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The Camel at the Crossroads of Multiple Perspectives: Introduction to an Interdisciplinary Encounter

While we were collecting the articles for this publication the international community's attention was preoccupied with the so-called Arab Spring of 2011. As is widely known, this series of protests and demonstrations started on December 18, 2010, in Tunisia with the self-immolation of a desperate vegetable vendor called Mohamed Bouazizi and rapidly spread across the Middle East and North Africa. Around the globe people could follow media coverage of those events on an almost daily basis. It is not my intention to discuss the peaceful and violent aspects of this mass movement in the Muslim world here, or the socio-technical organization of the protesters, its roots and routes or its outcomes and future perspectives. Yet a small detail in those powerful media images and narratives of the protests bore witness to the strong feelings and contrasts of the Arab Spring movement, simultaneously connecting them to this volume's main topic.

I became aware of a flamboyant creature that had appeared in a remarkable number of the myriad of Arab Spring images broadcast around the world by TV stations, newspapers, cell-phones and the internet: camels – or, to be more precise, dromedaries. See for example the powerful image (picture 1) of a camel-riding supporter of the embattled Egyptian president Hosni Mubarak, taken by the American Pulitzer-Prize-nominated photojournalist Chris Hondros.¹ Hondros had captured the dromedary and its rider in the midst of a turmoil during a clash between pro-Mubarak and anti-government protesters in February 2011 on Cairo's Tahrir Square. In this picture, camel and man seem to be pursuing the same goal. Angry men in the crowd around the camel are grabbing, pushing, shoving. People are shouting and the camel roars. The camel's saddle is a nice piece, decorated with a colorful woven blanket, on which a protester is pulling fiercely. Another protester seems to be ready to use his walking stick as a weapon. Although the scene is emotionally loaded, conveying tension and danger, the encounter between people and camel seems to be self-evident and remarkable at the same time.

What was and is so particularly affective in these kinds of pictures? Why did the media channels, reporters and private protesters time and again pick the camels out of the crowds of thousands of protesters? Why did the journalists on site, the protesters and the spectators in other parts of the world as well seem to be crazy for this particular kind of camel-in-the-protest image? Why had Mubarak's supportive riders chosen to include this particular animal in their political intervention? What is the long-standing specific attraction, ongoing for thousands of years in the Orient and the Occident alike, related to this animal? What forged this special bond between human being and camel?

This volume might help to throw some light on some of these and related questions. Allow me to give a few glimpses into the human fascination with camels from the perspective of an interested social anthropologist.

First of all, camels are archaic animals, having lived on this planet for millions of years. Camels as we know them are the only surviving branch of the *Tylopoda*, the "swollen foot" suborder of "terrestrial herbivorous even-toed ungulates", which was widespread in South

¹ Picture by Chris Hondros (Getty Images), Tahrir Square, Feb. 2, 2011, Cairo, Egypt. Hondros was killed in April 20, 2011, while on assignment in Libya.

America and Asia for about 46 million years. This would put the camel's emergence into the geological time of the Eocene. These animals are categorized as "even-toed ungulates" (*Artiodactyla*) because their weight is borne evenly between two toes – in contrast, for example, to the privileged third toe of horses. Accordingly, today's camel's taxonomic scheme reads: class: *Mammalia*, order: *Artiodactyla*, group: *Tylopoda*, family: *Camelidae* (Mukasa-Mugerwa 1981:2).

Nowadays this family of predominantly domesticated animals, the *Camelidae*, spans almost the whole planet, with living representatives in the New World (i.e. Llama, Alpaca, Guanaco, Vicuña in South America's Andes regions) and in the Old World (Bactrian or two-humped camel and wild camel in Asia; dromedary or one-humped camel in Arabia and North Africa). This book focuses on one of the two major branches, namely on Old World camelids.

A second possible argument for the continuing fascination with camels might be that this animal is particularly closely associated with one of the major steps in human history and human evolution, namely the Neolithic Revolution (Childe 1936). Based on archeological evidence it is assumed that the transition from hunter-gathering to settlement, agriculture and pastoralism through the domestication of animals and plants took place under favorable climatic conditions between 8000 to 5000 BCE (Gupta 2004). The climatic conditions that made the Neolithic Revolution possible were given in tropical and subtropical areas of southwestern and southern Asia, northern and central Africa and Central America (*ibid.*) and thus humanity's evolution at this juncture happened in several places.

In contrast to older, unilinear development models, in the 1950s anthropologists started to think about this process as a "unity in diversity" (cf. Gingrich 2010), with the alternative of a tree- or bush-model in mind instead of the older unilinear metaphor of a staircase. Simultaneously, the evolutionary process with regard to domestication is not one-directional; it should rather be thought of as a gradual adaptation of both animals and humans – i.e. as co-evolution. In marked contrast to older evolutionary assumptions, according to which pastoralism and animal husbandry was seen as the second stage in human evolution after hunter-gathering, around the turn of the 19th century anthropologist Eduard Hahn was already stressing that the development of nomadic pastoralism usually presupposes the cultivation of food plants by sedentary cultures (Gingrich 2010). As a particularly significant domestic animal the camel refers us to this kind of a long-standing human intervention in nature through taming and selective breeding. Compared to the domestication of dogs some 10,000 years ago and to the goat 8000–9000 years ago, however, at 5000–6000 years for the Bactrian and 3000–4000 years for the dromedary, the domestication of camels is relatively young, as Pamela Burger will show in this volume.

Apart from evolutionary developments, a third argument for our continuing fascination with camels might lie in the fact that this animal is intrinsically linked to mobility. The camel is the prerequisite for far-reaching transport and long-distance trading. Since its domestication the camel has developed into the most significant means of transport in arid and semi-arid areas of the Old World, making the wheel almost superfluous in some of these regions (Bulliet 1990).² In the slow and ruminant rhythms of their characteristic pacing gait, camels have been carrying people's loads for centuries – loads that range from frankincense about 5000 years ago to satellite dishes in the 21st century (see picture 26 in Chuluunbaatar's contribution to this volume), as well as to the Arab Spring intervention discussed above. Together with cats, giraffes and opossums, with whom they share this unique kind of animal locomotion, camels stand out from the majority of mammals by moving the limbs of one side of the body simultaneously (pacing gait).

² Although the camel had marginalized the wheel as a means of transportation, both camel and wheel were and sometimes still are nevertheless essential as a socio-technical and animal unit for rotating systems like irrigation, milling (see Bulliet 216–217; Gingrich this volume), and for the wells, one might add, which are often operated by a simple wheel, a pull rope and a draft animal (Gingrich/Heiss 1986:31–39, 182).

By conquering spatial distance, camels and ships provided the basis for long-distance trade and thus for the resulting wealth of cultures, in particular in Europe and China. Landscapes have developed along with the patterns of movement of this animal and its related human/animal interactions: the long-distance trading-scapes, domesticated landscapes of pastoralists and breeders, wild-scapes as the refuges of the remaining last wild camels, tourist-scapes, laboratory-scapes and so on, as many articles in this volume will show.

A fourth moment that might explain the continuing fascination camels exercise on human beings is perhaps the dialectical human-nature relationship. The cognitive distinction of human cultures between “wild” and “domestic” spheres refers to the level of human control over nature. The degree of social distance between humans and particular animals defines for example whether certain animals’ meat is categorized as edible or not, whether terms for animals are considered to be useful for verbal abuse or not (Leach 1976, 1964), or whether we hug a species as stuffed animal or not (Bendix 2002:216–217). One consequence of the dialectical human/camel relationship that becomes clear in this volume is that hybridization, the cross- or interbreeding of different species, has a domestic and thus desired and positive dimension, but also a wild and thus negative dimension. Different camel species have been interbred by humans for centuries with the goal of “improving” the animal’s characteristics and qualities (see e.g. Bulliet 1990:142–146, 168–170, Potts 2005). Robustness, the ability to carry heavy loads, and a benevolent character are favored attributes of Bactrian camels, while good milk-giving qualities, its speed and elegant, long-legged body structure are favored in dromedaries. When it is within human control, inter-breeding is a human skill, inherent in the above-mentioned process of the Neolithic Revolution, and hybrids are desired outcomes (see Faye and Konuspayeva, and Knospe et al. in this volume). Outside of human control, however, inter-breeding has a negative, endangering dimension. In several articles in this book, second generation hybrids appear as camels with a “bad” character (see the article by Faye and Konuspayeva) or as a threat to the last remaining wild camels in China and Mongolia (see the contributions by Yadamsuren, Dulamtseren and Reading, Yuan Lei, Hare, Yuan Guoying and Cheng Yun and Silbermayer and Burger).

Finally, camels not only provide material for human consumption (meat, milk, wool), they also contribute energy, mostly in the form of power and work. “Animals may therefore be ‘domestic’ in the literal sense of becoming part-members of human households and integral to their labor force” (Ingold 1996:60) – and to their protesting force, as we have seen. Beyond providing work and material for human consumption camels also have symbolic significance (as the articles by Gingrich, Fischer, Lang and Chuluunbaatar show).

There may be a hundred further arguments for the special bond between human beings and camels, and for our continuing fascination with this animal. The outstanding significance of camels for humans’ past and present is even carried over into the future: for instance, camel milk is acquiring increasing prominence for sufferers from cow’s milk allergy; in times of climatic change, when pastures are declining, camels are increasingly valued as environmentally sensitive animals, for their grazing habits and their comparably soft hooves; and antibodies from the camel’s immune system are currently being investigated as promising agents in cancer treatment.

ENVIRONMENTS HUMANS SHARE WITH CAMELS: RESEARCH TRADITIONS AND INTERDISCIPLINARITY

The histories of camels and humans have long been intrinsically linked in environments where humans would often not even have been able to survive without this unique and remarkable creature. Now, when aridity is affecting ever more areas as a result of climatic change, camels will also become increasingly important. Since its foundation more than 160 years ago there has been a long-standing research record at the Austrian Academy of Sciences into topics concerning these particularly challenging environments that human share with camels.

The genealogy of scholars who made distinctive academic contributions on these arid areas begins as early as Joseph Freiherr von Hammer-Purgstall, who was the first president of what in his days was called the “Imperial Austrian Academy of Sciences.” Hammer-Purgstall was a pioneer of Middle Eastern languages, or what formerly was called an “orientalist”. His works and translations not only inspired poetry and philosophy in German, but also the Habsburg court’s diplomatic services in the Middle East and Central Asia. As early as the middle of the 19th century, Hammer-Purgstall therefore established a research tradition at the academy that closely examined cultures living in interconnection with camels. This specifically Middle Eastern research tradition continued in the last quarter of the 19th century, with the experts in Arab and Semitic languages David Heinrich Müller and Eduard Glaser until the turn of the 19th and 20th centuries.³ Subsequently, this legacy was continued after the Second World War by the academy’s late Full Member Walter Dostal and his scholars.⁴

In 1854 Hammer-Purgstall published a book entitled *The Camel* (Das Kamel). The insights in that work were exclusively based on Arabic sources. Hammer-Purgstall understood that, because of the lack of language skills in Europe, these rich Arabic literary and scientific sources on camel breeding, camel treatment and camel trading were not accessible to the average European natural scientists, historians or commercial travelers. For these reasons, Hammer-Purgstall did what had never been done before – in fact, he did something similar to what this interdisciplinary book on the significance of Old World camels is aiming at.

As early as 1854 Hammer-Purgstall envisioned the potential of a fruitful dialog between the natural sciences and the humanities. In his compilation of camel-related terms and classic text passages he tried to overcome the lack of communication between different fields of academic research – that is, between the two major academic branches that the physicist and novelist C. P. Snow (2001) so aptly addressed one hundred years later in his famous lecture as two different “cultures” in science and the humanities. In his camel-centered invitation to bridge this divide between the academic branches the academy’s first president Hammer-Purgstall envisioned that

this [book] will set up an unprecedented example how the humanities and philology may promote natural sciences and biology: by compiling those words that belong to the same subject area, these clusters of terms will then reveal hitherto unknown facts, qualities and modalities of the animal under investigation. The same might work with horses, or with palm trees, similar to the more detailed Arab vocabulary on the camel.⁵

With a research focus on Asia, the Institute for Social Anthropology (Center for Asian Studies and Social Anthropology, Austrian Academy of Sciences) continues this established and longstanding concern with areas humans share with camels. Moreover, through the cooperation with the University of Veterinary Medicine, Vienna for this publication there is also a continuity of the subject-focused interdisciplinary dialog that the academy’s president, Hammer-Purgstall, pioneered in the mid 19th century. This volume developed out of a conference that discussed the camel in its biological and socio-cultural dimensions from various disciplinary angles. Both

³ For insights into the work of Joseph von Hammer-Purgstall see Wentker (2008), of David Heinrich Müller see Sturm (in preparation), and of Eduard Glaser see Dostal (1993, 1990).

⁴ There is a broad field of contemporary research at the Austrian Academy of Sciences in areas where humans interact with camels. Some of the most relevant AAS Institutions in this regard are the Institute for Iranian Studies (IfI) and the Institute for Social Anthropology (ISA) where scholars such as Andre Gingrich and Johann Heiss (1986) follow in the footsteps of Walter Dostal (2006) and his predecessors.

⁵ In his introductory words Hammer-Purgstall states that his publication “sich einzig und allein an die arabischen Quellen halten und ein bisher noch nicht dagewesenes Beispiel aufstellen, wie durch die Wörterkunde und Philologie die Naturgeschichte und Physiologie gefördert werden können: durch die blosse Zusammenstellung der in dasselbe Stofffach gehörigen Wörter gehen aus den Gruppen derselben bisher unbekannte Thatsachen der Eigenschaften und Gewohnheiten des besprochenen Thieres hervor. Beim Pferde und der Palme würde sich dasselbe bewähren, indem der Araber dafür auch eine grosse Anzahl von Wörtern hat, deren Zahl sich aber mit der in dem arabischen Sprachschätze über das Kamel vorhandenen keineswegs vergleichen kann” (Hammer-Purgstall 1854:1; translation by the author).

the camel conference and this resulting publication thereby followed the excellent model of a comparable endeavor that was focused on the economy of the horse in Asia and carried out by the Institute for Iranian Studies.⁶

The 2010 conference “Camels in Asia and North Africa” addressed scientific and academic camel-related research in a cross-cutting overview manner.⁷ It was organized by the two editors of this book, i.e. by a veterinarian from the University of Veterinary Medicine, Vienna and myself, a social anthropologist with the Austrian Academy of Sciences. We had the rare privilege of discussing the significance of the camel’s past and present with about 100 researchers and guests from five different continents, and from a wide range of different disciplines in the natural and life sciences as well as in the humanities and social sciences. It was an intense camel-focused dialog carried out by representatives of such diverse fields as animal science, Arabian studies, archeology and archeozoology, biology, dairy and animal production, ecology, ethnobotany, ethnomusicology, genetics, history, literature, public health, sinology, social and cultural anthropology, veterinary medicine, wildlife management, and zoology, as well as by representatives of camel-protecting NGOs, by camel owners, camel breeders, and people otherwise interested in camels.⁸

By consequence, the insights, considerations and research horizons assembled in this publication might interest scholars from all these scientific and academic fields. This book might also be of value for colleagues working in the recently emerged field of “human-animal studies” or “animal studies”, or “anthrozoology”.⁹ With roots in a wide range of scientific and academic disciplines (e.g. in history; Bulliet 2005) and with an interdisciplinary orientation from the outset this field seeks to overcome anthropocentrism in its re-reflection of human-animal relationships – including humans’ attitudes toward, thinking about and conceptualizing animals as well as treating animals. By focusing on Old World Camels this book assembles human-animal interactions in a wide range of human practices, including science, industry, tourism, medicine, consumption, cosmology and art, as well as the practice of handling wild and domesticated camels ranging from breeding, herding, trading, managing to the conservation of camel species.

THE CAMEL AS A BOUNDARY OBJECT

What we were aiming for with the 2010 conference might be described in a metaphorical way as sending the camel through an interdisciplinary eye of a needle. This pun refers to the widely known saying “it is easier for a camel to go through the eye of a needle, than for a rich man to enter into the kingdom of God”, a phrase spoken by Jesus to his disciples according to Matthew 19, 24. The “eye of a needle” might refer to a very small gate in the city wall of Jerusalem. Since the gate was so small, only humans but no camel could pass. In the vernacular of historic Jerusalem this gate was called the “eye of a needle” (Röhrich 1992:1070). Regardless of these historic roots, some scholars think the proverb may, however, be based on a translation error by

⁶ In October 2006 the Institute for Iranian Studies (Center for Asian Studies and Social Anthropology, Austrian Academy of Sciences) together with the Department for Asian Studies at the Ludwig-Maximilians-Universität, Munich, organized a conference on “The International Horse Economy in Iran, India and China” and published the insights gained from it (Fragner et al. 2009).

⁷ “Camels in Asia and North Africa. Interdisciplinary workshop on their significance in past and present”, took place from 5th to 7th October 2010 at the Austrian Academy of Sciences’ main building, Dr. Ignaz-Seipel-Platz 2, Vienna, Austria. I had the great pleasure to conceptualize, organize and chair this conference together with Pamela Burger. For the workshop program see http://www.vetmeduni.ac.at/fileadmin/v/z/english/camel_workshop_program.pdf, consulted 10 Oct., 2011.

⁸ The 2010 workshop on the significance of Old World camels was not only inter- and multidisciplinary, it was even transdisciplinary. With the attendance of interested lay persons and representatives of private camel farms and riding schools in Sweden and Austria, the workshop reached beyond the academic ivory tower.

⁹ This new field of inter-disciplinary inquiry developed over the last few decades with respective specialist journals such as *Anthrozoos: A Multidisciplinary Journal of the Interactions of People and Animals*, *Humanimalia: A Journal of Human–Animal Interface Studies*, or *Society & Animals: Journal of Human–Animal Studies*.

which the Greek *κάμηλον* (camel) was confused with *κάμιλιον* (rope). Accordingly, the metaphorical comparison for an extremely difficult, almost impossible endeavor should read “it is easier to push a rope through the eye of a needle than . . .” (ibid., see also Bendix 2002:210). Be that as it may, tiny city gate or translation error, with this saying the camel resounds in common parlance – thus even being represented in the discourses and the vernacular of people such as Austrians, who do not share their environment with camels.

Metaphorically stating that we were sending the camel through an interdisciplinary eye of a needle in the 2010 conference and this publication of the conference proceedings means we are here trying something really challenging. We tried to push the camel through an interdisciplinary eye of a needle by assembling insights on this creature from the natural as well as from the social sciences. The camel was scratching and kicking against our efforts to shove it through. On each of our successive efforts, it looked a little different – bent and almost a little deformed by the respective disciplinary perspective. In our scrutiny from various and highly heterogeneous disciplinary angles the camel thus became a “boundary object” – as the conference’s keynote speaker Ulrike Felt from the Department of Social Studies of Science at the University of Vienna pointed out in her analysis of the dynamics of interdisciplinarity. Putting the camel center stage through a multidisciplinary approach is not an easy task. Since the 19th century, science has been increasingly preoccupied with creating and upholding disciplinary boundaries, resulting in the development of distinct “cultures” of how we know, what we know and how we communicate what we know. Every researcher and author in this volume belongs to a disciplinary knowledge community; a “thought collective” with a rather specific “thought-style” (Fleck 1979). By our efforts at knowledge exchange across disciplinary boundaries, this assemblage of contributions from multiple thought-styles in one volume reveals the camel as a boundary object, i.e. as

an analytic concept of those scientific objects which both inhabit several intersecting social worlds [. . .] and satisfy the informal requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local [or disciplinary] needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. (Star/Griesemer 1989:393).

Such boundary objects are central in the development of interdisciplinary thinking.¹⁰ As the focal point of a shared interest, camels as boundary objects enable us to link highly heterogeneous researchers since they make it possible for us to collaborate despite a plurality of research interests and methodological approaches (Wenger 1998). They allow us to make connections and share our insights – and, at the same time, they allow us to some extent to hold on to our respective perspectives, theories and methods. This volume comprises highly heterogeneous methods of generating data, including searching archives that reveal scholarly thinking on camels hundreds of years ago, shooting anesthetic darts from jeeps racing through impassable deserts, begging camel herders for blood and hair samples for DNA analysis or listening carefully to their folk songs, cutting up plastic containers to see if and how what is inside might affect the quality of camel milk, staring at the stars in the sky with farmers or wandering for months with camel-herding nomads and sharing their daily life. Yet assembling and unifying contributions from highly diverse scientific and academic thought collectives is a challenging task that requires all contributors to withdraw to some extent from their own disciplinary writing standards. Authorship for example is extremely unevenly organized between natural sciences and the hu-

¹⁰ Moreover, the camel itself is “good to think with” interdisciplinarity, argued European ethnologist Regina Bendix in her inauguration speech: With its extremely long limbs and its peculiar hump or humps, the enormous molars, and its heavy eyelashes the camel reminds us more of a combination of not entirely harmonizing images than of a singular entity – it is, in fact, as such a paradigm for a long-practiced interdisciplinarity (Bendix 2002:205–206).

manities. We thus meet standards of multiple authorship¹¹ alongside those of single authorship in this book. Giving first names is frowned upon in the natural sciences while it is courteous within the humanities. This list of obstacles that have to be overcome in working on camel matters across the borders of the major scientific cultures can be extended endlessly. To complicate things further, there are also the diverse national scientific and academic traditions and cultural differences engraved in this volume, for example according to the presence or absence of first names and surnames. And above all, the camel truly is a boundary object in many more respects. There are, for example, no scientifically defined camel breeds. The fact that almost every country with local traditions of camel breeding categorizes its own breeds, often by using local terminology, gives geneticists headaches when trying to compare camel populations around the world.

THE STRUCTURE AND ORGANIZATION OF THIS BOOK

As early as the 4th century BCE, Aristotle had distinguished two species of camel in his *Historia Animalium* and noted that “the Bactrian camel differs from the Arabian; the one has two humps, the other but one” (Bohn 2005:B.II.27). In 2010, when we started organizing our camel conference, there were still two different Old World camel species known to the scientific world. In the meantime, however, it has become clear that the two variations of the Bactrian camel are not as closely related as was previously assumed, as Pamela Burger will show in her contribution to this volume. Hence there are, in fact, three different species (*genera*) in the Old World camel habitats (i.e. the distribution area of the Old World *Camelini* tribe of the family *Camelidae*):

- a) the recently identified new subspecies of the wild camel (*Camelus ferus*), which has two humps.
- b) the two-humped Bactrian camel (*Camelus bactrianus*), and
- c) the one-humped dromedary or Arabian camel (*Camelus dromedarius*),

The organization of this book essentially follows the kinship structure of the *Camelini*, and in addition it reflects the varying degrees of scientific and academic knowledge about the different members of this camel family tree.

I – OLD WORLD CAMELS (*TRIBE CAMELINI*)

In the first part of the book we discuss the relationship between the different Old World camels, their common history and their domestication process.

Pamela Burger combines insights of veterinary medicine with molecular and population genetics in order to throw light on the domestication process of Old World camel. The understanding of this process is still limited and as such it is a missing link in the history of our livestock species. Based on genetic and archeozoological evidence, Burger argues that, contrary to the widespread assumption of a single origin of the Old World Camelids, there are separate origins of the dromedary and the Bactrian camels. Identifying centers of domestication and thus wild ancestral and closely related camel populations can help to save the biodiversity of camels, a particularly important type of livestock in Asia and North Africa.

¹¹ As a social researcher, in the course of compiling this volume I learned that a first-mentioned author of articles in the natural sciences had carried the main workload in gathering data or running analysis in the laboratory, while the last mentioned is the principal investigator who had designed the study and had been responsible for acquiring the funding for the overall investigation. The positions between the first and the last author belong to people who had substantially contributed to the study, e.g. by providing a particular sequence of the analyzing process. This is in sharp contrast to the humanities, where more than three authors are highly uncommon and – if not listed alphabetically – the last mentioned has contributed the least to the publication.

Bernard Faye and *Gaukhar Konuspayeva* scrutinize Kazakhstan as one of the few countries where the distribution areas of the two domestic Old World Camelids, i.e. the Bactrian camel and the dromedary, overlap. Since it was an important section of the Silk Road, with a high demand for stronger pack animals, it is no wonder that we encounter the human skill of cross-breeding in this country.

The first part of the book concludes with the critical empirical investigation of an almost mythical assumption on camels' development history. With reference to a frequently cited Italian source from 1879, it was assumed that the wild camel (*Camelus ferus*) was the common ancestor of both the Bactrian and the Arabian camel. By providing contrary anatomical evidence, *Clemens Knospe et al.* refute the persistent assumption according to which there is a two-humped phase in the embryonic development of one-humped camels that relates to its two-humped ancestry.

II – WILD CAMELS (*CAMELUS FERUS*)

In the second part it will become clear that our knowledge of wild camels (*Camelus ferus*) is still merely rudimentary. We know little about how these shy and timorous animals live and how they move about their territory. As mentioned above, until recently we knew so little about their genotype that this animal was described in scientific discourses as the feral relative of the domesticated Bactrian camel – or even as the ancestor of all Old World camels. It is not even clear how many of them are still out there in the unbelievably harsh conditions of the deserts of China and Mongolia, where wild camels have survived in four more or less isolated populations. With an estimated population of less than 900 animals in China's wildlife refuges, the wild camel would, in fact, be more endangered than the giant panda.

In their critical report on the conservation status of the wild camel in Mongolia, *Adiya Yadamsuren, Enkhbileg Dulamtseren and Richard R. Reading* discuss the various threats to this critically endangered species, such as illegal mining, hunting, the decline or destruction of water resources and the wild camel's various encounters with domesticated livestock.

Yuan Lei et al. discuss the situation in China, where about another half of the remaining world's wild camels have found a fragile refuge. Both articles make clear the difficulties and obstacles that have to be overcome and the strategies and measures that would be urgently necessary to save the last remaining wild camel populations on this planet.

Learning more about the distribution, habitat needs, movement patterns and social behavior of wild camels may essentially contribute to ensure their survival. One way to gain this kind of knowledge is to track and monitor their movements via GPS satellite collars. Collaring wild camels with this device in southern Mongolia, however, is, according to the contribution by *Chris Walzer et al.* like "working in a freezer". The harsh conditions in the exceptional wild-camel environment require a precise harmonization of esthetics and hurried operational procedures.

Mating with domestic Bactrian camels is another serious threat to the remaining wild camel population. Through genetic analysis, *Katja Silbermayr and Pamela Burger* reveal a hybridization process, and based on these insights they suggest measures for the preservation of the genetic integrity of the last wild camel populations.

III – BACTRIAN CAMELS (*CAMELUS BACTRIANUS*)

Another genetic-analysis approach, this time by analyzing ancient DNA, opens the third section of the book, which deals with Bactrian camels. *Alexandra Trinks et al.* use a particular part of ancient DNA as a window into the camel's domestication process, which took place in the steppes of Eurasia in the Bronze Age. Mitochondrial DNA, passed down from mother to daughter, revealed a relatively wide distance between domestic Bactrian and wild camels but a rela-

tively limited diversity within the group of early domestic Bactrians. The authors thus conclude that a split between the two populations occurred about 700,000 years ago – long before domestication. The domestication of the two-humped camel, however, was rather a single domestication process that probably took place in southwestern parts of Central Asia.

Maria-Katharina Lang's contribution offers the view of an art-interested anthropologist on interactions and interconnections between Mongolian people and Bactrian camels. In her analysis of various descriptions and depictions of camels, such as the famous film *The Story of the Weeping Camel*, Lang reveals links between the historic past, narratives, legends and lived practices in Mongolian encounters with camels.

In *Otgonbayar Chuluunbaatar's* article it is music that contributes to our understanding of the significance of camels in Mongolian society. Through the exploration of various song texts, Chuluunbaatar points to the special place the camel has in legends, metaphors, ritual songs, everyday folk songs and modern literature. One day, she concludes, the camel may be completely replaced as means of transport, but it will probably always be an essential motif and an integral part of Mongol culture.

IV – DROMEDARIES (*CAMELUS DROMEDARIUS*)

The wide scope of the comprehensive fourth part of this book reflects the comparatively extensive research and writing available on one-humped camels – also called the Arabian camel or dromedary – in western Asia and northern Africa.

The section on dromedaries opens with an archeozoological contribution by *Margarethe and Hans-Peter Uerpmann* that focuses on camel remains excavated in the United Arab Emirates. By comparing dromedary bones from the Iron and the Bronze Age the authors are able to indicate a shift from hunting to herding camels that occurred between about 1400 and 900 BCE and which puts South-East Arabia at the crossroads of the early history of dromedary domestication.

The second dromedary text is by *Walter Dostal*, who died on August 8, 2011, at the age of 84. In his last lecture, given at the 2010 camel workshop, he was brave enough to critically reconsider some of the insights that he had made on the camel-riding positions and the development of Bedouin societies of the Arabian Peninsula. While the riding position on a Bactrian camel is more than obvious – in between, and thus safely secured by the two humps – the dromedary with its enormous one hump offers three possible riding positions. Dostal reconstructs Bedouin history by analyzing two of these possible riding positions and the corresponding saddle constructions as they developed in different parts of the Arabian Peninsula. With reference to archeological findings and contemporary dromedary-riding techniques, he shows that the sequence of different riding techniques relates to cultural exchanges. His article discusses among other things one of the most impressive artifacts of human/camel interaction, namely the more than two-meter-wide woman's saddle.

The challenging logistics of long-distance trading camel caravans are scrutinized by *Johann Heiss* with reference to a 10th-century South Arabian writer and to travel routes through the southwest of the Arabian Peninsula. For centuries, caravans of several hundred dromedaries carried goods through the challenging terrain. Heiss shows that providing this enormous workforce of animals with sufficient amounts of water and fodder, and distributing the burdens and hardships of the undertaking evenly required elaborate strategies.

Andre Gingrich discusses camel-related folk conceptions common in the *Tihāma*, the coastal plain area along the eastern shores of the Red Sea. The farmers of this area believe in the camel's sensitivity to the return of the star constellation of the Pleiades and thus to the coming of the rainy season. As animals with a specifically meaningful relationship to humans, dromedaries indicate the beginning of the rainy and thus fertile season by staring at the farmer's house. Gin-

grich relates his ethnographic analysis to the ritual significance of camels and oxen in pre-Islamic southwestern Arabia.

Daniel Martin Varisco examines the extensive lore as documented in Arabic texts about what dromedaries should and should not eat. Based on texts from the 9th century CE, his contribution on the relevant Arabic ethnobotany reveals human concerns with camel fodder ranging from plants classified as the best pasture, to those that produce superior quality milk, and others that are thought to cause harm.

Darem Tabbaa gives a broad overview on the socio-economic significance of dromedaries in Syria. This includes Syrian pastoralists' struggle for survival in modern Syria but goes also beyond Syrian borders. This especially refers, for example, to the remarkable historic event in 1856, when about 100 Syrian camels and a Syrian camel herder were shipped to the US to serve with desert garrisons in California and Arizona.

Another country-focused contribution is *Arshad Iqbal's* discussion of dromedaries in Pakistan. He sheds light on different camel production systems and points to a general increase of camel's socio-economic significance in safeguarding human nutrition.

Mohammed Shunnaq and Susanne Ramadan Shunnaq consider images and potential of camels in the tourism industry. Mediated through classical films such as *Lawrence of Arabia* and countless advertising strategies of the tourism industry, images of camels have become a vital element in popular fantasies about the Orient. The authors analyze this camel-related orientalism and explore its potential for a future marketing via desert camel tracking of attractive but not yet intensively traveled tourist sights in the northern and central parts of Jordan.

A contribution on the significance of dromedaries in folk medicine closes the cluster on western Asia. *Abdulsalam A Bakhsh et al.* discuss the use of camel urine and camel milk as medical remedies in Arab folk medicine and in contemporary biomedical settings.

Anja Fischer's ethnographic contribution on questions of prestige associated with camels opens the next subsection on dromedaries in North Africa. Fischer explores the significance of dromedaries as creatures of affection in a nomadic society in the Algerian Desert. Particular prominence is given here to the long-legged white dromedary. It is worth noting that people apply this color preference both to the one-humped dromedary and to the two-humped Bactrian camel, as we know from Maria Katharina Lang's article in the third section.

Maurizio Dioli's contribution serves as an introduction to a subsequent broader block concerned with the significance of dromedary milk in northern Africa. He presents traditional pastoralists' techniques and devices regarding milking, fostering and weaning dromedaries that he encountered as a veterinary surgeon in the Horn of Africa. The reader might feel pity for some of the camels, yet one should not forget that in an environment where camel milk is essential for human survival these techniques are meaningful to ensure the flow of milk and to avoid a calf being rejected by its mother and destined to die.

Mario Younan and David M. Mwangi explore the informal character of the camel-milk market in Kenya and Somalia, which is largely a women's business. Camel milk has outstanding keeping qualities. This allows the milk women, despite the long distance to the producers, the heat and the unfavorable sanitary conditions, to respond to the ever-growing demand for camel milk from the increasing numbers of urbanized and sedentary (ex-)pastoralists in the area.

Another milk-focused article is *Ibtisam E.M. El Zubeir's* study on the shelf life of camel milk. By comparing the efficiency of a lacto enzyme on the keeping qualities in cow's and camel milk, Zubeir points to the significance of camel milk for countries like Sudan.

The dromedaries part of this book concludes with another approach to the boundary object camel, namely in pictures. The photo-essay on dromedaries in the Nigeria-Niger corridor by

Abdussamad M. Abdussamad et al. is concerned with the topics of camel's classification according to different phenotypes, their reproduction, and health.

Richard W. Bulliet has been kind enough to conclude this interdisciplinary volume on Old World camels with an afterword. He reflects on his 45 years of studying the history of camel use and domestication as well as on two surprising limitations in relation to this creature. Firstly, the world's strongest pack animal is rather limited in its cultural manifestations – there is an elephant goddess but no camel god. Secondly, in comparison to the worldwide spread of other livestock, the camel is rather restricted in its geographical spread. The limited cultural impact of camels, argues Bulliet, has to do with their late period of domestication, and the sparse and fruitless results of experiments to export camels to exotic locations are linked to their long maturation period.

As a rough categorization of the 26 articles in this interdisciplinary volume on Old World camels according to their research focus it can be said that the contributions from the natural-science branch tend to discuss evolutionary processes. They thereby operate on a larger time frame and a 'smaller'-object of evidence, namely genes. With the aim of preserving the last remaining wild camels, this time line spans the evolutionary history of *Camelini* developments from some five million years ago through to domestication 6000 to 8000 years ago and into the future and destiny of a remarkable animal. The natural sciences interact with camel species per se. Social-science contributions, by contrast, are rather concerned with the significance of human/camel encounters in more contemporary, everyday situations. So we can identify a roughly focus in this volume either on evolution or on history and society – and we see various intersections: the contributions from the humanities, such as archeology and history, as well as the considerations from the veterinary, wild-life management and dairy farming representatives, show the limits of such an effort to group the highly heterogeneous perspectives, aims and insights of camel research assembled in this publication.

It is evident that the significance of Old World camels in the past and present goes far beyond the interdisciplinary aspects collected in this volume. Racing camels, one of the world's largest camel markets in India, the heyday of the camel caravans on the silk road, the environmentally pressing problematic of feral camels in Australia, the question of why there is no camel among the animals of the Mongol calendar, or the saying that humans know 99 names of Allah, but the 100th name is only known to the camel are topics not covered in this book, along with hundreds of further rewarding subjects. This book should therefore only be seen as a first attempt to bring together scholars from all over the world from diverse scientific and academic backgrounds and with diverging perspectives, interests and methods to share their knowledge, queries and sympathy for one of the most fascinating animal on this planet. It is therefore especially encouraging that the Vienna 2010 conference triggered a continuing dialog between specialized representatives of the humanities and the life sciences that will lead to subsequent camel conferences (a further interdisciplinary camel conference was planned for 2012 in Syria but had to be postponed owing to the difficult political situation that resulted from the Arab Spring movements in the region). Another gratifying outcome of the 2010 camel conference in Vienna was a consultation between the organizers Burger and Knoll for an Austrian TV documentary on camels and a subsequent cooperation between this film project and a genetic research project at the Veterinary University, Vienna.¹² For future research the camel will remain at the crossroads of interdisciplinary interests and perspectives.

¹² Documentary "Wüstenschiffe" (Ships of the Desert) 2012 by Georg Misch, Mischief Films www.mischief-films.com/htm/filmeuebersicht.php?id=28&PHPSESSID=e9c8536e2949f766840ac9954ff0bcd5&langswitch=e&PHPSESSID=e9c8536e2949f766840ac9954ff0bcd5, consulted 12 July, 2012).

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