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The Chronological Evidence for the Introduction of Domestic Stock into Southern Africa

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This essay reviews radiocarbon dates associated with earliest evidence of domestic stock in Southern Africa and reviews existing models for their introduction in light of the current evidence. Two primary models exist for the introduction of domestic stock into Southern Africa: a early Khoisan wave or an Early Iron Age source. Neither model is completely supported by the evidence. Available chronological evidence suggests that Khoisan and Iron Age herders simultaneously ushered domestic stock into the northern and eastern regions of Southern Africa. Early Iron Age groups in southern Zambia are likely external sources. Khoisan herders exclusively introduced domestic stock into Namibia and the Cape. However, in the northern and eastern regions of Southern Africa stock possession and transfers probably were complex, and involved both Khoisan and Iron Age groups.

Cet essai passe en revue des dates de radiocarbone associées à l'évidence des premières troupe de bétail en Afrique australe, et discute les different modèles de leur introduction en les comparend a l'èvidence courante. Deux modèles primaries existent pour l'introduction du bétail en l'Afrique australe: une vague tôt de Khoisan ou une première source d'âge de fer. Ni l'un ni l'autre modèle n'est complètement supporté par l'évidence. L'évidence chronologique disponible suggére que les pastoraux du Khoisan et de l'âge de fer aient simultanement conduit le betail dans les regions du nord et de l'est de l'Afrique australe. Les groupe d'âge de fer sont probablement des sources exterieures. Les pastoraux du Khoisan ont introduit le betail domestique exclusivement en Namibie et la region du Cap. Cependant, dans les regions du nord et de l'est de l'Afrique australe, la possession de bétail et leurs échanges etaient complex et concement les groupes du Khoisan ainsi que celles de l'âge de fer.

Key words: southern Africa, domestic stock, Later Stone Age, Iron Age, Khoisan, radiocarbon dates

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INTRODUCTION

When, by what routes, and from what sources did domestic animals first reach Southern Africa? Over the last 20 years many archaeologists believed that these questions had been successfully answered, but new evidence and critical review of current data indicate that answers are not firmly established. This paper assesses the radiocarbon evidence for stock keeping or herding in southern African, questions the source of domestic stock, and provides an alternative view for the initial introduction of domestic animals into southern Africa.

Khoisan Routes of Stock Introduction

Previously most archaeologists accepted that domestic stock, initially sheep, were introduced by Khoisan groups before Iron Age incursions into Southern Africa along one of two routes (Deacon, et al., 1978; Klein, 1986). Both pre-Iron Age routes begin in eastern Africa and loop west through Zimbabwe into northern Botswana (Figure 1). Two similar versions, based on rock art and oral traditions, propose a western route that arches down through Namibia into the southwestern Cape (Stow, 1905; Cooke, 1965). Then herders or at least domestic stock spread back to the east along the southern coast of South Africa. The second route, derived from linguistic evidence, begins in northern Botswana and leads south through the western Transvaal and Free State (Elphick, 1977; Ehert, 1982). It branches at the confluence of the Orange and Vaal rivers with one path projecting west along the Orange River splitting north and south on the western coast. The other branch extends south from the Orange-Vaal confluence following eastern Karoo rivers, e.g., Zeekoe River, and the western edge of the interior grasslands into the southeastern Cape from where it spread west along the southern coast and then north up the western coast. Also, it has been argued that this initial incursion of stock was by Khoisan groups before the spread of Iron Age populations into southern Africa. Numerous scholars have discussed theoretical models for the development of full fledged pastoralism in southern Africa (Kinahan, 1991; Smith and Jacobson, 1995), however this paper addresses only the initial spread of domestic animals. The initial spread may have been undertaken by groups that were not firmly dedicated to a pastoral economy.

THE CHRONOLOGY OF STOCK INTRODUCTION INTO SOUTHERN AFRICA

In the following discussion and analysis I use age estimates in uncalibrated radiocarbon years before present (B.P.). Tree-ring calibrations do not increase the resolution nor, in fact, change the general patterns observed with the uncalibrated radiocarbon ages. For simplicity I choose to use the ^{14}C time scale. Radiocarbon assays associated with evidence for domestic stock at Later Stone Age and Iron Age sites in southern Africa were obtained from Clark and Fagan 1965; Hall and Vogel 1980; Denbow 1986; Denbow and Wilmsen 1986; Parkington and Hall 1987; Morais 1988; Phillipson 1989; Bousman 1991; Huffman 1993; Sealy and Yates 1994; Smith and Jacobson 1995. A complete list of radiocarbon dates and calibrated ages can be obtained by writing the author.

Distribution of Early Khoisan Radiocarbon Ages

The temporal and spatial distributions of all radiocarbon dates associated with early Khoisan domestic stock have inexplicably failed to document the gradual spread from north to south or east to west along one or another route. Evidence of non-Bantu pastoralism is well documented in East Africa by 4500-4000 B.P. (Ambrose, 1982, 1984). In Zambia ceramics were found in a Later Stone Age context at Kavumba Loop Kopje (Figure 2), but their exact age is unknown and faunal remains were not preserved (Peters, 1985). This evidence may or may not indicate the presence of Later Stone Age herding in Zambia. Other occurrences of Later Stone Age ceramics in Zambia appear to be much more recent and do not reflect an early stage of Later Stone Age herding (Musonda, 1987).

In Southern Africa one of the earliest claims for direct evidence of Later Stone Age herding is from Bambata Cave (Figure 3) in southwestern Zimbabwe at 2140±60 B.P. (Pta-3072) where sheep/goat remains and distinctive ceramics were found together in a single layer (Walker 1983). However, Huffman (1989) rejects the association between this radiocarbon sample and the ceramics from this layer of Bambata Cave. Huffman suggests that an overlying layer with Iron Age materials, dated to 1630±150 B.P. (M-913), is the correct source of Bambata pottery. The association between the radiocarbon sample and sheep/goat remains may also be questioned on the same grounds.

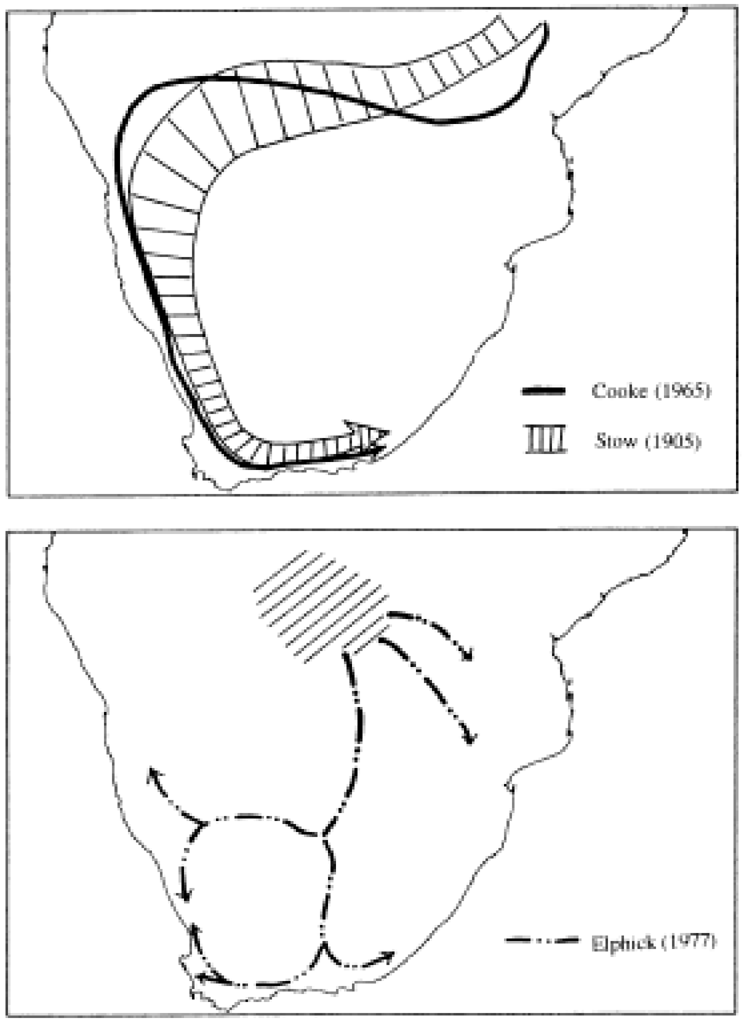

Figure 1. Hypothetical routes for the introduction of domestic stock in Southern Africa.

Another hypothesized secondary source area for domestic stock is northern Botswana, but clear cut evidence for early Later Stone Age herding is lacking at sites such as Mahopa (Yellen and Brooks, 1989) and questionably represented at Nxai Nxai (Wilmsen, 1989; Sadr 1997). In Namibia, at Geduld Rock Shelter, the earliest ^{14}C date associated with a dung deposit is 1790±80 B.P. (Pta-4419), but actual identified sheep bones occur

Table I. Radiocarbon assays associated with evidence for domestic stock at Later Stone Age sites in southern Africa (Hall and Vogel 1980; Denbow 1986; Denbow and Wilmsen 1986; Parkington and Hall 1987; Bousman 1991; Sealy and Yates 1994; Smith and Jacobson 1995; Henshilwood, 1996; Vogel, Plug, and Webley, 1997).

Site	Lab Number	Radiocarbon age (years B.P.)	Tree-Ring Calibrated Age (years B.P. ; intercepts and 2 σ range)[a]
Bambata Cave	Pta-3072	2140±[illegible]	2304 (2051) 1896
Spoegriver	OxA-3862	2105±65	2284 (1996) 1872
Spoegriver	Pta-4745	1920±40	1886 (1820) 1709
Blombos	OxA-4543	1960±50	1952 (1874) 1719
Blombos	OxA-4544	1880±55	1879 (1735) 1613
Blombos	Pta-6185	1840±50	1832 (1711) 1567
Geduld	Pta-4419	1790±80	1863 (1690, 1661, 1626) 1503
Boomplaas	UW-338	1700±55	1698 (1538) 1408
Boomplaas	UW-307	1510±75	1524 (1340) 1268
Lotshitshi	unpublished	1660±100	1721 (1523) 1303
Kasteelberg A	OxA-3864	1630±60	1605 (1505) 1338
Kasteelberg A	OxA-3865	1430±55	1380 (1293) 1182
Kasteelberg A	Pta-5937	1230±40	1224 (1069) 981
Mirabib	Pta-1535	1550±50	1520 (1387, 1364, 1359) 1298
Byneskranskop	OxA-3863	1370±60	1325 (1274) 1088
Die Kelders	OxA-3860	1325±60	1298 (1235, 1207, 1189) 1063
Die Kelders	OxA-3861	1290±60	1288 (1171) 994
Lame Sheep Shelter	Pta-6302	1350±50	1300 (1265) 1088
Blydefontein	SMU-1850	1305±31	1276 (1176) 1078
Blydefontein	SMU-1925	1255±109	1297 (1068) 916
Blinkklipkop	Pta-2840	1120±50	1067 (966) 921
Blinkklipkop	Pta-2835	1110±40	1060 (961) 924
Elands Bay Cave	GaK-4335	1120±85	1171 (966) 788
Nelson Bay Cave	OxA-873	1100±80	1161 (953) 785

[a]Tree-ring calibrations based on Calib 3.1 and use the southern Hemisphere correction (Stuiver and Reimer 1993; Vogel et al., 1993).

Table II. Radiocarbon assays associated with evidence for domestic stock at Early Iron Age sites in southern Africa (Clark and Fagan 1965; Hall and Vogel 1980; Denbow 1986; Denbow and Wilmsen 1986; Parkington and Hall 1987; Morais 1988; Phillipson 1989; Huffman 1993; Sealy and Yates 1994).

Site	Lab Number	Radiocarbon age (years B.P.)	Tree-ring calibrated age (years B.P. ; intercepts and 2 σ range)[a]
Divuyu	unpublished	1190±70	1241 (1059) 930
Divuyu	unpublished	1220±70	1271 (1067) 939
Divuyu	unpublished	1330±60	1300 (1239, 1204, 1195) 1064
Divuyu	unpublished	1370±60	1325 (1274) 1088
Divuyu	unpublished	1400±70	1356 (1285) 1160
Broederstroom	Pta-1384	1220±40	1175 (1067) 976
Broederstroom	Pta-1343	1300±40	1280 (1174) 1066
Broederstroom	Wits-870	1440±50	1381 (1296) 1254
Broederstroom	Fra-82	1450±100	1519 (1299) 1089
Broederstroom	UCLA-1791B	1490±50	1410 (1322) 1281
Broederstroom	RL-351	1520±110	1569 (1345) 1174
Broederstroom	Wits-871	1530±50	1507 (1350) 1292
Broederstroom	Pta-1375	1540±40	1501 (1354) 1301
Broederstroom	KN-2644	1570±65	1540 (1402) 1295
Broederstroom	KN-2643	1600±50	1540 (1412) 1328
Enkwazini	Pta-1977	1540±60	1524 (1354) 1290
Enkwazini	Pta-1847	1650±50	1606 (1518) 1357
Maunatlala	unpublished	1570±140	1716 (1402) 1171
Mzonjani	Pta-1989	1670±40	1606 (1527) 1408
Mabveni	SR-79	1380±110	1413 (1279) 988
Mabveni	Pta-2105	1365±30	1293 (1272) 1175
Mabveni	SR-43	1770±120	1891 (1682, 1676, 1616) 1349
Silver Leaves	Pta-2360	1700±50	1694 (1538) 1411
Silver Leaves	Pta-2459	1700±40	1687 (1538) 1418
Bambata Cave	M-913	1630±150	1826 (1505) 1194
University Campus	St-9837	1355±100	1394 (1267) 985
University Campus	St-9838	1590±75	1570 (1409) 1295
University Campus	St-9836	1775±85	1861 (1684, 1672, 1619) 1413

Zitundo	St-8913	1575±105	1688 (1404) 1271
Zitundo	St-8912	1685±105	1808 (1533) 1311
Zitundo	St-8911	1760±105	1871 (1609) 1358
Zitundo	St-8909	1775±105	1877 (1684, 1672, 1619) 1400
Matola	St-8547	1470±80	1506 (1309) 1178
Matola	St-8546	1720±110	1831 (1553) 1330
Matola	R-1327	1880±50	1875 (1735) 1619
Matola	St-8548	2025±80*	1675 (1418) 1247
Situmpa	C-829	1854±212	2310 (1717) 1293
Situmpa	Pta-2486	1990±45	1986 (1878) 1808
Situmpa	N-2314	2260±60	2346 (2302, 2253, 2157) 2050
Salumano "A"	N-3426	2330±65	2364 (2330) 2138
Benfica	Pta-212	1810±50	1816 (1697, 1646, 1636) 1542
Tchissanga East	Tx-6186	2250±60	2344 (2296, 2265, 2154) 2016
Tchissanga East	Tx-6256	2280±70	2353 (2310, 2231, 2206) 2050
Tchissanga East	Tx-6188	2300±80	2364 (2317) 2050
Tchissanga West	Tx-6184	2450±70	2730 (2358) 2322
Tchissanga West	Uga-5720	2525±85	2759 (2706, 2632, 2492) 2440
Tchissanga West	Tx-6185	2530±60	2749 (2707, 2628, 2599, 2496) 2351

[a]Tree-ring calibrations based on Calib 3.1 and use the southern Hemisphere correction (Stuiver and Reimer 1993; Vogel et al., 1993).

higher in the profile and are not associated with a radiocarbon assay (Smith and Jacobson, 1995). Smith and Jacobson (1995) also claim that one of the metal artifacts is associated with this assay. At Mirabib Rock Shelter a dung layer containing sheep hair dates to 1550±50 B.P. (Pta-1535) (Sandelowsky, 1977; Sandelowsky, et al., 1979). However, the initial claims for early domestic stock at Falls Rock and Snake Rock shelters (Kinahan, 1984, 1986; Klein 1986), also in Namibia, were not substantiated by further research (Kinahan, 1991).

In the northern Cape the earliest reliable radiocarbon assays associated with Later Stone Age herding extend only to 1110±40 (Pta-2835) and 1120±50 B.P. (Pta-2840) at Blinkklipkop (Humphreys and Thackeray, 1983). Some sites in the northern Cape with seemingly older evidence of sheep remains, such as

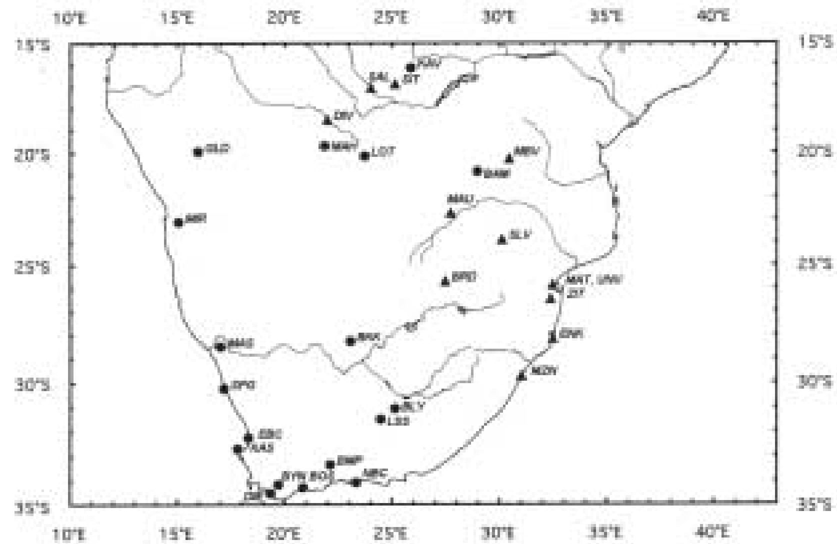

Figure 2. Map showing Later Stone Age sites with evidence of domestic stock or ceramics, and contemporary Early Iron Age sites. On map Later Stone Age sites shown at circles and Iron Age sites shown as triangles. Sites include BAM: Bambata Cave, BKK: Blinkklipkop, BLY: Blydefontein, BMP: Boomplaas, BOS: Blombos, BRD: Broederstroom, BYN: Byneskranskop, DIE: Die Kelders, DIV: Divuyu, EBC: Elands Bay Cave, ENK: Enkwazini, GLD: Geduld, KAS: Kasteelberg A, KAV: Kavumba Loop Kopje, LSS: Lame Sheep Shelter, LOT: Lotshitshi, MAH: Mahopa; MAS: /Ai tomas; MAT: Matola, MAU: Maunatlala, MBV: Mabveni, MIR: Mirabib, MZN: Mzonjani, NBC: Nelson Bay Cave, SAL: Salumano, SIT: Situmpa, SLV: Silver Leaves, SPG: Spoegriver, UNV: University Campus, and ZIT::Zitundo.

Dikbosch 1 and Little Witkrans, are poorly stratified and excavated in arbitrary spits (Humphreys and Thackeray, 1983). The associations between radiocarbon samples and sheep remains at these northern Cape sites appear to be unreliable. Evidence for early sheep at Wonderwerk (Humphreys and Thackeray, 1983) reflects mixing due to bioturbation (Sealy and Yates, 1994).

In the eastern Karoo (Elphick's route) the radiocarbon assays are associated with identified sheep bones dating to 1350±50 B.P.(Pta-6302) at Lame Sheep Shelter (Sampson and Vogel, 1995; Plug, et. al., 1994). By relaxing the criteria for herding to include Khoi ceramics, this age is supported. (Sampson, et al., 1989; Sampson and Vogel, 1995). However, the Zeekoe Valley shelters have thin homogeneous deposits with evidence of mixing (Pease, 1993; Bollong, 1994) and independent chronological evidence is needed to confirm these older determinations.

In part, a dung deposit at Blydefontein Rock Shelter, east of the Zeekoe Valley in the Kikvorsberg Range provides this independent evidence. Phosphate analysis of sediments at Blydefontein indicates that Layer CPB is primarily composed of dung (Bousman, 1991) and sheep are the most likely source. More detailed analysis of this layer is currently underway. One radiocarbon assay of 1305±31 B.P. (SMU-1850) is immediately below Layer CPB and directly associated with Khoi ceramics, and another of 1255±109 (SMU-1925) B.P. is in Layer CPB. The well-stratified Blydefontein stands in stark contrast to the poorly stratified Zeekoe Valley shelters, and in the 1985 excavation at Blydefontein rodent burrows and other bioturbated sediment were separated from intact matrix.

In the southwest Cape the oldest radiocarbon dates (circa 2000 B.P.) for domestic animals are from a series of sites near the southwestern Cape coast, such as Die Kelders, Boomplaas, Nelsons Bay Cave, Byneskranskop, Kasteelberg A, Spoegriver, /Ai tomas, and Blombos Cave (Schweitzer and Scott, 1973; Deacon, et al., 1978; Schweitzer, 1979; Schweitzer and Wilson, 1982; Klein, 1986; Inskeep, 1987; Klein and Cruz-Uribe, 1989; Webley, 1992; Henshilwood, 1996; Vogel, et al., 1997). These ^{14}C assays give the impression that herding appeared instantaneously in Zimbabwe and the southern coast, but somehow leap-frogged over the interior portions of southern Africa.

However, a review of these early radiocarbon dates, critical inspection of the context of these earliest sheep remains from specific layers in key sites (Spoegriver, Kasteelberg A, Byneskranskop, Die Kelders, Nelson Bay Cave), and independent assessment by AMS dating sheep bones eliminated many of the claims for sheep in the southwestern Cape before 1600 B.P.

(Sealy and Yates, 1994). At that time, only one direct bone assay produced a radiocarbon date significantly older than 1600 B.P. (Spoegriver 2105±65 B.P.; OxA-3862). Since the Sealy and Yates article, Henshilwood (1996) obtained new ^{14}C dates on charcoal (1840±50 B.P.; Pta-6185) and sheep bones (1960±50 B.P.; OxA-4543, and 1880±55; OxA-4544) at Blombos Cave, and Webley (Vogel, et al., 1997) has obtained additional charcoal assays associated with sheep bones from Spoegriver. The oldest charcoal determination at Spoegriver is 2400±25 (Pta-7200), although the age of the associated sheep remains is not available yet. Nevertheless, these dates support a pre-1600 B.P. age for the introduction of sheep into the southwest Cape.

Distribution of Early Iron Age Radiocarbon Ages

In the areas immediately to the north of southern Africa the earliest age estimates for the Iron Age are from Tchissanga West and Tchissanga East in Zaire (Denbow, 1990). The oldest determinations for Tchissanga West are 2525±85 B.P. (Uga-5720) and 2530±30 (Tx-6185). These are significantly earlier than the oldest radiocarbon determinations for Later Stone Age domestic stock in southern Africa (see Figure 3). However, it is unclear if domestic stock was present at Tchissanga West. A single radiocarbon assay from Benfica in northern Angola is much younger than the Tchissanga West and Tchissanga East assays, but nevertheless indicates an early presence of Iron Age groups (Denbow, 1990).

In southern Central Africa and the eastern portion of Southern Africa, numerous Early Iron Age sites, some with domestic stock, appear to be as old as the reliable Later Stone Age herding dates from southern Africa, and a few are older. Radiocarbon assays from Salumano "A" (2330±65; N-3426) and Situmpa (2260±60; N-2314) in southern Zambia represent the oldest Early Iron Age occupations in the region (Clark and Fagan, 1965; Katanekwa, 1981; Phillipson, 1989), and even at one standard deviation these overlap with the dates from Tchissanga East and Tchissanga West (see Figure 3). Domestic stock is not reported from Salumano, but both cattle and sheep/goat were recovered at the nearby, although younger, Early Iron Age site of Nanga (Plug, 1979). The determinations from Salumano and Situmpa are apparently older than the proposed early evidence for Later Stone Age domestic stock at Bambata Cave.

A small number of sites in southern Mozambique such as Matola, Zitundo and University Campus, provides consistent evidence of Iron Age groups in the area by approximately 1850-1750 B.P. (Morais, 1988; Maggs and Whitelaw, 1991; Klapwijk

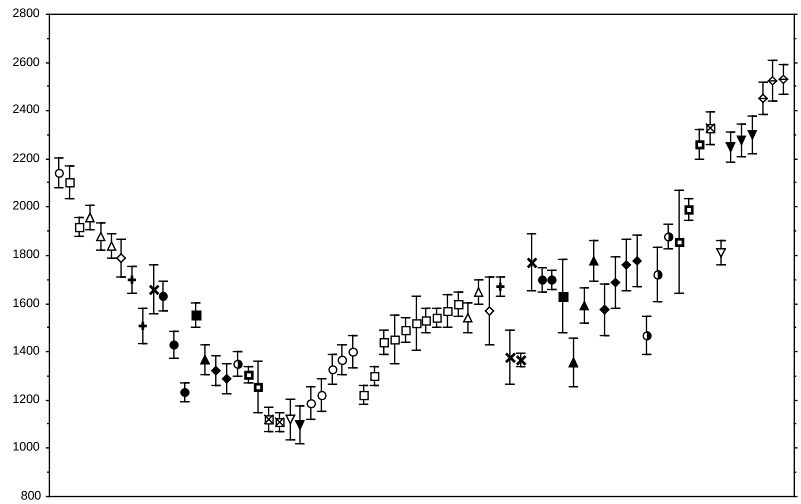

Figure 3. Chronological distribution of reliable ^{14}C dates and single standard deviation range associated with domestic stock at Khoisan and Iron Age sites. Khoisan sites listed on top row; Iron Age sites presented on bottom row. Sites plotted in order from left to right are: BAM: Bambata Cave, SPG: Spoegriver, BOS: Blombos, GLD: Geduld, BMP: Boomplaas, LOT: Lotshitshi, KAS: Kasteelberg A, MIR: Mirabib, BYN: Byneskranskop, DIE: Die Kelders, LSS: Lame Sheep Shelter, BLY: Blydefontein, BKK: Blinkklipkop, EBC: Elands Bay Cave, NBC: Nelson Bay Cave, DIV: Divuyu, BRD: Broederstroom, ENK: Enkwazini, MAU: Maunatlala, MZN: Mzonjani, MBV: Mabveni, SLV: Silver Leaves, BAM: Bambata Cave, UNV: University Campus, ZIT: Zitundo; MAT: Matola, SIT: Situmpav, SAL: Salumano, BEN: Benfica, TCE: Tchissanga East, and TCW: Tchissanga West.

and Huffman, 1996). The earliest radiocarbon determination from Matola of 2025±80 B.P. (St-8548) is on shell, and considered less reliable or accurate than assays using charcoal (Klapwijk and Huffman, 1996). However, calibration of this assay using 125±20 R-value correction for marine samples (the South African value) indicates that it actually may be contemporary (1418 cal B.P.) with charcoal assays from the same site (Stuiver and Reimer, 1993; Stuiver and Braziunas, 1993). Other Matola Tradition sites in Natal, such as Enkwazini and Mzonjani, have evidence for the presence of Iron Age peoples by approximately 1650 B.P.

Assays from Mabveni (1770±120 B.P.; SR-43) in Zimbabwe (Huffman, 1975) and Matola (1720±110 B.P.; St-8546) in Mozambique (Morais 1988) overlap at two standard deviations with the earliest radiocarbon date from Bambata Cave, and if the younger age (1630 B.P.) from Bambata Cave is the true age for domestic stock then these sites are fully coeval (see Figure 3). A number of additional Early Iron Age sites (Broederstroom, Divuyu, Enkwazini, Mzonjani, and Silver Leave) may be contemporary with some of the early dates for Later Stone Age domestic stock in the southwest Cape. However, few Early Iron Age sites in Southern Africa have preserved fauna, but at these rare sites, such as Broederstroom, Divuyu, and Mabveni, small stock is usually more common than cattle. Assays from these sites indicate that domestic stock was present among Iron Age groups at least by 1750-1650 B.P. (Huffman, 1975; Mason, 1981; Denbow and Wilmsen, 1986). The absence of domestic animal bones at Matola Tradition Iron Age sites along the coast is intriguing, but in such geological settings bone is often very poorly preserved and their absence in archaeological assemblages does not necessarily indicate domestic stock was completely unknown or unavailable to these Early Iron Age societies.

MODELS FOR THE INTRODUCTION OF DOMESTIC STOCK

Two current models account for the introduction of domestic stock into southern Africa. Smith and Jacobson (1995) suggest that a rapid wave of initial Khoisan groups brought domestic stock into Southern Africa. This initial incursion may have been almost invisible. Alternatively, Phillipson (1989) proposes that the initial introduction of domestic animals was from Early Iron Age sources in southern Zambia. The source of stock for early Iron Age herders in southern Zambia is unknown. Perhaps it was from east African herders (Ambrose, 1982, 1984) or from Early Iron Age groups in the southern Congo (Denbow, 1990).

The most credible early Khoisan model proposes that domestic stock spread from East Africa through Zambia and Botswana, into Namibia, and then south to the Cape. This model mirrors the Stow-Cooke model (see Figure 1). However, evidence is completely lacking in Zambia, Botswana or Angola for this Khoisan model (Peters, 1985; Musonda, 1987; Sadr, 1997).

An Early Iron Age model can be proposed that suggests that two major routes could have led from a southern Zambian Early Iron Age source (Figure 4). The first route away from southern Zambia extends west through southern Angola bypassing Botswana, then south through Namibia and eventually the southwest Cape. It is unclear if a highland or a coastal route was used in Namibia. This was a Khoisan route, although metal at Geduld suggests an Iron Age link.

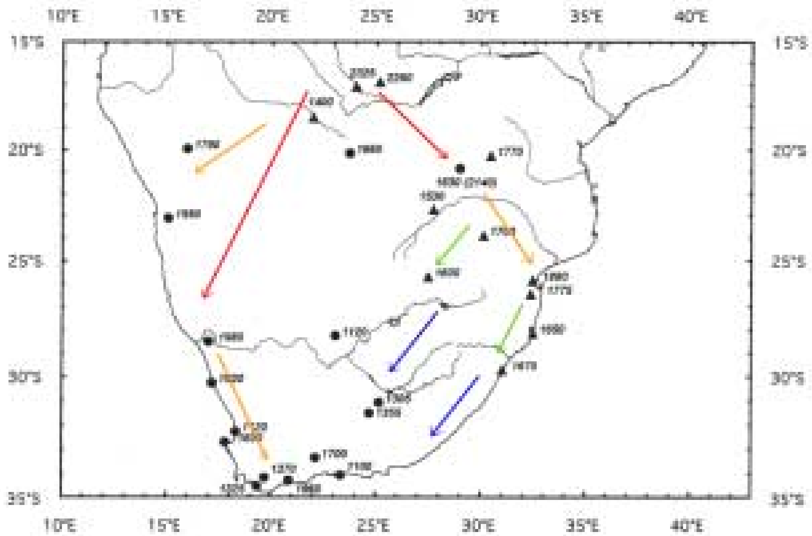

Figure 4. Model illustrating the introduction of domestic stock into southern Africa using ^{14}C years B.P.

The second and slightly later route extended south through Zimbabwe, the eastern Transvaal and Mozambique into the western Transvaal. It seems likely that both Early Iron Age and Later Stone Age groups had stock in these areas. Iron Age populations moving to the south and west through the Transvaal, and along the coast are associated with the earliest evidence of stock in the north and east portions of South Africa. Somewhere in the Highveld the earliest evidence for stock herding shifts to Khoisan groups although very little is known about Khoisan stock herding in this region (Thorp, 1996). Later Khoisan groups introduce stock into the eastern Karoo perhaps through the Caledon Valley. Khoisan groups in much of the remainder of South Africa acquired stock possibly from both western and eastern Khoisan and Iron Age sources.

DISCUSSION

This essay examines the chronological evidence for the introduction of domestic stock into Southern Africa. Much has been written concerning theoretical models of pastoralism (Hall and Smith, 1986; Kinahan, 1991; Smith, 1992; Sealy and Yates, 1994), however detailed analysis of past climatic and environmental changes (Scott, 1996; Avery, 1992; Bousman and Scott, 1994) provide the critical contextual evidence necessary to address these behavioral questions. For example, using pollen and stable carbon isotopes from hyrax dung middens in the central Namib desert, Scott (1996) argues that shifts to moist conditions allowed herders to use this region. Bousman and Scott (1994) make a similar case for the eastern Karoo, where the occurrence of Khoi ceramics and sheep bones in rock shelters appears to correspond with grassy conditions. Every source of reliable evidence should be considered and critically evaluated, because the initial introduction of domestic stock into an area, possibly by groups with high mobility and small dispersed herds, will be difficult to recognize. Thus it is critical to be able to accurately decipher the occurrence and chronostratigraphic context of herd animals.

It is clear from linguistic analysis, genetic studies of living human populations, rock art, and ethnohistorical studies that the front-line Bantu groups had a long and involved interaction with Khoisan peoples in Southern Africa (Greenberg, 1963; Jenkins, et. al. 1970; Vinnicombe, 1976; Cavalli-Sforza, et al., 1994; Jolly, 1995). I suggest that a complex pattern involving Iron Age and Khoisan populations were involved in the transmission of domestic stock into southern Africa.

The Early Iron Age inhabitants in the north central and the eastern portion of Southern Africa must be considered as a possible source of domestic stock for Khoisan herders. At this point we cannot rule-out an independent Khoisan herding phase that predates the Early Iron Age in Central Africa, but clear evidence for its existence at sites like Kavumba Loop Kopje is missing. It seems more likely that Early Iron Age groups at such sites as Situmpa or Salumano "A" in southern Zambia were a temporary staging source for Khoisan and Iron Age groups to the south (Phillipson, 1989). It is also possible that a more complex pattern existed for Khoisan stock acquisition in Southern Africa. For example it is possible that pre-Iron Age herding existed in some areas (i.e., Zimbabwe and/or Namibia), and that Early Iron Age groups were the source of stock for other Khoisan groups such as in the northern and eastern Cape. Furthermore it is possible that some Early Iron Age groups acquired stock from Khoisan herders. As more reliable data are gathered on the initial incursion of herd animals into Southern Africa more realistic models can be developed, and the assessment of current evidence will constantly generate new ideas and models.

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