sahara and the Nile area (Leclant *et al.* 1980, Le Quellec 1998).

In the Nilo-Saharan phylum, words for “milk” and “to milk” have been reconstructed by Christopher Ehret (Ehret 2001) to the north Proto-Sudanic stage, which he places hypothetically around 8000 BCE. Similarly,

Peter Behrens has found words for “milk” in Proto-Afrasian, around the same period (Behrens 1985). Elsewhere, some precise correspondences between the Kushitic and Chadic for “milk” could be explained by an early historic contact in the region of the Eastern desert. So the data from historical linguistics point to a very early appearance of milking, around 8000 BCE, which poses a serious chronological problem — because this date corresponds *grosso modo* to that which certain archaeozoologists and prehistorians have proposed for an independent origin of the domestication of bovines in Africa. According to this supposition, this independent process occurred in the extreme south of Egypt around 7900 BCE or even before, in the region of Nabta Playa / Bir Kiseiba (Gautier 1980, Wendorf & Schild 1980, Gautier 2002). In reality, the osteological evidence and the ecological arguments presented in support of this suggestion only make it possible to make very fragile suppositions, and even if a few authors apparently accept it without hesitation (like Becchauss-Gerst & Keding 2007: 21), this hypothesis has been criticized very vigorously (Muzzolini 1983: 189-194, Smith 1986, Braunstein-Sylvestre 1988: 61), and its principal promoter himself, in the most recent review of the subject, has been very careful to speak only of “putative domestic cattle” or of “early hypothetical presence of livestock especially cattle” (Gautier 2002: 198, 200).

Even if, during more recent periods, cattle played a preeminent role in several sudanese sites like Kadruka (Reinold 2000, 2004) or Kerma (Chaix 2007), one still waits for new and truly solid arguments to suppose that there was an independent domestication of bovines in this region in the IX<sup>th</sup> or VIII<sup>th</sup> millennia BCE (Wengrow 2003). Matthieu Honegger has recently announced a date “around 7000 BC” for domestic cattle at Wadi el-Arab (Honegger 2007), and the eagerly-anticipated publication of these new data might create a wholly new situation. In order to make up for the weaknesses of this archaeological and osteological dossier (Grig-

son 2000: 48), researchers have several times called on genetic studies (Bradley *et al.* 1996, Troy *et al.* 2001, Hanotte *et al.* 2002) which are supposed to reinforce the idea that an African centre of domestication could have been located somewhere in the Eastern desert (Wendorf & Schild 1998, Jousse 2004). The supporters of an autochthonous and very early domestication of the African aurochs have sought help in the models constructed by geneticists, and have seen in them a confirmation of their own theory, without noticing that their procedure consisted of wishing to prove a supposition by a hypothesis.

To explain the difference between the archaeological and linguistic data, it has also sometimes been proposed that, for obvious reasons of taphonomy, there is always a certain lapse of time between the appearance of a phenomenon and the moment when it becomes sufficiently widespread to have a chance of being detectable millennia later, by means of archaeology (Muzzolini 1993). So one cannot reject a priori the data of historical linguistics for the sole reason that they have not (yet?) been attested through the results of prospections and excavations. Prehistorians are nonetheless highly sceptical of the linguists’ speculations when they contradict their own. Is it not possible that the linguists risk taking as evidence for an early and common origin what could actually be no more than the results of later contacts (Becchauss-Gerst & Keding 2007: 35)? Nevertheless one must admit that this objection, albeit certainly academically acceptable, has primarily been formulated as a matter of form and has very little chance of being well-founded, when one considers the work of such experienced linguists as Christopher Ehret, Roger Blench or Peter Behrens.

Contrary to the linguists’ deductions in this domain, there is a far more powerful argument, namely that the presence of a word for “milk” in a language in no way proves the practice of milking. The African example of the “non-milking area” (Map 1) should suffice to prove

this, if that were necessary, since many pastoralists obviously know about milk's existence, but refuse to milk their cows. As it seems impossible to bring the comparison to bear on terms like *askuf* ("insufflation in cows' vaginas to force them to give milk"), because for the moment this is a hapax, and as the earliest words for "to milk" are the result of a recalibration from terms known before domestication and which originally meant "to press" (Ehret 2004: 331-332), it is hard to see how historical linguistics could demonstrate the early existence of milking through that of words designating either it or milk. New statistical techniques of analysis of bone remains are enabling researchers to re-examine the question afresh in zones where recent and sufficiently meticulous excavations make this possible (Balasse *et al.* 2000), but this is not yet the case in the Sahara.

All things considered, it is therefore rock art which, for this zone, provides the best documentation. Although its dating is still imprecise (but not radically wrong!), it presents documents which prove that the first diffusion of taurines in the continent was accompanied by the technique of milking. Moreover, it attests, for the Saharan Neolithic, the existence of the technique of insufflation, which excavations would have great difficulty in detecting, to say the least. So in this zone, there is no need to resort to the hypothesis of the secondary products "revolution", and the dossier presented here strengthens for Africa the arguments already put forward in Europe against this hypothesis (Vigne & Helmer 2007).

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## APPENDICES

## 1 - INSUFFLATION TECHNIQUE

Nom	Abbreviation	Synonyms	Country	Linguistic group	Period	Source
Afar	AF	Danakil	Ethiopia	Afrasian	XX <sup>th</sup> century EC	Lagercrantz 1950: 48
<i>Al-'Ubayd</i>	UB		Iraq	Afrasian	ca. 2500 BCE	Gouin 1993
<i>Ancient Egyptians</i>	AE		Egypt	Afrasian	ca. 2500 BCE	See text
Anuak	AK		Sudan	Nilo-Saharan	XX <sup>th</sup> century CE	
Arabs of Basora	BS		Iraq	Afrasian	XVIII <sup>th</sup> century CE	Niebuhr 1779: 231
Baggara	BA		Sudan	Afrasian	XX <sup>th</sup> century CE	MacMichael 1924
Bana	BN		Chad	Afrasian	XX <sup>th</sup> century CE	Rühe 1938: 216; Plischke 1954: 4; Lagercrantz 1950: 49
Bedouins of Egypt	BD		Egypt	Afrasian	XX <sup>th</sup> century CE	Gouin 1993: 140, n. 29: "en Egypte ancienne et moderne"
Daza/Teda	DZ		Chad	Nilo-Saharan	XX <sup>th</sup> century CE	Baroin 1975: 495
Dinka	DK		Sudan	Nilo-Saharan	XX <sup>th</sup> century CE	Bernatzik 1929: 93; Parau 1975: 30; Castiglioni 1977: 159
Ibe	FU		Mali	Niger-Congo	XX <sup>th</sup> century CE	Fauvelle-Aymar 2007: 84
Gonaqua	GQ	"Gonna Hottentots"	South Africa	Khoisan	XX <sup>th</sup> century CE?	Lagercrantz 1950: 49-50
Immidir	IM		Algeria	Afrasian	IV <sup>th</sup> mill. BCE?	See text
Kafitšo	KF	Kaffa, Kefa	Ethiopia	Afrasian	XX <sup>th</sup> century CE	Bieber 1920: 345
Khoekhoen of the Cape	KH		South Africa	Khoisan	XVIII <sup>th</sup> -XX <sup>th</sup> centuries CE	Kolb 1719: 468; von François 1896: 258; Schultze 1907: 257.
Korana	KR	!Kora, !Ora Griqua	South Africa	Khoisan	?	Lagercrantz 1950: 49-50
Maasai	MA		Kenya	Nilo-Saharan	XXX <sup>th</sup> century CE	Menghin 1931: 529
Messak	MK		Libya	Afrasian	V <sup>th</sup> mill. BCE?	See text
Nguni	NG		South Africa	Niger-Congo	XX <sup>th</sup> century CE	Lagercrantz 1950: 50
Nuer	NU		Sudan	Nilo-Saharan	XX <sup>th</sup> century CE	Bernatzik 1930: 112

Oromo	OR	Galla	Ethiopia	Afroasian	XX <sup>th</sup> century CE	Paulitschke 1893: 266; Lagercrantz 1950: 48
Nama	NA	Namaqua, Damara, Damaqua, Bergdamara	Namibia, South Africa	Khoisan	XIX <sup>th</sup> century CE	Alexander 1838: 146
Qora (Arabs of Dhofar)	QR		Sultanate of Oman	Afroasian	XX <sup>th</sup> century CE	Thesiger 1978: 55
Rolong	RL		Botswana	Niger-Congo	XX <sup>th</sup> century CE	Lagercrantz 1950: 50
Šilluk	SH	Šilluk	Sudan	Nilo-Saharan	XX <sup>th</sup> century CE	Bernatzik 1929
Somali	SO		Ethiopia	Afroasian	XX <sup>th</sup> century CE	Keller 1901: 135
Surma	SU		Sudan	Nilo-Saharan	XX <sup>th</sup> century CE	Fauvelle-Aymar 2007: 83
Tuareg of the Ayer	TG		Niger	Afroasian	XX <sup>th</sup> century CE	Bernus 1980: 110, Nicolaisen 1963: 51
Tswana	TS		Zimbabwe, Namibia, South Africa	Niger-Congo	XX <sup>th</sup> century CE	Lagercrantz 1950: 50
Turu	TR	Limi, Niaturu, Nyaturu, Rimi, Waniaturu, Walimi, Warimi	Tanzania	Niger-Congo	XX <sup>th</sup> century CE	Sick 1916
Wagogo	WG	Gogo	Tanzania	Niger-Congo	XX <sup>th</sup> century CE	Clauß 1911
Wodaabe	WO	Peuls Bororo	Niger	Niger-Congo	XX <sup>th</sup> century CE	Dupire 1962: 86
!Xosa	XS		South Africa	Niger-Congo	XX <sup>th</sup> century CE	Lagercrantz 1950: 50
Ziba	ZB	Wasiba, Kiziba	Tanzania	Niger-Congo	XX <sup>th</sup> century CE	Rhese 1910: 49

*i.e.*: Afroasian : 14. — Niger-Congo : 9. — Nilo-Saharan : 7. — Khoisan : 4. — Total: 34.

NB: Since these lines were written, Annie and Gérard Garcin informed me that Odette de Puigaudeau noticed the insufflation technique during her trip to Mauritania in 1923-1924 (see Puigaudeau O. 2003, *Pieds nus à travers la Mauritanie*, Phébus, Paris : 73).

## APPENDICES

## 2 – SITES YIELDING EARLY CATTLE REMAINS IN AFRICA

DATES BCE

Site	Country	age CalBC	age 14C BP	Laboratory	Reference
Bir Kiseiba	Egypt	8500-7800	9000±100	SMU-481	Gautier 2002
Wadi el-Arab	Sudan	ca. 7000	Forthcoming	Forthcoming	Honegger 2007
Enneri Bardagué	Chad	6700-5900	7455±180	Hv-2775	Hassan 2002
Haua Fteah	Libya	6060-5700	7000±110	GrN-3541	Clark <i>et al.</i> 2008
Nabta Playa	Egypt	5900-4800	6480±270	/	Applegate <i>et al.</i> 2001
Adrar Bous (site I)	Niger	5570-4580	6200±250	Pa-753	Paris 1997
Shaheinab	Sudan	5485-5385	6500	/	Gautier 1987-a
Merimde	Egypt	5350-4750	6130±110	/	<i>Ibid.</i>
Gabrong (level b)	Chad	5300-4800	6130±90	Hv-3709	<i>Ibid.</i>
Messak (Ti-n-Einesnis)	Libya	5300-4800	6080±80	GX-28543	Lernia 2006
Wa-n-Muhjâj (Uan Muhuggiag)	Libya	5200-4700	6035±100	UD-225	Belluomini & Mandra 1987: 128, 328
Ti-n-Torha North II	Libya	4960-4710	5870±50	R-1031	Gautier & van Neer 1982
Wa-n-Muhjâj (level VIII)	Libya	5250-4500	5952±120	UD-225	Clutton-Brock 1989
Fayum (E29G3)	Egypt	4830-4720	5900	/	Gautier 1987-a
Relidjem (Erg Admer)	Algeria	4500-3950	5420±130	Ly-408	<i>Ibid.</i>
Méniet	Algeria	4550-3800	5400±150	Sa-59	<i>Ibid.</i>
Arlit	Niger	4500-3900	5380±130	Gif-3057	<i>Ibid.</i>
Adrar Tiwyin (Tiouyine)	Algeria	4550-3800	5320±130	Gif-1380	<i>Ibid.</i>
Tamaya Mellet	Niger	4230-3960	5245±55	Pa-1042	<i>Ibid.</i>
Murzuq 2	Libya	4230-3960	5248±51	KIA 11195	Pachur & Peters 2001
el-Khattara	Egypt	4230-3820	5215±55	SMU-493	Gautier 1987-a
Messak (site 556)	Libya	4230-3700	5150±110	GX-28446	Lernia 2006
Messak (I-n-Habeter IIIa)	Libya	4000-3660	5071±91	GX-20348	<i>Ibid.</i>
Kehf el-Barûd (chamber)	Morocco	4600-2900	5035±343	/	Jousse 2004

Wādi el-Bakht (Gif Kebîr)	Egypt	3900-3400	5180±60	KN-3079	Gehlen <i>et al.</i> 2002
		3970-3750	5070±60	KN-3149	
Kadada	Egypt	3780-3370	4840±70	Gif-6809	Gautier 1986
Geldaman-Akbu	Algeria	3700-2900	4630±130	Ly-3657	Chaïd-Saoudi 1987
Zakiab	Sudan	3500-3320		T-2818	Close 1980
Ti-n-Hanakaten S3	Algeria	2880-2490	4100±70	Mc-676	Chaïd-Saoudi 1987
Tichitt (site 46)	Mauritania	2650-1900	3830±120	Gif-2884	Holl 1985
I-n-Tuduf (TDF3)	Niger	2900-1600	3740±200	Pa-1048	Paris 1997
Windé Koroji I (level 17)	Mali	2300-1700	3635±90	GX-19990	MacDonald 1996
Karkarichinkat (KN2)	Mali	2150-1750	3620±80	N-1398	Smith 1974
Chami A2	Mauritania	2150-1500	3500±120	Gif-2492	Bouchud 1981
Asa Koma	Djibouti	1960-1520	3440±90	Gif-7404	Guérin & Faure 1996
Chin-Tafidet	Niger	2300-900	3325±260	Pa-0292	Faye 1988
Khatt Lemaïteg	Mauritania	2200-1000	3310±200	Ly-2502	Bathily <i>et al.</i> 1998
Gajiganna B	Nigeria	1610-1210	3150±70	UtC-2330	Breunig <i>et al.</i> 1996
Nkang	Cameroon	890-420	2580±70	LV-1940	van Neer 2002

## APPENDICES

2 – SITES YIELDING EARLY CATTLE REMAINS IN AFRICA  
DATES AD

Site	Country	age CalBC	age 14C BP	Laboratory	Reference
Wadh Lang'o	Kenya	120-250	1819±28	OxA-14505	Lane <i>et al.</i> 2007
Toteng	Botswana	280-320	1765	/	Denbow & Wilmsen 1986
Mzinyashana	South Africa	270-330	1750	/	Plug 2002
Lotshitshi	Botswana	205-593	1660±100	/	Denbow & Wilmsen 1986
Kasteelberg A	South Africa	310-560	1630±60	OxA-3864	Bousman 1998
Usenge 3	Kenya	410-580	1560±40	Beta-190746	Lane <i>et al.</i> 2007
Debbat Bandgit	Sudan	400-1000	/	/	Gautier & van Neer 1997
Broederstroom 24/73	South Africa	ca. 460		UCLA-1791B	Mason 1974
Mabveni	Zimbabwe	1-540 430-880	1770±120 1380±110	SR-43 SR-79	Bousman 1998
Kamabanga I	Angola	780-1020	1120±60	Gif-6182	van Neer 2002
Nqoma	Botswana	760-1050	1000±60	/	Denbow & Wilmsen 1986
Drie Susters (DSM)	South Africa	870-1150	1050±60	Pta-5478	Smith <i>et al.</i> 1991
Kreeftebaai	South Africa	980-1190	970±50	Pta-5517	<i>Ibid.</i>
Makwe	Zambia	946-1214	980±70	SR-206	Phillipson 1976
Kitala II	Angola	1200-1330	720±60	Gif-6011	van Neer 2002
Linbangbo	RCA	1270-1450	559±77	Bdy-582	<i>Ibid.</i>
Matupi	Congo	1360-1390	730±45	GrN-7244	<i>Ibid.</i>
Mondongué	RCA	>1400	130±240	BM-2425	<i>Ibid.</i>

NB: The date at Haa Fteah comes from problematic bones and needs confirmation (Klein and Scott 1986). The date of 1610 ±100 BP (I-2698) cited by Hélène Jousse (Jousse 2004: 193) for Kintampo R6 (Ghana), where bovine bones were found, in reality was obtained from shelter K1 which is fifteen kilometers away (Carter & Flight 1972: 280) and so cannot be used here. Moreover the identification of *Bos* has been called into question, and it could be a small buffalo (Stahl 1985: 140). The date of 6980±80 BP (SMU-273) given by Achilles Gautier (1980) for Wādi Bakht in Egypt was obtained from

fragments of ostrich eggshells collected from the surface, and one can doubt their connection with the 25 bones of domestic cattle, goats and sheep which were also collected from the surface. Since no bone of a domestic animal has ever been collected from the sites of Gilf B (whose chronological position corresponds to this date), and since the remains of this period are also very rare on the surface, the most probable scenario is that these bones actually belong to the local phase known as Gilf C, situated around the middle of the V<sup>th</sup> millennium BCE (Gehlen *et al.* 2002: 108). The date of 7430±220 BP published in the 1960s

for a *Bos* found at Ti-n-Torha in the Akukas mountains (Libya) and said to be at stage of “incipient domestication” (Gautier & van Neer 1982: 109, Table 1) led Barbara Barich to first suppose that domestication could have been the result of a local development (Barich 1987: 331-40). But Achilles Gautier (1987-b: 297) has corrected his identification, and no other research could ever confirm the presence of such ancient domestic bovids at Ti-n-Torha (Lernia & Cremaschi 1996: 225, Barich 2010: 162). This means that this date of 7430 BP, given by the Pisa (PI) laboratory at a time where the results were not reliable yet, must be erroneous. The same remark can be made for the

date of 7438±226 BP obtained in 1959 by charcoals from hearths at the basic level of the Wa-n-Muhjāj rock-shelter in the Akukas mountains (Pasa & Pasa-Durante 1962). This date has not been published in Radiocarbon, Barbara Barich could not confirm it (Barich 1987: 120) and the oldest ascertained date for this site is 6900±220 BP NA-60 (Barich 2002: 212). The presence of fully domesticated cattle is only proven here for the middle levels at 6035±100 BP (Belluomini & Manfra 1987), and older dates for domestic cattle in the Akukas obviously must be abandoned (Barich 1998: 43).

