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## Neolithization in Progress – The Advent of Domesticates in Northeastern Africa

### Summary

The neolithization of Northeastern Africa is currently studied in terms of the successful incorporation of domesticates as an active response to climatic changes, by carefully dividing between pre-pastoral and pastoral modes of life or wild and domestic species, respectively. However, it becomes obvious that interest in domesticates is a long-term commitment to other species, given that numerous intended and unintended consequences arose from this particular change in human-environmental relations. According to Gabriel Tarde, innovation can be studied as an act of 'imitation' that produces 'variation'. This would defocus from the subject position of initiators of innovations and rather stress other agents in this process, both human and non-human.

Keywords: Neolithic; cattle domestication; human-animal relations; commitment; Nile Valley; Egypt; Sudan.

Die Neolithisierung Nordostafrikas wird gegenwärtig über die erfolgreiche Eingliederung von Domestizierten als aktive Reaktion auf Klimaveränderungen untersucht, indem ein strikter Unterschied zwischen der präpastoralen und der pastoralen Lebensweise bzw. zwischen wilden und domestizierten Spezies gezogen wird. Es ist jedoch unübersehbar, dass das Interesse an Domestizierten eine langfristige Verpflichtung gegenüber anderen Spezies bedeutet, da dieser Wandel in den Mensch-Umwelt-Beziehungen zahlreiche beabsichtigte wie unbeabsichtigte Folgen nach sich zog. Wird Innovation nach Gabriel Tarde als eine Dialektik von ‚Imitation‘ und ‚Variation‘ aufgefasst, liegt der Fokus weniger auf dem Subjekt des Urhebers, sondern schließt auch andere, menschliche wie nicht-menschliche Akteure ein.

Keywords: Neolithikum; Rinderdomestikation; Mensch-Tier-Beziehungen; Commitment; Niltal; Ägypten; Sudan.

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## I Introduction

Both southeastern Europe and northeastern Africa owe their first domesticates, a ‘package’ consisting of sheep, goat, pig, cattle, probably also dog, and so-called founder crops such as emmer, barley, legumes, and flax, to southwestern Asia.<sup>1</sup> Cattle is often excluded from this list as some researchers assume that cattle were domesticated locally from wild aurochs populations in northeastern Africa.<sup>2</sup> Many questions focus on the spread of related practices that in both perspectives are seen as novelties that gradually entered more distant regions. After its initial advent in northeastern Africa, probably by means of human-driven migrations from the southern Levant, the package of domesticates was split up and modified in a way that does not allow us to consider neolithization a diffusion of ready-made species and norms, except for in the very short term (Fig. 1). As some elements were chosen while others were rejected, this pathway is thought to go beyond the commonly agreed upon categories of the ‘Neolithic’ for other regions.<sup>3</sup>

While relating European history to early Holocene southwest Asian agricultural practices we seem to fail to consider the African Neolithic in its own terms.<sup>4</sup> From a European viewpoint, it constitutes a challenge to gain a more symmetrical understanding of local traditional African subsistence strategies and human-animal co-existence on the one hand and the attraction and impact exercised by southwest Asian domesticates on the other, because we consider the latter to be part of our own history. Some even criticize the inappropriate use of terms such as ‘Mesolithic’ and ‘Neolithic’ since they are thought to be reserved for the European scheme.<sup>5</sup> This raises the question of what basic terms and schemes we can still agree on to appropriately represent a global prehistoric past. Because, quite unchallenged, our archaeological writings are full of modern eco-

1 Wetterstrom 1993.

2 Gautier 2002; Wendorf and Schild 2001.

3 See comments in Arkell and Ucko 1965, 156–164.

4 See critics of Garcea 2006, 200–201; Dittrich 2013a, 45.

5 Garcea 2006, 203–204.

nomie terms indicating relationships that in pre-modern conceptions seem completely out of place.

Since the 19th century the study of the origins of domesticates has gained more and more interest. However in Europe it has remained restricted to emblematic agricultural tools (cf. Fig. 11) and the classic set of a few species, while the domesticated status of other species was and still is rejected. This discussion additionally underlined the ‘inventor’s’ prestige gained through the successful ‘diffusion’ and ‘adoption’ of desirable ‘innovations’ as indicators for universal ‘progress,’ while borrowing these and other terms from modern economy.<sup>6</sup> It must be remembered that in former colonial rhetoric the introduction of ‘efficient’ agricultural practices to large parts of Africa according to Western schemes was heavily publicized. Stigmatizing them as having remained at a past or ‘primitive’ stage to be overcome was one of the main arguments for interfering with and violating traditional human-environmental relations on the whole continent.<sup>7</sup>

The discussion of Neolithic innovations comprises an astonishingly similar and narrow range of ‘ideal’ categories including (biological) domestication and sedentism, ‘secondary products’ such as milk, traction and the plough,<sup>8</sup> or the emergence of property and commodities<sup>9</sup>. From the view of early Holocene hunter-gatherer-fisher communities, practices leading to the domestication of herd animals could be termed as novelties that would certainly have affected the way of life as previously known by both humans and animals. In most studies, exactly this change in human-environmental relations is brushed over very generally,<sup>10</sup> and the credit for innovations is given to quite different agents in this process.

One focus is on the question where and when biological domestication first occurred. This notion of domestication suggests innovations to be related to the change or ‘improvement’ of biological properties of species which led to a change in human behavior. From a purely modern viewpoint, even genetic changes are seen as innovations based on the “introduction of new breeds or varieties which have specific advantages, i.e. being higher yielding or more resistant to certain weather/soil conditions.”<sup>11</sup> However, the validity of such functional relations formulated as retrospective instructions for the prehistoric past is questionable. Paying attention to the social practices of domestication instead would challenge our present notion of domestication and human-animal relations in general.<sup>12</sup> Therefore, the concept of ‘innovation’ will be used here to consider the supposed pros and cons as well as probable unintended outcomes of novelties imposed on existing relationships. As a result, one might ask if a unique development or

6 Rogers 1962.

7 Robertshaw 1990.

8 Sherratt 1981; Hodder 2011.

9 Gebel 2011.

10 Cf. Hassan 2002; Garcea 2004.

11 Veen 2010, 2.

12 Ingold 2000; Russell 2002; Russell 2007.

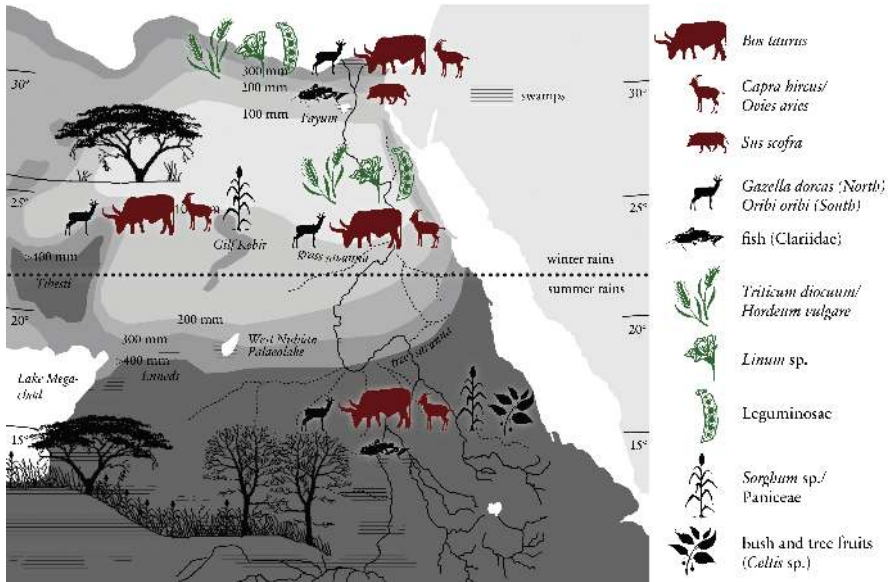


Fig. 1 Regional combinations of domesticated animals and plants introduced from the Levant (colored) and of local African species (black) around 5000 cal BCE (paleo-ecological data after Neumann 1989; Pachur and Altmann 2006; Linstädter and Kröpelin 2004).

chain of independent ‘innovations’ and ‘entanglements’<sup>13</sup> formed a particular African pathway to herding and agriculture.

## 2 Moving species – the paleo-environmental evidence

The northeast African study area can be separated from north to south into three main ecological zones (Fig. 1): (1) Lower Egypt as part of the Mediterranean corridor but consisting almost completely of the intensely drained Nile delta, (2) Upper Egypt and Sudanese Nubia as parts of the Eastern Sahara with only marginal vegetation, and (3) the Central Sudanese Nile valley as part of the sub-Saharan savanna belt.<sup>14</sup> During the early Holocene, there were considerable differences in the water regimes of the Nile river basin comprising extended local drainage systems, lagoonal lakes and swamps,<sup>15</sup> the rain-fed lake systems covering large parts of the present-day Sahara,<sup>16</sup> and desert areas providing only restricted or non-permanent access to water. Furthermore, there must have been a qualitative difference between the continuous winter rains of the north and the short but more violent monsoon summer rains of the south<sup>17</sup> accounting for divergent ripening seasons of different grasses.

<sup>13</sup> Cf. Hodder 2011.

With the three main ecological spheres in northeastern Africa, a striking duality can be observed in the mid-Holocene adoption of domesticates (Fig. 1). The first pattern appears around 5100/4800 cal BCE in the Egyptian Nile delta and in the Fayum basin and could be considered the adoption of the ‘full Neolithic package’ of domesticates, including cattle, sheep, goat, pig, dog, emmer, barley, legumes and flax.<sup>18</sup> The presence of these species could not signify a greater rupture of local traditions in terms of the previously unknown practice of farming and herding or linen cloth production. Nevertheless, the first farming communities of Egypt made a quite specific choice: although several varieties of barley, emmer, hard wheat and bread wheat must have been known to them from contacts to the Levant, they relied mainly on six-row barley (*Hordeum vulgare* ssp. *vulgare*) and emmer wheat (*Triticum turgidum* ssp. *dicoccon*)<sup>19</sup>. During the mid-Holocene period all of Egypt most likely received winter rains (Fig. 1), allowing the farming of southwest Asian crops to rely on a seasonal cycle similar to that of the Mediterranean area with harvesting in early spring.<sup>20</sup>

However, this kind of subsistence is still complemented by a significant amount of fish as a long-established local food component as well as by the hunting of Nile-based species and species of the circum-Mediterranean fauna including hartebeest, dorcas gazelle and hare.<sup>21</sup> Also the collection of wild plants such as knotgrasses, sedges, ryegrasses, and legumes (*Vicia* sp.) still persisted.<sup>22</sup> The swamps in the Nile delta and the Fayum supplied a further range of water-dependent species and edible plants such *Typha* sp. or Papyrus (*Cyperus papyrus*). There is weak evidence that at the same time the full package of domesticates spread as far as the Upper Egyptian Nile valley, probably with the exclusion of pig.<sup>23</sup>

By contrast, in Sub-Saharan northeast Africa the summer monsoon rains facilitated a tree savanna with dense grasslands during the Holocene which is found today about 800 kilometers further south (Fig. 1, 2).<sup>24</sup> In these areas, including the Sudanese Nile valley, a second pattern for the adoption of domesticates is found: a restriction of the faunal component that includes only cattle, sheep, goat, and dog.<sup>25</sup> Obviously, the ‘original package’ had been modified while excluding barley, emmer wheat, legumes, flax and pigs (Fig. 1).<sup>26</sup> Plant food was still provided through the collection of abundant

14 Neumann 1989; Barakat and Gamal el-Din Fahmy 1999.

15 Adamson, Williams, and Gillespie 1982.

16 Hoelzmann et al. 2001; Pachur and Altmann 2006.

17 Linstädter and Kröpelin 2004, 774.

18 Wetterstrom 1993, 204–220.

19 Cappers 2013.

20 Phillipps et al. 2011.

21 Wetterstrom 1993, 208, 214.

22 Wetterstrom 1993, 209, 213.

23 Wetterstrom 1993, 216–217.

24 Neumann 1989.

25 El-Mahi 1988.

26 However, recent microbotanical evidence suggests that at the same time *Triticum* sp. and/or *Hordeum* sp. spread as far south as the Dongola region (Madella et al. 2014).

and diverse wild savanna grass seeds, tree and shrub fruits as well as medicinal plants, as previously practiced during the early Holocene.<sup>27</sup>

The combination of animal herding and the reliance on wild annual grasses, namely millets such as *Sorghum*, *Pennisetum*, *Echinochloa*, *Panicum* and *Setaria* (Fig. 2), is archaeologically known as far north as the Farafra Oasis in Western Egypt<sup>28</sup> but extends also to the west into Libya<sup>29</sup>. The staple dish based on ‘wild’ millets instead of ‘domestic’ cereals reveals a culturally different dietary concept.<sup>30</sup> Sorghum seeds are consumed as porridge, soft bread and beer, whereas the stems are used as construction material, fuel, or fodder for herd animals.<sup>31</sup> Though it is highly likely that sorghum was cultivated during the Neolithic or even well before, it is presently not accepted as having been domesticated according to the biological definition.<sup>32</sup> Again, Neolithic subsistence in the south was complemented by hunting and also by fishing and the collection of mollusks in riverine environments. Animal bone remains represent the rich diversity of the Ethiopian fauna, including gazelles, large antelopes, elephant, giraffe, African buffalo, rhinoceros, aardvark, and warthog.<sup>33</sup>

Summing up the paleo-environmental evidence one could ask why different choices were initially made in the north (Egypt) and in the south (Nubia, Sudan). As a proposition, I would argue that by systematically accentuating the various causes for the acceptance and rejection of domesticates in each region, we may better understand the essential impact of neolithization. Despite the occurrence of different species we may still find similarities that could be studied as novelties. Another related question is whether animals or domestic species themselves should be viewed as innovations, or if we have to expand the methodological approach beyond the biologicistic paradigm. In other words, we could ask if ‘wild’ or ‘semi-wild’ species were involved in similar practices of domestication. As it has previously been stated that cattle could have been initially domesticated in Northern Africa, namely in Egypt, it is necessary to first consider the main arguments for this and how innovation is thought to be rooted in human-environmental relations.

### 3 Living apart in the wild? The wild and domestic ends of cattle

Among most proponents of African autochthonous cattle domestication from aurochs (*Bos primigenius*) populations it is assumed that cattle herding evolved within mobile and

27 Magid 1989.

28 Barakat and Gamal el-Din Fahmy 1999, 43.

29 Garcea 2006.

30 R. Haaland 2007.

31 R. Haaland 1999; Mirzeler 2009, 401.

32 R. Haaland 1999.

33 El-Mahi 1988. Diet consisting of animals, however, might have been even more diversified, given the presence of land snails, reptiles such as snakes, turtles, and lizards, birds as well as rodents among the faunal remains (El-Mahi 1988).

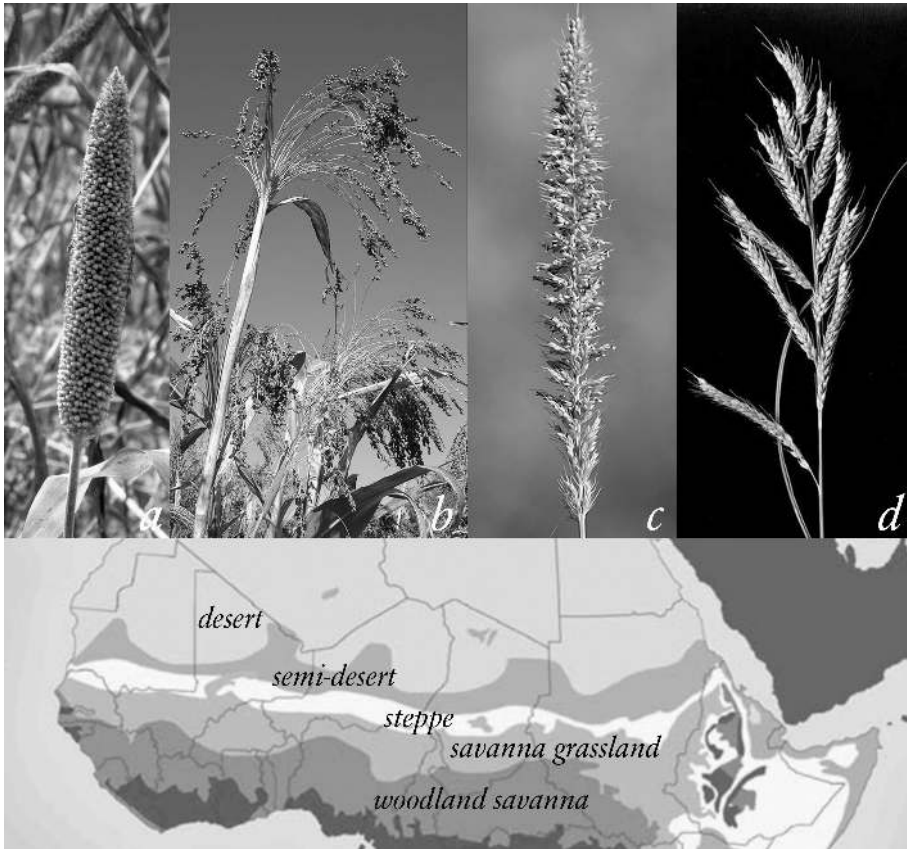


Fig. 2 African millets and the current savanna belt, (a) pearl millet (*Pennisetum glaucum*), (b) wild sorghum (*Sorghum arundinaceum*), (c) bur-bristl grass (*Setaria verticillata*), (d) burgu (*Echinochloa stagnina*).

specialized early Holocene foraging communities in the eastern Sahara. Archaeologically, their material culture was accredited varyingly to either Epipaleolithic, Mesolithic, or Neolithic tool kits as well as with both the absence or presence of pottery,<sup>34</sup> as if none of these object classes could have changed during the process. The major line of distinction was drawn between a ‘pre-pastoral’ and a ‘pastoral’ subsistence (as will be discussed below). This reverses the southwest Asian scheme of a gradually emerging sedentism into a north African sequence of sedentary fisher-hunter communities living along lakes and rivers, turning gradually into mobile cattle pastoralists.<sup>35</sup>

34 Wendorf and Schild 2001; Kuper and Kröpelin 2006.

35 Garcea 2006, 200, 204; cf. Gehlen et al. 2002. This domestication process is thought to even predate the first archaeological evidence for the Neolithic in the Nile valley (c. 5100 cal BCE) by more than 2000

The causes for this transition were presented from a modern rationalist viewpoint as an ecological requirement and as a benefit for an economic surplus: (1) the ongoing desertification of the Sahara had enforced highly adapted subsistence strategies such as cattle pastoralism<sup>36</sup>, and (2) concluding from present-day sub-Saharan Africa, domesticated cattle would have immediately meant the provision of milk as well as the existence of property and wealth,<sup>37</sup> despite objections that both might be the outcomes of long-term processes. Most unsatisfying, the theory that Saharan foragers started to ‘domesticate’ wild cattle locally essentially lacks an explanation as to why the hunters’ perception of animals – both had lived in a mutual relationship facing a series of climatic crises long before – should have changed in a lasting way at this particular juncture and why they should have developed an additional demand for domesticated southwest Asian goats and sheep that have no wild African progenitors.

It comes as no surprise that the assumed autochthonous primary cattle domestication has come under massive criticism. Although during the Early Holocene aurochs held a prominent position among the archaeologically accessible species in the Egyptian Nile valley,<sup>38</sup> there seems to be no contemporary evidence for human engagement with aurochs other than in hunting and mythological practices.<sup>39</sup> When depicted in late Pleistocene rock art (Fig. 3), aurochs appear as uncontrolled and are found in contexts with other wild species.<sup>40</sup> In more recent rock drawings and reliefs, domestic cattle are drawn more statically, enumerated and often accompanied by humans (Fig. 7, 8).

Uncontroversial evidence for domestic cattle as well as for sheep, goat and pig – based on bone size comparisons – is dated to around 5100 cal BCE, or respectively, after the supposed initial contacts with migrating Levantine groups.<sup>41</sup> Although it is very likely that these contacts are the causal events for the introduction of domesticates and would prove to be a critical juncture for further developments, they do not yet explain the varying degree of their acceptance or rejection in northeastern Africa.

Indeed, there are genetic patterns in African cattle that might have emerged only after significant genetic introgression of local aurochs.<sup>42</sup> In the past, cross-breeding is

years, while reliable dates are conspicuously missing (cf. Dittrich 2013a, 52–54).

- 36 Cf. Wendorf and Schild 2001; Gautier 2001; Hassan 2002; Lernia 2006. A typical reductionist definition of pastoralism in this context is the “exploitation of domestic animal herds for food production” while moving the herds “for grazing according to seasonal availability of pasture” (Garcea 2004, 111). In a similar way, African pastoralism has been viewed as broad adaptation to a basic grassland environment (Smith 1992, 10).
- 37 Wendorf and Schild 2001; Garcea 2006, 200.

38 Linseele and Van Neer 2010.

39 Although the latter might include practices such as capturing, taming and sacrificing that could be termed practices of domestication (cf. Russell 2012a).

40 Huyge and Ikram 2010.

41 Grigson 2000; Dittrich 2013a, 49, 52–54.

42 Gifford-Gonzales and Hanotte 2011. Humped or zebu breeds are thought to have been introduced to northeastern Africa during a more recent period, most likely from Asia via the Horn of Africa (Gifford-Gonzales and Hanotte 2011, 8).





Fig. 3 An aurochs herd, two small gazelles and a goose as probably encountered during a spring season, rock carving, Qurta (Egypt), late Pleistocene.

likely to occur during free-range herding, and its promotion or tolerance would have involved pre-existing knowledge about aurochs (cf. Fig. 3). Therefore, it might be interesting to pay more attention to the encounters of wild and domestic cattle populations in the Saharan corridor during the mid-Holocene. Later on, cattle herding must have had a severe impact on wild populations such as the African buffalo in the Sudanese Nile valley as well as hartebeest and aurochs in Egypt.<sup>43</sup>

In this respect, animals, either being on the domestic or wild ends of the broad spectrum of human-animal relations,<sup>44</sup> should not be viewed as static elements of prehistoric landscapes. From the paleo-environmental record it can be concluded that northeast African interest in domesticates occurred during a climatically favorable period with significant rains (cf. Fig. 1). The question of domesticates as a choice and necessity to respond to climatic deterioration – strongly influenced by present conditions and their economic effects – could have risen only much later and would then have enforced specific innovations, e.g. irrigation. Furthermore, since biological changes in animals became visible as long-term outcomes only, the scientific restriction to them as the actual novelties may obscure much of the underlying social practices. Thus, the respective practices should be discussed in greater detail.

43 Linseele and Van Neer 2010. While African buffalo seems to disappear almost completely and rapidly from Neolithic assemblages in the Sudanese Nile valley (Dittrich 2011, 232–234), there is still evi-

dence for wild aurochs in the Egyptian Neolithic and late Neolithic sites (cf. Linseele and Van Neer 2010, tab. 3).

44 Russell 2002.

#### 4 Animal domestication as social practice

The exploitation of animals for obtaining meat has long been thought of as the primary motivation ('primary product') for their domestication.<sup>45</sup> However, this view has recently been challenged by zooarchaeologists in stating that domestication as social practice is actually a clear shift to the living animal.<sup>46</sup> It may be necessary here to examine the passive role assigned to animals even more critically. Based on the modern binary oppositions such as humans vs. animals, society vs. nature, or reason vs. instinct, animals have been consistently stipulated as 'the Other' or 'Opposed' to human beings.<sup>47</sup> Criticized early during the 20th century and taken up recently by a broader sociological perspective of human-animal studies,<sup>48</sup> this dichotomy emerges as the outcome of anthropocentrism and speciesism excluding 'non-human' animals as constituents of contemporary Western society.<sup>49</sup> Rightly, human-animal studies claim that although 'non-human' animals are present in almost all social spheres, in most modern historical and sociological reflections animal agency remains invisible. In archaeology animals are seen mainly as material resources while being reduced to 'economic imperatives' and to 'symbolic schemata'.<sup>50</sup> It is often ignored that access to the material properties of animals commonly involves killing them and – as part of the modern 'production process'<sup>51</sup> – since the 19th century has stimulated innovations around the maximization and industrialization of the killing process. In contrast, the ethnographic and mythological record of pre-modern conceptions is full of living and acting animals to which various grades of subjectivity are often ascribed. Consequently, with regard to neolithization, a "fundamentally social approach to domestic animals"<sup>52</sup> is claimed to also affect the still prevailing biological notion of domestication.<sup>53</sup>

In pre-modern societies, animals as well as other entities appear largely as subjects, and are approached by humans as persons or even as divine manifestations.<sup>54</sup> Therefore, dead animals' materials should be kept conceptually distinct from the agency of living animals. The notion of animal 'products' is restricted here to living animals' products such as milk, dung, urine, body heat, or blood.<sup>55</sup> In animistic cosmologies, even artefacts made from organic materials may not just be 'dead' things emerging *ex nihilo*

45 Sherratt 1981.

46 Russell 2012b, 219. Furthermore, the obvious 'unbalanced distribution' of animal body parts in the archaeological record including burials of animal individuals does not mesh with such a general explanation (Marciniak 2011, 127).

47 Cf. Ingold 2000, 61–63.

48 Cf. Mütterich 2008, 5107.

49 Chimaira 2011.

50 Orton 2010, 189.

51 Cf. Dittrich 2013b.

52 Orton 2010, 189.

53 Russell 2002; Russell 2007.

54 Descola 2011, 197–218.

55 The bleeding of living African cattle to obtain blood for food was probably overestimated by 19th and early 20th century ethnographers (El-Mahi 1988, 91). Bleeding may have ritual or medical backgrounds (Evans-Pritchard 1940, 28). In general see Dittrich 2013b.

to underline the subject position of their human creators/inventors but may be transformed subjects who still keep some of their original ontological predicates.<sup>56</sup> These may transcend life and death and may continue to have effects on the bearer.

#### 4.1 Kinship

As novelties related to domestication primarily regard the ‘social incorporation’ of domestic animals into the society,<sup>57</sup> it was thought that “this locates the key change in animal domestication not in the animals’ bodies, nor even in human-animal relations, but in the social definition of animals as a resource.”<sup>58</sup> In a more recent paper, Nerissa Russell considered domestication a social practice that could be equated to kinship extended to other species or ‘distant relatives.’<sup>59</sup> Most importantly, kinship as a classificatory system is partly established through non-biological relations such as marriage, adoption or godparenthood. When animals are integrated into families, herd structures, mating partners, movements and locations of herds or individuals are ordered according to other social and cosmological patterns. By analogy, this would relate the food taboo to the incest taboo for close ‘relatives’ (pets), or the concept of castration of oxen to the notion of their edibility.<sup>60</sup> Russell would also relate the emergence of bridewealth constituted of herd animals who follow into the new household to an extension of the kinship system.

#### 4.2 Mother-child relations

As it is not sufficient to simply transpose human social schemes onto human-animal relations, animal behavior can also become a model for human behavior. Because young mammals rely on milk-giving, they are all familiar with receiving food through another human or animal individual. Milking enables a set of trans-species interactions as known from various myths that narrate relations between an animal mother and a human child. As an example, the ideal of kingship during the Old Kingdom in Egypt was still based on animal-animal relations providing a role model that might be as old as the idea of domestication in the Nile valley. The king was likened to a “strong bull”, while the king’s mother was “the cow that hath borne a bull.”<sup>61</sup> Accordingly, the sun (king) appeared as

56 Descola 2011, 568.

57 Ingold 2000, 64.

58 Russell 2002, 291. As this view reduces novelties in human-animal relations to changes in human-human relations, it has been criticized as reductionist (Orton 2010, 190).

59 Russell 2007, 33–34.

60 Russell 2007, 35.

61 Frankfort 1948, 162. While Henri Frankfort has offered useful insights into the religious basis of human-environmental relations, his ideas of cattle herding connected to ‘hamitic’ or ‘semi-hamitic’ diffusion should be regarded with great caution, cf. the criticism of Sanders (Sanders 1969). It has been further warned that, due to a historically handed-down holiness of cattle, “forms and images relat-

“the bull of heaven”, born and suckled by the heavenly cow.<sup>62</sup> The word for “joyful, being friendly/caringly” was written with a hieroglyph showing a cow turning backwards to her calf.<sup>63</sup> Among the Tanzanian Iraqw, milk itself “as a metonym for the mother-child relationship [...] may be used metaphorically only in relationships that share some of the same intimate qualities” and it may therefore be considered shameful to sell milk at markets.<sup>64</sup>

While keeping in mind that a joyful and caring cow-calf relation could mark the ideal of descent, it is remarkable that female human and cattle figurines made of clay, ivory, or stone appear with the onset of the Neolithic throughout the Nile valley (Fig. 4, see also fig. 10).<sup>65</sup> It has been suggested that female and cow figurines generally signified motherhood and stood for a basic trust that also characterized the ideal of other social dependencies.<sup>66</sup> At the same time we observe a different categorization and more prominent position of children in Neolithic burial rituals.<sup>67</sup>

Although the life cycles of domestic animals are shorter than those of humans, children and young animals can grow up together, in a way that intertwines their life histories.<sup>68</sup> For example, among the South Sudanese Nuer, milking is practiced by women and youths, promoting their identification with cows (Fig. 5). The identification of men, however, is expressed by the care, feeding and adornment of their favorite oxen that are handed over during initiation and destined for later sacrifice.<sup>69</sup>

### 4.3 Sacrifice and death

Sacrifice acts as an institutional frame when killing becomes part of this mutual relationship.<sup>70</sup> It involves both the domination and violence that were suggested to be

ing to cattle have often remained subject to cliché and generalization in archaeological interpretation” (Wengrow 2001, 91). Therefore, the notion of a general Neolithic ‘cattle complex’, employing a term of Herskovits (Herskovits 1926) or of a Neolithic ‘cattle cult’ in Northern Africa (Lernia 2006) simply based on the presence of a species remains superficial as even basic herders’ quite different concepts of categories such as calf, cow, bull, or oxen are not considered.

62 It is interesting to note that the goddess Hathor’s (or Nekhbet’s) “embodiment was not the domesticated cow but the wild animal, living in the marshes” (Frankfort 1948, 171). The ancient Egyptian notion of wild cows, however, does not necessarily conform to our biological notion of wild cattle (aurochs). For instance, it may have concerned free-ranging domestic cows that are not otherwise fed.

63 Frankfort 1948, 162.

64 Rekdal 1996, 376.

65 While cattle and particularly cow figurines in combination with human imagery were found in the Neolithic settlement of Merimde Benisalâme in the Nile delta (Eiwanger 1992, fig. 18), Neolithic figurines are mostly known from grave goods in burials of adults as well as children.

66 G. Haaland and R. Haaland 1995.

67 Cf. Dittrich 2011, tab. 8.4.

68 Ingold 2000, 86.

69 Evans-Pritchard 1953. Prior to initiation, male Nuer children are mainly concerned with small livestock such as goats, sheep and calves (Evans-Pritchard 1953, 186). Unfortunately, Evans-Pritchard failed to study female categories and activities in similar detail.

70 Russell 2007.

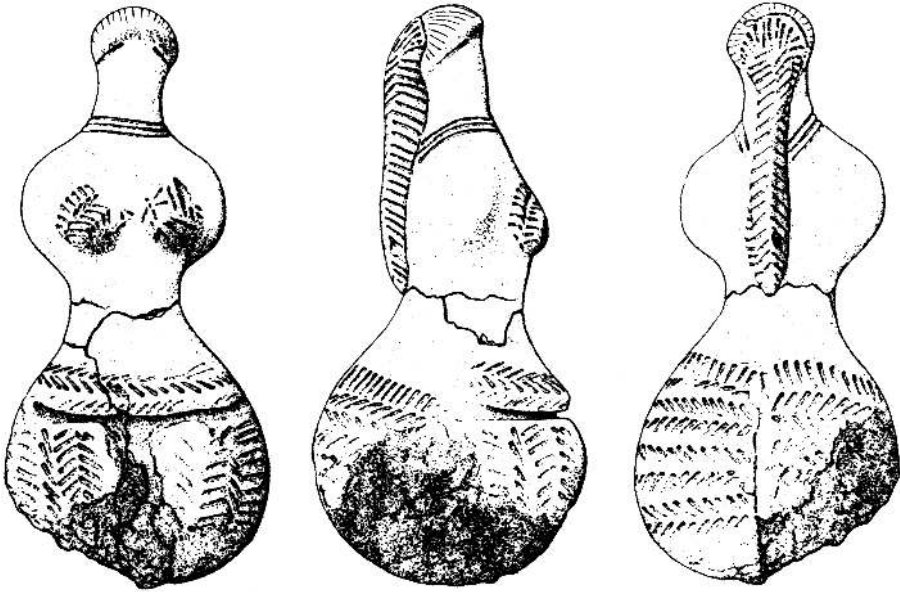


Fig. 4 Female clay figurine from a Neolithic burial, Kadada, Sudan, late 5th millennium BCE.

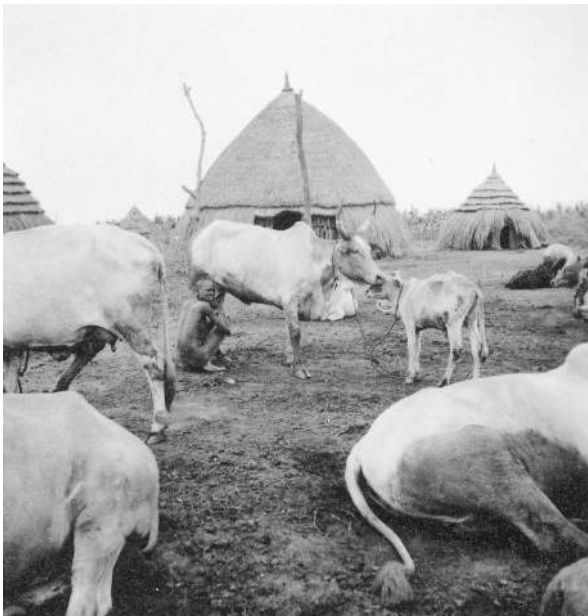


Fig. 5 Nuer girl milking with cow and calf tethered and a hut for cattle (byre) behind, photograph taken by E. Evans-Pritchard in 1935.

viewed according to classical moral concepts of domination and care connected to the ideal of the well-being of the household. Consequently, Timothy Ingold linked human domination over animals with human domination over other humans, namely slaves or captives.<sup>71</sup> Human dominance over dependants might seem difficult to detect for the prehistoric past, however, there are certain features in burial rites that are indeed interpreted in this way.<sup>72</sup> Only recently, a Neolithic burial of an adult man surrounded by three supposedly sacrificed humans and two dogs has been reported from Kadada in the Sudanese Nile valley.<sup>73</sup> The sacrifice of humans is commonly deduced from their peripheral and subordinated position (Fig. 6).

Beside the inhumation of dogs, burials of domestic animals such as cattle, sheep and goat frequently appear at Neolithic and Predynastic cemeteries throughout the Upper Egyptian and Sudanese Nile valleys. The animals' presence ranges from parts such as legs, hides or horns and bucrania (Fig. 6) to complete and carefully arranged burials of individual animals. A tomb complex excavated at Hierakonpolis and dated to 3650 cal BCE not only contained numerous satellite graves of "what may be interpreted as family and courtiers";<sup>74</sup> but was also surrounded by a whole animal cosmos of 46 burials of 'wild' and 'domestic' species such as aurochs, elephant, cow and calf, goats, bull, hartebeest, dogs, cats, baboon, and hippopotamus. Similar to humans, animals could be placed on or covered by matting and textiles.<sup>75</sup> Also cowhides served as mats for human corpses<sup>76</sup> which – next to the presence of cattle horns (cf. Fig. 6) – could point to their assistance during the transition to afterlife/rebirth.<sup>77</sup>

This broad range of burial practices calls for a precise definition of sacrifice, which is thought to specifically occur together with domesticated animals.<sup>78</sup> Edward Evans-Pritchard provided a detailed account of Nuer traditions according to which cattle should not be slaughtered except in sacrifice, meaning that this should take place only on rare occasions while observing specific rules of participation and meat sharing.<sup>79</sup> To

71 Ingold 2000, 61–76.

72 Reinold 1987.

73 "Archaeologists dig up 'oldest' African human sacrifice," AFP news, 15 Feb 2008. Available: <http://www.sudantribune.com/spip.php?article25984> (visited on 17/01/2017).

74 Friedman, Van Neer, and Linseele 2011, 157.

75 Friedman, Van Neer, and Linseele 2011, 175.

76 Reinold 1987; Wetterstrom 1993, 217.

77 Structural parallels to practices among the Bayankole were suggested to exist during the 19th century according to which the dead king after having been washed with milk was wrapped in the hide of a sacrificed cow (Frankfort 1948, 164). Other

cows were made to participate in the mourning through being separated from their calves to further mark the unbearable event. In Jie conceptions, the cow skin is linked to procreation instead, as it is an indispensable prerequisite for the wedding night (Mirzeler 2009, 408).

78 Russell 2012a.

79 Evans-Pritchard 1953, 192–194. As the eating of such meat has sometimes been refused by the former cattle owner because of his emotional attachment to a particular animal, sacrifice reveals itself as a communal practice that may cause emotional plight among individuals.

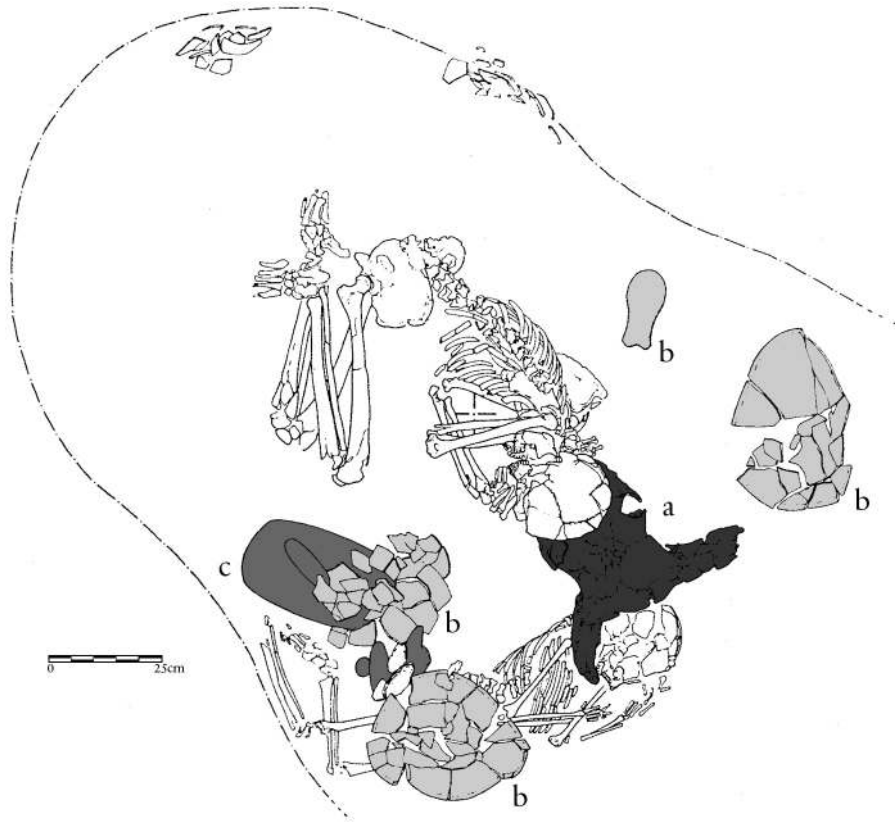


Fig. 6 Neolithic burial of an adult with head resting on a cattle bucranium (a) and of a 10-year-old child placed beneath grave goods including pottery (b), a stone palette and a grinder (c). Kadada (Sudan), late 5th millennium BCE.

subject carefully chosen animals to ‘ritualized killings’ could be seen as a practice of domestication, as through ritual<sup>80</sup> this act is marked as different from the otherwise sanctioned violation of animals. While for animal materials among the grave goods, such as bone tools, ivory objects and used animal hides, the sacrificial transformation may date back in time, the burial of intact animal individuals equates them to the human deceased – as (living) companions for the afterlife. Thus, the Neolithic burial rites proved

80 Ritual is to be understood as a “system of ritualized actions, which were practiced by active and passive agents [...] repeatedly in prescribed, strict or fluid order, time and form, in created areas or instances of liminality and the results of which have inten-

tionally altered the physical world with the motivation to express sacred beliefs [...] so that order, in the way they understand it, can be maintained and [...] their society can prosper” (Koutrafouris 2009, 96–97).

both dominance exercised over dependants through sacrificing and slaughtering – the latter remained restricted to animals – as well as careful concern with contemporary humans and non-humans.

## 5 Studying prehistoric innovations or ‘difference and repetition’

The view of domestication as a set of social practices seems to call for an equally formulated concept for studying prehistoric innovations. Generally, the use of modern economic terms superficially transposes to the past inscribed mechanisms, power relations or ideal goals such as reducing human labor input or increasing yields. These become most inapplicable to the discussion of animals and human-animal relations predating the present industrialized exploitation of animal life. In archaeology, domestic animals and plants are still *per definitionem* encountered as ‘objects’ or ‘products,’ hindering a social approach that goes beyond human-object relations to them.<sup>81</sup>

Our present notion of innovation is not only rooted in modern economic relations but also embedded in certain practices such as writing and publishing, copyright laws, patents, brands, first editions, or scientific reports. Thus, a more general concept of innovation will be used here as a novelty being imposed on pre-existing structures in a way that will lead to the alteration of known things and relations.<sup>82</sup> While being mediated through certain non-written practices such as rituals, contradictions that would arise in this process are responded to by relating new schemes to existing categories.<sup>83</sup> Similarly, Claude Lévi-Strauss attributed changes in the totemic classification to the constant concern of society with differentiating features but not to the interest in change itself. According to him, variations are due to “several means of re-establishing a system, which may not be identical with the earlier one but is at least formally of the same type.”<sup>84</sup> As a consequence, however, the categories themselves are transformed in the long-term.<sup>85</sup>

Since innovation is not an inevitable event or process, the intentions for its promotion or rejection might be rooted in unequal power relations.<sup>86</sup> Viewing innovation as progress passing through various consecutive stages, remains a retrospective view confined to a linear notion of history.<sup>87</sup> When Schiffer classified consecutive stages of (1) invention, (2) development, (3) replication, and (4) adoption for studying innovation in archaeology,<sup>88</sup> he relied heavily on Everett Rogers’ five sequential stages of knowl-

81 Cf. Dittrich 2013b.

82 Thus, the supposed ‘novelty’ is closely related to the concept of the ‘event’ which – when perceived as a “happening of significance” (Sahlins 1985, 153) – is both a historical and a mytho-practical instrument of relating to cultural change.

83 Sahlins 1981, 67–72.

84 Lévi-Strauss 1966, 68.

85 Sahlins 1981, 67–72.

86 Bernbeck and Burmeister, this volume.

87 In economic history this is also known as path-dependence (cf. Martin and Sunley 2010).

88 Schiffer 2010.



edge, persuasion, decision, implementation, and confirmation as defined for the purpose of studying principles of modern economy.<sup>89</sup> Both Michael Schiffer and Everett Rogers considered a problematic intermediate stage of resilience or aversion that has to be overcome to demonstrate the historical success of an innovation. However, it would be false to reduce innovations to necessities, the implementation of which has to be completed while facing various complex challenges. When van der Veen recalled that ‘Western technology’ introduced to “poor, developing countries” often failed to find acceptance,<sup>90</sup> her example unintendedly illustrated much of the colonial and optimistic connotation of the term innovation. In fact, this kind of transfer caused many social and environmental problems. In the words of Gabriel Tarde, “inventions are far from being, then, the simple effects of social necessities; they are their causes.”<sup>91</sup>

Predominantly through the material access of archaeology, one of the above mentioned stages, namely that of replication/imitation, is studied. In this way, the linearity of historical processes could be replaced by a cyclical view that is more in accordance with the reproduction of knowledge in non-literate societies through repetitive commemorative ceremonies and bodily practices.<sup>92</sup> This is exactly the point where the early thoughts of Gabriel Tarde about invention and imitation become relevant for prehistoric archaeology: “since, then, all inventions and discoveries are composed of prior imitations [...], and since these composites are themselves imitated and are destined to become, in turn, elements of still more complex combinations, it follows that there is a genealogical tree of such successful initiatives and that they appear in an *irreversible*, although otherwise indeterminate, sequence.”<sup>93</sup> As a consequence, it is argued here that innovation cannot be analyzed as a category that becomes effective on its own or that is viewed without considering preceding and succeeding events.

Tarde’s sequence of invention and imitation might be understood not only chronologically but also dialectically, not in the sense of an antithesis of the new and the old, but of an immediate dialectic of difference and repetition, as was pointed out by Deleuze.<sup>94</sup> Since imitation is an act of repetition involving conscious or unconscious differentiation, imitation itself always emerges as a source of variation.<sup>95</sup> Only recently, more attention has again been paid to change that “partly comes about through unintended, contingent, accidental interactions.”<sup>96</sup> Fortunately for archaeology, most of those interactions are materialized in one way or another. This is the point where both the history of innovations and the material scope of archaeology could intersect.

89 Rogers 1962, fig. 5–1. Rogers himself was influenced by Gabriel Tarde’s *Les lois de l’imitation* first published in 1890 (Tarde 1903).

90 Veen 2010, 3.

91 Tarde 1903, 93.

92 Lucas 2005, 77–82.

93 Tarde 1903, 45.

94 Deleuze 1994, 40, 157–158.

95 Tarde 1903, 6–7.

96 Hodder 2011, 182.

However, with prehistory there is no static knowledge fixed by certain practices such as writing that can be followed through and still identified after having passed subsequent stages of manipulation. In contrast, prehistoric or pre-modern inventions/innovations that occurred as historical facts became invisible in a palimpsest of practices, rooting them in mythology. The initial events were often re-enacted as a kind of mytho-praxis<sup>97</sup> and yet, may be still accessible in this form.<sup>98</sup> From this viewpoint, the notion of innovation also emerges as a qualification that may be exercised only afterwards through detaching it historically from preceding imitations, regardless of their human or non-human origin. The latter becomes most obvious with the current extension of modern patents to animal and plant breeds, while preferably employing wild, old, or indigenous varieties. The rhetoric of innovation may thus also emerge as an appropriation of rights that have never been claimed before. At the moment we ask when and where innovations occurred during prehistory we simultaneously create them as quasi-historical facts.<sup>99</sup>

To avoid this, I would like to stress the continuum between various past and present practices, the chronological separation of which – into ‘prehistoric,’ ‘historic’ or ‘modern’ practices – remains often quite arbitrary or, with greater distance in the past, even pejorative. Consequently, I do not aim to historicize such practices.<sup>100</sup>

## 6 Pastoralism, space and gendered activities

According to the notion of change brought about by the reproduction of a system – or by imitation that resulted in variation – I want to discuss how concepts related to spatial categories and gendered activities may have transformed with neolithization. It is of particular interest how novelties imposed by the seemingly new social obligations to domesticate could have been attached to already known schemes. Explicitly, the focus is on contexts that become archaeologically known to us.

Since Neolithic animal herding has never been imagined in terms different from that of (recent) pastoralism – loosely defined by mobility for the welfare of animals<sup>101</sup> –,

97 Sahlins 1981; Sahlins 1985.

98 Mytho-praxis is defined as relating historical events and persons to the stereotypic reproduction of existing myths and mythic descent, thus creating “historical metaphors of mythical realities” (Sahlins 1981, 11). A good example would be the Ark of Noah event. It memorializes a threat to the existing order where a sufficient number of humans and animals are transferred to an unknown place to re-establish ‘domestic’ and ‘wild’ spheres there as known before.

99 Lucas discussed very similar arguments that are employed to detach prehistory as ‘lost’ or ‘other’ time that archaeology seeks to bring back “through historicizing narratives that employ devices such as chronology or origin stories” (Lucas 2005, 126).

100 Although such practices do widely exist in non-economic contexts of contemporary modern societies, they are still best documented in ethnographic records in non-industrialized environments to which this article occasionally refers.

101 Smith 1992; Garcea 2004.

this notion has hindered a view of Neolithic subsistence in its own historical context. It seems paradoxical that while highly mobile groups may have promoted the fast spread of domesticates, and thus mobility seems to be an important concept in this respect, it is the establishment of multiple domestic spheres that predominantly characterize Neolithic landscapes.

In this context it is worth looking at spatial conceptions as they were expressed through decorations of funerary chapels during the Old Kingdom in Egypt that may have originated in human-environmental relationships predating this period. Space in ancient Egypt, either worldly or transcendent areas, could be displayed as an ‘inner’ and an ‘outer’ cultural landscape within a fundamental world of “eating and being eaten.”<sup>102</sup>

### 6.1 The inner sphere

The inner sphere is imagined as a place of preparation and transformation of ritual food with different tasks done by women and men.<sup>103</sup> The transformation of cereals through brewing beer and baking bread<sup>104</sup> provided the prerequisites for furnishing sacrifices, feasts or paying debt. Such social properties of domesticated cereals must have been occupied long before by sorghum and other wild grasses. A major difference between north and south lies in the shifted seasons, resulting in different periods of cultivation and therefore in the shifted reoccurrence of feasts that are related to periods of harvest and abundance.<sup>105</sup> While southwest Asian crops in Egypt were harvested in early spring,<sup>106</sup> in the sub-Sahara sorghum is presently harvested twice during the wet season, in autumn and winter.<sup>107</sup>

During feasting as well as in daily life, it is often the gift of specific food and drinks that enables reciprocity or solidarity, as the example of the still important role of sorghum beer in Tanzania vividly illustrates.<sup>108</sup> After the introduction of barley and emmer wheat, differences between north and south were also manifested in the varying importance of baking and cooking. As Randi Haaland put it, while Egypt became firmly placed in the “bread eating world”, Nubia formed the corridor to “the porridge eating world” in the south.<sup>109</sup> The different practices seemed to favor the “invention of different

102 Fitzenreiter 2010, 314, fig. 12.

103 Fitzenreiter 2010.

104 Fermentation is an important means for these transformations, thus also a form of domestication (Fitzenreiter 2010, 333).

105 It has been stated that since potentially difficult relations could be settled through special events of giving and sharing, feasting became prominent among growing sedentary groups during the Neo-

lithic (Benz 2006). Furthermore, as agricultural rites are related to myths about death and birth as major transitions in life (cf. Frankfort 1948), the subsequent feasting marked the transition as successfully accomplished.

106 Wetterstrom 1993, 209–210; Murray 2000, 520.

107 Evans-Pritchard 1940, 97.

108 Rekdal 1996, 369.

109 R. Haaland 2007, 178.

items for food preparation – ovens and pots respectively – in the two regions”.<sup>110</sup> This combination is thought to explain the fact that pottery had already appeared around 2000 years earlier than domesticated cereals in Africa.

Among Jie pastoralists in Uganda it is related that it was women who took up the novelty of sorghum sowing and cultivating.<sup>111</sup> Through the circulation of sorghum grain – grains and lands are handed down by the mother – “women’s social power is constituted”.<sup>112</sup> Furthermore, Jie occasionally express human descent through the metaphors of ‘granaries’ as mothers and ‘seeds’ as fathers.<sup>113</sup> As excavations of oval huts and pits show, the storage of sorghum and other wild grass grains was already practiced around 7100 cal BCE in the Egyptian Western desert.<sup>114</sup> At that time wild grasses constituted the staple food throughout Northern Africa,<sup>115</sup> and such finds suggest that in ecologically favorable areas sedentism as a temporal establishment of an inner sphere had already emerged. During the Neolithic, granary pits were still dug into the higher ground of settlements and lined with coiled basketry as documented in the Egyptian Fayum<sup>116</sup> and in the Nile delta.<sup>117</sup> As the ethnographic record further suggests, granaries are not just mere containers, but myths of birth and origin might also have been attached to them that were manifested in rituals during their seasonal filling and emptying.

The inner sphere constitutes the stage for animal domestication requiring the daily repetition of practices such as individually approaching, taming, feeding and milking, which are often within the scope of women.<sup>118</sup> Cows are fastened with ropes close to the villages while the calves are around. The Old Kingdom pictorial record observes further practices exercised by men in domestic environments. Captured wild animals were sometimes symbolically domesticated through feeding such as the force-feeding of hyena or the cramming of fowl, most likely shortly before sacrifice.<sup>119</sup> This practice would remain invisible in the archaeological record and may well predate the Neolithic.

110 R. Haaland 2007, 179.

111 In ancient Egypt, Osiris as the personified principle of pending rebirth and resurrection has been claimed as the one “who made the barley and the emmer to nourish the gods, and even so the living creatures after the gods” (Frankfort 1948, 185). Osiris is thought to manifest physically in sprouting cereals. It is interesting that a similar idea of an ancestor (god) manifesting in grains is known among the Ugandan Jie; however, Orwakol is meant to be present in the grains of sorghum. Likewise, the harvest of sorghum is accompanied by a set of rituals (Mirzeler 2009, 395).

112 Mirzeler 2009, 393. As was rightly stated, “the metaphor of cattle has long been the main topic of

the academic conceptualization of pastoralist communities in East Africa [...] but sorghum is yet to be incorporated into these formulations” (Mirzeler 2009, 389).

113 Mirzeler 2009, 408–409.

114 Królik and Schild 2001.

115 Boulos and Gamal el-Din Fahmy 2007, 507.

116 Caton-Thompson and Gardner 1934, pl. 25–27.

117 Wetterstrom 1993, 212–213. Since some of these excavated granaries still yielded mice nests (Caton-Thompson and Gardner 1934, 53), it seems tempting to associate the subsequent appearance of the domesticated cat in Egypt and its paramount tasks.

118 Fijn 2011, 129.

119 Fitzenreiter 2010, 331, fig. 14.

Most significantly, with the institution of sacrifice itself, the actual place of ‘domesticated’ killings is relocated from the outer to the inner sphere.

Thus the village becomes structured by places for humans, animals and diverse human-animal interactions. The South Sudanese Nuer build huts for cattle out of wood (byres) that resemble the shape of human dwellings (Fig. 5) and that virtually confirm domestication as incorporation into the domestic sphere.<sup>120</sup> In present-day Africa, kraals are built out of wooden fences or thorn bushes to further fend off predators<sup>121</sup> as well as thieves.<sup>122</sup> While living fences remain so far unknown in the archaeological record, there is evidence for postholes of wooden enclosures and pathways at the Neolithic settlement of Kerma in Nubia.<sup>123</sup> Also some of the symbolic rock art depictions from Nubia could be interpreted as different types of spatial enclosures.<sup>124</sup> However, these might also include traps for game drives used during hunting<sup>125</sup> that would point to a pre-existing knowledge of herding practices. It can be assumed that a range of further practices were in use to expel predators and other forces endangering the integrity of the inner sphere.

## 6.2 The outer sphere

The ‘outer’ zone in Old Kingdom conceptions is represented exclusively by men’s activities in the marsh lands of the ‘north’ or in the deserts of the ‘south.’<sup>126</sup> In the marsh lands, the depictions comprise fishing, processing of marsh plants, hunting birds using throwing sticks (cf. Fig. 11.30, 31) and nets, as well as guiding cattle herds to remote pastures. Perhaps the pharaoh’s expedition to the marshes for fishing and fowling<sup>127</sup> may be related to a symbolical renewal to secure abundance of these animals.

It has been stressed by many authors that given the North African ecology such as the deserts or the vast swamps of the Sudd, “cattle would not survive the harsh conditions” without human assistance.<sup>128</sup> Herders have to guide domestic animals to pastures and to water. During these activities, they tend to avoid bush lands where the tsetse fly is nesting or tick contact could occur.<sup>129</sup> Another method of minimizing contact with

120 Building houses out of reed for cattle is known from Uruk cylinder seals dated to c. 3000 cal BCE (Marciniak 2011, fig. 2). Such buildings have to be assumed for Neolithic Lower Egypt as well, but were depicted only much later on a Roman mosaic showing scenes of the Nile delta (Tristant 2005, fig. 17).

121 Wild predators such as lions account for a mortality rate of up to 10 % among domestic sheep and goat and up to 8 % among cattle in Africa today (Prins 2000, tab. 3). Crocodile and hippopotamus might be added as predators in the past, the latter being

also known for severe attacks on humans and the damage of fields.

122 Honegger 2006, fig. 12.

123 Honegger 2006, fig. 7, 10, 11.

124 Dittrich 2011, 269, fig. 8.18.

125 Edwards 2007.

126 Fitzenreiter 2010, 328.

127 Cf. Altenmüller 2008.

128 Evans-Pritchard 1940, 36; Gautier 2002.

129 Gifford-Gonzales and Hanotte 2011. – During the mid-Holocene, the tree and bush savanna must have stretched far to the north of the present distribution (Neumann 1989).

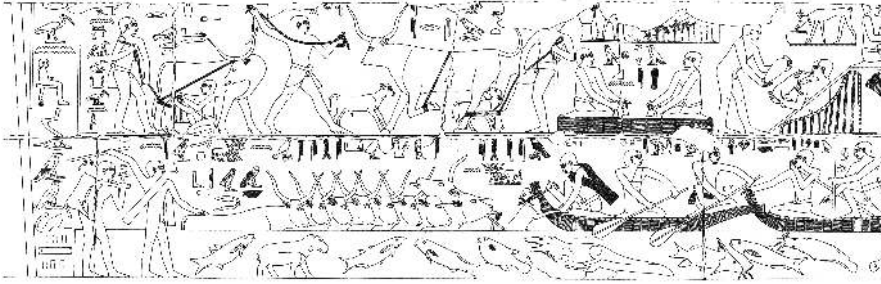


Fig. 7 Dangerous river passage (lower row): A calf acts as decoy to persuade the herd to follow, a man is pointing at a crocodile probably while casting a spell on it, relief at the tomb of Kagemni, Saqqara (Egypt), Old Kingdom.

insects is the burning of bush lands, through which African landscapes have become largely structured by humans in the past.<sup>130</sup> Burning grasslands may furthermore result in the fast growth of fresh green shoots or of fodder plants that would not grow due to competition with other grasses.<sup>131</sup>

In Egyptian reliefs, the activities in the outer zones are often imagined as being surrounded by potentially dangerous animals. In one scene a cattle herd is driven through the Nile dangerously close to a crocodile<sup>132</sup> eying the animals (Fig. 7), while in desert scenes 'wild' animals and free-ranging cows are hunted or captured by roping.<sup>133</sup> As some of these activities are related to foraging and hunting in potentially dangerous environments, they not only involved certain tools, skills and risks but they also must have already had a long tradition.

In the outer sphere and in contrast to the villages, herds are often combined beyond the species level and can reach very large numbers, similar to the behavior of wild savanna ruminants. Through this conduct, humans and animals become companions, and even more, humans start to defend the interests of herd animals. In Neolithic Saharan rock art, animal herders are frequently shown equipped with weapons, including bows and arrows, for protecting themselves and free-ranging herds. Lion attack scenes resemble an archetypal scheme of a dangerous and eventful human-animal encounter (Fig. 8) and were still depicted in Old Kingdom reliefs. In one of the latter, a lion attack on a cow is observed by a dog handler and two attentive dogs being directed either to intervene or to watch and learn.<sup>134</sup>

130 Prins 2000.

131 Smith 1992, 117. As charcoal is a frequent component of early to mid-Holocene sediments it can be concluded that the practice of burning bush and grasslands or gallery forests already originated within hunter-gatherer strategies of manipulating landscapes (cf. Dittrich 2011, 53–56).

132 As accompanying texts indicate the crocodile has to be fended off by the herders, a purpose for which the casting of magic spells might also be suitable (Erman 1919, 29–31).

133 Davies 1900, pl. 3, 22.

134 Davies 1900, pl. 22.



Fig. 8 Archers defending a backward turning cow from an attacking lion, rock painting, Jebel Ouenat (Egypt).

Domestic dogs are thought to have been followers of the introduction of herd animals from the Levant although the taming of captured animals was widely known among hunter-gatherers before. In northeastern Africa dogs are presently identified among the faunal remains of the Neolithic period but not earlier.<sup>135</sup> The mutual relationship between dogs and humans during prehistory remains far from being studied thoroughly. Apart from their social contributions to past societies, dogs may have played an active role in herding and hunting. In predynastic and pharaonic art, trained dogs are frequently depicted as companions of hunts where they are thought to metaphorically refer to the maintenance of “order over chaos”,<sup>136</sup> with the chaos placed demonstratively within the contemporary notion of the ‘wild’.<sup>137</sup>

The whole range of supra-regional movements of human-animal groups becomes archaeologically partly visible through the wide spread of exotic materials including Red

135 Gautier 2002.

136 Hendrickx 2007, 743.

137 The increase of smaller game such as hare or small gazelles among the hunted species as observed in the Neolithic faunal record in Sudan (cf. Dittrich

2011, fig. 7.15) could be seen as an outcome of the introduction of the hunting dog. Besides their controlled participation in hunting, dogs do account for the decimation of wildlife due to interference and the transmission of diseases (Prins, 2000).

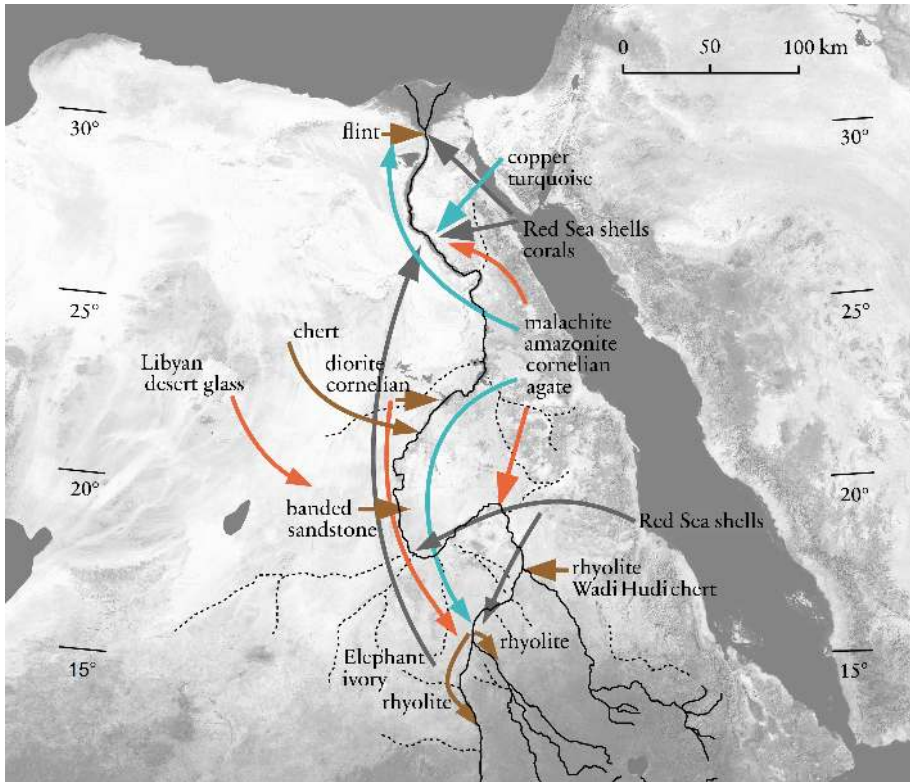


Fig. 9 Flow of exotic raw materials in the Nile valley and beyond during the 5th and 4th millennia BCE.

Sea shells, malachite, amazonite or cornelian (Fig. 9). The underlying network spanning from the Red Sea over northeast Africa is marked only by the location of recipients, as these materials are frequently found among Neolithic grave goods along the Nile valley and adjacent desert routes (cf. Fig. 10). They should not only be viewed as the sign of an emerging elite being involved in long distance exchange, but as a channel that had formerly enabled the migration of humans and domesticates.<sup>138</sup>

### 6.3 Complementary strategies

In short, the ‘inner’ sphere stands for transformed (domesticated) food while the ‘outer’ sphere imposed risks and unpredictability on the successful procurement of food while enabling different interactions with animals. The guidance of cattle herds is clearly assigned to the outer sphere, situated conceptually not far from the hunting of desert ani-

138 Krzyżaniak 1991.



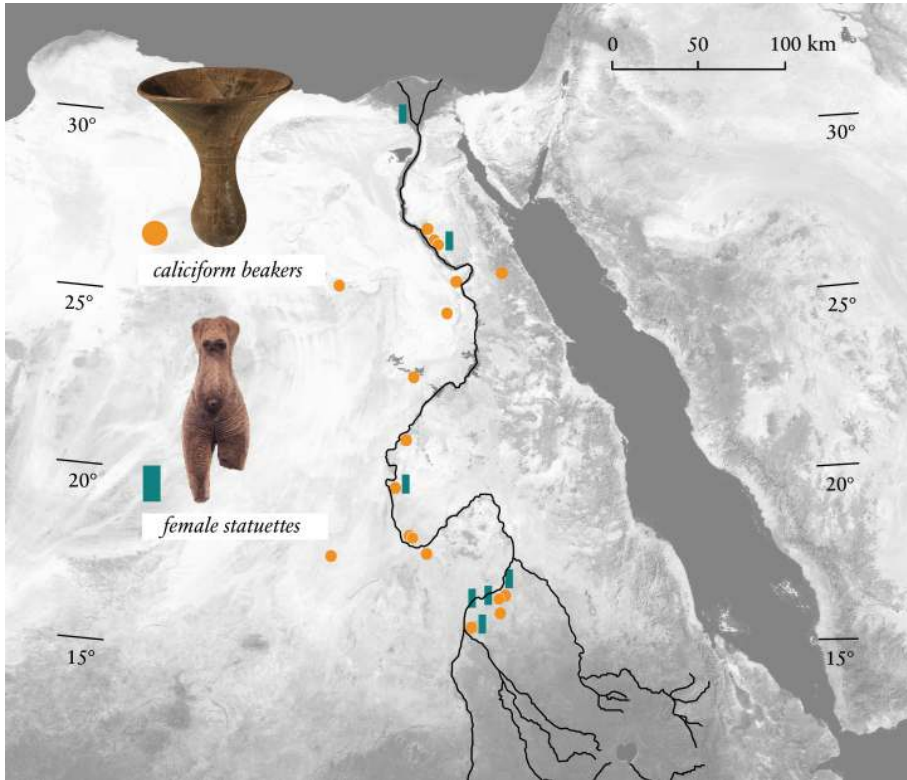


Fig. 10 Finds of caliciform beakers and female figurines, mainly from burials dated to the second half of the 5th millennium BCE.

mals. Skills required for both could have made cattle guiding attractive to certain groups of people, among them men and subadults. However, a general analogy between pastoral herding and hunting<sup>139</sup> may emphasize the prestige as maintained by only very few protagonists. To the exclusion of other gender-related activities, this view neglects not only the actual contribution to food procurement, which may be minor with respect to the processing of plants in villages, but also ignores the changed perceptions of landscapes and human-animal relations among pastoralists when compared to hunters. When used for the description of the prehistoric past, the term pastoralism might therefore not be appropriate to represent past societies on equal terms.

In the ancient Egyptian conception, both the 'inner' and the 'outer' activities appear as complementary. By contrast, the Neolithic communities in northeastern Africa

139 Gautier 2001; Wendorf and Schild 2001.

did not solely rely on food procured from and by domesticates. Instead, several subsistence strategies have been followed such as fishing, collecting mollusks, hunting, capturing, herding, fowling, farming of cereals, or gathering of wild plants and fruits.<sup>140</sup> Wilma Wetterstrom concluded that the reliance on a broad subsistence spectrum reminds us more of the diversified strategies of ‘delayed-return’ foragers than of restricted agropastoralists who are highly dependent on a few species.<sup>141</sup> This overlap of gathering, herding, hunting and cultivating forms a continuum and transcends our present pre-Neolithic vs. Neolithic or pre-pastoral vs. pastoral dichotomies. Most significantly, the cultivation and collection of wild millets continued or even intensified after the introduction of herd animals in large parts of northeastern Africa.

## 7 New combinations

Apart from previously existing knowledge that could have been advantageously amalgamated into new schemes, the incorporation of certain combinations may prove also unintended or unconscious consequences inherent in innovations. Such combinations were obviously not actively questioned but accepted as whole sets during the Neolithic and later.

### 7.1 Harvesting

As a general observation, both humans and cattle rely on grasses but when looking more closely at the level of plant species, a range of other plants has become involved. From the predynastic settlement of Hierakonpolis there is evidence that common field weeds of Eastern Mediterranean and Irano-Turanian origin must have reached Egypt along with emmer wheat and barley.<sup>142</sup> Harvesting must have occurred in a way that ensured their follow-up seeding.

Prior to the Neolithic period, no specific cutting tools such as sickles could be identified among the lithic material, because seeds of wild grasses (cf. Fig. 2) are thought to have been easily stripped off by hand or swept into a basket without cutting the whole plant.<sup>143</sup> No threshing was required, while dehusking may have been necessary.<sup>144</sup> Threshing of barley and emmer, however, would produce large quantities of remains

140 Wetterstrom 1993; El-Mahi 1988.

141 Wetterstrom 1993, 224–225. Over the annual cycle the seemingly wide range of subsistence strategies is reduced to successive seasonal patterns.

142 Boulos and Gamal el-Din Fahmy 2007, 508–509.

143 R. Haaland 1999. As such sustaining procedures would not impose pressure for selection, they might explain the delayed genetic modifications among African savanna grasses (R. Haaland 1999). Presently, such human-plant interactions seem to escape the domestication paradigm.

144 Fuller, Allaby, and Stevens 2010, 16.

that could be further used as fuel, fodder, or as temper in pottery or plaster.<sup>145</sup> Fuller, Allaby and Stevens<sup>146</sup> suggested that threshing appeared as an additional and probably unintended practice with domesticated plants and, consequently, they did not call it an ‘innovation’ but “a ‘trap’ of new work” that people fell into. It is thought to require the cutting of halms for which specific cutting instruments such as sickles were needed.<sup>147</sup>

Neolithic sickle blades hafted in wooden handles are clearly designed as cutting instruments for farmed crops since in the Fayum they were found in granary pits together with cereals.<sup>148</sup> During Pharaonic times flint sickle blades were still set into wooden handles, sometimes in the shape of cattle jawbones resembling the animals’ teeth (Fig. 11.22).<sup>149</sup> This further indicates that real cattle jawbones may also have been used.

Although pottery making does not appear to be directly connected to cereals, modifications occurred with the Neolithic. One of the simple but significant characteristics is the availability of the dung of domesticated ungulates following their introduction into the Nile valley or of chaff from threshing remains. Both materials could be used as temper in the pottery making process, resulting in a reduction in weight of pottery vessels.<sup>150</sup> At the Neolithic settlement site of Merimde Benisalâme in the Nile delta, chaff-tempered pottery occurs at an early stage in the occupation,<sup>151</sup> indicating that when introduced to this region, pottery making had become dependent on the availability of chaff or dung.

Hence, the whole set of interrelated and already inseparable practices, i.e. the sowing of plant combinations, the seasons of harvest and feasting (as discussed above), cutting, threshing, and processing of threshing remains must have been introduced together with barley and emmer to Egypt. Furthermore, such combinations did not only involve tools (cf. Fig. 11) and human labor; threshing by trampling as well as sowing – namely the trampling in of the grains – were two ancient Egyptian practices assisted by hooved domestic animals.<sup>152</sup>

## 7.2 Milking

Since milking – as attested through fat residues on pottery – dates back to 6500–5000 cal BCE in Anatolia,<sup>153</sup> it must have already been of interest when herd animals were introduced to northern Africa. As the mother-child relation formed an important ideal, cow milk was shared between humans and calves. The Nuer hold “that if the calf were

145 Murray 2000, 526.

146 Fuller, Allaby, and Stevens 2010, 6.

147 Other methods of harvesting include uprooting the whole plant, as known from flax, or reaping the cereal ears by hand (Murray 2000, 520–522).

148 Caton-Thompson and Gardner 1934, pl. 26.1, 30.1.

149 Cf. Murray 2000, fig. 21.8.

150 Dittrich 2011, 262–263.

151 Eiwanger 1992.

152 Murray 2000, 519, 524.

153 Evershed et al. 2008.

1:5

KAHUN. WOODEN TOOLS. XII DYN.

IX

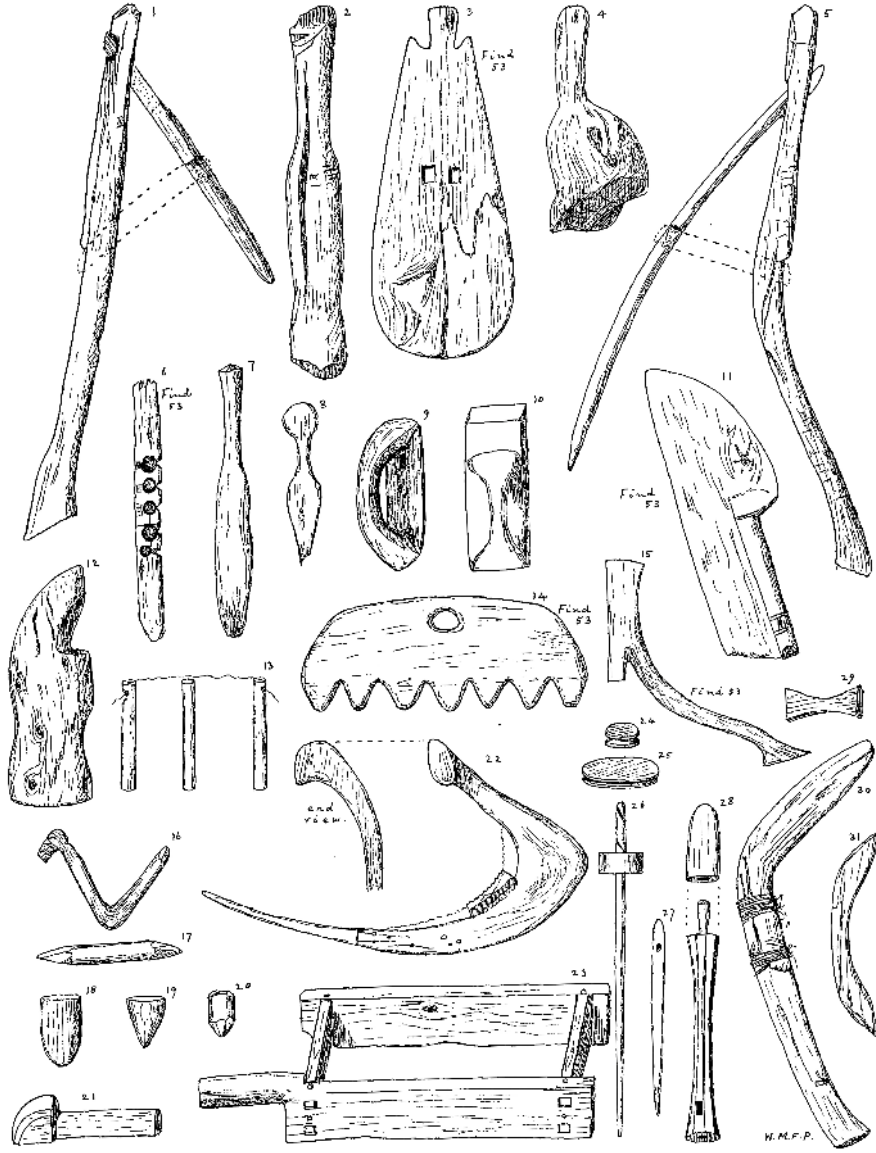


Fig. 11 Wooden tools that in 19th century imagination formed indices to ancient Egyptian agriculture including a sickle in the shape of a cattle jaw with flint insertions (22), Kahun (Egypt), early 2nd millennium BCE.

not first to suck the cow would hold up its milk.<sup>154</sup> After that, the calf might be fastened with a string to the foreleg of the cow to allow further interaction between them (cf. Fig. 5).

The transformation of milk into cheese or yoghurt demanded as indispensable requisites the use of vessels, either made of wood, gourds, animal skins, or ceramics.<sup>155</sup> Not much is known so far about the types of rennet used in this process during prehistory. The description of recent Nuer practices indicates that rennet was considered part of specific churning gourds that usually remained uncleaned and were probably exchanged in that state.<sup>156</sup>

The range of pottery types known from Neolithic grave goods<sup>157</sup> becomes more diversified with a tendency towards smaller bowls and beakers to meet the increasing demands for commensal dishes (cf. Fig. 6). In later Egyptian reliefs both types appear as milking vessels. The characteristic shape of high and slender caliciform beakers (*Tulpenbecher*) – a type occurring only at the turn of the 5th to 4th millennium BCE – points to an imitation of leather bottles. Their appearance in few but often richly furnished burials<sup>158</sup> (Fig. 10) suggests that they may have been on display on special occasions. Although an analysis the presence of milk or other fat residues does still not exist, such vessels were certainly used for liquids, either collecting or pouring them during a ceremony.

### 7.3 Body decoration

Body painting, tattooing and scarification are well-known from Saharan rock art and from female figurines found in the Sudanese Nile valley (as seen in Fig. 4). Furthermore, in Saharan rock art different patterns and colors of cattle as well as horn shapes were carefully depicted (cf. Fig. 8), thereby reminding us of the enormous number of terms that still exist for differently colored cattle, for instance among the Nuer.<sup>159</sup> As in animistic belief systems bodies are seen as mere cover for personal interiorities,<sup>160</sup> decorating and manipulating this cover would highlight classificatory features.

In this respect, the manipulation and artificial deformation of cattle horns – mainly the left one from oxen – also needs to be mentioned.<sup>161</sup> Among the Nuer, this painful

154 Evans-Pritchard 1940, 22.

155 Only recently, a study revealed fat residues from dairy products still present on Neolithic pottery finds from Libya (Dunne et al. 2012). While pre-Neolithic pottery did not contain such traces, the first pottery supposedly used for yoghurt and cheese dates back as far as the 5th millennium BCE.

156 Evans-Pritchard 1940, 24.

157 Although pottery may remain scarce or even absent among grave goods in areas such as Lower Egypt.

158 Cf. Math 2006; Dittrich 2011, 85.

159 Evans-Pritchard 1940, 41–48.

160 Descola 2011, 198.

161 Deformed horns are known since as early as the Fifth Dynasty from pharaonic depictions but were also identified among faunal remains of the contemporary Nubian Kerma Culture (Chaix 2006). Neo-

procedure of “cutting (ngat) of one of the horns of a favorite ox [...] so that it will grow against the cut in a fancy angle, generally in a curve around the muzzle (ma gut)” is compared to the initiation of human youths during which scarification plays an important role.<sup>162</sup> Both acts would mark an important life transition. Furthermore, the wearing of bracelets on the upper left arm becoming tightly fixed over time might be connected to such practices. Nuer youths and men frequently used their arms to describe the specific shape of the horns of their favorite ox.<sup>163</sup> The analogous body language of human arms and cattle horns is evident in Egyptian mythological depictions where either cow horns or human arms lift up the solar disc.<sup>164</sup> Much earlier during the predynastic period (c. 3650 BCE) the uplifted arms of red-painted female figurines may resemble the pointed horns of a cow.<sup>165</sup> Bracelets made from elephant or hippopotamus ivory, horn or shell belong to a widespread class of ornaments and cosmetic objects that occur simultaneously at the beginning of the Neolithic.<sup>166</sup> Thus, specific forms of body decoration seem to appear in combination with domestic animals.

#### 7.4 Powerful tools

In the Sahara and the Egyptian Nile valley, bifacial or surface retouch started to be applied to stone tools during the Neolithic.<sup>167</sup> While through this technology distinctive contour lines and artificial surfaces could be created, the first respective tool types comprised hunting or fighting gear (arrowheads) as well as butchering tools (knives). Both are on display not only during supposedly ‘daily’ activities but also during their ritual counterparts such as sacrifice.<sup>168</sup> Large flint knives were still in use during pharaonic times and can clearly be linked to the occasion of the butchering of domestic animals in sacrifice.<sup>169</sup> I would tend to also include surface retouched sickles here, especially when they are viewed in the light of ancient Egyptian mythology. The time of harvest was

lithic cattle horn remains have not yet been evaluated in this respect.

162 Evans-Pritchard 1953, 187.

163 Evans-Pritchard 1953, 187.

164 Hornung 1982, fig. 9. For the depiction of cattle horns as arms in a greeting gesture cf. Frankfort 1948, fig. 38–39.

165 Cf. Wengrow 2006, fig. 5.3.

166 It has even been concluded that the preoccupation with the adornment of human bodies, which surely included also those of domestic animals, would call for the term ‘embodiment’ focusing at the locus of the body instead of ‘domestication’ in the sense of focusing at the house (Wengrow 2006, 70–71).

167 Shirai 2007.

168 Judging from the often fragmentary archaeological record, however, none of these tools can be clearly associated with pre-Neolithic hunter-gatherer activities as has been stated by Riemer 2007 and Shirai 2007).

169 Erman reads the speech added to a butchering scene as *put something into the knife’s mouth*, “[i.e. the] knife is hungry” (author’s translation; Erman 1919, 10). During the predynastic period the ivory handles of such knives were often decorated with the ‘order over chaos’ theme through depicting a hunting dog behind rows of ‘wild’ animals (Hendrickx 2007: fig. 6–9). As knives are not commonly thought of as hunting gear, this again illustrates sacrifice as a transfer of the killing act to the inner sphere which required its encoding in ritual.

likened to a potentially dangerous period in the transition between the death and rebirth of Osiris who was manifest in the cereals.<sup>170</sup> Accordingly, his death was exercised through the cutting of the plants, while his rebirth can be expected from the moment the threshing of grains is finished. Thus, the surface retouched instruments were indeed charged with prestige as assumed by Noriyuki Shirai<sup>171</sup>, namely with the power of killing.

It would seem that the concept of the Holocene surface retouch of knives, arrowheads and sickles, which undoubtedly has southwest Asian origins, appeared simultaneously with domesticates in Egypt. In this area, it might have mediated the introduction of specific rituals when compared with the less specifically shaped lithic tool types such as those found in Sudan and Sub-Saharan Africa.<sup>172</sup> In the latter areas, insertions for composite tools, either cutting instruments or projectiles, were still made by flaking and backing, more similar to the microliths of the preceding Mesolithic/Epipaleolithic period.<sup>173</sup> There must have been a different concept of marking powerful instruments or actions and thus, as with the different seasonal cycles of wild grasses, a different set of rituals formed around domesticates.

## 8 Living with herds: commodification or commitment?

There is still one point left that seems to provoke controversy even with the discussion of the social side of domestication. It is a concept thought to have profoundly altered human-animal relations, and it is commonly encompassed in the term ‘property’.<sup>174</sup> Prevailing materialist notions still stress the object status of animals by relating Neolithic herd animals to ‘commodities’ to assign their passive role in property and production systems.<sup>175</sup> It has been argued that it was through becoming exchangeable commodities – resembling the Marxist notion of *Waren* and explicitly including animals – that new technologies and ideas were created and accepted.<sup>176</sup> Consequently, the term ‘domestication’ could be replaced with that of ‘commodification’ as an assumed key change with neolithization. The definition implies universality in both the things and their values. However, it is difficult to believe that one single ‘thing’ concept existed for establishing

170 Frankfort 1948, 186.

171 Shirai 2007.

172 However, tools made of a characteristic brown Egyptian chert – with the exception of sickles – can be identified as imports to southern regions as far away as the Nubian Nile valley. Many of them bear the characteristic ‘brand’ of their origin from the Egyptian plateaus since they contain a white cor-

tex that had been deliberately left visible by the manufacturers.

173 Dittrich 2011, fig. 4.32.

174 Ingold 2000; Russell 2002.

175 Orton 2010 has remained so far the only one to acknowledge the status of animals as ‘beings’ and, consequently, suggested the term ‘sentient property’.

176 Gebel 2011, 43.

relations between all the different entities given the ‘beings’ among them must have been charged with subjectivity and personality.<sup>177</sup>

We have every reason to acknowledge that the pre-modern interaction with non-human species did not comprise a naturalistic worldview, but included animistic and totemistic beliefs that consisted of subject-subject relations.<sup>178</sup> Therefore, it is the relations between subjects, both human and non-human, that condition the ‘production’ of means of subsistence. This contradicts the modern notion that the production of objects constitutes the relations between human subjects only.<sup>179</sup>

A whole set of subject relations can be applied to greater entities as known from hunter-gatherers who perceive the forest as ‘father’ and ‘mother’ nursing its dwellers in a ‘giving environment’.<sup>180</sup> When the Egyptian pharaoh himself set off to the marshes to ‘receive’ fish and birds – commonly captured in large quantities – he aimed precisely at the renewal of these very old relations. As stated by Sahlins<sup>181</sup>, to keep the worldly order he staged a ‘mythic reality’. The perception of the marshes or the forest as an “ever-providing parent” is in contrast to the construction of nature as a “reciprocating ancestor” as seems to prevail among cultivator and cultivator-hunter groups.<sup>182</sup>

An ‘ancestor nature’ may provide its yields only reciprocally in return for “appropriate conduct”.<sup>183</sup> The role of human cultivators is then to assist earth in bringing forth its crops.<sup>184</sup> However, we must be careful not to view this just within the narrow limits of the anthropomorphization of human-environmental relations. Particularly human interaction with herd animals or dogs has produced a specific body and noise language,<sup>185</sup> and there is an enormous corpus of knowledge on animal behavior and diseases. Before herd animals can act as a ‘giving’ entity, favors have to be done to them. They need to be raised, assisted to give birth, led to watering places and pastures, or protected from diseases. In religious texts, humans are advised to treat herd animals and crops as divine gifts and to ensure the blessing that lasts on them.<sup>186</sup> According to Timothy Ingold, this does not fit the modern category of ‘production’ since “bringing up children or raising livestock, just as much as the cultivation of crops, is a process in which plants, animals or people are not so much made as grown, and in which surrounding human beings play a greater or lesser part in establishing the conditions of nurture”.<sup>187</sup> Thus, the term ‘food production’, as frequently used to describe Neolithic subsistence, is clearly rooted in our present-day animal exploitation after having widely broken up the dialectical linkage of social and beneficial approaches to herd animals.

177 Cf. Descola 2011.

178 Ingold 2000, 47.

179 Descola 2011, 472.

180 Bird-David 1990, 190.

181 Sahlins 1981.

182 Bird-David 1990, 190.

183 Bird-David 1990, 190.

184 Ingold 2000, 86.

185 Fijn 2011, 39, 123.

186 Dittrich 2013b.

187 Ingold 2000, 87.



The Neolithic notion would have probably been more in line with a ‘commitment’ according to Barbara Bender<sup>188</sup> that would root human-herd animal relations in a kind of mythically handed down contract consisting of mutual favors. With this, the concept of property of animals emerges less as a set of rights in resources than as a set of obligations to beings. In the same way as the Egyptian goddess Hathor bears certain physical and beneficial cow qualities, every living cow must also bear some divine qualities. It is in this way that among contemporary African herders cattle can still be found in connection to important social spheres and transitions such as with “marriage and divorce, with burial, inheritance and food customs.”<sup>189</sup> While also acting as debt, loot, companionship, gifts, bridewealth, prey and most significantly as sacred beings or as belonging to divinities and thus being occasionally destined for sacrifice, cattle are frequently subjected to outside claims<sup>190</sup> that undermine much of the concept of herd animals as static property. Rather, similar to the kinship system, decisions about the translocation and exchange of herd animals largely appear to follow social patterns,<sup>191</sup> while the selling and buying of animals and animals’ products may often be restricted by taboos.<sup>192</sup> As the commitment to domesticates emerges as a specific path taken in the long-term it is less likely that it has been mediated through a material – in the sense of an objectified or inanimate – value system subjected to changing variables, but rather through the integration into a vivid social community that was always made of more than just humans.

## 9 Conclusions

Although it undoubtedly involved the introduction of several domesticated species and combinations from the outside, the process of neolithization in northeastern Africa emerges partly as a continuation of former practices that should not be historicized in terms such as Neolithic or Mesolithic. Pottery making, sorghum cultivation, sedentism, or the burning of bushlands are only some of those practices that became archaeologically known to us. Furthermore, domesticates were encountered through the lens of specific pre-existing worldviews. While for Egypt it would appear as if Neolithic subsistence as known in southwest Asia had just been translocated through migration, the difference is in the detail. From various cereals only two, barley and emmer wheat, were selected, along with several dependent technological combinations such as field weeds, feasting seasons, harvesting and threshing techniques that existed at that specific moment. Although all these combinations existed as available options, in Sudan

188 Bender 1978.

189 Herskovits 1926, 272.

190 Evans-Pritchard 1940, 20, 91, 165.

191 Russell 2007.

192 Cf. Rekdal 1996.

and adjacent regions domesticates were integrated differently, based on shifted seasonal rhythms. Clearly in this case environmental conditions may have set the limits, but the social properties of southwest Asian cereals were still occupied by sorghum and wild millets. African millets in fact became confirmed in their importance, culminating in the later alteration of species with biological domestication.

Yet, in both regions domestication practices induced a general refiguring of concepts of kinship, ancestry, death and afterlife as well as of worldly and ritual landscapes. The 'inner' perspective would have been formed by the spatial re-definition of landscapes into fields, gardens, kraals, or pastures and the establishment of villages and burial sites along the Nile valley. It is here that close relationships between sedentary humans and domesticates emerged, mediated through daily procedures and rituals. It is here that strong bonds to ancestors and an intensified care for the dead materialized through specific rites. Finally, domestication practices may transcend the biological dichotomy of 'wild' and 'domestic', which becomes obvious with the inclusion of 'wild' animals into burial and sacrificial rites. In the 'outer' perspective, mobility seems to be an important issue because it enables further and different modes of human-animal companionship when compared to villages.

If the focus is on practices not on categories, the process of prehistoric innovation can be seen as cyclic imitation of previous actions *sensu* Gabriel Tarde.<sup>193</sup> As imitation produces variation, a constant dialectic of reproduction and differentiation emerges with neither of them happening apart from the other.<sup>194</sup> Thus, a more cyclic view of innovations would lift neolithization out of the unique historical development in which it is presently rooted. Consequently, the neolithization of northeastern Africa cannot be qualified as a process different to elsewhere, or as the secondary, partly or subordinated recycling of outside ideas. Since it emerges as a set of practices related to a reconception of human-environmental relationships, it could be termed neolithization 'in progress', yet with quite different outcomes than in the regions in which the term is commonly claimed.

One may ask if the notion of innovations materialized in tools and techniques would still apply. Certainly it does, but they cannot be thought of independently from encompassing practices and ideas. This becomes most significant when animals are taken into consideration. Animals considered wild, semi-wild or domestic are by no means innovations in terms of 'cultural artifacts' or 'products', because with this we end up in the one-way road of recent speciesism. Also for their alleged object status as commodities or property, it is difficult to believe that domestic animals were encountered with a 'thing' concept and a material value only. This does not explain in the least the

193 Tarde 1903.

194 Deleuze 1994, 319.

wide array and aspects of human-animal relations. However, when we look at the degree of practices aimed at marking them differently from the contemporary notion of the ‘wild’ – the unfed, uncontrolled, and uncared-for in an environment ruled by both, well-disposed and disastrous forces –, humans, animals, plants, houses, tools and other objects together became more closely involved in a worldview based on their growing cooperation for the maintenance of cosmological cycles in these environments. While giving way to a pre-modern notion of animals as living companions, it becomes obvious that interest in domesticates is a commitment to other species. Most importantly, this was confirmed by the extension of kinship to other species<sup>195</sup> as well as by the emergence of animal sacrifice as ritualized killing in domestic spheres to maintain reciprocity between both divinities as creators and enlarged human-animal communities as preservers. With the supposed shift from a ‘parent’ to an ‘ancestor’ notion for relating to the ‘giving environment’,<sup>196</sup> the human sense of participation and responsibility intensified, and intimate social relations were projected to a wider circle as a novelty with neolithization.

195 Russell 2007.

196 Bird-David 1990.

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