

IMPROVING CONSERVATION OUTCOMES: UNDERSTANDING SCIENTIFIC, HISTORICAL AND CULTURAL DIMENSIONS OF THE ILLICIT TRADE IN RHINOCEROS HORN

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ABSTRACT

This article aims to illuminate the pervasive allure of the rhinoceros to better comprehend the historical and cultural drivers for the illicit global trade in its most coveted part: rhinoceros horn. The market for rhino horn remains dominated by customary and cultural purposes, most notably in traditional medicine. Developing conservation strategies and responding to the criminological implications of the market requires cross-cultural understanding, drawing upon multidisciplinary sources from evolutionary biology, species ecology, cultural anthropology, biomedicine, biomaterial engineering as well as ancient and modern history. Analysis will be carried out in three parts: (1) a synopsis of evolution and ecology; (2) an examination of the cultural significance of the rhinoceros as informed by historical and contemporary sources; and (3) an investigation into the morphology and established uses of rhinoceros horn. This analysis demonstrates the importance of interdisciplinary approaches to developing optimal conservation strategies addressing the multifaceted problem of illicit trade in wildlife.

KEYWORDS

Rhinoceros, rhino horn, wildlife conservation, history, traditional medicine, illicit trade.

On 19 June 2015, Ceballos et al published significant findings (against conservative metrics) confirming that Earth has entered its sixth age of mass extinction due to the sheer rates of biodiversity loss endured over the last few centuries. The authors offer a hopeful yet cautious recommendation: '[a]verting a dramatic decay of biodiversity and the subsequent loss of ecosystem services is still possible through intensified conservation efforts, but that window of opportunity is rapidly closing.'¹ There is no doubt that urgent conservation action is required to contend with the Holocene extinction, but questions remain as to how to improve the impact of conservation policy frameworks on local, regional, national and international echelons. To state it simply, time is of the absolute essence and priority ought to be afforded to approaches that are scientifically informed, targeted and capable of effective implementation.

Among the drivers of extinction challenging policy makers today is the illicit trade in wildlife, a multi-billion dollar global industry, estimated between \$US5- 20 billion per annum.² This industry predates on some of the world's most endangered wildlife, treating

¹ Gerardo Ceballos et al 'Accelerated modern human-induced species losses: Entering the sixth mass extinction' (2015) 1(5) *Science Advances* (forthcoming), 18.

² Tom Milliken, US Aid and TRAFFIC, *Illegal Trade and Rhino Horn: an Assessment Report to Improve Law Enforcement Under the Wildlife TRAPS Project* (2014) 1. See also: World Wildlife Fund and

them as commodities to be sold whole or peddled piece by piece. However, the trade in species is not a new phenomenon. Its extensive history presents a double-edged sword: on the one hand, it provides an opportunity to design strategies informed by a wealth of historical data to extrapolate market trends and evaluate the effectiveness of past counter-measures; on the other, it drives home the stark reality that many practices associated with wildlife commodities derive from longstanding customs, which may be too culturally entrenched to overcome in the brief window of extinction mitigation for many species. As this article will demonstrate, the rhinoceros provides a prime example of a species besieged by the illicit trade for largely cultural-historic reasons, inviting an interdisciplinary approach to support conservation strategies.

This paper advances the necessity for conservation policies to be scientifically evidenced, historically informed and culturally aware, using the rhinoceros as a case study. Accordingly, it will be divided into three parts. Part I will clarify the subject matter by providing an overview of rhinoceros taxonomy. It will outline the evolutionary history of the taxonomic family *Rhinocerotidae* and profile each of the five extant species, including population statistics. Part II will draw together literary accounts of the rhinoceros in order to demonstrate the longitudinal human fascination with the animal and its horn, canvassing western and non-western accounts. Lastly, Part III will undertake a closer examination of the rhinoceros horn by investigating its morphology as well as historical and current uses across eastern and western cultures.

PART I: THE EVOLUTION AND ECOLOGY OF THE RHINOCEROS

The Rhinoceros (or ‘rhino’) is a mammal belonging to the taxonomic family *Rhinocerotidae* characterised by the following features: large size, thick skin, short tail, long hair-tipped ears, and distinct facial horns.³ The name *rhinoceros* is evocative of the latter feature, comprised of the Greek words *rhino* (meaning ‘nose’) and *ceros* (meaning ‘horn’).⁴ There are five extant species of rhinoceros: two African species (White and Black) and three Asian species (Indian, Sumatran and Javan). White, Black and Sumatran Rhinos possess two horns (the front referred to as the ‘anterior horn’ and the rearmost as the ‘posterior horn’) whereas Javan and Indian species sport a single horn. Less obvious to the naked eye, Asian rhinos have evidence of tusks whereas African species do not. All species are herbivores with a gestation period of approximately sixteen months, communicate through

Dalberg, *Fighting illicit wildlife trafficking: A consultation with governments* (2012) http://www.dalberg.com/documents/WWF_Wildlife_Trafficking.pdf.

³ Eric Dinerstein, ‘Family Rhinocerotidae (Rhinoceroses)’ in Don E Wilson and Russell A Mittermeier (eds), *Handbook of the Mammals of the World*, Vol 2 (Lynx Edicions, 2011), accessed January 29, 2015. <http://www.lynxeds.com/hmw/family-text/hmw-2-family-text-rhinocerotidae-rhinoceroses>.

⁴ See also: Kathleen Coleman, ‘The Rhinoceros in the Ancient World’ (1990) 39(1) *Lantern* 27-31, 27: ‘The rhinoceros was named for us by the Greeks, who designated it ‘nose-horn’; the Romans transliterated the Greek name into their own alphabet. Latin gave the word to English and, with modifications, to other modern European languages: ‘renoster’ (Afrikaans), ‘rhinocéros’ (French), ‘rinoceronte’ (Italian).’

vocalisations, feces, urine and scent, have high functioning senses of smell and hearing, possess low functioning sight, and despite size variation between species are all referred to as *mega fauna*. Rhinos are also associated with the older zoological grouping *pachyderm* derived from the Greek *pachys* (meaning 'thick') and *derma* (meaning 'skin').⁵ In contemporary science, rhinos are referred to as *ungulates* (derived from the Latin *ungula* meaning 'hoof') and specifically as 'odd-toed ungulates'.⁶

The evolutionary history of the rhinoceros is as fascinating as it is expansive, with Dinerstein highlighting three particular hallmarks: 'the antiquity of the lineage, the diversity and variety of the feeding niches that they occupied, and numerical abundance.'⁷ There were three *Perissodactyl* families resembling the modern-day rhino: the *Hyracodontidae*, *Amnyodontidae* and *Rhinocerotidae*.⁸ Hyracodontidae (often referred to as 'running rhinos') first appeared in the Eocene through to the early Miocene; whereas the Amnyodontidae (also known as 'aquatic rhinos') appeared in the late Eocene with one genus, *Cadurcotherium* surviving until the Mid-Miocene. The Rhinocerotidae appeared in the late Eocene, achieving greatest abundance during the late Oligocene, and persists to this day. The five extant species of rhinoceros evolved across different geological timelines. Paleontological evidence plots the emergence of the White, Indian and Javan rhinoceroses as having occurred during the Mid-Pleistocene, positioning these three species as the most recent. Next in sequence from youngest to oldest is the Black Rhinoceros, which emerged in the Pliocene Epoch. The least derived species, the Sumatran Rhinoceros, has fossil records dating its genus to the early Miocene.⁹ The Sumatran Rhinoceros, a true living fossil of the prehistoric era, shares more traits with its Miocene ancestors than any surviving species.

A visual representation of the rhino's vast history, including its early interactions with humans, can be found on the walls of the Chauvet-Pont-d'Arc in Southern France.¹⁰ The caves were discovered in 1994 and contain some of the most optimally preserved figurative cave paintings in early human history. The precise date of the hundreds of paintings adorning the cave walls has been debated, with a 2012 study dating the artwork to 30-32, 000 years ago.¹¹ Among the paintings of lions, bears, mammoths, hyena, horses and other creatures are two woolly rhinoceroses (*Coleodonta antiquitatis*), their horns pressed together. Paleontological discoveries continue to shape our understanding of possible early interactions between humans and rhinos. Most recently, a fossil of an *Elasmotherium sibiricum* found in Kozhamzhar, Kazakhstan was dated 29, 000 years old, not only indicating that the animal existed at the same time as humans in the region, but

⁵ Ibid.

⁶ "Rhino Species- Rhinocerotidae," The Australian Rhino Project, accessed January 29, 2015. <http://theaustralianrhinoproject.org/index.php/rhino-info/species>.

⁷ Dinerstein, 'Family Rhinocerotidae (Rhinoceroses).'

⁸ Ibid.

⁹ Dinerstein, 'Family Rhinocerotidae (Rhinoceroses).'

¹⁰ Richard Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine* (Washington, DC, Island Press, 2005), 75.

¹¹ Benjamin Sadier et al, 'Further constraints on the Chauvet cave artwork elaboration' (2012) 109 (21) *Proceeding of the National Academy of Sciences of the United States of America* 8002-8006.

substantially rewrote the species' range which previously placed its extinction approximately 350, 000 years ago.¹²

For the purpose of accurate illicit horn supply chain tracking, it is imperative to profile each species individually in order to gauge distinct levels of vulnerability and potential victimisation. At the very least, it requires an understanding of the extent to which populations have decreased, if not become regionally extinct, due to past predation. Profiling each species also serves to inform audiences as to the existence and characteristics of Asian rhinos as the lesser-known variations. Metrics of endangerment refer to the IUCN Red List classification that provides a seven-category sliding scale from 'Least Concern' to 'Extinct' (with 'Near Threatened,' 'Vulnerable,' 'Endangered,' 'Critically Endangered' and 'Endangered in the Wild' in between) in addition to two categories that go towards availability of data, 'Not Evaluated' and 'Data Deficient.'¹³

THE RHINOS OF AFRICA

Black Rhinoceros

The Black Rhinoceros (*Diceros bicornis*), also referred to as the 'hook-lipped rhinoceros' or 'prehensile-lipped rhinoceros,' is not actually black in colour, but ranges from grey to brown.¹⁴ As at December 2010 there were 4880 black rhinos in Africa.¹⁵ The Black rhino is native to Angola, Kenya, Mozambique, Namibia, South Africa, Tanzania and the United Republic of Zimbabwe. It is possibly extinct in Ethiopia, regionally extinct in Cameroon, Chad and Rwanda and has been reintroduced in Botswana, Malawi, Swaziland and Zambia.¹⁶ In *Green Hills of Africa*, Ernest Hemingway once described a black rhino he had shot as '...a hell of an animal.'¹⁷

It should be noted that there has been some debate as to the number of subspecies, with the African Rhino Specialist Group recommending a distinction of four subspecies: *Diceros bicornis bicornis* (vulnerable), *Diceros bicornis minor* (critically endangered), *Diceros bicornis michaeli* (critically endangered) and *Diceros bicornis longipes* (listed as extinct in 2011)¹⁸ whereas Groves and Grubb currently identify four additional subspecies This was (*Diceros bicornis chobiensis*, *Diceros bicornis occidentalis*, *Diceros bicornis brucii* and *Diceros*

¹² Andrei Valerievich Shpansky, Valentina Nurmagambetovna Aliyassova and Svetlana Anatolievna Ilyina, 'The Quaternary Mammals from Kozhamzhar Locality (Pavlodar Region, Kazakhstan)' (2016) 13 (2) *American Journal of Applied Sciences* 189-199.

¹³ IUCN 2014. *The IUCN Red List of Threatened Species. Version 2014.3.*, accessed January 15, 2015. <http://www.iucnredlist.org>.

¹⁴ Kees Rookmaaker (ed), Rhino Resource Center, *Black Rhino- Diceros bicornis*, accessed January 29, 2015. <http://www.rhinoresourcecenter.com/species/black-rhino/>.

¹⁵ Richard Emslie, 2012. *Diceros bicornis*. The IUCN Red List of Threatened Species. Version 2014.3, accessed 30 January, 2015. www.iucnredlist.org.

¹⁶ Ibid.

¹⁷ Ellis, *Tiger Bone & Rhino Horn*, 93.

¹⁸ Date Assessed: 2011-08-05. Assessor: Emslie, R. Reviewers: Knight, M.H. & Adcock, K.

bicornis ladoensis).¹⁹ Irrespective of classification, numbers of black rhinoceros have dwindled, with the most recent Red List determination of ‘critically endangered.’²⁰ The scale of endangerment has been documented for decades, with Nowak branding the decline in Black Rhinoceros populations as ‘the greatest single mammalian conservation failure of the twentieth century.’²¹ Fortunately, twenty-first century conservation has seen some victories, with the current population trend increasing and successful regional reintroductions.

White Rhinoceros

The taxonomy of the White Rhinoceros (*Ceratotherium simum*), commonly known as the ‘square-lipped rhinoceros,’²² has also been subject of some debate. The IUCN classification distinguishes two subspecies: *Ceratotherium simum simum* (the Southern White Rhinoceros) and *Ceratotherium simum cottoni* (the Northern White Rhinoceros)²³ whereas Groves, Fernando and Rabovsky advance that these should be considered separate species.²⁴ As per 2011 assessment, the Southern White Rhinoceros is classified as ‘Near Threatened’ whereas the Northern White Rhinoceros is ‘Critically Endangered.’²⁵ This species favours bush land and savannah habitats and is recognizable for a distinctively large hump on the back of its neck. It is native to South Africa, possibly extinct in: the Democratic Republic of Congo, South Sudan and Sudan and regionally extinct in the Central African Republic of Chad. The species has been reintroduced in Botswana, Kenya, Mozambique, Namibia, Swaziland, Uganda and Zimbabwe and introduced in Zambia.²⁶

In December 2010 there were 20,170 White Rhinos in Africa (a far cry from less than one hundred individuals in 1895), with a general population trend increasing due in large part to increased protection and translocations.²⁷ There are currently only three Northern

¹⁹ Colin Groves and Peter Grubb, *Ungulate Taxonomy* (Baltimore, John Hopkins University Press, 2011). See also: Colin Groves, ‘Geographic variation in the Black Rhinoceros’ (1967) 32 *Zeitschrift für Säugetierkunde* 267-276.

²⁰ Date assessed: 2011-08-06, Assessor: Emslie, R. Reviewers: Knight, M.H. & Adcock, K.

²¹ Ronald Nowak, *Walker's Mammals of the World* (6th edition, Volume II, Baltimore, John Hopkins University Press, 1991), 1036.

²² It ought to be noted that ‘the notion that the label ‘white’ is a corruption of the Afrikaans/Dutch word ‘wyd’/‘wijd’ (wide), presumably referring to the broad lips of the white rhino, has been convincingly disproved.’ See: Jan C. A. Boeyens and Maria M. van der Ryst, ‘The cultural and symbolic significance of the African rhinoceros: a review of the traditional beliefs, perceptions and practices of agropastoralist societies in southern Africa’ (2014) 26 *Southern African Humanities* 21-55, 23; Jim Feely, ‘Black rhino, white rhino: what’s in a name?’ (2007) 43 *Pachyderm* 111-15.

²³ Richard Emslie, 2012. *Ceratotherium simum*. The IUCN Red List of Threatened Species. Version 2014.3, accessed 30 January, 2015. www.iucnredlist.org.

²⁴ Colin Groves, Prithiviraj Fernando, and Jan Rabovsky, ‘The sixth rhino: a taxonomic re-assessment of the critically endangered northern white rhinoceros’ (2010) *PLoS ONE* 5(4) e9703.

²⁵ Date assessed: 2011-08-06, Assessor: Emslie, R. Reviewers: Knight, M.H. & Adcock, K.

²⁶ Richard Emslie. 2012. *Ceratotherium simum*. The IUCN Red List of Threatened Species. Version 2014.3, accessed 30 January, 2015. www.iucnredlist.org.

²⁷ *Ibid*.

White Rhino: Sudan, Najin and Fatu (male and two females living in Kenya) following the deaths of Angalifu (2014, San Diego Safari Park) and Nabire (2015, Dvur Kralove Zoo). Mitigation strategies have mobilised to bring the Northern White Rhinoceros back from the brink of extinction. In November 2015, San Diego Zoo received six Southern White Rhinos to become surrogates for Northern White embryos, aiming to produce a calf within ten to fifteen years.²⁸ Northern White populations have suffered substantially due to increased poaching during periods of civil war in the Democratic Republic of Congo and neighbouring Sudan.²⁹

On 21 January 2016, TRAFFIC released its 2015 Africa-wide statistical breakdown. It noted a slight decrease in poaching in South Africa (from 1,215 in 2014 down to 1,175 in 2015), yet stressed that the Africa-wide figures are the worst in the continent's history (from 1,299 in 2014 up to 1,305 in 2015).³⁰ The decrease in South Africa was offset by an increase in Zimbabwe (up from 12 in 2014 to 'at least 50' in 2015) and Namibia (from 24 in 2014 to 80 in 2015). However, on 9 March 2016, the IUCN Species Survival Commission's African Rhino Specialist Group reported a higher 2015 total figure of 1,338. It appears that increased law enforcement and expenditure has slowed the rate of increase in poaching from 2013-2015. The African Rhino Specialist Group reported provisional Africa-wide 2015 population numbers as ranging between 19,682 and 21,077 White Rhinoceros and 5042 and 5455 Black Rhinoceros. Currently, South Africa conserves 79% of Africa's rhinos and has suffered 85% of poaching incidents since 2008.³¹

THE RHINOS OF ASIA

Indian Rhinoceros

The Indian Rhinoceros (*Rhinoceros unicornis*) also referred to as the 'Greater-One Horned Rhino' has no subspecies.³² It is native to India and Nepal and regionally extinct in Bangladesh and Bhutan. In 2008, the species was categorised as 'vulnerable'.³³ It is known

²⁸ 'Southern white rhinos arrive at San Diego Zoo for surrogacy conservation initiative to save northern relative from extinction', *ABC News*, 8 November, 2015. See also: O. A. Ryder et al, *Press release: Reproduction and stem cell researchers set up a rescue plan for Northern White Rhino* (Press release of the Leibniz Institute, Berlin, December 2015) 1.

²⁹ Richard Emslie. 2012. *Ceratotherium simum*. The IUCN Red List of Threatened Species. Version 2014.3, accessed 30 January, 2015. www.iucnredlist.org.

³⁰ TRAFFIC, *South Africa reports small decrease in rhino poaching Africa-wide 2015, but the worst on record*, January 16, 2016. <http://www.traffic.org/home/2016/1/21/south-africa-reports-small-decrease-in-rhino-poaching-but-af.html>.

³¹ International Union for Conservation of Nature, *IUCN reports deepening rhino poaching crisis in Africa*, March 9, 2016. <http://www.iucnredlist.org/news/iucn-reports-deepening-rhino-poaching-crisis-in-africa>.

³² Kees Rookmaaker (ed), Rhino Resource Center, *Indian Rhino- Rhinoceros unicornis*, accessed January 29, 2015. <http://www.rhinoresourcecenter.com/species/indian-rhino/>.

³³ Talukdar, B.K., Emslie, R., Bist, S.S., Choudhury, A., Ellis, S., Bonal, B.S., Malakar, M.C., Talukdar, B.N. & Barua, M. 2008. *Rhinoceros unicornis*. The IUCN Red List of Threatened Species. Version

for its magnificent horn and large folds of skin. So prominent are its skin folds that artists have depicted its body covered in plated armour. Assumptions due to its size are betrayed by its keen ability to swim. It was this species of rhino that inspired the English writer Rudyard Kipling to write *How the Rhinoceros got his Skin* (1902). Therein, a Parsee man rubs cake crumbs into a rhino's skin, causing it to itch and scrape itself up against a palm tree, creating the vast folds of skin we see today. A 2007 population estimate identified a total of 378 in Nepal and 2,200 in India, with an overall population trend increasing.³⁴

Javan Rhino

The Javan Rhinoceros (*Rhinoceros sondaicus*) has three subspecies (*Rhinoceros sondaicus sondaicus*, *Rhinoceros sondaicus annamiteus* and *Rhinoceros sondaicus inermis*, the latter of which is extinct).³⁵ The Red List states that it is 'critically endangered' and in 2008 determined it was native to Indonesia and Vietnam (regionally extinct in Bangladesh, Cambodia, China, India, the People's Democratic Republic of Lao, Peninsular Malaysia, Myanmar and Thailand). The last Javan rhinoceros in captivity was a male called 'Rhini'³⁶ (1886 - 1907) who resided at Adelaide Zoo.³⁷ In 2008, there were estimated 40-60 animals on the western tip of Java in Ujung Kulon National Park with a smaller population in Cat Tien National Park, Vietnam.³⁸ In 2010 it was declared extinct in Cat Tien, leaving Ujung Kulon the last stronghold of the Javan Rhino; an area at risk from natural disasters including tsunami and volcanic eruption.³⁹ In April 2015, the International Rhino Foundation identified between 58-61 individuals, including juveniles. A total of seven calves were born during 2015, and as at April 2016, the population has been recorded at 63 individuals.⁴⁰ In 1817, in his *History of Java*, Raffles noted the demand for the Javan Rhinoceros' horn 'whose virtues are highly priced.'⁴¹

Sumatran Rhinoceros

The Sumatran Rhinoceros (*Dicerorhinus sumatrensis*) has three subspecies (*Dicerorhinus sumatrensis lasiotis*, *Dicerorhinus sumatrensis sumatrensis* and

2014.3, accessed January 30, 2015. www.iucnredlist.org.

³⁴ Ibid.

³⁵ van Strien, N.J., Steinmetz, R., Manullang, B., Sectionov, Han, K.H., Isnan, W., Rookmaaker, K., Sumardja, E., Khan, M.K.M. & Ellis, S. 2008. *Rhinoceros sondaicus*. The IUCN Red List of Threatened Species. Version 2014.3, accessed January 30, 2015. www.iucnredlist.org.

³⁶ Clare Peddie, 'Mr Rhini leads the charge to share animals' stories' *The Advertiser*, September 7, 2010.

³⁷ L. C. Rookmaaker et al, *The Rhinoceros in Captivity: A List of 2439 Rhinoceroses Kept from Roman times to 1994* (The Hague, Kugler Publications, 1998), 120-1.

³⁸ Ibid.

³⁹ Colin P. Groves and David M. Leslie Jr, 'Rhinoceros sondaicus (Perissodactyla: Rhinocerotidae)' (2011) 43(887) *Mammalian Species* 190-208.

⁴⁰ Hans Nicholas Jong, 'Birth of calves brings hope to Javan rhino' *The Jakarta Post*, March 22, 2016.

⁴¹ Thomas Stamford Raffles, *The History of Java*, Vol 1 (London, Black, Parbury & Allen, 1817) 49.

Dicerorhinus sumatratrensis harrissoni) and is classified as ‘critically endangered.’⁴² In 2008, it was said to dwell mainly in the tropical rainforests and montane moss forests of Indonesia and Malaysia, and was listed as possibly extinct in Myanmar and regionally extinct in Bangladesh, Bhutan, Brunei Darussalam, Cambodia, India, People’s Democratic Republic of Lao, Thailand and Vietnam. A recent study published in *Oryx* found that the Sumatran Rhino is extinct in the Malaysian wild, with the only remaining *in situ* populations living in three separate groups in Indonesia.⁴³ There are less than one hundred individuals in total, and one of the populations has experienced a decline in distribution range of 70% over the past decade.

As at April 2016, there are only nine Sumatran Rhinos in captivity. Tam, Iman and Puntung are held in the Borneo Rhinoceros Sanctuary in Sabah, with current data indicating that they are the only remaining members of the Bornean subspecies.⁴⁴ The Indonesian Sumatran Rhino Sanctuary houses females Ratu (due to give birth in May 2016), Rosa and Bina, and males Andalas, Harapan, Andatu. Andalas and Harapan were born at the Cincinnati Zoo in 2001 and 2007, and are offspring of the most prolific Sumatran sire, Ipuh and female Emi (both deceased).⁴⁵ In fact, Andalas was the first Sumatran rhino born in captivity in 112 years.

Owing to its prehistoric appearance, British naturalist Charles Hose described ‘the beast’ in 1929 as ‘the most grotesque of his kind.’⁴⁶ In 1822, Raffles wrote of the *badak*’s shy nature: ‘they are not bold, and one of the largest size has been seen to run away from a single wild dog.’⁴⁷ Of the demand for its horn, Wallace wrote of two specimens purchased in the Bazaar at Sibiu in 1874: ‘[b]oth horns and teeth are brought to Sibiu by natives arriving from the above district for purposes of trade; and these articles being valued by Chinese and Malays for their supposed medicinal properties, at once command a ready sale, so that they disappear generally beyond hope of recovery.’⁴⁸

PART II: A CULTURAL HISTORY OF ‘RHINOMANIA’ AND ‘RHINOCEROTICA’

⁴² Kees Rookmaaker (ed), Rhino Resource Center, *Sumatran Rhino- Dicerorhinus sumatrensis*, accessed January 29, 29 2015. <http://www.rhinoreourcecenter.com/species/sumatran-rhino/>.

⁴³ R. G. Havmøller et al, ‘Will current conservation responses save the Critically Endangered Sumatran rhinoceros *Dicerorhinus sumatrensis*?’ (2015) *Oryx* published online August 3, 2015.

⁴⁴ Jeremy Hance, ‘Officials: Sumatran rhino is extinct in the wild in Sabah’, *Mongabay*, April 23, 2015.

⁴⁵ They also shared a sister, Suci (born 2004- died 2014).

⁴⁶ Charles Hose, *The Field Book of a Jungle-Wallah: Being a Description of Shore, River, and Forest Life in Sarawak* (Singapore, Oxford University Press, 1929).

⁴⁷ Thomas Stamford Raffles, ‘Descriptive catalogue of a zoological collection, made on account of the Honourable East India Company, in the island of Sumatra and its vicinity, with additional notices illustrative of the natural history of these countries’ (1822) 13 *Transactions of the Linnean Society of London* 239-274, 269.

⁴⁸ Alfred Russel Wallace, ‘On the rhinoceros of Borneo’ (1874) *Proceedings of the Zoological Society of London*, November 3, 498-499, 499.

Extinction causation is complex, and while the particular conditions of endangerment impacting each of the five extant species of rhinoceros varies (even more so when honing in on regional extinctions) each of the IUCN Red List assessments identifies poaching for the coveted horn as a significant driver in population decreases.⁴⁹ The cultural and economic value of the horn and its intended utility vary regionally. What is clear from historical accounts, the world over, is that the animal is bearing the ultimate cost for centuries of human captivation that has morphed into a fatal attraction, one which views the animal as a resource for human consumption. The so-called 'beast' is reduced to a trophy on the wall, handle of a dagger, or ingredient in the pharmacopoeia. This phenomenon of human fascination with the rhinoceros has been described by Clarke as resembling 'rhinomania' and 'rhinocerotica.'⁵⁰

To obtain a fuller appreciation of the drivers of the international market for rhino horn, it helps to pursue a broader avenue of cultural inquiry that seeks to situate the rhino and its horn within a lengthy history of human interest. The allure of the rhino and its horn draws from a rich tapestry of scientific facts woven together with flights of fancy and embellished with mystique and myth. The following section of this article will investigate both western and non-western representations of the rhino to account for its global appeal.

Ancient Accounts

The procurement and exchange of exotic animals has been traced back to both the Egyptians (2,500 BC) and the Greeks (7th century BC), and increased significantly during Roman times where animals were used for blood sport in the Amphitheatre games from 186 BC to the last games in 523AD.⁵¹ Ancient accounts of traded species, including the rhinoceros, were dominated by a handful of authors. In 2013, Waters published a rigorous comparison of ancient accounts canvassing the records of: Ctesias, Aristotle, Pliny the Elder and Claudius Aelianus (better known as Aelian).⁵²

The first classical version was recorded around 400 BC by the Greek medical practitioner, Ctesias of Cnidus. Following his seventeen year service to King Darius II of Persia, Ctesias wrote his *Indika*, describing the Persian and Indian worlds. Much in the tradition of oral history, Ctesias had not travelled to India himself, but had rather accumulated knowledge from visitors to the Persian court. He described the 'wild ass' as an animal 'with a white

⁴⁹ For example, the IUCN Red List assessment indicates that populations of Greater One-Horned rhinoceros have been adversely affected by declines in quality of habitat in some regions due to severe invasion of alien plants, 'reductions in the extent of grasslands and wetlands due to woodland encroachment and silting up of beels,' and competition for grazing with domestic livestock.

⁵⁰ T. H. Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799* (London, Sotheby's Publications, 1986) 1-219.

⁵¹ Julie Ayling, 'What Sustains Wildlife Crime? Rhino Horn Trading and the Resilience of Criminal Networks' (2014) 16 *Journal of International Wildlife Law & Policy* 57-80, 57.

⁵² Elyse Waters, 'Zoological analysis of the unicorn as described by classical authors' (2013) *Archeometrial Műhely* X(3) 231-236.

body, red head, blue eyes, bile in the liver, and bitter flesh' with ankle-bones like an ox. Of the horn's value, he stated that the dust filed from the horn protects from deadly drugs and that an individual would be immune to poison if drunk from a vessel fashioned from the horn.⁵³

In the sequence offered by Waters, Aristotle was the next significant author to describe what he called the 'Indian ass' in *The History of Animals*. He adds to Ctesias' work, identifying the 'Indian Ass' as the only creature to have solid hooves and a knuckle-bone: '[t]here are...some animals that have one horn only, for example, the oryx, whose hoof is cloven, and the Indian ass, whose hoof is solid. These creatures have a horn in the middle of their head.' Next was the renowned Roman encyclopaedist, Pliny the Elder, who compiled the records of one hundred authors in his *Natural History*. Of all the classical accounts, it was Pliny's that proved the most influential, with an impact spanning for over 1,500 years. Pliny's account of a 'monoceros' was published in 77AD: 'the Orsaean Indians hunt an exceedingly wild beast called the Monoceros, which has a stag's head, elephant's feet, and a boar's tail, the rest of the body being like that of a horse.'⁵⁴ He expands '[o]f the Rhinoceros:'

[i]n the same Plays of Pompey, and many Times beside was shewed a Rhinoceros, with a single Horn on his Snout. This is a second begotten Enemy to the Elephant. He fileth this Horn against hard Stones, and so prepareth himself to fight; and in his Conflict he aimeth principally at the Belly, which he knoweth to be the tenderest Part. He is full as long as his enemy; his Legs much shorter; his Colour a palish Yellow (Book VIII, Chapter XX).

Battles between rhinos and elephants were a popular spectacle for centuries, adding to the pomp and ceremony of gladiatorial games. For example, in Cassius Dio's *Roman History* Book LV, p 479 it is written that '...[t]he gladiatorial games in honor of Drusus were given by Germanicus Caesar and Tiberius Claudius Nero, his sons. [In the course of them an elephant vanquished a rhinoceros...]' It was a powerful visual interpreted by artists, centuries apart. For example, in 1685 Jan Griffier published a mezzotint *A True Representation of the Two Great Masterpieces of Nature...* depicting an elephant and rhinoceros fighting in the manner described by Pliny the Elder, the rhino piercing the elephant's lower belly with its horn.

The final author discussed by Waters is Aelian who lived in Rome for the majority of his life, but composed most of his work in Greek. Aelian refers to the creature as a 'cartazonus' in his *De natura animalium*. Like Aristotle, Aelian's account draws strongly from Ctesias.⁵⁵ His version corroborates Pliny the Elder's wherein the animal possesses a tail and loud

⁵³ Ibid, 232.

⁵⁴ Ibid, 232.

⁵⁵ Malcolm South (ed) *Mythical and fabulous creatures: a source book and research guide* (Greenwood Press, 1987) 11.

vocalisations. Aelian's contribution provided extra details on how the animal interacted with others of its species.⁵⁶

Historians have studied the inception of rhinos in Greco-Roman culture with particular interest, with the current pool of research indicating that accounts refer to Indian and African rhinos (with the number of horns depicted being a useful indicator). Regarding allusions to the Indian rhinoceros, Nichols traces Ctesias' 'wild ass' specifically to the Indus Valley and the northwest of India,⁵⁷ whereas Lavers connects Aelian's description to the Tibetan plateau.⁵⁸ In addition, Pliny's description of the 'monoceros' displayed by Pompey the Great in his games of 55BC, and Aristotle's 'Indian ass' also correspond with an Indian rhino.⁵⁹ In fact, Coleman cites the single-horned specimen of Pompey the Great as the first record of a rhino to be shown in Rome.⁶⁰ The African rhino too has a rich history during the ancient period. Coleman refers to a third century wall painting from a tomb at Marissa, Jordan as the earliest Greek representation of a rhinoceros (one bearing two distinct horns). The author corroborates this portrayal of an African rhinoceros with sources referring to an 'Ethiopian rhinoceros' of similar description which was shown in 275-274BC.⁶¹ Enright elaborates that the Greek King of Egypt, Ptolemy II (Philadelphos) paraded animals as part of his Ptolemaia celebrations, and at the 275-274BC event made an appearance the end of the parade wherein 'men led a white bear, fourteen leopards, nine cheetahs, four caracals, a giraffe and a white rhinoceros from Ethiopia.'⁶² Significantly, Coleman indicates that the Nile was the 'main artery of the trade route supplying African rhinos to the Mediterranean world.'⁶³ One of the sources used to support this claim is a mosaic at Piazza Armerina in Sicily known as the 'Great Hunt' which shows a rhino standing in water surrounded by an array of African animals, which may thus be interpreted as being set on the Nile. The mosaic dates from the 4th century AD which coincides with the growth of mosaic workshops in Africa, and so Coleman suggests that it was likely designed in Carthage before being exported and laid in Sicily.⁶⁴ Keimer supports this analysis of trade, adding that information on imports to Egypt (Alexandria) and Rome indicate that Asian, as well as African species of rhino were supplied.⁶⁵ Further, rhinos were shown alongside hippos in the triumphal procession of Octavian (the Emperor Augustus) in 29BC following his victory over Cleopatra.⁶⁶

⁵⁶ Waters, 'Zoological analysis of the unicorn as described by classical authors', 232-233.

⁵⁷ Andrew Nichols (trans), *Ctesias. On India, and Fragments of His Minor Works* (London, Bristol Classical, 2011) 18-19.

⁵⁸ Chris Lavers, *The natural history of unicorns* (New York, Granta Books, 2009) 37.

⁵⁹ Coleman, 'The Rhinoceros in the Ancient World', 28.

⁶⁰ *Ibid*, 28.

⁶¹ *Ibid*, 28. Pliny the Elder described this Ethiopian Rhinoceros as being found in the Upper Nile.

⁶² Kelly Enright, *Rhinoceros* (London, Reaktion Books Ltd, 2008) 29.

⁶³ Coleman, 'The Rhinoceros in the Ancient World', 28.

⁶⁴ *Ibid*, 29.

⁶⁵ L Keimer, 'Note sur les rhinoceros de l'Egypte ancienne' (1948) 48 *Annales du Services des Antiquités de l'Egypte* 47-54, 50. See also Pliny's account of 'Rhinoceros Indicus' in Book VIII, Chapter XX of his *Natural History*.

⁶⁶ Coleman, 'The Rhinoceros in the Ancient World', 29.

The above sources are the most commonly attributed in ancient representations of the rhinoceros; however, a variety of other sources from a range of mediums sheds light on its cultural significance. As previously cited, the earliest representations are the drawings inside the Chauvet Caves. Looking to the East, rhinos appeared on Harappan seal stones from Mohenjo Daro (now in southern Pakistan) that have been dated as far back as 2,000 BC,⁶⁷ and the existence of a rhino-like creature in China was recorded in 2,697 BC.⁶⁸ In fact, historians studying Ancient Egypt have made a number of key findings relating to black and white rhinos relying on different forms of primary sources.⁶⁹ For example, imitation horns made of pottery were found in the *mastaba* ('eternal house') of the First Dynasty King Hor-Aha, located at Saqqara.⁷⁰ These were created to evoke the mystical powers believed to flow through the horn. Additionally, a sunken relief of a rhinoceros killed by the pharaoh in Nubia appears on a pylon of Thutmose III of the Eighteenth Dynasty in the Temple of Armant (Hermonthis).⁷¹

As time passed, and with it the increased dissemination of tales and illustrations of animals, the *Physiologus* was composed (approximately 200 CE).⁷² Cook and Pitman describe the impact of the *Physiologus* as follows: 'with the exception of the Bible, there is perhaps no other book in all literature that has been more widely current in every cultivated tongue and among every class of people.'⁷³ This book of animal legends, with no single author, was first published in Alexandria and subsequently translated into Syrian, Arabic, Armenian, Ethiopian, Latin, German, French, Provençal, Icelandic, Italian and Anglo-Saxon. It metamorphosed into what became known as the *Medieval Bestiary* (or *Book of Beasts*) around the twelfth century.⁷⁴ The exact point of transition between the two texts is unclear; however historians have indicated that the *Bestiary* derived its name from the opening line of the *Physiologus*: '*Bestiarum Vocabulum*.'⁷⁵

Compendiums and encyclopedias of exotic species continued to be informed by explorers, travelers and envoys well into the modern era. In fact, it was none other than Marco Polo (1254-1324) who provided one of the earliest descriptions of the Sumatran rhinoceros:

They have wild elephants and plenty of unicorns, which are scarcely smaller than elephants. They have the hair of a buffalo and feet like an elephant's. They

⁶⁷ Ellis, *Tiger Bone & Rhino Horn*, 88.

⁶⁸ Ibid, 74; Rudiger Robert Beer, *Unicorn, Myth and Reality* (New York, Mason/Charter, 1977).

⁶⁹ Dale J Osborn and Jana Osbornová, *The Mammals of Ancient Egypt- The Natural History of Egypt Volume IV* (Warminster, Aris & Phillips Ltd, 1998) 140.

⁷⁰ Ibid, 140.

⁷¹ Ibid, 140. The authors also note that errors have occurred in interpreting the animal subjects of some Ancient Egyptian art based on physical features. For example, in distinguishing between elephants, rhinos and hippos, a trunk or tusk may be mistaken for a horn (or vice versa).

⁷² John S Wilkins, *Species: A History of the Idea* (Berkeley and Los Angeles, University of California Press, 2009) 38.

⁷³ Albert Stanburrough Cook and James Hall Pitman, *The Old English Physiologus* (New Haven, Yale University Press, 1921) iv.

⁷⁴ Ellis, *Tiger Bone & Rhino Horn*, 8878.

⁷⁵ Janetta Rebold, *The Medieval Menagerie* (New York, Abbeville Press, 1992) 69.

*have a single large, black horn in the middle of the forehead. They do not attack with their horn, but only with their tongue and their knees; their tongues are furnished with long, sharp spines, so that when they want to do any harm to anyone they first crush him by kneeling upon him and then lacerate him with their tongues. They have a head like a wild boar and always carry it stooped towards the ground. They spend their time by preference wallowing in mud and slime. They are very ugly brutes to look at.*⁷⁶

While these early representations indicate a natural, almost intuitive, attraction to the rhinoceros, the historical cocktail of science and folklore begged as many questions as it afforded answers. However, what it did provide was a mystique that followed the rhinoceros into the 16th century, where an unprecedented impact on Western thought was imminent. The rhino would become a diplomatic gift, travelling attraction, taxidermied exhibit, figure on a coin, a hairstyle, a knick-knack and the subject of many artistic interpretations.

16th-18th Century Europe: The Clarke Eight

A principal scholar of European rhinoceros iconography, T.H. Clarke, undertook the daunting task of chronologically documenting not only the influence of the first rhinos in Europe since the menageries of Ancient Rome, but also the animal's appearance in multiple artistic representations including: tapestries, pottery, porcelain and glass, sculpture, clocks, furniture, arms and armour. The rhinos described are all Indian Rhinoceroses and will be hereon referred to as the 'Clarke Eight.'⁷⁷ The 'Clarke Eight' illustrate the continuum of intrigue sparked by the ancient writers, in particular Pliny the Elder, and in the exceptional cases of the first and fifth rhinos in sequence, a heightened individual impact enduring centuries after their demise.

1. 1515: The Lisbon or Dürer Rhinoceros, or the Ganda

The first live rhinoceros to reach Europe since the 3rd century arrived in Lisbon on 20 May 1515 on the Portuguese ship *Nostra Senora da Ajuda*, transporting spices from Goa.⁷⁸ The rhinoceros was referred to by the Portuguese as a *ganda* (its Indian Gujarati name).⁷⁹ It was a diplomatic gift to Albuquerque, governor of Portuguese India, by Sultan Muzafar II, ruler of the kingdom of Cambaia. The earliest sculpture of the *ganda* is a 'corbel below a feigned oriel on the side of the tower facing the Tagus' as this was the river that bore it to its destination.⁸⁰ King Manuel I of Portugal wished to test Pliny's account and scheduled a fight between the *ganda* and an elephant on Trinity Sunday, 3 June 1515. Reports of the day state that the elephant turned tail and sought refuge.⁸¹ In March of the preceding year, King Manuel I had gifted Pope Leo X a famed and popularly beloved elephant, Hanno, and now

⁷⁶ Ibid, 86-87; Marco Polo, *The Travels*. Trans R E Latham (Harmondsworth, Penguin, 1958).

⁷⁷ Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799*, 1-219.

⁷⁸ Ibid, 19.

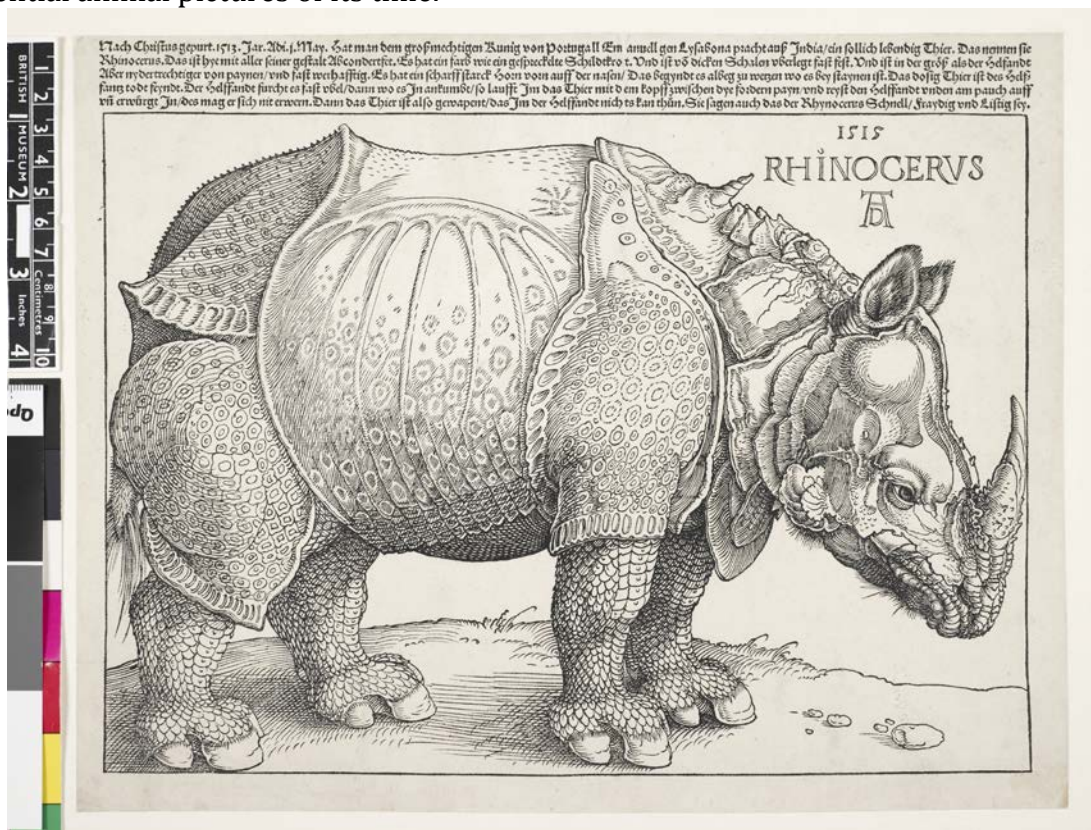
⁷⁹ Ibid, 16.

⁸⁰ Ibid, 19.

⁸¹ Ibid, 19.

decided to garner more favour by offering his *ganda*.⁸² After the ship docked briefly in Marseilles en route to Rome, disaster struck and in the midst of a storm the ship sunk and the rhino, chained to the deck, perished. This event is dated late January 1516. It has been alleged that the rhino was recovered, stuffed and brought to Rome to be received by the Vatican and subsequently displayed *impagliato* (according to writer Damião de Gois).⁸³

Nuremburg artist Albrecht Diirer received a sketch from Valentin Ferdinand and created several ink sketches and his famous woodcut. The *Diirer Rhino* depicts an awe-inspiring animal adorned with impenetrable armoured plates and an extra horn jutting from its shoulder. According to the British Museum, Diirer's iconic creation inspired European illustrators for the next three centuries even after they had seen a living rhinoceros without plates and scales.⁸⁴ Of the woodcut, Quammen in *The Bollerplate Rhino: Nature in the Eye of the Beholder* posited that this representation 'despite inaccuracies is one of the most influential animal pictures of its time.'⁸⁵



'The Rhinoceros', Albrecht Durer, Germany, c.1515. © The Trustees of the British Museum.

⁸² Ibid, 19.

⁸³ Ibid, 20.

⁸⁴ British Museum 'Albrecht Diirer's Rhinoceros, a drawing and woodcut, accessed February 4, 2015.

http://www.britishmuseum.org/explore/highlights/highlight_objects/pd/a/albrecht_dürers_rhinoceros.aspx.

⁸⁵ David Quammen, *The Bollerplate Rhino: Nature in the Eye of the Beholder* (New York, Scribner, 2000) 206.

The *Diirer's Rhinoceros in Brown Ink* has a similar inscription to the woodcut. The translation is as follows:

In the Year 1513 (sic) upon the I. Day of May, there was brought to our King at Lisbon such a living Beast from the East-Indies that is called Rhinocerate: Therefore on account of its Wonderfulness I thought myself obliged to send you the Representation of it. It hath the Colour of a Toad⁸⁶ and is close covered with thick Scales in Size like an Elephant, but lower, and is the Elephant's deadly Enemy; it hath on the fore part of its Nose a strong sharp Horn; and, when this Beast comes near the Elephant to fight with him, he always first whets his Horn upon the Stones; and runs at the Elephant with his Head between his fore Legs; then rips up the Elephant where he hath the thinnest Skin, and so gores him: The Elephant is terribly afraid of the Rhinocerate; for he gores him always, where-ever he meets an Elephant; for he is well armed, and is very alert and nimble. This Beast is called Rhinoceros in Greek and Latin; but, in Indian, Gomda.⁸⁷

This iconic image continues to be of great value today, both financially and culturally. In January 2013, a Diirer Rhino drawing sold for a record US\$866, 500 at auction house Christie's, New York.⁸⁸ More significantly, the woodcut impact was included in *A History of the World in 100 Objects* by Neil MacGregor.⁸⁹ The rhino is also the subject of the book *The Pope's Rhinoceros*.⁹⁰

It is also worth noting that there were other artistic renditions of the Diirer Rhino. On 3 July 1515 Giovanni Giacomo Penni, published twenty-one verses about the rhino with a woodcut of a rhinoceros on the cover below the title *Forma e natura e costumi de lo Rinocerorhe*.⁹¹ According to Clarke, 'the woodcut shows a sympathetic, naive creature, with beady eyes, its forelegs hobbled and chained, its folds of skin clothing it like a surcoat, the ribs, which in Diirer's woodcut have been likened to the spokes of an umbrella, are here more like an uncomfortable saddle.'⁹² Also in 1515, a second German woodcut was made by a friend and contemporary of Diirer, Hans Burgkrnair.⁹³ This rhino appears in chains and more true-to-life, its armour less pronounced and the extra horn missing.

2. 1579-86: *The Madrid rhinoceros or abada*

⁸⁶ 'Toad' has also been translated as 'tortoise.'

⁸⁷ Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799*, 20.

⁸⁸ Katya Kazakina, 'Durer 'Rhino' Sells for Record \$866, 500 at Christie's NYC', *Bloomberg*, January 29, 2013. <http://www.bloomberg.com/news/articles/2013-01-29/durer-rhino-sells-for-record-866-500-at-christie-s-nyc>.

⁸⁹ Neil MacGregor, *A History of the World in 100 Objects* (London, Penguin, 2012).

⁹⁰ Lawrence Norfolk, *The Pope's Rhinoceros* (London, Sinclair-Stevenson, 1996).

⁹¹ Clarke, *The Rhinoceros from Dürer to Stubbs*, 23.

⁹² *Ibid*, 23.

⁹³ *Ibid*, 24.

The Madrid Rhino came to Lisbon in 1579 as a gift to King Phillip II, ruler of Spain and Portugal. Phillippe Galle produced an engraving of the *abada* in Antwerp in 1586.⁹⁴ It was also the subject of a watercolour once owned by Emperor Rudolf II of Prague. In 1584 the *abada* was seen by the first Japanese embassy of four noble youths on their way to visit the Pope. Despite its appeal, it was not spared maltreatment, as evidenced in the following account:⁹⁵

At the Escorial in Spain I saw [a Rhinocerot] that was brought from the Indies; but because he had overturned a Chariot full of Nobility, though fortunately no harm was done, the King commanded his eyes should be put out, and his horn cut off. The Duke of Medina advised the King to kill him with a musket, because he had maimed a Gentleman of his . . . his eyes were put out and his horn cut off.

3. 1684-5: The first London rhinoceros

The third of Clarke's rhinos is also known as the first London rhinoceros. An advertisement in *The London Gazette* dated 6 October 1684 reads: '[a] Very strange Beast called a Rhynoceros, lately brought from the East-Indies, being the first that ever was in England, is daily to be seen at the Bell Savage Inn on Ludgate-Hill, from Nine a Clock in the Morning till Eight at Night.'⁹⁶ Upon viewing the rhinoceros in person, John Evelyn wrote a lengthy description in his diary, dated 22 October 1684:⁹⁷

The Rhinoceros (or Unicorne) . . . resembled a huge enormous swine . . . but what was the most wonderful, was the extraordinary bulke and Circumference of her body, which . . . could not be lesse than 20 foote in compasse: she had a set of most dreadful teeth, which were extraordinarily broad, & deepe in her Throate, she was led by a ring in her nose . . . in my opinion nothing was so extravagant as the Skin of the beast, which hung downe on her hanches, both behind and before her knees, loose like so much Coach leather . . . these lappets of stiff skin, began to be studded with impenetrable Scales, like a Target of coate of mail, loricated like Armor. (When she lay down] she appeared like a greate Coach overthrowne, for she was much of that bulk, yet would rise as nimbyas ever I saw an horse . . . to what stature she may arrive if she live long, I cannot tell, but if she grow proportionable to her present age, she will be a Mountaine.

As to its end, a newsletter circulated 28 September 1686 informed readers that 'last weeke died that wonderful creature the Rhynocerus.'⁹⁸

⁹⁴ Ibid, 28.

⁹⁵ Ibid, 30.

⁹⁶ Ibid, 37.

⁹⁷ Ibid, 39.

⁹⁸ Ibid, 39.

4. 1739: The second London (or Parsons) rhinoceros

The second London rhinoceros, a young male, arrived from Bengal via the ship *Lyell* on 1 June 1739.⁹⁹ While in Leiden, Dr James Douglas saw the stuffed body of a rhino that had died aboard a Dutch East Indiaman in 1677 (another casualty had perished on the *Shaftesbury* in 1737). During this visit he met the painter and engraver Jan Wandelaar who made drawings of the *impagliato* animal for him.¹⁰⁰ The arrival of this new rhino in London gave Dr Douglas cause to visit its display in Red Lion Square¹⁰¹ where he wrote a description that he orally reported to the Royal Society on 21 June 1739. Douglas' presentation was accompanied by drawings and figures created by his assistant, Dr James Parsons. After Douglas' death, Parsons carried his work forward, publishing a letter in *Philosophical Transaction* dated 9 June 1743 containing *The Natural History of the Rhinoceros*.¹⁰² The *Philosophical Transaction* was widely read all over Europe, with some copies reaching India. Parsons' letter was translated into both French and German and representations were extensively pirated.¹⁰³

5. 1741- 1756: The 'Dutch' rhinoceros, Clara

The Dutch rhinoceros was a female captured in snares in 1738 or 1739. The ruler of the Kingdom of Assam presented it to the director of the Dutch East India Company in Bengal, after which she was acquired by a Dutch sea captain by the name of Douwe Mout van der Meer.¹⁰⁴ They arrived in Holland on 22 July 1741 on the *Knabenhoe*. She became known and beloved as Clara.¹⁰⁵

By happenstance, a stopover in the captain's hometown in Leiden in 1742 intersected with a visit by Bernhard Siegfried Albinus who was working on his seminal anatomy text *ext Tabulae sceleti et musculorum corporis humani*.¹⁰⁶ Albinus, who was collaborating with the artist Wandelaar, added young Clara to the background of two plates (plates IV and VIII). This intersection of 18th century art and science produced the first anatomically accurate depiction of a rhino in visual medium.

Van der Meer toured Clara throughout Europe for seventeen years on a cart drawn by eight horses.¹⁰⁷ According to Clarke, she roused universal interest, being 'received by royalty and fed beer by commoners.' 'Rhinomania' was in full effect: poems and songs were written about her; she was sketched and engraved on porcelain, snuff boxes, clocks and the like. Her likeness was even emulated in the fashion of the day, with reports on 8 May 1750

⁹⁹ Ibid, 42.

¹⁰⁰ Ibid, 42.

¹⁰¹ According to Clarke, the price of viewing this rare pachyderm had, then, more than doubled since 1684.

¹⁰² James Parsons, 'A letter containing the natural history of the rhinoceros. (1743) 42(470) *Philosophical Transactions of the Royal Society of London* 523-541, pls 1-3.

¹⁰³ Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799*, 45.

¹⁰⁴ Ibid, 47-8.

¹⁰⁵ Ibid, 48.

¹⁰⁶ Ibid, 50.

¹⁰⁷ Ibid, 51.

describing French women styling their hair *à la rhinocéros*.¹⁰⁸ Her face gilded medals, pamphlets and posters in German, French English and Dutch. Portrayals of Clara include those by Jean-Baptiste Oudry, *Clara the Rhinoceros in Paris* (1749), Pietro Longhi, *Exhibition of a Rhinoceros at Venice* (1751) and several by Johann Elias Ridinger including *Eve gives Adam the Forbidden Fruit* (1748-50). Oudry's *Portrait of Clara in Paris* (1749) was adapted further and appeared in the naturalist Georges-Louis Leclerc, Comte de Buffon's *Histoire naturelle, generale et particuliere* and Diderot and d'Alembert's *Encyclopédie*.¹⁰⁹ Even the equally famed Casanova became part of Clara's adventures when his mistress mistook a man 'dressed in the African fashion' for a rhinoceros when visiting her exhibition at the St Germain Fair in 1749.¹¹⁰ Clara returned to London in 1758, where she was exhibited at the *Horse and Groom* in Lambeth with an entry price of sixpence and one shilling. This was where she died on 14 April, aged approximately twenty years. So impactful was Clara's legacy that Kees Rookmaaker wrote a short piece *How I met Clara, the Dutch Rhinoceros* for the 50th issue of *Pachyderm* in 2011.¹¹¹

6. 1770: The Versailles rhinoceros

The Versailles rhinoceros (1770-93) was procured for Louis XV. Clarke makes the key observation that 'le rhinoceros de Versailles' attracted little attention from painters and sculptors' particularly in comparison to its magnificent predecessor. However, it was visited both by naturalists and distinguished members of the public, such as the Austrian Emperor Joseph II in 1777, the Dutch anatomist Petrus Camper (who made a sketch in ink on 28 July 1777) and by naturalist Georges-Louis Leclerc, Comte de Buffon on several occasions. This was the first European rhino to be held in permanent captivity in a specially designed enclosure until its death in 1793.¹¹²

7. 1790: The third London rhinoceros (or Stubbs rhinoceros) & 8. 1799: The fourth London rhinoceros

The third London, or Stubbs Rhinoceros (1790-3) and fourth London rhino (1799-1800) were both exhibited at the Exeter Change.¹¹³ The former is referred to by Rookmaaker, Gannon and Monson as 'Clark's Rhinoceros' and the latter as 'Pidcock's Rhinoceros'.¹¹⁴ The menagerie housed in the Great Room was founded by Thomas Clark whose success in the 1770s saw his animals also displayed at The Lyceum a few blocks east.¹¹⁵ Around this time, Gilbert Pidcock had started his business touring a small-scale menagerie. In 1789 the two

¹⁰⁸ Ibid, 60.

¹⁰⁹ Glynis Ridley, *Clara's Grand Tour: Travels With A Rhinoceros In Eighteenth Century Europe* (New York, Grove Press, 2004) 136.

¹¹⁰ Ibid, 143.

¹¹¹ Kees Rookmaaker, 'How I met Clara, the Dutch rhinoceros' (2011) *Pachyderm* Special 50th Issue 10-11.

¹¹² Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799*, 70.

¹¹³ Ibid, 70.

¹¹⁴ Kees Rookmaaker, John Gannon and Jim Monson, 'The lives of three rhinoceroses exhibited in London 1790-1814' (2015) 42(2) *Archives of Natural History* 279-300.

¹¹⁵ Caroline Grigson, *Menagerie: The History of Exotic Animals in England* (Oxford, Oxford University Press, 2015) 98.

arrived at a commercial agreement whereby Pidcock would hire out some of Clark's animals for tour.¹¹⁶

The third London rhinoceros was purchased by Clark for £700 from Henry Dundas, president of the Board of Commissioners for the Affairs of India, who had received it as a gift from Asaf-Ud-Daula (the Nawab of Lucknow in Utar Pradesh).¹¹⁷ The healthy two-year-old arrived in London on 5 June 1790 and could be seen at The Lyceum for one shilling. Just as Clara had appeared before King George II in 1752, the third London rhinoceros was brought before royalty during the reign of King George III:¹¹⁸

This Day June 3 1793 HER MAJESTY sent to PIDCOCK the Exhibitor of the Rhinoceros, for that Animal to be brought to the QUEEN'S Lodge, for the Queen and Princesses to view it. It was of course immediately drawn in the Machine before the Lodge, the appearance of which highly gratified them and the KING.

The Clark Rhino was the subject of a watercolour by the artist Stubbs¹¹⁹ however its image was more popularly recognised on the face of a token halfpenny when private coinage was used to supplement the shortage in the royal mint.¹²⁰ The docile rhino became well known for drinking three or four bottles of sweet wine.¹²¹ After it died, it was taxidermied and exhibited.¹²² The rhino's skin was later sold for five shillings and the horn went for one pound and two shillings.

The last of the Clarke Eight rhinos was a smaller male. He arrived in 1799 and was purchased by Antonio Alpi, an agent of the Holy Roman Emperor Francis II, for £1000.¹²³ *The Times* (25 November 1799) reported that the rhino had toured through Kent with Pidcock's menagerie and was exhibited before the Princess of Wales at her residence in Blackheath.¹²⁴ He died in a stable-yard in Drury-Lane in 1800, two months after being purchased but had not yet been shipped.¹²⁵

¹¹⁶ Ibid 100.

¹¹⁷ Christopher Plumb, *The Georgian Menagerie: Exotic Animals in Eighteenth-Century London* (London, I. B. Tauris, 2015) 136-137.

¹¹⁸ Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799*, 74.

¹¹⁹ Ibid, 75.

¹²⁰ Ibid, 74.

¹²¹ Caroline Grigson, *Menagerie: The History of Exotic Animals in England* (Oxford, Oxford University Press, 2015) 101.

¹²² Plumb, *The Georgian Menagerie: Exotic Animals in Eighteenth-Century London*, 136-137.

¹²³ Grigson, *Menagerie: The History of Exotic Animals in England*, 112.

¹²⁴ Kees Rookmaaker, John Glannon and Jim Monson, 'Sources on the three rhinoceroses living in London in The Exeter 'Change and The Lyceum from 1790 to 1814' (2015) 42(2) Supplementary Material to *Archives of Natural History* 279-300.

¹²⁵ Clarke, *The Rhinoceros from Dürer to Stubbs 1515-1799*, 75. See also: Plumb, *The Georgian Menagerie: Exotic Animals in Eighteenth-Century London*, 38.

The attraction roused by the Clark Eight provides modern researchers insight into the enduring appeal of the rhinoceros, and this is further demonstrated by its historical valuation in the exotic animal trade. Simons writes of Charles Jamrach who was a renowned London-based dealer from the early 1840s-1880s.¹²⁶ Jamrach's empire extended throughout the imperial world, with agents posted across the colonies collecting his exotic wares. For example, in 1873 Jamrach's agents in Singapore had secured the services of two local hunters referred to as 'the Fernandez brothers' to scout the Malaysian Peninsula for a shipment including 'eight each of rhinoceri, tapirs, tigers and panthers as well as numerous birds.'¹²⁷ The stock of Charles Jamrach was quoted in a 1879 article, including 'a Sumatran rhinoceros (currently on loan to London zoo)' for £1000 and an Indian Rhinoceros called 'Begum' who was purchased from British officers in Burma for £1250.¹²⁸ What followed was a steep decline in the price of exotic animals that saw tigers plummet from £300 to £80, lions from £100 to £20-£25 and elephants from £400 to £120-£150 between the time of Charles Jamrach in 1879 and his son Albert Jamrach in 1903.¹²⁹ It appears that the rhinoceros was impervious to this downturn with its price remaining stable at £1000 in 1903. Simons attributes this partially to its 'great size and rarity.'¹³⁰ Indeed, the rhino has proven to be a particularly charismatic example of megafauna across historical eras.

The Clarke Eight, in particular the Diirer rhinoceros and Clara, have left their indelible mark on Western perceptions of their kind. Their legacy of inspiring artists across centuries to emulate their likeness in the visual medium remains testament to the species' appeal. Salvador Dali became enthralled with both the rhino and its horn, referring to the latter's structure as divine geometry.¹³¹ A selection of his inspired works include: *Paranoic-Critical Study of Vermees Lacemaker* (1955), *Rhinocerotidae* (statue based on Diirer 1956), *Rhinoceronte vestido con puntillas* (1956), *Velasquez painting the Infanta Margarita* (1958), *Aphrodisiac Rhino Horns*, *Monde fantastique, comes de rhinoc* (1965), *Nude on a rhinoceros horn* (1967), *Rhinoceros* (1968), *The Laser Unicorn Disintegrates the Horns of the Cosmic Rhinoceros* (1974) and *Le vierge et le rhinoceros* (1976). So enamoured was Dali with the animal that he and collaborator Philippe Halsman included a photograph of Dali face-to-face with a rhino in their 1954 compendium *Dali's Mustache*. Photographer Annie Leibowitz reinterpreted the iconic image in a 1996 photo shoot for *Vanity Fair* featuring actor Nicholas Cage. Adding to its pop culture credentials, Andy Warhol produced a screen print entitled *Black Rhinoceros* as part of his *Endangered Species* series in 1983.

Non-Western Accounts

¹²⁶ John Simons, *The Tiger that Swallowed the Boy: Exotic Animals in Victorian England* (Faringdon, Libri Publishing, 2012); John Simons, 'The Scramble for Elephants: Exotic Animals and the Imperial Economy'. In Melissa Boyde (ed), *Captured: The Animal within Culture* (New York, Palgrave Macmillan, 2014) 26-42.

¹²⁷ Simons, *The Tiger that Swallowed the Boy: Exotic Animals in Victorian England*, 33.

¹²⁸ Ibid, 33.

¹²⁹ Simons, 'The Scramble for Elephants: Exotic Animals and the Imperial Economy'. In Boyde (ed) *Captured: The Animal within Culture*, 31.

¹³⁰ Ibid, 31.

¹³¹ Ridley, *Clara's Grand Tour*, 135.

In assessing the broad appeal of the rhino, it is necessary to examine non-Western representations of the rhinoceros, certainly given its Asian and African origins. To address the westernisation of rhinoceros iconography, Heller asks *Why Has the Rhinoceros Come from the West?*¹³² Allusions to rhinos are made in a number of Eastern spiritual traditions. In Chan rhetoric, for example, an exchange between Dongshan Liangjie and one of his students sees the master utilise the metaphor of a 'chicken-scaring rhinoceros.'¹³³ In Buddhist scripture, the *Rhinoceros Sutra* advises the practitioner to be like the rhinoceros (or rhinoceros horn) in avoiding attachments to the superlative or material. In the *Discourses on the Causes and Conditions of the Pratyeka-Buddha* we find the line '[The pratyeka-buddha] is like the rhinoceros's one horn, leaving far behind the company of disciples.' Another passage expands on the theme of singularity: 'silently preserving his integrity, constantly in a state of detachment, he dwells in still and silent places such as mountains and forests, and along-side ravines and streams. Because his mind courses in quietude, he has nothing to say. It is like the horn of the rhinoceros, solitary in its travels.'¹³⁴

The rhinoceros was referred to as *xi* or *si* in ancient China.¹³⁵ Preceding the Tang Dynasty (618-906 AD), the Shang (1600- 1050 BCE) and Zhou (1046- 256 BCE) controlled rhino populations, with the 'beasts' being driven out as a necessary part of civilisation. In support of this claim, Heller cites the example of Mencius who, when listing the Duke of Zhou's accomplishments, praises him for 'expelling tigers, leopards, rhinoceroses, and elephants so that they were far away.'¹³⁶ During Tang rule it roamed an area including western and southern Hunan and adjacent areas, with some also allegedly ranging across Hunan, Hubei, Guizhou and Sichuan. They were hunted for their hides and horns to make shields and drinking vessels. In fact, the practice of using rhinoceros hides for armour originated well before Tang rule. Harris refers to a chapter entitled 'the Story of Goujian Descend upon Wu' in the book *the History of Wu and Yue* which speaks of a general named Goujian who ruled the Southeast China coastal provinces having amassed an army of 130,000 soldiers 'armed with suits of rhinoceros skin.'¹³⁷ This not only illustrates the sheer scale of production using rhinoceros skin, but indicates that there would have been a substantial population of rhinoceros in China during the 4th century BC.

¹³² Natasha Heller, 'Why Has the Rhinoceros Come from the West? An Excursus into the Religious, Literary, and Environmental History of the Tang Dynasty' (2011) 131(3) *Journal of the American Oriental Society* 353-370.

¹³³ *Ibid*, 353.

¹³⁴ *Ibid*, 357.

¹³⁵ Margrit Harris, 'China and the Rhino', *NIKELA* <http://www.nikela.org/wp-content/uploads/2011/03/Ebook China and the Rhino.pdf> accessed 11 March 2016, 4.

¹³⁶ *Ibid*, 355.

¹³⁷ Harris, 'China and the Rhino', 6.

Horns were also fashioned into ritual sceptres known as *ruyis* and used as hair pins in royal attire.¹³⁸ Working primarily from tax and tribute records offered to the throne, scholars have found that the horn was categorised as both a medicinal and luxury item. Records also show that some horns were described as *tongtian*- a term denoting extraordinary properties and even a passage to heaven.¹³⁹ The *Baopuzi* by Ge Hong is the most widely cited source that explains these qualities:

*...the horn can part water, providing safe passage across rivers. It is also known to scare chickens when employed as a vessel for their feed, a property that extends to frightening other birds, and in other sources even to foxes. The horn can also aid in keeping courtyards free of moisture, and is luminescent. Elsewhere the rhinoceros horn is said also to dispel dust.*¹⁴⁰

Hong also suggests that the horn may be used as an antidote for poison arrow wounds as well as for poison detection generally. As a technique to acquire the valued *tongtian* horn, Hong encourages readers to locate a spot where a rhinoceros 'sheds and drops their horn' each year, make a replica out of wood and return it to that spot as a substitute, allowing them to take the true horn and ensure that the rhino returns to shed at that spot the following year.

The rhinoceros was also the subject of poetry in Chinese culture. In particular, Heller refers to two Chinese poems, *Tame Rhinoceros* by Yuan Zhen (809 AD) and *Ballad of the Stone Rhinoceroses* by Du Fu (712-770 AD). The former speaks of a rhinoceros offered as tribute, but died in the Imperial Park from the bitter cold.¹⁴¹ The latter tells the story of the third century protagonist Li Bing who sought to guard his irrigation system from flooding by the Min River.¹⁴² He created five stone rhinos to satiate the water spirit. Heller goes on to explain Du Fu's extended metaphor where rhinos were associated with 'methods to suppress things,' further linked with 'strange beings' like demons and monsters contrasted with the natural order, good government as the 'way of former kings,' and a means to control water.¹⁴³

Where Heller's representation accounts for rhino iconography in Buddhism, Majupuria provides a brief description of some of the rhino's connotations within Ancient Hindu culture.¹⁴⁴ Not dissimilar to other societies, the rhino was the subject of woodworks and sculptures, some being depicted on the seals of the Indus Valley Civilization, as statues on the steps of the Temple of Batsala Devi in Bhaktapur and even portrayed in artwork

¹³⁸ Heller, 'Why Has the Rhinoceros Come from the West? An Excursus into the Religious, Literary, and Environmental History of the Tang Dynasty', 355.

¹³⁹ Ibid, 358. See also Margrit Harris, 'China and the Rhino', 8.

¹⁴⁰ Ibid, 358.

¹⁴¹ Ibid, 360-1.

¹⁴² Ibid, 367-70.

¹⁴³ Ibid, 369.

¹⁴⁴ T. C. Majupuria, *Sacred and symbolic animals of Nepal: animals in the arts, culture, myths and legends of the Hindus and Buddhists* (London, Sahayogi Prakashan, 1977).

depicting them living among domesticated animals in the Indus Basin.¹⁴⁵ Consistent with the Western sources examined so far, the desire to pit animal against animal for human entertainment was also prevalent. In his account of Lucknow, Abdul Halim Sharar states that at the time of Nasir ud Din Haidar there were fifteen or twenty fighting rhinoceroses kept at Chand Ganj.¹⁴⁶ Further, at the time of King Ghazi ud Din Haidar, some rhinoceroses, besides being made to fight, were supposedly so pacified that they were harnessed to carts and mounted by riders.¹⁴⁷ Rookmaaker, Vigne and Martin provide commentary on rhinoceros fights in India in considerable detail.¹⁴⁸ An account of Mogul Emperor Shah Jahan (1627-1658) states that the ruler would 'witness contests between elephants and other wild animals, such as lions, tigers, *abbadas* or rhinoceros, and wild buffalos.' The authors elaborate on the description of Nasir ud Din Haidar, adding that the rhinos were prepared for battle by ingesting stimulants and that rhino-rhino fights were a regular pastime in the 1820s.¹⁴⁹ The authors also refer to two later incidents in Baroda in 1864 and 1875. The first was recounted by the French traveller Rousselet in his 1877 book entitled *L'Inde des Rajahs* including a particularly detailed description of a typical fight where opposing rhinos were chained at opposite end of the arena with their horns painted either black or red to aid spectators in distinguishing between the opponents.¹⁵⁰ In the second, in November 1875, the Rajah was entertaining the Prince of Wales when the rhinos withdrew from combat after a few passes and could not be convinced to continue even when attendants proceeded to throw cold buckets of water onto the competitors and thrust at them with lances.¹⁵¹ It is unlikely that the similarities in the use of rhinos in the public life of leaders, be it in formal processions or as part of arena fights, across Greco-Roman, European and South Asian cultures are mere historical coincidence. An explanation may be extracted from Enright's example of Ptolemy II where the rhino became 'an exotic symbol of his empire...a representative of lands he had explored, conquered, and held tame.'¹⁵² Reflecting on this notion, perhaps the common thread between the societies who arranged these duels is less about attitudes toward the rhino itself, but rather located within the broader context of empire wherein rulers or the ruling classes demonstrated their ability to exercise dominion as part of public spectacle. Herein, the rhino was forced into a narrative where it was paradoxically a powerful device and subjugated victim.

The cultural significance of the Indian Rhinoceros in its homeland is inextricably linked with the region's colonial past. The species was on the brink of extinction in the early 1900s (fewer than 50 Indian Rhinos in 1910) due to the mass conversion of alluvial plains grasslands to agricultural development which resulted in an increase in human-rhino

¹⁴⁵ Ibid, 128.

¹⁴⁶ Abdul Harim Sharar, E S Harcourt and Fakhir Hussain (trans and eds) *Lucknow: the last phase of an oriental culture* (London, Paul Elek, 1975) 120.

¹⁴⁷ Ibid, 120.

¹⁴⁸ L. C. Rookmaaker, Lucy Vigne and Esmond Bradley Martin, 'The Rhinoceros Fight In India' (1998) 25 *Pachyderm* 28-31.

¹⁴⁹ Ibid, 28.

¹⁵⁰ Ibid, 29.

¹⁵¹ Ibid, 29-31.

¹⁵² Enright, *Rhinoceros*, 29.

conflict.¹⁵³ Rashkow writes of the colonial regime's extensive vermin eradication programme in which 'subaltern *shikaris*' (a class of poor, rural hunters) were employed.¹⁵⁴ The programme 'targeted tigers, wolves, bears and other species identified by the state as 'dangerous beasts.'¹⁵⁵ In fact, Martin, Martin and Vigne indicate that these eradication schemes had a greater impact on rhino populations than hunting for sport, with the government offering a bounty of Rs20 for killing a single rhino, and where 'a rhino rampaging a tea plantation was anathema.'¹⁵⁶ That is not to say that sport hunting, which had become common in the late 1800s and early 1900s, did not contribute to the decline of the species, for example in West Bengal and Assam, the Maharajah of Cooch Behar boasted of having shot 207 himself between 1891 and 1907.¹⁵⁷ The wildlife population declines of the early twentieth century coincided with the introduction and enforcement of laws targeting locals as poachers, and so hunting tribes were forced to stop their traditional means of existence and become 'detribalised,' and local hunters sought employment with elite British sports hunters¹⁵⁸

Rashkow describes how hunting became a locus for Indian-Western conflict, suggesting that a variety of motivators explains Hindu interest in the conservation of some species (including religion, 'anti-colonial consciousness, assertions of local authority and territoriality and an environmental ethic').¹⁵⁹ While the conservation laws of the empire were dominantly informed by the 'sportsman's ethic' by the mid-twentieth century, conflict between sportsmen and villagers in India periodically moved the British to institute measures to 'regulate the types of weapons, methods, times, places, and species permissible for hunting.'¹⁶⁰ While no express mention is made to rhinos in Rashkow's analysis, the period studied overlaps with the establishment of what is now Kaziranga National Park, which became a reserve in 1905 for the last 10-20 Indian rhinos in Assam, and was found to be home to 70% of the global species population in May 2007.¹⁶¹

¹⁵³ Talukdar, B.K., Emslie, R., Bist, S.S., Choudhury, A., Ellis, S., Bonal, B.S., Malakar, M.C., Talukdar, B.N. & Barua, M. 2008. *Rhinoceros unicornis*. The IUCN Red List of Threatened Species. Version 2014.3, accessed January 30, 2015. www.iucnredlist.org.

¹⁵⁴ Ezra Rashkow 'Making subaltern shikaris: histories of the hunted in colonial central India' (2014) 5(3) *South Asian History and Culture* 292-313, 292.

¹⁵⁵ Ibid, 292.

¹⁵⁶ Esmond Bradley Martin, Chryssee Bradley Martin and Lucy Vigne, 'Conservation crisis — the rhinoceros in India' (1987) 21(4) *Oryx* 212-218, 212.

¹⁵⁷ Ibid.

¹⁵⁸ Ibid, 293.

¹⁵⁹ Ezra Rashkow, 'Resistance to Hunting in Pre-independence India: Religious environmentalism, ecological nationalism or cultural conservation?' (2012) 49(2) *Modern Asian Studies* 270-301, 288. Rashkow refers to local resentment over India becoming the 'happy hunting grounds of the British' and specifically cites negative Hindi and Urdu press concerning atrocities committed by the British while hunting. Further, on page 283, the author indicates that 'Caste Hindus, Jains, and Bishnois in Marwar often attempted to protect wild animals from any, and all, hunters.'

¹⁶⁰ Ibid, 299.

¹⁶¹ Talukdar, B.K., Emslie, R., Bist, S.S., Choudhury, A., Ellis, S., Bonal, B.S., Malakar, M.C., Talukdar, B.N. & Barua, M. 2008. *Rhinoceros unicornis*. The IUCN Red List of Threatened Species. Version 2014.3, accessed January 30, 2015. www.iucnredlist.org. Kaziranga became a formal reserve forest

Conservation of the Indian Rhinoceros was supported further in 1910 when the government officially outlawed rhino hunting, although poaching remained a constant threat to recovering populations.¹⁶² Given the rate of decline in the late nineteenth century, it appears that some form of developing conservation ethic was at play in the *in situ* protection of the species in the early twentieth century.

Lastly, an analysis of non-western rhinoceros significance would be incomplete without an examination of the Black and White Rhinos of Africa. A particularly pivotal study was undertaken by Boeyens and van der Ryst who collated ethnobiological, archaeological, linguistic and historical ethnographic data to ascertain the significance of the African rhinoceros in agro-pastoralist communities.¹⁶³ The authors located similarities in the meaning of the rhino between groups of varying adherence to class structures.¹⁶⁴ For example, the Mapungubwe (a class-based society) not only adopted a golden rhino as an 'emblem of royal power,' but would present the breast meat of a rhinoceros as tribute to the chief who would carry a rhino horn club as 'the symbol of the dignity of the chief' (and who could have the head of a decapitated rhino served to rivals to send a political message).¹⁶⁵ Horns were also fashioned into 'receptacles for rainmaking medicines, whereas rhino bones, especially foot and leg bones, became important elements in rainmaking rites.'¹⁶⁶ Finally, rhinoceros figurines were 'used as didactic tools during initiation ceremonies' providing instruction on values, laws and other subjects.¹⁶⁷ Black and White Rhinos were also significant to the Sotho-Tswana (a less-stratified society) who had five distinct names for the former and two for the latter (in addition to the generic term *tshukudu* used for both).¹⁶⁸ Rhinos were employed as a device in poems of praise for Tswana chiefs where the anterior horn was wielded as a weapon of attack and defence, with its 'cutting action' representing the chief's authority to make final decisions. This metaphor carried as a reference in the architecture of nineteenth century Tswana central courts and appeared on the entrances and walls of Venda and Zimbabwe cultural locales.¹⁶⁹ Results across communities demonstrated that belief in the cultural and symbolic

in 1908, a game sanctuary in 1916, and officially closed for shooting in 1926. Following the independence of India, it was declared a wildlife sanctuary in 1950. In 1954, the Assam (Rhinoceros) Bill was passed by the Assam Legislative Assembly to impose serious sanctions for poaching. The passing of the *Assam National Park Act of 1968* was required to declare Kaziranga a national park as existing forestry instruments did not provide for the creation of national parks. The national park was granted status by the government on 11 February 1974 and several expansions have occurred since. Kaziranga National Park was declared a World Heritage Site by UNESCO in 1985.

¹⁶² Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 113.

¹⁶³ Jan C. A. Boeyens and Maria M. van der Ryst, 'The cultural and symbolic significance of the African rhinoceros: a review of the traditional beliefs, perceptions and practices of agropastoralist societies in southern Africa' (2014) 26 *Southern African Humanities* 21-55.

¹⁶⁴ *Ibid*, 21.

¹⁶⁵ *Ibid*, 49.

¹⁶⁶ *Ibid*, 49.

¹⁶⁷ *Ibid*, 48.

¹⁶⁸ *Ibid*, 49.

¹⁶⁹ *Ibid*, 49.

significance of African rhinos was widely entrenched for an expansive period of time among south-eastern Bantu speakers.¹⁷⁰ For instance, conceptions of leadership could be derived from the traits of both species, wherein the Black Rhinoceros reflected a more aggressive and solitary archetype in comparison to the more sociable, protective and territorial White Rhinoceros.¹⁷¹

PART III: THE RHINO HORN: MORPHOLOGY AND CONSUMER DEMAND

What emerges from the analysis in Part II is a longitudinal collective experience of rich human fascination with the rhinoceros that persists today. Yet, it is not exclusively the innate qualities of the rhinoceros as it exists in reality that accounts for the extent of its appeal. It is the anthropocentric value-laden interpretation of the rhinoceros, as symbol and caricature, which has imposed cultural significance beyond its physical presence, extraordinary as it is. This captivation spans millennia, transcends cultural bounds, and paradoxically drives some to save the rhinoceros and others to kill it. The relentless market for rhino horn embodies the interminable desire to possess a piece of the animal as a token or for other uses. It was best put by Rabinowitz who observed that ‘the focus of our obsession with the animal has revolved around the protuberance of hardened hair on the animal’s head known as rhino horn.’¹⁷² Accordingly, the following section of this chapter will examine the morphology and uses of rhino horn to better understand the science of its composition and traditional use as a pharmacological agent.

Horn Morphology

Dinerstein provides a succinct description of rhinoceros horns. Of the five species, Black and White Rhinos have the largest horns, bearing both an anterior and posterior horn.¹⁷³ The anterior horn of a Black Rhinoceros can reach 130cm, whereas its posterior horn ranges widely from 2–55cm. By comparison, the anterior length of a White Rhinoceros typically ranges from 94-102cm, whereas the posterior can grow up to 55cm. The Sumatran Rhino also has two horns, and while some horn specimens identified have been large (25-80cm), these are generally much smaller than the other four species. The Indian and Javan species possess a single horn, with males of both species averaging a length of 25cm. Horns grow from the base (as much as 7cm annually in White Rhinos).

A formative study of horn morphology was published by Ryder.¹⁷⁴ The investigation found that unlike sheep or cattle horns which fray into sheets, rhino horn frays into tubules (filaments). In fact, the author mused that the myth of rhino horn simply being matted hair arose from the appearance of this fraying. Ryder’s work was corroborated by a study

¹⁷⁰ Ibid, 21

¹⁷¹ Ibid, 21.

¹⁷² Alan Rabinowitz, ‘Sumatran Rhino Conservation’ (1995) 9(1) *Conservation Biology* 482-488, 482.

¹⁷³ Dinerstein, ‘Family Rhinocerotidae (Rhinoceroses).’

¹⁷⁴ M. L. Ryder, ‘Structure of Rhinoceros Horn’ (1962) 193(4821) *Nature* 1119-1201.

published in 1973 by Lynch, Robinson and Anderson.¹⁷⁵ The team studied the horn of a White Rhinoceros using a scanning electron microscope and reported findings 'broadly consistent' with Makinson¹⁷⁶, Earland et al¹⁷⁷ and Ryder. Hieronymus, Witmer and colleagues¹⁷⁸ have also contributed significantly to the literature on rhinoceros horn morphology, emphasising that unlike most ungulate horns, the rhino horn lacks a bony core, but is instead anchored to the skin covering the frontal and nasal bone.

A more contemporary overview of the horn was provided by Yang in 2011.¹⁷⁹ The primary component of rhinoceros horn is keratin, which is a tough, fibrous protein. Keratins exist in many biological materials and form the protective covering of all land vertebrates: skin, fur, hair, wool, claws, nails, hooves, horns, scales, beaks, and feathers.¹⁸⁰ Keratinous structures are composed of dead cells that are packed full of the keratin,¹⁸¹ and so the horn cannot immediately repair itself once broken. While keratin is the primary component of rhinoceros horn, calcium and melanin affect the behaviour and structure of the horn: calcium deposits harden and strengthen keratin, while melanin deposits protect the core from ultraviolet rays.

The research into horn morphology has been harnessed for conservation aims. In 2003, Amin, Bramer and Emslie of the African Rhino Specialist Group published a paper exploring the technology behind horn fingerprint identification and how it could be employed to gather intelligence, monitor illegal supply chains and provide evidence for criminal prosecutions.¹⁸² The study found that it is possible track the movement of a rhino by analysing the chemistry of its horn because the composition of the horn reflects what the animal has consumed over time (the analysis is aided by knowledge of the types of food sources available in different regions as influenced by other variables such as climate).¹⁸³ The scale of the study was unprecedented, and with the financial assistance of the World

¹⁷⁵ L. J. Lynch, V Robinson and C. A. Anderson, 'A scanning electron microscope study of the morphology of rhinoceros horn' (1973) 26 *Australian Journal of Biological Sciences* 395-399.

¹⁷⁶ K. R. Makinson, 'The elastic anisotropy of keratinous solids' (1954) 7(3) *Australian Journal of Biological Sciences* 336-347.

¹⁷⁷ C. Earland, P. R. Blakey and J.G.P. Stell, 'Molecular orientation on some keratins (1962) 196(4861) *Nature* 1287-1291.

¹⁷⁸ T. Hieronymus, T. Witmer and R.C. Ridgely, 'Structure of white rhinoceros (*Ceratotherium simum*) horn investigated by X-ray computed tomography and histology with implications for growth and external form' (2006) 267 *Journal of Morphology* 1172-6; T. Hieronymus and T. Witmer, 'Rhinoceros horn attachment: anatomy and histology of a dermally influenced bone rugosity' (2004) 260(3) *Journal of Morphology* 298.

¹⁷⁹ Sam Yang, *A Review of Rhinoceros Horn*, May 2, 2011. Franklin W Olin College of Engineering (ENGR3810 Structural Biomaterials).

¹⁸⁰ *Ibid*, 3.

¹⁸¹ S. A. Wainwright et al, *Mechanical Design in Organisms* (Princeton, NJ, Princeton University Press, 1982) 187-190.

¹⁸² Rajan Amin, Max Bramer and Richard H Emslie, 'Intelligent data analysis for conservation: experiments with rhino horn fingerprint identification' (2003) 16(5) *Knowledge-Based Systems* 329-336.

¹⁸³ *Ibid*, 330.

Wildlife Fund, samples from 27 Black Rhino populations and 22 White Rhino populations were collected with coverage across South Africa, Namibia, Kenya, Swaziland and Zimbabwe.¹⁸⁴ This began the establishment of a continental horn database still utilised today.

Established uses for rhino horn: Trophies, Traditional Medicines, Cups and Dagger Handles

Much of the literature on rhino horn consumption focuses on 'exotic' or 'oriental' uses and ignores the demand posed by Western trophy hunting. Western sport hunting was discussed earlier in relation to the Indian rhinoceros, however rhino hunting continues today predominantly on the African continent. In his discussion of 'consumptive wildlife tourism' ('a form of leisure travel undertaken for the purpose of hunting or shooting game animals, or fishing for sports fish, either in natural sites or in areas created for these purposes')¹⁸⁵ Lovelock identifies North America and Western Europe as significant longitudinal nodes of both supply and demand for the international market. South Africa, Zimbabwe and Botswana remain part of the 'mainstay of outbound CWT,' whereas Mozambique, Ethiopia, Central African Republic, Congo and Cameroon are categorised as emerging destinations.¹⁸⁶ Trophy hunting is a type of CWT that entails the killing of wild animals for their body parts, such as head and hide, for display but not primarily for food and sustenance. A study by Radder suggests that trophy hunters possess a range of motivators 'within realms of spiritual, emotional, intellectual, self-directed, biological and social motives.'¹⁸⁷ Further, hunter typologies extend beyond the imperialist archetype (e.g. meat hunters, nature hunters, sports hunters).¹⁸⁸ This is supported by photographer David Chancellor who released his acclaimed monograph entitled 'Hunters' in 2012, and observed that 21st century trophy hunters 'include hedge fund managers, doctors, attorneys, their wives and children.'¹⁸⁹ The most viable data as to consumption in the West comes from the United States. Data collected from the US Fish and Wildlife Service between 2005-2014 found that more than 1.26 million wildlife trophies, spanning nearly 1,200 species, were imported into the US, mostly from Canada and South Africa (other highly ranked countries included: Namibia, Mexico, Zimbabwe, New Zealand, Tanzania, Argentina, Zambia and Botswana).¹⁹⁰ Of the 32,500 'Big Five' trophies imported, 337 were Southern White Rhino trophies (317 trophies, and 20 pairs of horns imported exclusively from South

¹⁸⁴ Ibid, 330.

¹⁸⁵ Brent Lovelock (ed), *Tourism and the Consumption of Wildlife: Hunting, Shooting and Sport Fishing* (Milton Park, Abingdon, Routledge, 2007), 5.

¹⁸⁶ Ibid, 8-9.

¹⁸⁷ L. Radder, 'Motives of International Trophy Hunters' (2005) 32(4) *Annals of Tourism Research* 1141-1144, 1143.

¹⁸⁸ Lovelock (ed), *Tourism and the Consumption of Wildlife*, 4; Stephen R. Kellert, *The Value of Life: Biological Diversity and Human Society* (Washington D.C., Island Press, 1997), 71-72.

¹⁸⁹ Tom Seymour, "After a kill, some pray, some smoke": the man who shot the trophy hunters', *The Guardian*, 5 August 2015.

¹⁹⁰ Humane Society of the United States, *Trophy Hunting by the Numbers: The United States' Role in Global Trophy Hunting*, February 2016, 1.

http://www.hsi.org/assets/pdfs/report_trophy_hunting_by_the.pdf.

Africa).¹⁹¹ Two Black Rhino trophies were also imported from Namibia in 2015, including one shot after the Dallas Safari Club auctioned off a permit for USD\$350,000. By comparison, the cost of a Southern White Rhino hunt generally ranges between USD\$55,000- USD\$150,000. US based safari clubs drive 'Big Five' hunting in Africa through global competitions and large hunting conventions. Indeed, 2009 estimates indicate that of the 18,500 trophy hunters who visit Africa annually, nearly 15,000 are from the US. Moreover, the American desire to hunt Big Game was unscathed by a 7% decline in hunting participants in between 1991-2001, which also saw a 29% increase in expenditure.¹⁹² With the debate around 'conservation hunting' resurfacing in recent times, it is important to factor in western consumer typologies, particularly in assessing whether regulation is possible to avoid intersection with the illicit market, or whether this would merely provide another driver.

While the West's use of rhino horn is primarily for ornamental display, the dominant use in Asia is in Traditional Chinese Medicine (TCM).

It should not be taken by pregnant women; it will kill the foetus. As an antidote to poisons (in Europe it was said to fall to pieces if poison were poured into it). To cure devil possession and keep away all evil spirits and miasmas. For gelsemium [jasmine] and snake poisoning. To remove hallucinations and bewildering nightmares. Continuous administration lightens the body and makes one very robust. For typhoid, headache, and feverish colds. For carbuncles and boils full of pus. For intermittent fevers with delirium. To expel fear and anxiety, to calm the liver and clear the vision. It is a sedative to the viscera, a tonic, antipyretic. It dissolves phlegm. It is an antidote to the evil miasma of hill streams. For infantile convulsions and dysentery. Ashed and taken with water to treat violent vomiting, food poisoning, and overdose of poisonous drugs. For arthritis, melancholia, loss of voice. Ground up into a paste with water it is given for hematemesis [throat hemorrhage], epistaxis [nosebleeds], rectal bleeding, heavy smallpox, etc.¹⁹³

The extract above appears in Read's 1931 translation of Li Shih-Chen's 1597 *materia medica*, *Pen Ts'ao Kang Mu*. It explains the plethora of symptoms and afflictions rhino horn was alleged to remedy. A keen observer may note that the category of ailments is left open by the use of 'etc' at the end of the account. As the author is regarded as a key proponent, if not the father of TCM, it may assist to understand his methods within the context of the broader practice and beliefs underpinning TCM.

¹⁹¹Ibid, 18-19.

¹⁹²Lovelock (ed), *Tourism and the Consumption of Wildlife*, 10.

¹⁹³ B. E. Read, 'Chinese Materia Medica: Animal Drugs' (1931) 5(4) *Peking Natural History Bulletin* 37-80.

TCM is comprised of 'a system of medical practices embedded in the ethic which understands health-as-balance.'¹⁹⁴ There is a general objective to reinstate balance by curing and preventing imbalances caused by illness. The concept of *Qi* as the vital energy of life is fundamental, as when the body is in a state of imbalance it requires a readjustment to ensure *Qi* is restored. Where deficiencies occur, there is a choice of eight therapeutic methods: diaphoretic, emetic, downward, dispersing, mediating, warming, clearing, and tonifying.¹⁹⁵ When a therapeutic method is established, a therapeutic strategy (or *materia medica* formula) is assembled. It is at the point that *yao* is introduced.¹⁹⁶ The *Chinese Medical Dictionary* defines *yao* as 'all objects or substances which can be used to treat diseases'¹⁹⁷ whereas the Kang Yan Classical Chinese Dictionary defines *yao* as 'those categories which can heal diseases such as grass, trees, metal, stones, birds, beasts, insects, fishes.'¹⁹⁸ The principle behind the use of *yao* is that each possesses its own condensed *Qi* factor which may be used to restore a patient's balance. In the marketplace, Asian horns (known as 'fire' horns) are more valuable than African horns (known as 'water' horns) as consumers typically believe that their smaller size indicates a more concentrated potency.¹⁹⁹ A nationwide survey covering 80% of China's land area conducted from 1983-1988 found there were 12,807 *yao* in China.²⁰⁰ Of these, 1,581 had animal origins and only 160-220 of those were considered commodified for clinical use. An earlier study had similarly found that only a portion of animal species were used commonly, citing a figure of 60 commonly used of approximately 900 animal species.²⁰¹

Following the Opium Wars, China's ports opened to the West resulting in the inter-cultural exchange of medical techniques, ingredients and approaches to healing. In an article published in *The Lancet*, Scheid provides a succinct categorisation of how TCM is integrated into China's healthcare system.²⁰² The practice delivers almost 40% of total health-care services in China and has the same legal status as western medicine. It is government supported and is predominantly hospital based. In addition to the almost 3,000 dedicated hospitals, over 95% of western hospitals have Chinese medicine wards and outpatient departments. Scheid identifies three methods by which TCM is integrated into China's

¹⁹⁴ Felix Patton, 'Understanding Chinese Medicine- the Scourge of the Rhino' (2011) 4 *SWARA, Nairobi* 38-40.

¹⁹⁵ *Ibid*, 39.

¹⁹⁶ Rey Tiquia, 'Tiger bones, Rhino Horns, Bear Bile, Manchurian Ginseng and Traditional Chinese Medicine Practice in Australia' Proceedings of the Second Australian Symposium on Traditional Medicine and Wildlife Conservation, Melbourne, Australia March 1999, 52.

¹⁹⁷ *Ibid*, 52.

¹⁹⁸ *Ibid*, 52.

¹⁹⁹ J. Still, 'Use of animal products in traditional Chinese medicine: environmental impact and health hazards' (2003) 11 *Complementary Therapies in Medicine* 118-122, 119; David Holt-Biddle, 'Rhino Horn: Miracle Medicine or Mythical Magic?' 13(4) *REF News* 5.

²⁰⁰ H. Y. Zhang, 'Categories of China's material Medica Resources' (1995) 7(20) *Journal of Chinese Materia Medica* 387-390; Tiquia, 'Tiger bones, Rhino Horns, Bear Bile, Manchurian Ginseng and Traditional Chinese Medicine Practice in Australia', 53.

²⁰¹ L. Han, *A glossary of Chinese-Latin-English Names in Animal Medicine Materials*. (Fuzhou, China, Fujian Science & Technology Press, 1992).

²⁰² Volker Scheid, 'The Globalisation of Chinese Medicine' (2000) 354 *The Lancet* December 10, 10.

healthcare system as follows: (1) the use of TCM drugs or treatment techniques to enhance effectiveness of biomedical treatment or manage its side-effects, (2) use as a medical system in its own right, and (3) an integration of both Chinese and Western medicine.²⁰³ The internationalisation of TCM sees it now practiced in one form or another by more than 300,000 practitioners in over 140 countries.²⁰⁴

As demonstrated in Li Shih-Chen's account, rhino horn was alleged to be a veritable one-stop-shop remedy in the Chinese pharmacopoeia. Looking to other jurisdictions, Martin and Martin examined popular trends in rhino horn use in the Taiwanese market, listing these as: 'tranquilizers, relieving dizziness, building energy, nourishing the blood, curing laryngitis or simply, as the old snake-oil salesman would have it "curing whatever ails you."' ²⁰⁵ In Nepal they found a wider use of rhinoceros anatomy, wherein rhino urine is said to ease asthma, congestion and stomach disorders, rhino meat is consumed with spices to ward off disease, rhino liver is eaten to cure tuberculosis and rhino kneecaps are used to create oil lamps for religious ceremonies or turned into charcoal (which when fired produce fumes to cure disease in penned cattle). ²⁰⁶ There have even been accounts of rhino horn being used to relieve distemper in lapdogs in Taiwan.²⁰⁷ In surmising the regional use of rhino anatomy in traditional medicine, Leader-Williams found that Chinese, Burmese, Thai and Nepalese practices utilise a variety of rhino parts whereas Japanese and Korean communities exclusively use the horn.²⁰⁸ In 1985, Martin advanced that the Nepalese use more parts of the rhino than any other people in the world for religious, medicinal, and decorative purposes such as bracelets, earrings and walking sticks.²⁰⁹ In doing so, Martine offered the following example of the range of products made from a single rhino: '[i]n 1938, when Kiran Shumsher Rana, the son of the Prime Minister then, shot a rhino in southern Nepal, he gave almost all of its skin to a craftsman in Patan to make a spice container, a flowerpot, picture frames, two table lamps, a chandelier, a bowl and a jewel box, all of which he still keeps as very special treasures.'²¹⁰

Fascinatingly, Li Shih-Chen did not explicitly mention one purpose that preoccupies Western perceptions of the Eastern consumption of rhino horn. Authors including Martin,²¹¹ Ellis²¹² and Dinerstein²¹³ concur that the supposed widespread use of rhino horn

²⁰³ Ibid, 10.

²⁰⁴ Ibid, 10.

²⁰⁵ Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 124; C. B. Martin and E. B. Martin, 'Profligate spending exploits wildlife in Taiwan' (1991) 25(1) *Oryx* 18-20.

²⁰⁶ Ibid, 114.

²⁰⁷ David Holt-Biddle, 'Rhino Horn: Miracle Medicine or Mythical Magic?' 5.

²⁰⁸ Nigel Leader-Williams, TRAFFIC, *The World Trade in Rhino Horn: A Review* (1992, TRAFFIC International and the People's Trust for Endangered Species) 4.

²⁰⁹ E. B. Martin, 'Religion, royalty and rhino conservation in Nepal' (1985) 19(1) *Oryx* 11-16; Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 114.

²¹⁰ Ibid.

²¹¹ E. B. Martin, 'Deadly love potions' (1987) 90(1) *Animal Kingdom* 16-21.

²¹² Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 121-3.

as an aphrodisiac in TCM is no more than a myth purported by Western writers, perhaps aided by both the phallic shape of the horn as well as the animal's capability to copulate for as long as ninety minutes, with the male achieving climax at two minute intervals.²¹⁴ Up until recently, rhinoceros horn was used as an aphrodisiac only by the Gujarati community in India,²¹⁵ with contemporary evidence now suggesting that some is being used for this purpose in Vietnam, consumed as *tuu giac* ('rhino wine') as a sexual enhancer for men.²¹⁶ It should be noted, however, that other parts of the rhino are used for aphrodisiac purposes. For example, some people from northern India, Burma, and northern Thailand consume rhino blood, urine, and penises for sexual enhancement. Further, in Nepalese medicine, the penis is sold dried and then rehydrated and consumed to cure impotence.²¹⁷ By way of more recent concerns over horn consumption, TRAFFIC identified four user typologies in the Vietnamese market ('the terminally or seriously ill', 'habitual users on the social circuit', 'protective young mothers' and 'elite gift givers').²¹⁸

Efforts have been made to curb the use of rhino horn in traditional practices in some countries. President of the American College of Traditional Medicine, President of Council of Colleges of Acupuncture and Oriental Medicine and council member of the WWF, Lixin Huang, has spearheaded recent movement to see endangered animals taken off the shelves of the TCM pharmacopeia. On the topic of rhino horn, Huang issued a statement, reiterating that rhino horn is no longer appropriate for use in traditional Chinese medicine and called for the members of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora*²¹⁹ (CITES) Standing Committee to take strong action where breaches occur. In the 2014 article *Rhino is No Medicine* Huang responded decisively to popularised myths, stating that rhino horn is not a cure for a hangover or cancer.²²⁰ It should also be noted that the reasons against animal yao in TCM are numerous and extend beyond conservation goals. In 2003, Still argued that the use of animal parts in TCM was a direct threat to public health through the transmission of infectious diseases between human and non-human species. Even discounting this concern over zoonotic disease, there is an obvious set of risks flowing from the lack of quality control in the life cycle of many of the products used (from collection, manufacturing and distribution), particularly in relation to those traded illegally. For example, a study of 260 Chinese patent medicines imported to the USA uncovered that almost half contained potentially harmful levels of contaminants,

²¹³ Ibid, 123; Eric Dinerstein, *The Return of unicorns: The Natural History and Conservation of the Greater One-Horned Rhinoceros* (New York, Columbia University Press, 2003).

²¹⁴ Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 121.

²¹⁵ Nigel Leader-Williams, TRAFFIC, *The World Trade in Rhino Horn: A Review*, 4.

²¹⁶ Tom Milliken and Jo Shaw, TRAFFIC, *The South Africa-Viet Nam Rhino Horn Trade Nexus: A deadly combination of institutional lapses, corrupt wildlife industry professionals and Asian crime syndicates* (2012, TRAFFIC) 122.

²¹⁷ Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 114.

²¹⁸ Milliken and Shaw, TRAFFIC, *The South Africa-Viet Nam Rhino Horn Trade Nexus: A deadly combination of institutional lapses, corrupt wildlife industry professionals and Asian crime syndicates*, 134-7.

²¹⁹ *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, opened for signature 3 March 1973, 993 UNTS 243 (entered into force 1 July 1975).

²²⁰ Lixin Huang, 'Rhino horn is no medicine' (2014) 2966 *New Scientist*, April 26 2014.

such as heavy metals (lead, arsenic and mercury), drugs (ephedrine, salicylates, caffeine, phenacetin, etc) and other potentially harmful chemicals.²²¹

Measures to ban the use of rhino horn in TCM have run in tandem with the funding of research into viable alternative materials. In 1991, Paul Pui-Hay But, Yan-Kit Tam and Lai-Ching Lung found that the most effective substitute is buffalo horn (saiga horn had also been tested).²²² The team replicated an antipyretic effect when using herbs specified in the traditional Qingying Decoction,²²³ suggesting that water buffalo horn can be used as a substitute for rhinoceros horn in treating hyperthermia. These findings were consistent with results from the School of Pharmacy, Beijing Medical University in 1979 which found that rhino horn was 80% effective in treating Epidemic Encephalitis B whereas buffalo horn was 82.4% effective, and in treating febrile diseases rhinoceros horn was 67.8% effective whereas buffalo horn was 70% effective.²²⁴ The search for alternatives has also sparked debate over the use of artificial synthetics.²²⁵ Biotech company Pembient and competitor Rhino Horn LLC have announced current projects underway to manufacture synthetic rhino horn for commercial use aided by new technology such as 3D printers.²²⁶ While some studies have endorsed the position that rhinoceros horn possesses medicinal qualities, consensus indicates that the narrow scope of afflictions it allegedly treats have readily available alternatives from both traditional and conventional medicine.

In addition to its use as yao, Li Shih-Chen advocated the use of the horn as a drinking vessel to reveal the presence of poison. He explains 'the unicorn horn is a safe guide to tell the presence of poison: when poisonous medicines of liquid form are stirred with a horn, a white foam will bubble up, and no other test is necessary.'²²⁷ Anne and Steve Toon have tested this claim and found that 'improbable as it sounds, there may be some justification for the belief as the alkaloids present in some poisons do react strongly with the keratin and gelatin in horn.'²²⁸ Beyond traditional cups, another customary practice associated with rhino horn is the use of *jambiyas* in Yemen. *Jambiyas* are daggers given to young Yemeni boys as a rite of passage into young adulthood. The horn is not used for the blade, but rather the handle of the dagger, and because the handle is not shaped like the horn

²²¹ J. Still, 'Use of animal products in traditional Chinese medicine: environmental impact and health hazards', 118-122.

²²² Paul Pui-Hay But, Yan-Kit Tam and Lai-Ching Lung, 'Ethnopharmacy of rhinoceros horn. II: antipyretic effects of prescriptions containing rhinoceros horn or water buffalo horn' (1991) 33 *Journal of Ethnopharmacy* 45-50.

²²³ Portion by weight: 3 parts rhino horn, Other 8 herbs are (Bambusa 1, Coptis (1.5), Forsythia (2), Lonicera (3), Ophiopogon (3), Rehmannia (5), Salvia (2) and Scrophularia (3).

²²⁴ Healthy People-Healthy Wildlife Proceedings of the Second Australian Symposium on Traditional Medicine and Wildlife Conservation (Melbourne Australia March 1999) Dr Jerry (Jiangsheng) Zhang.

²²⁵ Ibid.

²²⁶ Zoë Corbyn, 'Can we save the rhino from poachers with a 3D printer?' *The Guardian*, May 24, 2015.

²²⁷ Ellis, *Tiger Bone & Rhino Horn: The Destruction of Wildlife for Traditional Chinese Medicine*, 77.

²²⁸ Ibid, 78; Anne Toon and Steve Toon, *Rhinos: Natural History and Conservation* (World Life Library/ Voyager Press, 2002).

wastage runs to over 60%, with the remains sent to pharmacological factories.²²⁹ The relationship between poaching and the jambiya market has been studied, drawing direct correlation between the rise in Saudi income and rates of African rhino poaching.²³⁰ Prior to the 1970s few could afford an authentic rhino horn jambiya, however this changed in the 1980s due to an increase in lucrative employment prospects linked to the Saudi oil boom. There was a sevenfold increase in the per capita income in Yemen during that time and a twentyfold increase in the price of rhino horn. Yemen then became the world's largest market for rhino horn. The collapse in oil prices in the mid-1980s coupled with a government ban on rhino horn imports significantly decreased the trade; however a black market still exists driven by northern tribesmen and younger affluent men in the capital Sana'a.²³¹

CITES action between the late 1980s and early 1990s, together with individual state action to give effect to its provisions (e.g. the United States 'pellying' under the Clinton administration)²³² significantly reduced the global trade in rhinoceros horn as reflected in poaching data sets.²³³ According to TRAFFIC's 2014 report, poaching effectively stopped in the early 1990s, with incidents remaining limited in the early 00s (e.g. from 2002-2005 an average of 56 rhinos were illegally killed across Africa per year, increasing to an average 61 rhinos per year in 2006 and 2007).²³⁴ A dramatic increase occurred in 2008 with a loss of 262 animals, with nearly two-thirds killed in Zimbabwe during a period of economic instability and mass land reforms.²³⁵ TRAFFIC correlates the year 2008 with the reintroduction of Vietnam into the horn trade and emergence of China as a key consumer country.²³⁶ By way of international trends, TRAFFIC reported global killings of 745 rhino in 2012 and 1090 rhino in 2013,²³⁷ and 148 rhino horn seizure cases in 21 countries between 2009 and September 2014.²³⁸

Conservation campaigning in destination countries has recently sought to inculcate a conservation-conscious consumer culture to reduce the demand driving rhino extinction. In Hanoi, Vietnam, this has included billboards targeting mothers, and the distribution of the Humane Society International book *I'm a Little Rhino* in primary schools. The African Wildlife Foundation and WildAid partnered to produce a series of campaigns targeting Chinese consumers by harnessing celebrity influence to inspire change. For example, in

²²⁹ Ibid, 98.

²³⁰ Ibid, 96.

²³¹ Ayling, *What Sustains Wildlife Crime? Rhino Horn Trading and the Resilience of Criminal Networks*, 60.

²³² Steve Charnovitz, 'Environmental Trade Sanctions And The GATT: An Analysis Of The Pelly Amendment On Foreign Environmental Practices' (1994) 9(3) *American University Journal of International Law and Policy* 751-807.

²³³ Tom Milliken, TRAFFIC, *Illegal Trade In Ivory And Rhino Horn*, 14.

²³⁴ Ibid, 15. During this time a poaching decline in Kenya was offset by a major increase in Zimbabwe.

²³⁵ Ibid.

²³⁶ Ibid, 23.

²³⁷ Ibid, 15.

²³⁸ Ibid, 18.

2016 they launched the *Nail Biters* campaign (featuring Li Bingbing, Cheung Kun, Jing Boran, Chen Man, Richard Branson and Maggie Q) in addition to the earlier *Say No* ads starring Yao Ming and *Tools of the Trade* campaign starring Jackie Chan.²³⁹

CONCLUSION

The value of many wildlife products is not limited to economic price but is rather inextricably linked to the cultural practices and historically-laden significance of both the commodity and its animal of origin. The breadth of human captivation by the rhinoceros remains informed not only by the evolutionary resilience that bore it miraculously into the 21st century, but by a multiplicity of depictions since the *Coleodonta antiquitatis* was painted onto the walls of the Chauvet-Pont-d'Arc. As time progressed, these representations were accompanied by short stories and tall tales that sometimes found their way into the natural histories of the species to its detriment. As demonstrated in Part III, myth can yield influence centuries removed, whereupon Western musings of rhino powder as an Eastern aphrodisiac has now become reality. This provides but one example of where a historiographical understanding of folklore could reset popular narratives to improve conservation outcomes.

So entrenched is the history between humans and rhinos that the international market in its horn persists decades after the 1977 *CITES* ban. Even if a decrease in horn use were to occur across any number of sovereign states, the danger would always remain that, like many cultural activities subject to fashion and trends, its use could return *in vogue* and initiate the next great extinction of the rhinoceros, assuming it survives the current poaching crisis. As outlined in Part I, the impact on rhinoceros populations has been palpable, including extinctions of regional populations and entire subspecies. For regulatory responses to be truly effective, conservation strategies must not only be robust in their standards and enforcement, but drafted with full acknowledgement of the established uses, including cultural connotations and significance, of the commodity being traded. That is, policies need to be scientifically evidenced, historically informed and culturally aware. As the global ecosystem faces down the Holocene extinction, interdisciplinary approaches may well yield the most effective solutions to contend with the illicit trade in wildlife.

²³⁹ It is difficult to track and compare the precise impact of consumer campaigns and NGOs as there is currently no standard set of objectives between campaigns or method to measure outcomes being applied to consumer behavior research in these regions.