

—. "Xinjiang at the turn of the century: the causes of separatism." *Central Asian Survey*, 20/3 (2001): 289-303.

McMillen, Donald H. *Chinese policy and power in Xinjiang, 1949-1977*. Boulder: Westview Press, 1979.

Millward, James A. *Violent Separatism in Xinjiang: A Critical Assessment*. Policy Studies, No. 6. Washington, DC: East-West Center Washington, 2004.

Sautman, Barry. "Is Xinjiang an internal colony?" *Inner Asia*, 2/2 (2000): 239-71.

Seymour, James D. "Xinjiang's production and construction corps, and the sinification of Eastern Turkestan." *Inner Asia*, 2/2 (2000): 171-193.

Toops, Stanley. "Recent Uyghur Leaders In Xinjiang." *Central Asian Survey*, 11/2 (1992): 77-99.

White, Lynn T., III. "The Road to Urumchi: Approved Institutions in Search of Attainable Goals during Pre-1968 Rustication from Shanghai." *China Quarterly*, 79 (1979): 481-511.

Zhao, Yueyao. "Pivot or Periphery? Xinjiang's Regional Development." *Asian Ethnicity*, 2/2 (2001): 197-224.

## About the Author

From 2003-2005 **Nathan Light** was Visting Assistant Professor in the Department of Sociology and Anthropology at the University of Toledo (Ohio, USA). His Indiana University Ph.D. dissertation, "Slippery Paths: The Performance and Canonization of Turkic Literature and Uyghur Muqam Song in Islam and Modernity," is available online at his extensive website focussing on Uyghurs and Kazakhs <<http://www.utoledo.edu/homepages/nlight/mainpage.htm>>. He is currently working on a book, tentatively titled *From Stone Inscriptions to Sufi Classicism: An Interpretive History of Eastern Turkic Literature*. He may be contacted at [nlight@UTNet.UToledo.Edu](mailto:nlight@UTNet.UToledo.Edu).

# Bactrian Camels and Bactrian-Dromedary Hybrids

**Daniel Potts<sup>1</sup>**  
*University of Sydney*

If the Silk Road may be described as "the bridge between Eastern and Western cultures," then the Bactrian camel should rightfully be considered the principal means of locomotion across that bridge. Yet there is a great deal of misinformation concerning the Bactrian camel and its relatives, particularly in the ancient Near Eastern literature. This paper explores some of the problems surrounding *Camelus bactrianus* and the little-known hybrids of the Bactrian with the Arabian dromedary (*Camelus dromedarius*).

Zoologists nowadays tends to favor the idea that *Camelus bactrianus* and *dromedarius* are descendants of two different subspecies of *Camelus ferus* (Peters and von den Driesch 1997: 652), and modern research suggests that the original habitat of the wild, two-humped camel extended from the great bend of the Yellow River in northwestern China through Mongolia to central Kazakhstan (Schaller 1998: 154; Nowak 1999: 1078; Bannikov 1976: 399) generally at elevations of 1500-2000 m. above sea-level. Although some scholars have suggested the original habitat of *C. ferus* may have extended as far west as the Caspian Sea, this is unlikely. If this were true, we should expect to find *C. ferus* faunal remains at prehistoric and early historic sites around the Caspian, but this is not the case. Moreover, to suggest that the natural distribution areas of the wild two-humped camel extended so far to the west flies in the face of everything that is known about the physiology and environ-

mental adaptations of *C. bactrianus* (see below).

The survival of *C. ferus* in Inner Asia was long suspected but no firm evidence was available until N.M. Przewalski killed and described several specimens in 1873 (*Camelus ferus* Przewalski 1878 [?]). *C. ferus* has been described as "relatively small, lithe, and slender-legged, with very narrow feet and a body that looks laterally compressed" (Schaller 1998: 152).<sup>2</sup> *C. ferus* has "low, pointed, cone-shaped humps - usually about half the size of those of the domestic camel in fair condition" (Bannikov 1976: 398). Representations of camels in the rock art of Palaeolithic caves in eastern Mongolia, such as Chojt-Zenker Cave, show what are believed to be *C. ferus* (Peters and von den Driesch 1997: 653, 661).<sup>3</sup> (Fig. 1) *C. ferus* were still hunted in the medieval era in the Khotan, Turfan, Tarim, Lob and Katak regions of Inner Asia, and in Mongolia (Roux 1959-60: 50-51), while 18th-century Chinese

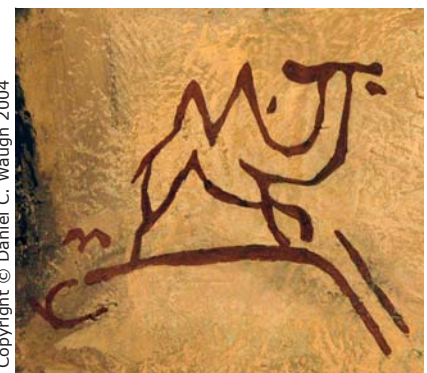


Fig. 1. Pre-historic cave image of camel. Display in National Museum of Mongolian History, Ulaan Baatar.

records attest to the presence of wild camels on the northern and western edges of the Chinese empire (Lehmann 1891: 99). Small numbers are present in the region to this day (Heptner, Nasimovic and Bannikov 1966: 85-94; Bannikov 1976; Schaller 1998: 151-162).

The wild range of *C. ferus*, in all likelihood, extended only as far west as central Kazakhstan. This is significant for a number of reasons but first and foremost because this means that the natural distribution of the wild, two-humped progenitor of what we know as the domesticated Bactrian camel would *not* have included Bactria (northern Afghanistan/southern Uzbekistan) at all. How, then, to explain the name "Bactrian" given to the domesticated two-humped camel?

The term "Bactrian" was first applied to two-humped camels by Aristotle, who wrote of "the two species of camel, Bactrian and Arabian" (*Historia Animalium* 2.1 [498b9]) and noted that "The Bactrian camel differs from the Arabian in having two humps as against the latter's one" (*Historia Animalium* 2.1 [499a15-17]). Some scholars have suggested that the name "Bactrian" became associated with the two-humped camel because camel-breeding developed in Bactria *after* initial domestication in eastern Iran and/or southern Turkmenistan (Schuegraf and Terbuyken 2001: 1225), but, as indicated above, this is not supported by the faunal evidence and it seems more likely that the Bactrian camel was introduced into Bactria proper from further east, not the south (eastern Iran/Seistan) or the west (Turkmenistan). Thus, like many commodities one can think of — Brussels sprouts or India ink — *C. bactrianus* would seem to be a misnomer. We have no idea where Aristotle got the designation "Bactrian" for the domesticated, two-humped

camel, but he seems to have been responsible for introducing a term into the literature which should never have been applied to a mammal that was almost certainly domesticated outside of the region with which it is popularly associated.

Pure-bred Bactrians stand 1.5-2.4 m high to the top of the humps and are normally 1.68-1.63 m long, with a mean weight of 460 kgs (Epstein 1969: 118). They have been known to carry loads of 220-270 kgs some 30-40 kms daily, or 80-100 kms if pulling a loaded cart (Walz 1954: 56).<sup>4</sup> Bactrian camels, which can live to be 35-40 years old, are generally put to work at the age of four and can expect to have 20-25 years of productive work (Epstein 1969: 120). They are at their best in the dry cold of the winter and spring months in Inner Asia, when their thick coats provided them with ample warmth. Able to withstand extremes of heat and cold, Bactrians prefer temperatures below 21° C but are capable of tolerating a 70°-broad range between winter lows and summer highs (Manefield and Tinson 2000: 38). Consistent heat, however, is intolerable for Bactrians and the caravans which once set out from China westwards across the Gobi desert always travelled in winter (Walz 1954: 55-56). Bactrians have been known to function at altitudes of up to 4000 m. above sea level, e.g. in the Pamirs (Gauthier-Pilters and Dagg 1981: 6). After a long journey they were typically rested for 1-2 weeks and were pastured for the summer months on the steppe, where they built up their fat reserves again in anticipation of further caravan crossings the following winter (Walz 1954: 56).

The precise chronology of the gradual westward spread of the Bactrian camel is difficult to determine, but the available evidence nonetheless suggests

we are dealing with a "sloping chronology," i.e. a progression from earlier finds in the east towards later finds in the west. The principal difficulty that arises in verifying this hypothesis is the relative paucity of well-studied and dated faunal assemblages from sites within the range of *C. ferus*. Camelid faunal remains are said to have been found (Olsen 1988: 21)<sup>5</sup> at Neolithic sites near Baotou (Inner Mongolia) and Lake Barkhol (northeast Xinjiang), and although it is not certain that these are *C. bactrianus* as opposed to *C. ferus*, they were certainly two-humped. The likelihood that these were domestic Bactrians is considered strong given that the locales would have been difficult to reach without the use of the camel (Peters and von den Driesch 1997: 661). As Lehmann wrote in 1891 (p. 141; my translation): "Without the camel neither the icy steppes of Western Siberia nor the inner Asian plains were inhabitable; they would have remained until today an insurmountable obstacle to communication and would have made a nomadic existence impossible."

By the middle of the fourth millennium BCE *C. bactrianus* was probably present in southern Turkmenistan. This being the case, and assuming a more or less continuous distribution of *C. bactrianus* from central Kazakhstan to the west, the animal was probably already present in Bactria by this time as well.<sup>6</sup> Other sites on the southern (Iranian) side of the Kopet Dagh, however, do not show evidence of *C. bactrianus* at this early date.<sup>7</sup> More Turkmenian evidence of *C. bactrianus* dates to the first half of the third millennium BCE. This includes terracotta models of wheeled carts drawn by Bactrian camels found at Altyn-depe in contexts dating to the Namazga IV period (Kohl 1992: 186) as well as faunal remains from Shor-depe,

Chong-depe and Hapuz-depe (Compagnoni and Tosi 1978: Table 3).<sup>8</sup> By the late third and early second millennium BCE the Bactrian camel is attested in the iconography of copper stamp seals and figurines thought to be from Bactria.<sup>9</sup>

Looking much further west, an unprovenanced cylinder seal in Old Syrian style in the Walters Art Gallery on which a Bactrian camel is depicted has been dated stylistically to c. 1750-1700 BCE (Gordon 1939: Pl. 7.55; Collon 2000: Fig. 8), but whether the fact that it bears a rider should be read as an indication that Bactrians were being ridden (e.g. Pohl 1950: 252) is unclear. Gordon noted that the awkwardness of the camel's form on the Walters seal indicated that the seal-cutter was unfamiliar with Bactrian camels. We cannot say whether this seal reflects the presence of Bactrian camels in the Syro-Anatolian area in the early second millennium BCE, direct contacts between Syro-Anatolia and a region in which Bactrians were present (whether native or introduced), and/or indirect contacts between such regions via intermediaries like Elam or Assyria..

A possible indication of the northwestward spread of the Bactrian camel by or during the third millennium BCE may be provided by faunal remains in today's Tatarstan and Ukraine,<sup>10</sup> and there is evidence of the southward and eastward spread of *C. bactrianus* into Pakistani Baluchistan beginning in the early second millennium BCE.<sup>11</sup> As we move ahead into the Iron Age, there is little persuasive evidence to demonstrate the presence of Bactrian camels in western Iran.<sup>12</sup>

This brings us, chronologically speaking, to the Achaemenid period when the Bactrian delegation, illustrated on the Apadana reliefs at Persepolis (Fig. 2, p. 58, below), is shown

bringing Bactrian camels to the imperial capital, and a Bactrian camel appears on one of the small gold plaques from the Oxus Treasure (Curtis and Searight 2003: Fig. 6.50). Thereafter, depictions of Bactrian camels become increasingly common, e.g. the Sarmatian gold plaques at Filippovka near the Ural River on the Eurasian steppes north of the Caspian (Aruz et al. 2000: Figs. 68, 96, 98) of fifth/fourth century BCE date. A particularly clear depiction from the late fifth century BCE occurs on a red-figured squat *lekythos* (E 695) in the British Museum (Curtis 1928: Abb. 6). Some scholars suggest that the Greeks first came into contact with Bactrian camels in Asia Minor, to which region they had been brought as a result of Achaemenid expansion (Schauenburg 1962: 99). Indeed Herodotus says that camels carried provisions for the advancing Persians, marvelling that Xerxes' camel train was attacked by lions while marching between Acanthus and Therma, even though the lions "had never seen that beast before, nor had any experience of it" (7.125). We do not know whether these were dromedaries, like those used by Cyrus against Croesus of Lydia (Herodotus 1.80).<sup>13</sup>

According to Soviet research (cited in Peters and von den Driesch 1997: 662), Bactrian camels were present and probably eaten during the Hellenistic period in Choresmia, between the Aral Sea and the Amu Darya (Oxus) River. Finally, T'ang period (seventh/eighth century) tomb figures of Bactrian camels from China, some of which stand more than half a meter tall, are shown heavily laden with cargo (Vollmer, Keall and Nagai-Berthrong 1983: 47, 66) confirming their use as pack animals at this time.

In summary, the evidence just reviewed attests to an ever-expanding zone in which *C.*

*bactrianus* is attested archaeologically outside the presumed native habitat of *C. ferus*. Although the data are not as plentiful as one would like, there is a general sense in which we move from the earliest evidence in the east (Neolithic Inner Mongolia) towards the west, with evidence beginning to appear in Turkmenistan (mid-fourth millennium BCE), Margiana and Bactria (mid-third millennium BCE) and surrounding areas to the north (Andronovo, Tripolye contexts) and south (Pirak, in Pakistani Baluchistan) as we move into the later second and early first millennium BCE. Above all, the available evidence flatly contradicts the idea that the two-humped camel was first domesticated in Bactria, and then spread eastward to China. In fact, it was precisely the opposite.

It is against the background of the archaeological evidence just reviewed that we turn now to some important epigraphic evidence attesting to the presence of *C. bactrianus* in Assyria from the end of the second through the middle of the first millennium BCE.

In a badly preserved fragment of the annals of Assur-bel-kala (1074-1057 BCE) on a tablet from Assur, the Assyrian king says that he sent merchants to acquire female Bactrian camels, *udrate* (Heimpel 1980: 331). On the Kurkh stele, Shalmaneser III (858-824 BCE) says that he brought back seven Bactrian camels as part of the booty from a campaign against Gilzanu (Mitchell 2000: 188, n. 7 with refs.), now thought to have been in the area south of Lake Urmia in northwestern Iran (Zadok 2002: 142-143). These are indeed illustrated twice, on the Black Obelisk, excavated by Layard at Nimrud, where they occur in Band 1 (Bulliet 1975: Fig. 70), and on the bronze gate decoration (Band 7) from



Balawat, ancient Imgur-Enlil, several kilometers northeast of Nimrud (Bulliet 1975: Fig. 71). Interestingly, Bactrian camels are also shown in Band 3 on the Black Obelisk as tribute from Musri (Egypt).

Roughly a century later the Iranian stele of Tiglath-Pileser III (744-727 BCE), the exact provenance of which is unfortunately unknown, itemizes a long list of rulers from whom tribute was exacted, including several in the Zagros region of northwestern Iran. There we read, "And as for Iranzu of Mannaea, Dalta of Ellipi, the city rulers of Namri, of Singibutu (and) of all the eastern mountains - horses, mules, Bactrian camels, cattle (and) sheep I imposed upon them (as tribute) to be received annually in Assyria" (Tadmor 1994: 109). (15) In his first Babylonian campaign, the army of Sennacherib (704-681 BCE) seized both Bactrian and dromedary camels in Merodach-Baladan's abandoned camp near Kish (Luckenbill 1924: 56, l. 7). Esarhaddon (680-669 BCE) campaigned against Patusharra to the east of Assyria, seizing Bactrian camels as booty.<sup>16</sup>

A debt-note from the reign of Esarhaddon, dating to 674 BC (Postgate 1976: 149, no. 38), shows us an Assyrian official named Dannaya putting two Bactrian camels at the disposal of three individuals. The text reads (Kwasman and Parpola 1991: no. 241):

Two double-humped camels belonging to Dannaya, at the disposal of Yahutu, Ilu-kenu-[usur], and Adad-aplu-[ddina]. They shall give the camels back on the first of [Marchesvan] (VIII). If they do not give them, they shall pay 6 minas of silver. Month Tishri (VII), 14<sup>th</sup> day, eponym year of Sarru-nuri. Witness Siqu-Issar. Witness Sulmu-sarri. Witness

Adad-dan. [I]f they do not pay the silver, it will increase by 2 shekels per mina.

These sources raise a number of questions. First, what of the lands from which Bactrian camels were acquired? With the possible exception of Patusharra, which may have been located as far east as the Pamirs (thus Vallat 1993), all of the regions mentioned as sources of Bactrian camels were situated in western Iran, from modern day Iranian Azerbaijan southwards to western Luristan. Yet as our review of the available faunal and other archaeological evidence of *C. bactrianus* has shown, nothing suggests that these areas were even remotely close to the most westerly regions where Bactrian camels are known in iconography and the faunal record. Indeed, judging by the faunal inventory at sites on the Iranian Plateau, Turkmenistan seems to be the most westerly of those areas where Bactrian camel use could be said to have become common. On the contrary, the presence of *C. dromedarius* remains at Chalcolithic Tepe Ghabristan (period 4, c. 3700-3000 BCE) and early Iron Age Tepe Sagzabad (late second millennium BCE) shows that the dromedary was known on the Iranian Plateau from an early date. In view of this evidence, it could be suggested that the Bactrian camels demanded of Mannaea, Ellipi, Namri, Singibutu or Gilzanu would not have been native to those districts, but themselves imported from further east. Presumably, however, the Assyrians would not have demanded Bactrian camels of these regions if they had not seen them there. The question arises, therefore, why were west Iranian communities keeping Bactrian camels, and might this have something to do with their eventual use by the Assyrians? The answer, I suggest, lies in camel hybridization.

From the seventeenth century onward, a series of European travellers, anthropologists and veterinary scientists have amassed an important record of observations of the intentional cross-breeding of Bactrian and dromedary camels (Kolpakow 1935; Menges 1935; Tapper 1985). As with most hybridization, the aim in crossing camels has been to produce a "better" camel, in this case a more robust individual, stronger as a pack animal. In general, the best first generation hybrids are the products of male Bactrians crossed with female dromedaries, although female Bactrians crossed with male dromedaries are also attested. In cultures which practised camel hybridization, the stud function of Bactrian males was paramount, while small numbers of Bactrian females were kept in order to maintain a supply of pure Bactrian males. Tapper provides evidence on this practice over a region extending from Afghanistan to Anatolia. For example, amongst the Shahsevan of Azerbaijan, he observed, "Only the wealthiest of Shahsevan keep Bactrians, both male and female, and solely for breeding purposes. Female Bactrians are rarely if ever bought or sold, though they may change hands as gifts or be demanded as part of a bride-wealth." (Tapper 1985: 59-60). In Central Asia, Kolpakow (1935: 619) found that 6-7 year old Bactrians were optimal for use as studs.

Although larger and stronger, hybrids look like dromedaries in that they have one hump, though this is normally not very symmetrical and often has a small indentation between 4 and 12 cm deep which divides the rear portion of the hump — often 2-3 times as large as the front — from the front part. Alternatively, the hump may end up looking quite flat, and has been compared to a flattened pyramid.

Hybridization produces a large animal, which can stand 2.32 m high at the hump or 2.15 m high at the shoulder (Kolpakow 1935: 618, n. 5). The legs are long, the height of the camel often greater than its length, and the weight sometimes in the 900-950 kg range, though more often approaching an average of c. 650 kg (Kolpakow 1935: 620).

All of the sources confirm the greater strength and load-bearing abilities of the hybrids and indeed references to hybrids able to carry 400-500 kgs, roughly double that of a dromedary and more than double that of an ordinary Bactrian, are not uncommon. It should not be a surprise then that the sources are also consistent in recording the substantially higher price of hybrids vs dromedaries (Tapper 1985: 57, 59).

There is a considerable body of evidence concerning subsequent generations of hybrids crossed with pure-bred or other hybrid individuals, all of which points to their bad temper, inadequate size and generally poor quality. For this reason, hybrid males were usually castrated (Tapper 1985: 61). As Tapper (1985: 63) notes, "The hybrids were not allowed to breed, as their offspring would be vicious and dangerous." Statements to the effect that the dromedary-Bactrian crosses were infertile (Gray 1972: 161) are incorrect, and ample evidence demonstrates the contrary (Peters and von den Driesch 1997: 654). Already in the early nineteenth century Eduard Friedrich Eversmann reported seeing fertile offspring in Turkestan (Hartmann 1869: 70).<sup>17</sup>

To sum up, Tapper (1985: 67) notes, "in my experience, the main advantage of the hybrid over the purer species, to both nomadic and commercial users, is less its supposed versatility than its vastly greater size, strength

and carrying capacity, its aesthetically pleasing appearance, and its correspondingly greater value, in both financial and ceremonial terms." In view of the evidence just reviewed, which extends from Anatolia and Syria in the west to Afghanistan in the east, we can safely say that small numbers of Bactrian camels have been kept, over the past 300-400 years, by groups which, in the main, raised dromedaries, for the purpose of producing hybrids of outstanding strength. Further, these hybrids were used specifically as caravan and draught animals. It can at least be suggested, therefore, that the reason why Assyrian kings seized Bactrian camels and demanded them as tribute from Iranian lands to the east of Assyria was to acquire studs and breeding females in order to practice the same sort of hybridization as just outlined, with a view to developing stronger pack animals for a variety of purposes (military, commercial, agricultural). While we have as yet no archaeological evidence of camel hybridization from the Assyrian period, we do have some from later periods in the Near East, which demonstrates that hybridization was practiced in antiquity.

In recent years, archaeozoologists have identified faunal evidence of camel hybrids at Mleiha in the United Arab Emirates, Troy in western Turkey, and Pella in Jordan. Chronologically, the earliest evidence dates to the Roman or Parthian period. In 1994, Dr. S.A. Jasim excavated an important cemetery near Mleiha, in the interior of Sharjah, United Arab Emirates, which contained the graves of at least 12 camels, most of which, judging from associated finds, date to the first two centuries CE (Jasim 1999). The faunal remains, studied by H.-P. Uerpmann, included three hybrids. Iden-

tification of these individuals as hybrids was based on the morphometric analysis of selected bones (axis, astragalus, first phalanx) as compared with dromedary and Bactrian material. In addition to this material, Uerpmann (1999: 111-113) has identified the phalanx of a probable hybrid from a Roman context at Troy. Finally, I. Köhler-Rollefson (1989: 149) has identified possible hybrids amongst the faunal remains from early Islamic Pella, in Jordan. These are presumed to have been killed by an earthquake in 747.

Additional archaeological evidence includes camel figurines from Parthian contexts at Seleucia-on-the-Tigris which, as Bulliet (1975: Fig. 80) noted nearly 30 years ago, exhibit the small indentation in the hump characteristic of the hybrid.

## Conclusion

The ethnographic and historic observations reviewed above leave one in no doubt about the benefits and geographically widespread evidence of hybridization, while the archaeological evidence from Mleiha and Troy confirms the existence of hybrids by the Roman or Parthian period. But this evidence alone does not sustain Bulliet's (1990: 731; cf. 1975: 168; Peters and von den Driesch 1997: 654) assertion that Diodorus "contains the first recorded reference to cross breeding of the dromedary and the Bactrian camel." I would suggest that the Neo-Assyrian sources cited above — the inclusion of Bactrian camels in the list of livestock demanded as tribute by Tiglath-Pileser III and Esarhaddon, the receipt of Bactrian camels from Musri and Gilzanu as shown on the Balawat gates and the Black Obelisk, the loan of Bactrian camels by Dannaya, Sennacherib's capture of Bactrian camels in Merodach-Baladan's camp, and Assur-bel-

kala's damaged reference to *udrate* — all point to the presence of Bactrian camels in Babylonia and Assyria some 500-1000 years before Diodorus observed them. Furthermore, given what we know of the distribution of *C. ferus* and *C. bactrianus*, and of the presence of *C. dromedarius* on the Iranian Plateau at an early date, I would suggest that the Iranian groups, mainly Median, from whom the Assyrians sought Bactrian camels were already engaged in camel hybridization by the time the Assyrians became conscious of the practice. Whether the Syrian cylinder seal from the eighteenth century BCE allows us to push that date even further back in time is difficult to answer, but in view of the ever-increasing body of evidence for ties between Central Asia and Elam (Amiet 1986: 146-207), and between Elam and Assyria and Mari in the early second millennium BCE (Potts 1999: 166ff), it is entirely possible that this was the period in which the peoples of the Near East first became aware of *C. bactrianus*. Whatever the case may be, it is now clear that the Bactrian camel has little beyond its name in common with the region of Bactria, and that its origins lie much further east, on the high steppes of Inner Asia. That it came to play an important role further west, already by the Assyrian period if not earlier, seems clear. The *raison d'être* behind the Assyrian interest in the Bactrian camel, and behind its later occurrence as far west as Anatolia, lies in the breeding of Bactrian-dromedary hybrids, the strength of which was unsurpassed by any other domestic animal, apart from the elephant, in the ancient Near East.

## About the Author

**Daniel Potts** was educated at Harvard (AB '75, PhD '80) and has taught at the Freie Universität Berlin (1981-1986), the Univ. of Copenhagen (1980-1981, 1986-

1991) and the Univ. of Sydney (1991- present). He is a specialist in the archaeology of Iran, Mesopotamia and the Persian Gulf, and has published widely on these areas. He is the founding editor of *Arabian Archaeology & Epigraphy*, and is a Fellow of the Australian Academy of the Humanities. He may be contacted at: dan.potts@arts.usyd.edu.au.

## References

Amiet 1986

P. Amiet. *L'âge des échanges inter-iraniens, 3500-1700 avant J.-C.* Paris, 1986. Notes et documents des Musées de France 11.

Amschler 1939

J. W. Amschler. *Tierreste der Ausgrabungen von der "grossen Königshügel" Shah Tepé, in Nord-Iran.* Stockholm, 1939. Reports from the Scientific Expedition to the North-West Provinces of China under the Leadership of Dr. Sven Hedin — The Sino-Swedish Expedition — Publication 9.

Aruz et al. 2000

J. Aruz, A. Farkas, A. Alekseev, and E. Korolkova, eds. *The Golden Deer of Eurasia.* New York and New Haven: Metropolitan Museum of Art and Yale University Press, 2000.

Badam 1984

G. L. Badam. "Holocene faunal material from India with special reference to domesticated animals." In: *Animals and archaeology: 3. Early herders and their flocks.* J. Clutton-Brock and C. Grigson, eds. British Archaeological Reports Int. Ser. 202. Oxford, 1984, pp. 339-353.

Bannikov 1976

A. G. Bannikov. "Wild camels of the Gobi." *Wildlife*, 18 (1976): 398-403.

Baur et al. 1933

P. V. C. Baur, M. I. Rostovtzeff, and A. R. Bellinger, *The Excavations at Dura-Europus...Preliminary*

*Report of Fourth Season of Work, October 1930 - March 1931.* New Haven: Yale University Press, 1933.

Boardman and Vollenweider 1978

J. Boardman and M.-L. Vollenweider. *Catalogue of the engraved gems and finger rings (Ashmolean Museum, Oxford) I. Greek and Etruscan.* Oxford: Clarendon Press, 1978.

Brentjes 1960

B. Brentjes, B. "Das Kamel im Alten Orient." *Klio*, 38 (1960): 23-52.

Bulliet 1975

R. W. Bulliet. *The Camel and the Wheel.* Cambridge: Harvard University Press, 1975.

Bulliet 1980

R. W. Bulliet. "Camel ii. In Persian history and economy." *Encyclopaedia Iranica*, 4 (1980): 730-733.

Collon 2000

D. Collon. "L'animal dans les échanges et les relations diplomatiques." In: *Les animaux et les hommes dans le monde syro-mésopotamien aux époques historiques.* Lyon: *Topoi* Supplement 2 (2000): 125-140.

Compagnoni and Tosi 1978

B. Compagnoni and M. Tosi. "The camel: Its distribution and state of domestication in the Middle East during the third millennium B.C. in light of finds from Shahr-i Sokhta." In: Meadow, R.H. and Zeder, M.A., eds. *Approaches to faunal analysis in the Middle East.* Peabody Museum Bulletin 2. Cambridge, 1978, pp. 91-103.

Curtius 1928

L. Curtius. "Sardanapal." *Jahrbuch des Deutschen Archäologischen Instituts*, 43 (1928): 281-297.

Curtis and Searight 2003

J. Curtis and A. Searight. "The gold plaques of the Oxus

- Treasure." In: *Culture through objects: Ancient Near Eastern studies in honour of P.R.S. Moorey*. T. Potts, M. Roaf and D. Stein, eds. Oxford: Griffith Institute, 2003, pp. 219-240.
- Douglas van Buren 1939  
E. Douglas van Buren. *The fauna of ancient Mesopotamia*. Rome, 1939. *Analecta Orientalia* 18.
- Duerst 1908  
J. U. Duerst. "Animal remains from the excavation at Anau and the horse of Anau in its relation to the history and to the races of domesticated horses." In: R. Pumpelly, ed. *Explorations in Turkestan, Expedition of 1904*. Washington: Carnegie Institution, 1908, pp. 341-442.
- During Caspers 1972  
E. C. L. During Caspers. "La hachette trouée de la sépulture E de Khurab, dans le Balouchistan persan, examen retrospectif." *Iranica Antiqua*, 9 (1972): 60-64.
- Epstein 1969  
H. Epstein. *Domestic animals of China*. Farnham Royal: Commonwealth Agricultural Bureaux, 1969.
- Gauthier-Pilters and Dagg 1981  
H. Gauthier-Pilters and A. I. Dagg, *The Camel: Its Evolution, Ecology, Behavior, and Relationship to Man*. Chicago and London: Univ. of Chicago Press, 1981.
- Geiger 1979  
W. Geiger. *Ostiranische Kultur im Altertum*. Aalen: Scientia, 1979 (repr. 1882 ed.).
- Ghirshman 1938  
R. Ghirshman. *Fouilles de Sialk, près de Kashan, 1933, 1934, 1937*. Paris: Geuthner, 1938.
- Gordon 1939  
C. H. Gordon. Western Asiatic seals in the Walters Art Gallery. *Iraq*, 6 (1939): 3-34.
- Gray 1972  
A. P. Gray. *Mammalian hybrids*, 2<sup>nd</sup> ed. Slough: Commonwealth Agricultural Bureaux, 1972.
- Hancar 1956  
F. Hancar. *Das Pferd in prähistorischer und früher historischer Zeit*. Vienna, 1956. *Wiener Beiträge zur Kulturgeschichte und Linguistik* 11.
- Hartmann 1869  
R. Hartmann. "Studien zur Geschichte der Haustierte I. Das Kameel." *Zeitschrift für Ethnologie*, 1 (1869): 66-79.
- Heimpel 1980  
W. Heimpel. "Kamel." *Reallexikon der Assyriologie* 5 (1980): 330-332.
- Heptner et al. 1966  
V. G. Heptner, A. A. Nasimovic, and A. G. Bannikov. *Die Säugetiere der Sowjetunion 1. Paarhufer und Unpaarhufer*. Jena: Gustav Fischer Verlag, 1966.
- van Ingen 1939  
W. van Ingen. *Figurines from Seleucia on the Tigris*. Ann Arbor and London: Univ. of Michigan and Oxford Univ. Press, 1939.
- Jettmar 1967  
K. Jettmar. *Art of the Steppes*. New York: Crown Publishers, 1967.
- Kohl 1984  
P. L. Kohl. *Central Asia: Palaeolithic Beginnings to the Iron Age*. Paris: Éditions Recherche sur les Civilisations, 1984.
- Kohl 1992  
P. L. Kohl. "Central Asia (Western Turkestan): Neolithic to the Early Iron Age." In: R. W. Ehrich, ed. *Chronologies in Old World Archaeology*, 3<sup>rd</sup> ed. Chicago and London: Univ. of Chicago Press, 1992, pp. 179-195.
- Köhler-Rollefson 1989  
I. Köhler-Rollefson. "Zoological analysis of camel skeletons." In: *Pella of the Decapolis*, Vol. 2. Wooster: College of Wooster, 1989, pp. 142-164.
- Kolpakow 1935  
V. N. Kolpakow. "Über Kamelkreuzungen." *Berliner Tierärztliche Wochenschrift*, 51 (1935): 617-622.
- Kuhrt 1999  
A. Kuhrt. "The exploitation of the camel in the Neo-Assyrian empire." In: *Studies in ancient Egypt in honour of H.S. Smith*. A. Leahy and J. Tait, eds. London: Occasional Publications of the Egypt Exploration Society, 1999, pp. 179-184.
- Kwasman and Parpola 1991  
T. Kwasman and S. Parpola. *Legal transactions of the royal court of Nineveh, Part 1. Tiglath-Pileser III through Esarhaddon*. Helsinki, 1991. State Archives of Assyria 6.
- Lamberg-Karlovsky 1969  
C. C. Lamberg-Karlovsky. "Further notes on the shaft-hole pickaxe from Khurab, Makran." *Iran*, 7 (1969): 163-168.
- Lattimore 1929  
O. Lattimore. *The Desert Road to Turkestan*. Boston: Little, Brown, 1929.
- Lehmann 1891  
O. Lehmann. "Das Kamel, seine geographische Verbreitung und die Bedingungen seines Vorkommens." *Zeitschrift für wissenschaftliche Geographie* 8 (1891): 93-141.
- Luckenbill 1924  
D. D. Luckenbill. *The Annals of Sennacherib*. Chicago, 1924. Oriental Institute Publication 2.
- Manefield and Tinson 2000  
G. W. Manefield and A. H. Tinson. *Camels: A compendium*. Sydney, 2000. T.G. Hungerford Vade Mecum Series for Domestic Animals Series C 22.



- Mashkour 2002  
M. Mashkour. "Chasse et élevage au nord du Plateau central iranien entre le Néolithique et l'Âge du Fer." *Paléorient*, 28 (2002): 27-42.
- Mashkour et al. 1999  
M. Mashkour, M. Fontugne, and C. Hatte. "Investigations on the evolution of subsistence economy in the Qazvin Plain (Iran) from the Neolithic to the Iron Age." *Antiquity*, 73 (1999): 65-76.
- Mashkour and Yaghamayi 1996  
M. Mashkour and E. Yaghamayi. "Faunal remains from Tappeh Hessar (Iran), results of the 1995 excavation." In: *Atti del XIII Congresso*, Vol. 1. Forlì: Unione Internazionale delle scienze preistoriche e protostoriche, 1996, pp. 543-551.
- Meadow 1993  
R. H. Meadow. "Continuity and change in the agriculture of the Greater Indus Valley." *International Association for the Study of the Cultures of Central Asia Information Bulletin*, 19 (1993): 63-77.
- Menges 1935  
K. Menges. "Die Wörter für 'Kamel' und einige seiner Kreuzungsformen im Türkischen." *Ungarische Jahrbücher*, 15 (1935): 517-528.
- Mitchell 2000  
T. C. Mitchell. "Camels in the Assyrian bas-reliefs." *Iraq*, 62 (2000): 187-194.
- Nikyulina 1994  
N. M. Nikyulina. *Iskusstvo Ionii i Achemenidskogo Irana*. [Art of Ionia and Achaemenid Iran.] Moscow: Iskusstvo, 1994.
- Nowak 1999  
R. M. Nowak. *Walker's mammals of the world*, 6th ed. Baltimore: Johns Hopkins Univ. Press, 1999.
- Olsen 1988  
S. J. Olsen. "The camel in ancient China and an osteology of the camel." *Proceedings of the Academy of Natural Sciences of Philadelphia*, 140 (1988): 18-58.
- Peters and von den Driesch 1997  
J. Peters and A. von den Driesch. "The two-humped camel (*Camelus bactrianus*): New light on its distribution, management and medical treatment in the past." *Journal of Zoology*, 242 (1997): 651-679.
- Pohl 1950  
A. Pohl. "Das Kamel in Mesopotamien." *Orientalia*, 19 (1950): 252.
- Postgate 1976  
J. N. Postgate. *Fifty Neo-Assyrian legal documents*. Warminster: Aris & Phillips, 1976.
- Potts 1999  
D. T. Potts. *The archaeology of Elam: Formation and transformation of an ancient Iranian state*. Cambridge: Cambridge Univ. Press, 1999.
- Roux 1959-60  
J.-P. Roux. "Le chameau en Asie centrale." *Central Asiatic Journal*, 5 (1959-1960): 35-76.
- Santoni 1979  
M. Santoni. "Les objets." In: J.-F. Jarrige and M. Santoni. *Fouilles de Pirak*, vol. 1. Paris: Boccard, 1979, pp. 167-232.
- Sarianidi 1998a  
V. Sarianidi. *Myths of ancient Bactria and Margiana on its (sic) seals and amulets*. Moscow: Pentagraphics, 1988.
- Sarianidi 1998b  
V. Sarianidi. *Margiana and Protozoroastrism*. Athens: Kapon Editions, 1988.
- Schaller 1998  
G. B. Schaller. *Wildlife of the Tibetan Steppe*. Chicago and London: University of Chicago Press, 1998.
- Schauenberg 1962  
K. Schauenberg. "Neue antike Cameliden." *Bonner Jahrbücher*, 162 (1962): 98-106.
- Schuegraf and Terbuyken 2001  
O. Schuegraf and P. Terbuyken. "Kamel." *Reallexikon für Antike und Christentum*, 19 (2001): 1224-1241.
- Shafer 1950  
E. H. Shafer. "The camel in China down to the Mongol dynasty." *Sinologica*, 2 (1950): 165-194, 263-290.
- Tadmor 1995  
H. Tadmor. *The inscriptions of Tiglath-Pileser III, king of Assyria*. Jerusalem: Israel Academy of Sciences and Humanities, 1994.
- Tapper 1985  
R. Tapper. "One hump or two? Hybrid camels and pastoral cultures." *Production pastorale et société*, 16 (1985): 55-69.
- Uerpmann 1999  
H.-P. Uerpmann. "Camel and horse skeletons from proto-historic graves at Mleiha in the Emirate of Sharjah (U.A.E.)." *Arabian Archaeology & Epigraphy* 10 (1999): 102-118.
- Vallat 1993  
F. Vallat. *Les noms géographiques des sources suso-élamites*. Wiesbaden, 1993. TAVO Beiheft B 7/11 [= Répertoire Géographique des Textes Cunéiformes 11].
- Voigt and Dyson 1992  
M. M. Voigt and R. H. Dyson, Jr. "The chronology of Iran, ca. 8000-2000 B.C." In: R. W. Ehrich, ed. *Chronologies in Old World Archaeology*, 3rd ed. Chicago and London: Univ. of Chicago Press, 1992, pp. 122-178.
- Vollmer et al. 1983  
J. E. Vollmer, E. J. Keall, and E. Nagai-Berthrong. *Silk Roads, China Ships*. Toronto: Royal Ontario Museum, 1983.



Walz 1954

R. Walz. "Neue Untersuchungen zum Domestikationsproblem der altweltlichen Cameliden." *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, 104 (1954): 45-87.

Wapnish 1984

P. Wapnish. "The dromedary and Bactrian camel in Levantine historical settings: The evidence from Tell Jemmeh." In: *Animals and archaeology: 3. Early herders and their flocks*. J. Clutton-Brock and C. Grigson, eds. British Arch. Reports Int. Ser. 202. Oxford, 1984, pp. 171-200.

Winkelmann 1999

S. Winkelmann. "Von Formen und Stilen — ein Versuch der Gliederung baktrischer Stempel- und Rollsiegel." *Hallesche Beiträge zur Orientwissenschaft*, 28 (1999): 112-209.

Zadok 2002

R. Zadok. *The ethno-linguistic character of northwestern Iran and Kurdistan in the Neo-Assyrian period*. Jaffa: Archaeological Center Publications, 2002.

Zeuner 1955

F. E. Zeuner. "The identity of the camel on the Khurab pick." *Iraq*, 17 (1955): 162-163.

## Notes

1. This is a modified version of a lecture delivered for the Inner Asia/Silkroad Study Group (IASSG) and co-sponsored by the Silkroad Foundation and the Stanford University Center for East Asian Studies, 21 October 2004. The paper was based on the author's "Camel hybridization and the role of *Camelus bactrianus* in the Ancient Near East," *Journal of the Economic and Social History of the Orient*, 47 (2004): 143-165. Readers interested in finding out more about the topic are advised to consult the 2004 article which has an extensive bibliography as well.

2. This thinness has given rise to the Mongolian name for *C. ferus*, *havtagai*, from *havtag*, meaning 'flatness' (Bannikov 1976: 398).

3. *C. ferus* are also well-represented in the rock art of the Altai, Tul-Kun, Tamurasche, Uryankhai, Turgai and Minusinsk (Suljek) regions between Inner Asia and Siberia but these are difficult to date (Heptner, Nasimovic and Bannikov 1966: 87-88, Abb. 26; Peters and Von den Driesch 1997: 653).

4. Epstein 1969: 120, puts the average load at 120-150 kgs.

5. Olsen did not give a written reference for this information, but referred to the fact that the camelid remains had been "excavated by archaeologists from the Museum of Inner Mongolia in Huhhot" (Olsen 1988: 21), which he visited in the early 1980's. Dr. Jianjun Mei (Needham Research Institute, Cambridge) kindly looked for written confirmation of this information but was unable to find any.

6. Camelid remains found at Anau-depe in period II contexts were identified as Bactrian on the basis of comparisons with modern Bactrian camels (Duerst 1908; cf. Compagnoni and Tosi 1978: 96 and Table 3), an identification that has recently been reconfirmed (Peters and von den Driesch 1997: 658).

7. Tepe Hissar has no camelid fauna at all (Mashkour and Yaghmaya 1996) while at Zagheh and Tepe Ghabristan (Qabrestan) on the Qazvin plain (west of Tehran), only *C. dromedarius* seems to have been present in the fourth millennium BCE (Mashkour, Fontugne and Hatte 1999: 71 and Table 2; Mashkour 2002: Table 2). (Dr. Marjan Mashkour [CNRS, Paris] kindly advised me that the quantity of camelid remains at these sites was very small and therefore somewhat surprising. She agreed that caution is required in interpreting this data.) The

depiction of a Bactrian camel on a sherd from period III<sub>4</sub> at Tepe Sialk (Ghirshman 1938: Pl. 79, A2) near Kashan has been interpreted as evidence of *C. bactrianus* on the Iranian Plateau in the late fourth millennium BCE (Compagnoni and Tosi 1978: Table 3).

8. Further south and east, skeletal remains of *Camel* sp. — possibly but not definitely Bactrian — have been found in strata assigned to Period II (phases 5-7) at Shahr-i Sokhta in Iranian Seistan (Compagnoni and Tosi 1978: 92), datable to c. 2700-2200 BCE (Voigt and Dyson 1992: 152), most probably to the earlier part of this period. That Seistan, noted for its aridity, is certainly well outside the natural habitat of the *C. ferus* is suggested by the absence of camel remains in earlier, period I levels at the site, and the absence of camels among the nearly 1300 zoomorphic figurines found there (Peters and von den Driesch 1997: 656).

Faunal remains of probable Bactrian camel dating to the second half of the third millennium BCE (Namazga V period) have been found at Ulug-depe, Altyn-depe and Namazga-depe in southern Turkmenistan (Peters and von den Driesch 1997: 659), where E.E. Kuzmina thinks "the use of Bactrian camels for draft purposes was a local development...peculiar to southern Central Asia" (Kohl 1984: 114), and at Shah Tepe in northeastern Iran (Compagnoni and Tosi 1978: Table 3; Amschler 1939: 77-80; but queried by Peters and von den Driesch 1997: 660).

9. Their exact provenance is not known, since they were purchased on the antiquities market (e.g. Amiet 1986: Fig. 189c; Sarianidi 1998a: 71-73, nos. 108-111; Winkelmann 1999: Abb. 4). Bactrian camel images are found on soft-stone stamp seals from controlled excavations

at Togolok 1 (burial 10), Togolok 21 (southern court) and Gonur South (room 592) in Margiana (Sarianidi 1998a: 297, nos. 1634-1635). Gonur North has also yielded a theriomorphic ceramic vessel in the shape of a Bactrian camel and a grafitto of a Bactrian camel incised on a ceramic drain pipe (Sarianidi 1998b: Figs. 14-15). Unfortunately, the camelid faunal remains from Gonur cannot be identified to the species level (Meadow 1993: 72, n. 2). A clay bulla with a cylinder seal impression from the *temenos* at Togolok 1 shows a human and a caprid between two Bactrian camels (Sarianidi 1998b: Fig. 28.1 = Winkelmann 1999: 151 and Abb. 19.3).

10. Specifically, at the Andronovo site of Alekseevskoe in Tatarstan (Hancar 1956: 235; Heptner, Nasimovic and Bannikov 1966: 89 says *C. ferus* bones have been found at Andronovo sites as well), in Karasuk culture graves at Il'inskaia gora in the southwestern Ural foothills (Hancar 1956: Tab. 48 and 255; Brentjes 1960: 27), and possibly at the Tripol'e culture site of Gorodsk north of Kiev in Ukraine (Walz 1954: 79-80, n. 3; Hancar 1956: 69, Tab. 22).

11. Camelid faunal remains from Harappan sites of late third and early second millennium BCE have been identified in all cases as dromedary, not Bactrian (e.g. Badam 1984: 349). However, a shaft-hole axe excavated by Sir Aurel Stein in a grave at Khurab, in Iranian Baluchistan, is widely thought to show a Bactrian camel in repose (Zeuner 1955; Lamberg-Karlovsky 1969; During Caspers 1972). At Pirak in Pakistani Baluchistan the period IB-III levels, dating to c. 1800-700 BCE, have yielded numerous clay figurines of Bactrian camels (Santoni 1979: 177-179, Figs. 94-95, Pls. 42B and 43) as well as faunal remains (Meadow 1993: 67, 70).

12. In Iran only *C. dromedarius* is present in the late second millennium BCE levels at Tepe Sagzabad (Mashkour 2002: Table 2). We cannot be sure that the so-called "Luristan bronze" buckle (4.7 cm. high, 8.7 cm. wide) in the former Foroughi Collection in Tehran, dated stylistically to the 8<sup>th</sup>/7<sup>th</sup> centuries BCE, on which a Bactrian camel is depicted (Jettmar 1967: Pl. 45) is in fact a true reflection of the presence of Bactrian camels in western Iran at that time. The provenance of the piece, even if it is authentic, is simply too vague to attribute any geographical significance to it.

13. Bactrian camels appear on so-called "Greco-Persian" seals of late fifth/fourth century BCE date (Nikylna 1994: nos. 207, 216, 493) and on Greek gems, probably of east Greek origin (Boardman and Vollenweider 1978: 114, no. 117). About this time, as well, the earliest references to Bactrian camels occur in late fourth century BCE Chou documents in China, becoming much more prevalent in the Han period (Shafer 1950: 174; cf. Walz 1954: 60; Epstein 1969: 117). Brentjes has surveyed the terracottas and wall paintings from the first millennium BCE and first millennium CE (Brentjes 1960: 28). At least three fragments of Bactrian camel figurines were discovered by the American excavators at Seleucia-on-the-Tigris in the 1930's (van Ingen 1939: 320, no. 1465a-c and Pl. 76.557). Further Bactrian camel figurines of Seleucid and/or Parthian date are known from Nippur (Douglas van Buren 1939: 36 with refs.).

14. Lattimore (1929: 133) observed, "the Mongols prefer a fast camel to a pony for a long journey in haste, if they cannot get relays on the road," favoring young camels which "are much the best for riding, as they are not only faster but softer-gaited" (cf. Geiger 1979 [1882]: 456, on the use of Bactrians by couriers in the Turkmenian deserts during the 19<sup>th</sup> century).

15. According to Zadok's (2002: 18ff, 42-3, 70, 77) recent study of western Iran in the Neo-Assyrian period, Mannaea was located to the south of Lake Urmia, Ellipi and Namri in western Luristan, and Singibutu around Khoy in Iranian Azerbaijan.

16. He describes his campaign against Patusharra (Vallat 1993: 214-215), 'a land that borders on the Salt Desert, in the midst of the land of the distant Medes, near Bikni, the lapis lazuli-mountain, where none of my forefathers had set foot'. Patusharra's location is uncertain, and depends on that of Mt. Bikni, a mountain which has been variously sought at Mt. Alvand in Luristan, Mt. Demevend near Tehran, or in the Pamirs (for refs. see Zadok 2002: 55).

17. The original source here is Eversmann's *Reisen von Orenburg nach Buchara...nebst einem naturhistorischen Anhang und einer Vorrede von H. Lichtenstein*, Berlin, 1823: 91.



Fig. 2. Bactrian delegate leading a Bactrian camel on the Apadana reliefs at Persepolis (photograph by the author).