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The Politico-Economic Impact of the Horse on Old World Cultures: An Overview

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The Politico-Economic Impact of the Horse on Old World Cultures: An Overview

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New York City

This overview examines the impact of horsepower on Old World¹ society over the last 6,000 years. Analysis of man's symbiosis with the domesticated horse necessarily takes the reader to regions remote from urban centers and pays special attention to mobile elements of nomadic society, too often deemed marginal or transitory. The discussion first grapples with the question of horse domestication on the steppes c. 4000 BC, a topic long fraught with bitter controversy. With the recent dissolution of the Soviet Union, however, Russian scholarship became more accessible, and rapport has grown warmer between western and eastern researchers. In light of new evidence and new interpretations, our discussion will attempt to summarize at a high level the salient points of scholarly debate: the general location at which initial horse domestication took place; the manner in which domestication was accomplished; and way in which the horse underwent the transition from being a food-providing animal to its transport role in pack, draft, and riding.

By examining early Indo-European² migrations and those of later ethnic groups, we will note both the important adaptations that enabled intrepid agro-pastoralists to traverse the hostile continental interior and the momentous impact of mobile equestrianism on cultures beyond the

¹ Kelekna is author of the 2009 publication *The Horse in Human History* (New York: Cambridge University Press), a broader work that assesses the impact of equestrianism worldwide. In this brief overview article, however, she restricts her commentary to the Old World.

² For authoritative discussions of this topic, see Mallory 1996, *In Search of the Indo-Europeans: Language, Archaeology, and Myth*; Mallory and Adams 1997, *Encyclopedia of Indo-European Culture*; Mallory and Mair 2000, *The Tarim Mummies: Ancient China and the Mystery of the Earliest Peoples from the West*; Anthony 2007, *The Horse, the Wheel, and Language: How Bronze-Age Riders from the Steppes Shaped the Modern World*.

steppes. While it is true that mobile horsemen relentlessly harassed the imperial armies of sedentary states, it is also true that their far-ranging routes across forbidding steppes, deserts, and mountains afforded rapid transport of distant trade goods, both essential and exotic. With trade went cultural exchange: adoption of different cultigens, implementation of new technologies, introduction of foreign inventions, dissemination of ideas, diffusion of religions, the spread of science and art. The history of the horse explores this dual reality: on the one hand, in battle the destructiveness of the warhorse, yet on the other, in the wake of conquest, the constructiveness of horsepower in greatly extending the scale and complexity of civilization. The politico-military and economic importance of the horse will thus be examined in the rise of the Hittite, Achaemenid, Chinese, Arab, and Mongol empires.

Events Prior to 4000 BC

First, though, let us take stock of significant evolutionary developments in the Old World that long preceded 4000 BC and the domestication of the horse.

The Neolithic: Agriculture and Animal Domestication

The earliest unambiguous evidence for agriculture, primarily wheat and barley, dates to the eighth millennium BC in Southwest Asia, along the woodland and steppe oases of the Levantine corridor and the mid-Euphrates valley.³ By the seventh millennium BC, in the lower montane valleys of the Taurus and Zagros ranges,⁴ we find the earliest firm indications of sheep and goat domestication.⁵ Cattle domestication followed a millennium later; the pig was one further participant in the farming complex. Around 4000 BC the donkey was domesticated in Nubia, and by the third millennium BC the Persian onager was herded east of the Tigris.⁶ Following its establishment in the nuclear area, Near East farming underwent rapid expansion,

³ In China, the shift to food production occurred a little later than in the West, earliest rice domestication taking place in the seventh millennium BC.

⁴ The Taurus mountains are located in southern Anatolia (Turkey) and the Zagros in western and southwestern Iran, extending westerly across Iraq's eastern border. The Tigris and the Euphrates rivers flow from the mountainous region between these two ranges into Syria and Iraq.

⁵ The dog was domesticated as a companion of the hunt during the Paleolithic.

⁶ Harris 1996, "The Origins and Spread of Agriculture and Pastoralism in Eurasia: An Overview," pp. 554, 558.

west to Europe, south to North Africa, and east across southwestern Asia to the Indian subcontinent. As farming radiated outward to different climates, experimentation was conducted with local wild species.

The Concomitant Development of Metallurgy

Also dating to the eighth millennium BC, metallurgy was another important technological innovation along the pathway to civilization, with the first uncontested copper artifacts encountered on the upper reaches of the Tigris River in aceramic Anatolia. By the beginning of the fifth millennium BC, across Anatolia, Mesopotamia, and as far afield as Iran, entire cultures had modest copper assemblages and lead ornaments.⁷ Alloying followed, first copper with arsenic, then tin, to produce bronze. Gold and silver were principally sumptuary products. All these varied advances in polymetallism were critically important in promoting the mass reduction of ores and paving the way chemically for the much later industrial utilization of iron.⁸

Emergence of the Centralized Alluvial States

With the intensification of farming and metallurgy, in fact long, long before the invention of iron, another important evolutionary development had occurred—the emergence of the state. The first pristine state, Sumer, arose at Uruk in Mesopotamia toward the end of the fifth millennium BC; Egypt emerged in the fourth millennium; and the Harappa civilization of India in the third.⁹ The Tigris-Euphrates, Nile, and Indus valleys shared one feature in common: all three were areas of abundant fertile agricultural land but circumscribed by inhospitable deserts, mountains, or seas. According to Carneiro,¹⁰ the concentration of rich river alluvium attracted large numbers of people who came into conflict over the premium territory. In the ensuing warfare, however, because of environmental restriction, defeated groups could not flee to the forbidding, arid hinterland, but instead were forced into subjugation by their victors and incorporated into increasingly complex political units. In this manner it is thought the centralized

⁷ Chernykh 1992, *Ancient Metallurgy in the USSR: The Early Metal Age*, p. 3.

⁸ Wertime 1973, "The Beginnings of Metallurgy: A New Look," p. 883.

⁹ In the Far East, Shang civilization would emerge in the second millennium BC.

¹⁰ Carneiro 1970, "A Theory of the Origin of the State."

state first evolved, encompassing large populations, collecting taxes, enforcing laws, organizing systematic flood control and extensive irrigation, and drafting men to work and war. The environmentally circumscribed alluvial states of the Middle East thus set the course of early civilization in the Old World.

By contrast, in the moister, non-circumscribed regions, as was noted, agricultural populations were free to expand into different habitats, there to develop new strains of cultigens. In their early fluid dispersal from the sixth to third millennium BC, tribal farmers developed different craft specializations and coalesced in autonomous fortified settlements, but nowhere did they attain the extraordinary political centralization of the circumscribed alluvial state. Yet population increase, naturally resulting from sedentary adaptation, exerted pressure on land and impelled splinter groups to migrate further and further afield, into outlying areas only marginally suited to agriculture. It is to one of these fringe areas of mixed farming and herding on the eastern borders of Europe we must now turn, to view the inception of a radically new mobile subsistence adaptation. Whereas, in circumscribed environments, the pristine states would soon develop monumental architecture, public art, writing, mathematics, science, medicine, and legal codes, on the steppes, it would take millennia for nomadism to fully mature. But in time, steppe equestrians would collide with and challenge the sedentary circumscribed civilizations that had earlier emerged.

Peripheral Farming and Eneolithic¹¹ Exploitation of the Horse on the Eurasian Steppes

From the preceding very brief synopsis of the beginnings of farming and metallurgy in southwest Asia, it is clear that the horse was not an immediate domesticated of the early Neolithic; nor was it native to the Near East, site of so many items of primary domestication. Throughout much of western and central Europe, exploitation of the horse as a food source had drastically decreased its numbers; while small pockets of wild horse populations possibly still persisted, these were too rare to play any essential role in the domestication of *Equus caballus*. To find the first domesticators of the horse, it is necessary to look for protracted human interaction with wild horses. This occurred only in the transitional area between the forest and grasslands of the Eurasian steppes, an ideal habitat for wild horses where large numbers had managed to survive

¹¹ Eneolithic, also known as Chalcolithic or Copper Age, is the transitional period between the Neolithic and the Bronze Age.

into post-glacial times.¹² It is to this ecozone that we must follow the farmer–herder–metallurgist in his initial adaptation to the steppes in order to understand fully the significance of man’s earliest symbiosis with the horse and the nature of agro-pastoralist expansion across Eurasia.

The earliest food-producing economies, whereby cattle, ovicaprids, pigs, cereals, ceramics, and hammered copper technology were first introduced onto the western steppes, originated in the lower Danube valley. First, c. 5600 BC, the Danubian Cris culture, traversing the forest-steppe fringes of the North Pontic region, encountered there thriving hunting-fishing populations, some of which adopted elements of Cris subsistence, giving rise to the first indigenous Neolithic cultures of the region. Shortly into the fifth millennium BC, processes of social integration resulted in the establishment of a second, far more hierarchical Danubian culture, the Cucuteni-Tripolye, which extended from the Carpathian piedmont to the Dnieper River, later trading large quantities of copper and gold artifacts east to the lower Volga.¹³ As agriculture and stockbreeding diffused eastward, attendant clearance of gardens and pastures in the constricted steppe-zone river valleys caused deforestation and reduction of wild resources. In the face of fish and game scarcity, to supplement the meat supplied from stockherding, hunters were forced to turn to the open steppe, where the wild horse became the dominant game animal. So great were the accumulations of horse bones encountered in osteological assemblages (61% in the case of Dereivka on the middle Dnieper c. 4000 BC), it was claimed this was a consequence not just of hunting, but of actually herding and riding horses. In support of such propositions, antler tine objects were cited as evidence of bridle cheek pieces.¹⁴ It was further asserted that, as a result of harnessing with a bridle, biting damage was inflicted on the mesial or anterior edge of the second premolars or P_{2S} (adjacent to the mandibular diastema where the bit is positioned), thereby causing a distinctive, quantifiable signature.¹⁵ Most recently, at Botai in the Ishim drainage, from residue left on ancient potsherds, the isotope deuterium, indicative of mare’s milk, was identified. Since it is impossible to milk a wild mare, such data along with skeletal evidence on metacarpal metrics indicate that at least a proportion of the horse population

¹² Bokonyi 1994, "The Role of the Horse in the Exploitation of the Steppes," p. 20.

¹³ Anthony 1991, "The Domestication of the Horse," pp. 256–257.

¹⁴ Telegin 1986, *Dereivka: a Settlement and Cemetery of Copper Age Horse Keepers in the Middle Dnepr*.

¹⁵ Brown and Anthony 1998, "Bit Wear, Horseback Riding and the Botai Site in Kazakstan," p. 331.

at Botai was domesticated c. 3500 BC.¹⁶ Genetic findings also suggest that, due to stallion irascibility, once having satisfactorily domesticated a male, horse breeders preferred to augment their herds by capturing the more docile wild mares.¹⁷

Despite this multi-faceted research, opposition to dating horse domestication and riding to the fourth millennium BC has been raised on several counts. Levine maintains the horses at Botai, as at Dereivka, were a wild population and dismisses Brown and Anthony's work on bit wear, charging that a large bevel can be produced naturally through pathological malocclusion.¹⁸ Historian Robert Drews similarly objects to the identification of rough antler objects as bridle cheek pieces, since in antiquity antlers were used for a wide variety of tools. Yet he disagrees with Levine with regard to domestication and supports the position that horses were probably domesticated c. fourth millennium BC. He recognizes that during the Paleolithic the horse was hunted extensively for its meat, but notes that the late Mesolithic saw a drop in horse population and, by the sixth millennium BC, the once-plentiful wild horses had disappeared from Europe west of the steppes. Notwithstanding, on the Pontic-Caspian steppe dependence on the horse continued, albeit with a slight decline and subsequent rebound in the Dnieper region. Drews interprets this local resurgence along with the dramatic increase in the number of horse bones in deposits across the Dnieper, Don, Volga, Ural, and Ishim valleys as clear evidence of horse domestication. He finds these data are further corroborated by the re-appearance—after a total absence of three millennia—of high numbers of butchered horse bones in the osteological assemblages of eastern and central Europe, which he attributes to domestication of the horse as a food-animal, diffusing westward from the steppes into adjacent regions toward the end of the fourth millennium BC.¹⁹ Drews also remarks the dramatic first appearance of the horse in funerary context in central Europe during the third millennium BC, noting that ritual association with other livestock next to human burial certainly implies the horse as a domesticate.²⁰ Nevertheless he is sharply critical of the claim that horse-riding originated in the fourth

¹⁶ Outram, Stear, Bendrey et al. 2009, "The Earliest Horse Harnessing and Milking," pp. 1334–1335.

¹⁷ Olsen 2006, "Early Horse Domestication: Weighing the Evidence," p. 81.

¹⁸ Levine 1999, "The Origins of Horse Husbandry on the Eurasian Steppe," pp. 11–12.

¹⁹ Drews 2004, *Early Riders: The Beginnings of Mounted Warfare in Asia and Europe*, pp. 11–12, 16–18.

²⁰ *Ibid.*, pp. 24–25.

millennium BC, asserting that no clear pictorial depiction of a horse rider exists anywhere much before 2000 BC.²¹

This last criticism is accurate in that the earliest unambiguous representations of a rider mounted on a horse are in fact evidenced in Afghanistan 2100–1800 BC²² and in Ur III 2050–2040 BC,²³ certainly challenging the hypothesis that riding was adopted shortly after horse-keeping was initiated. The ritual involvement of the horse in funerary context, observed by Drews for central Europe, however, was also widely manifested across the western steppes, where a most ancient sacrifice was practiced. Following ceremonial consumption of meat, the skin of the horse, still retaining skull and hoofs, was suspended on a pole over a kurgan burial. Retention of the bones in the head, feet, and tail helped maintain the form of the hanging horse, which from afar might be perceived as in flight. Thus, by the Eneolithic, the horse had come to play a prominent role not only in subsistence practices, but also in the belief system and mortuary rites of these agro-pastoralists. This latter point is further substantiated by the presence of ritually carved bone horse figurines in Eneolithic burials at Khvalynsk, Syezzhe, and Varfolomievka, in the Volga drainage.²⁴ The horse was also conspicuously represented in ceremonial observances as far east as Botai, where in one instance human skeletons were encircled by the skulls, vertebrae, and pelvises of 14 horses. Such simultaneous sacrifice of so many animals strongly implies the availability of a domesticated herd; to procure such a number from the wild would require transport over distance of 6,350 kg of horseflesh.²⁵ The differences between the viewpoints expressed above are clearly provocative. It is to be hoped that ongoing research and debate will clarify and resolve these issues in the near future.

²¹ *Ibid.*, pp. 31–34.

²² Sarianidi 1986, "Mesopotamiia i Baktriiia."

²³ Owen 1991, "The 'First Equestrian': An Ur III Glyptic Scene."

²⁴ Anthony and Brown 2000, "Eneolithic Horse Exploitation in the Eurasian Steppes: Diet, Ritual, and Riding," pp. 80–81.

²⁵ Olsen 2003, "The Exploitation of Horses at Botai, Kazakhstan," pp. 94, 98–99.

Wheeled Transportation

By the mid-fourth millennium BC, the Yamnaya (Pit grave) horizon, a series of diverse societies adopting a common stockbreeding-agricultural economy, developed semi-nomadic pastoralism on the western steppes. Derived from the earlier Dereivka, Syezzhe, and Khvalynsk cultures that had first ventured onto the steppe, Yamnaya effectively accomplished the earliest systematic grassland occupation, extending west to the Danube delta and east to the Ural River. These Yamnaya agro-pastoralists were proto-Indo-European (PIE) speakers and their migrations constituted the first major radiation of ancient Indo-European languages across Eurasia.²⁶ An important innovation, the acquisition of ox-drawn wheeled technology, helped facilitate this expansion in all directions.²⁷ There had been earlier migrations eastward, to Botai as noted, also c. 3600 BC to Afanasievo on the Yenisei River. But now carts and wagons would deliver the critical bulk transport capability that carried cultivators and tools to the field and delivered farm produce to the settlement. Wheeled technology also made systematic manuring possible, thereby opening areas of less productive soils to agricultural development.²⁸ Across the steppes, wheeled vehicles provided the additional function of transporting the supplies necessary for herders to live dispersed in remote areas with their animals for protracted periods.²⁹ Along with stocks of provisions, bedding, tents, and personal accoutrements, the very young, old, and infirm could travel safely, driving their herds to seasonal pastures as far as 80 km away from major river valleys. Alternatively, with its arched tilt of mats or felt, the covered wagon afforded habitation; in Pit graves, covered carts have been unearthed which constituted houses on wheels.³⁰ In the latter half of the fourth millennium BC, splinter groups also dispersed westward, migrating along the Danube valley as far as Croatia and Poland, the resultant Baden culture featuring hill-top fortifications. Westward contacts further north extended from the upper Volga to the Rhine, as

²⁶ Anthony 1991, "The Archaeology of Indo-European Origins," p. 214.

²⁷ Between 3400 and 3100 BC, carts and wagons appeared over a large area almost simultaneously in: Mesopotamia, central Europe, and on the Russian-Ukrainian steppes, reaching to the Rhine and the Indus by 3000 BC.

²⁸ Anthony 1995, "Horse, Wagon and Chariot: Indo-European Languages and Archaeology," pp. 558, 563.

²⁹ Anthony 1998, "The Opening of the Eurasian Steppe at 2000 BCE," pp. 102–103.

³⁰ Shilov 1989, "The Origins of Migration and Animal Husbandry in the Steppes of Eastern Europe," p. 123.

reflected in the Corded Ware culture, its eastern variant, the Fatyanovo-Balanovo, reaching into the northerly forest region of Russia.³¹

In the context of these migrations, the domesticated horse very probably functioned as a pack animal, its speed and high gait invaluable in traversing stretches of rugged terrain and fording rivers and streams.³² And while fully competent riding may not yet have been realized, rudimentary riding, in the form of herding animals, exploring for water, and prospecting for new mineral resources, likely was practiced. In fact, Yamnaya mobility was critical in the transport of metals and the spread of metallurgy across the steppes. With the advent of the Bronze Age, Yamnaya metalworkers were the first to intensively exploit steppe ores; they alloyed arsenic with copper to make tanged daggers, pins, and flat axes; they even experimented with iron.³³ But, almost certainly, the horse at first was not deployed in draft. Pole-and-yoke draft was originally designed for paired bovinds drawing the plow, the yoke attached to the horns or resting on the oxen's necks. Such a system however, when applied to hauling a wagon (weighing possibly as much as 700 kg), was ill-suited to equine anatomy, horses having slenderer necks and a much higher head carriage. When a horse was harnessed in this primitive manner, there was a tendency for the yoke to slip back, bruising and chafing the horse's withers; if the yoke were secured forward, straps constricting the animal's throat reduced tractive power.³⁴ The two-wheeled cart was unquestionably the lighter, more resilient vehicle. From the archaeological record, it is evident that efforts were underway, such as wickerwork sides of the cart, planked rather than the original solid disc wheel, later fenestrated openings or cross-bar construction, to lessen overall vehicular weight³⁵—very possibly in order to adapt the cart to horse traction.

On the steppes, c. 2300 BC, systematic agro-pastoralism was spreading far to the east beyond the Ural River, probably in response to the need for metal ores from the Ural mountains in order to manufacture hard bronze weapons. Migrations penetrated deep into the eastern steppes and forests, to areas previously uninhabited or only sparsely populated by hunter-

³¹ Mallory and Adams 1997, *Encyclopedia of Indo-European Culture*, pp. 43, 127, 196.

³² Mair 2003, "The Horse in Late Prehistoric China: Wrestling Culture and Control from the 'Barbarians,'" pp. 181.

³³ Anthony 1998, "The Opening of the Eurasian Steppe at 2000 BCE," pp. 103–104.

³⁴ Littauer and Crowell 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, pp. 11, 28–29.

³⁵ Mallory and Adams 1997, *Encyclopedia of Indo-European Culture*, p. 627.

gatherers. Hundreds of new sources of copper ores were located in Kazakhstan, the Altai, and the desert regions of Central Asia.³⁶ From the Don-Volga to the upper Ural basin, the important bronze production culture of Abashevo was established predominantly in forest-steppe zones. Seams were reached by open quarry or drift mine. Eventually tin deposits, rare in the west, were located as far afield as the upper Irtysh, gold was mined in the Dzungarian Alatau mountains, and, with transition to the Iron Age, bimetallic (bronze and iron) tools began to appear.³⁷ Widespread demand for valuable metals thus had led to far-flung exploratory prospecting in distant zones. At this time, population movement was no longer in a single direction; initial migration was followed by counter-stream, returning to the place of origin with reports of outlying opportunities and inciting new efforts at exploration and further colonization; lessons learned from novel situations were widely shared across society.

On the Ural-Tobol steppe, a region rich in copper and gold ores, forts at Sintashta and Petrovka (2200–1900 BC) were surrounded characteristically by defensive walls, composed of clay blocks and vertical pine logs with a timber palisade above. Traces of numerous fires and rebuilding attest to an unstable military situation and the necessity of fortifications for frequent defense of mines and metallurgy production centers.³⁸ In these formative cultures of the eastern steppe, funerary observances had become increasingly elaborate for an emergent chiefly class, featuring burials in which deceased warriors equipped with weaponry were accompanied by sacrificial offerings of horses. In addition, excavations in cemeteries of these strongholds uncovered spoke-wheeled chariots interred alongside funereal remains. Clearly derivative from the western steppe,³⁹ these mortuary offerings followed a thousand-year-long western-steppe tradition for which more than one hundred cart and wagon burials have been discovered; the chariot axle length was practically the same as the earlier steppe wagons, arguing for local evolution rather than foreign borrowing.

³⁶ Anthony 1998, "The Opening of the Eurasian Steppe at 2000 BCE," p. 107.

³⁷ Chen and Hiebert 1995, "The Late Prehistory of Xinjiang in Relation to Its Neighbors," pp. 249, 285.

³⁸ Kuzmina 2007, *The Origin of the Indo-Iranians*, pp. 32, 223.

³⁹ Mallory and Adams 1997, *Encyclopedia of Indo-European Culture*, pp. 520–521.

Such findings provide the earliest incontrovertible record of rapid horse transport. Weighing less than 34 kg, one-twentieth the weight of ancient wagons,⁴⁰ horse-drawn chariots were a new breed of vehicle, infinitely lighter and swifter than the older solid-wheeled conveyances. Sintashta draft horses were purebred, semi-thinned-legged, and stood 13–14 hands at the withers.⁴¹ Chariot wheels comprised eight to twelve spokes mortised into a separate navel. Extensive experimentation had been undertaken in order to engineer this sophisticated vehicle for the express purpose of harnessing the superior speed of the horse. North of Sintashta, at Krivoie Ozero, two horse skulls interred with a chariot yielded a date of 2026 BC. Next to the two horse skulls, amidst bronze weapons, lay four disk-shaped bone cheek pieces;⁴² horse bones together with similar shaped cheek pieces have been found in sites across the Volga, Don, and Donets regions.⁴³ In fact, it appears widespread experimentation with different types of bridling was undertaken at this time. Concurrent usage of shieldlike (with or without tenons), grooved, and rodlike cheekpieces indicates an intensive quest for the most efficient form.⁴⁴

Soon, the invention of the yoke saddle would adapt the vehicle yoke to horse anatomy. This was accomplished by suspending from the yoke two inverted v-shaped yoke saddles, designed to fit neatly over the neck of the horse, forward of the withers. By lying along the animal's shoulders, the legs of the yoke saddle transferred part of the pressure to this area. The horses were then secured to the yoke saddle by leather straps that ran separately across the neck of the horse and to its mouth to join with the organic or metallic bit. Additional horses would be fastened only by traces, their tractive power proportionately reduced. But in that these outer animals experienced less pressure, they tended to set a faster pace, thereby stimulating the yoke animals to increase their speed.⁴⁵ The rapid success of the chariot across the steppes was evidenced by innumerable petroglyphs of multi-spoke-wheeled chariots with teams of two, three,

⁴⁰ Piggott 1992, *Wagon, Chariot and Carriage: Symbol and Status in the History of Transport*, pp. 17–18.

⁴¹ Kuzmina 2008, *The Prehistory of the Silk Road*, p. 44.

⁴² Anthony and Vinogradov 1995, "The Birth of the Chariot," pp. 38–40.

⁴³ Kuzmina 2000, "The Eurasian Steppes: the Transition from Early Urbanism to Nomadism," p. 119.

⁴⁴ Kuzmina 2007, *The Origin of the Indo-Iranians*, p. 115.; Kuzmina 2008, *The Prehistory of the Silk Road*, p. 52.

⁴⁵ Littauer and Crouwel 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, pp. 29, 85.

or four horses from the Caucasus in the west across the Pamirs, the Mongolian Altai to the Gobi desert in the east,⁴⁶ showing clear examples of yoke saddles and mid-placed axles.⁴⁷

Horse Expansion into the Near East

To the south in the Near East, solid-wheeled battle wagons drawn by teams of donkeys or donkey-onager hybrids had been deployed in Mesopotamian warfare since 2800 BC. As attested by seal impressions at Karum Kanesh II (Kultepe), a four-spoke-wheeled war chariot—driven by a single figure brandishing a battle-axe and drawn by two horses controlled by lines attached to nose rings—was operative in Anatolia c. 1950–1850 BC. Not only did the light horse-drawn chariot render the clumsy battle wagons of the third millennium immediately obsolete, the critical innovation of harnessing with bridles, bits, and reins soon replaced the archaic methods of nose-ring and nose-band equid control throughout the Near East.⁴⁸ Utilized for hunting, military, and ceremonial purposes, in the course of the second millennium BC, the light horse chariot would diffuse rapidly westward to the Aegean and Central Europe,⁴⁹ south across the steppes to India,⁵⁰ and finally east toward China.

But, from the appearance of a word for horse in cuneiform texts of the Ur III period, we know that by the end of the third millennium BC steppe horse culture first penetrated the Near East.⁵¹ From the Eurasian steppes, various groups migrated south toward this nuclear area of earliest civilization, destroying Akkad in 2300 BC.⁵² In Anatolia at Alaca Huyuk, 2200 BC chiefly kurgan burials have been uncovered containing solar discs and theriomorphic standards characteristic of the Pontic steppe region. By early second millennium BC, Assyrian cuneiform tablets showed that Indo-European languages were spoken across Anatolia; Hittite was the first

⁴⁶ Littauer 2002, "Rock Carvings of Chariots in Transcaucasia, Central Asia, and Outer Mongolia," pp. 106–109, 112–115.

⁴⁷ Shaughnessy 1988, "Historical Perspectives on the Introduction of the Chariot into China," p. 205.

⁴⁸ Drews 2004, *Early Riders: The Beginnings of Mounted Warfare in Asia and Europe*, pp. 49–51.

⁴⁹ Pare 1992, *Wagons and Wagon Graves of the Early Iron Age in Central Europe*, p. 16.

⁵⁰ Parpola 1999, "The Formation of the Aryan Branch of Indo-European," p. 200.

⁵¹ Oates 2003, "A Note on the Early Evidence for Horse and the Riding of Equids in Western Asia," p. 117.

⁵² Macqueen 1996, *The Hittites and Their Contemporaries in Asia Minor*, p. 18.

language written.⁵³ The Hittites were preeminent in iron making, an industry over which they exercised strong political control from their fortress at Hattusas. They also placed great emphasis on the war chariot, engaging Kikkuli from the Hurrian kingdom of Mitanni to oversee the disciplined training of their chariot horses. Kikkuli's strict training-manual details the varied diet and veterinary care provided and how over a seven-month period by alternating gaits, intensifying efforts, and extending distances, the chariot horses were prepared for battle. A conspicuous and highly revealing feature of Kikkuli's technical vocabulary concerning the horse and chariot is its Indo-Aryan origin (see next section).

At the beginning of the seventeenth century BC, the Hyksos introduced the horse-drawn chariot to Egypt, a land they dominated for over a century.⁵⁴ Most chariot wheels of the Near East differed from those of the steppes by having far fewer spokes. And whereas the steppe spoke-wheel was made with spokes mortised into a separate cylindrical nave, late second-millennium-BC Egyptian chariots featured another type of construction: the integral nave, in which the spokes formed a composite part of the nave.⁵⁵ Also, the Near Eastern axle shifted from the center of the rider's box to the rear edge, endowing the vehicle with greater fore-aft stability.

At this time, only limited use was made of the mounted horse in military context. On occasions, the Hittites deployed dispatch couriers on horseback or light mounted auxiliaries in the execution of scouting or surprise tactics. Hittite major focus was always the war chariot. To meet the demands of chariot control, offensive warfare, and self-defense, the Hittites developed a deep enough vehicle to transport a three-man crew: driver, warrior, and a shield-bearing soldier to protect the crew. Crew members wore helmets and armor; horse flank, back, and neck were similarly protected by scale armor. In addition to bow and arrow, the chariot fighter was equipped with sword or spear, thereby achieving tactical advantage in hand-to-hand fighting at close quarters. The chariot was used to combat other chariots, to panic green infantry, and to run them down once they had broken rank.⁵⁶ Deploying the three-man chariot, the Hittites sacked

⁵³ Bryce 1998, *The Kingdom of the Hittites*, pp. 12–13, 17.

⁵⁴ Cotterell 2004, *Chariot: the Astounding Rise and Fall of the World's First War Machine*, p. 96.

⁵⁵ Spruytte 1983, *Early Harness Systems: Experimental Studies*, p. 26.

⁵⁶ Beal 2006, "Hittite Military Organization," pp. 548–549.

both Babylon and Aleppo and in 1286 scored a strategic victory over the Egyptians at the Battle of Kadesh, this conflict involving as many as 7,000 war chariots.⁵⁷

Indo-Aryan Expansion South

The Andronovo (2000–900 BC) were Indo-European speaking agro-pastoralists of the eastern steppes, who with the acquisition of the chariot expanded both east and south. In these wanderings, their language became sufficiently differentiated to form the Aryan branch of the Indo-European linguistic phylum. Their southern migrations toward India, following different routes, extended over a thousand years or more. Moving south from the Tobol-Ishim steppe, their first encounter with settled irrigation agriculturalists in Margiana was hostile. But subsequently across Margiana and Bactria there appears to have been social interaction between the two groups. At different oasis sites, evidence of hallucinogenic beverages, fire cults, and mortuary practices closely matched rituals known to characterize later Swat cultures of Pakistan and those of Vedic India.⁵⁸ Over the centuries, repeated migrations of these Indo-Aryan speaking peoples traveling south toward India was evidenced in the archaeological record by chiefly tombs with models of battle chariots, flourishing metallurgy, and proliferation of weapons.⁵⁹ At Pirak on the Kachi plain, terracotta figurines of mounted horsemen c. 1700 BC are indicative of regular travel on horseback.⁶⁰ The Early Iron Age was signalled by the appearance of Yaz I culture (1500–1000 BC), as the smelting of iron daggers and arrowheads spread from the steppes across the Iranian plateau through Baluchistan to India. Along the Ganges, iron axes were used to clear vegetation and iron ploughs to till soil, earlier impervious to copper and bronze tools.⁶¹ And in the Deccan (800 BC), megalithic stone circles with burials have been found surrounding

⁵⁷ Shaughnessy 1988, "Historical Perspectives on the Introduction of the Chariot into China," pp. 211–213.

⁵⁸ Mallory and Mair 2000, *The Tarim Mummies: Ancient China and the Mystery of the Earliest Peoples from the West*, pp. 260–265.

⁵⁹ Parpola 1999, "The Formation of the Aryan Branch of Indo-European," p. 188.

⁶⁰ Parpola 1988, "The Coming of the Aryans to Iran and India and the Cultural and Ethnic Identity of the Dasas," pp. 150–151.

⁶¹ Wolpert 1993, *A New History of India*, pp. 37–38.

a central mound. In these graves lay sacrificed horses elaborately fitted with iron bits, copper ornaments and trappings, closely paralleling ancient funerary practices of the faraway steppes.⁶²

Thus in the course of a thousand years, southward migrations of Indo-Aryan charioteers significantly impacted southern Asia. While the horse and chariot wrought military and political upheaval, efficient stockbreeding and the introduction of iron strengthened the economies of these lands. But changes were not only political and economic in nature. The invaders also brought with them from the steppes their religion, in which the horse and war chariot featured dramatically in the cosmic symbolism of myth and ritual. From the *Rgveda*, the ten sacred books of Sanskrit hymns, we learn that the horse-chariot was believed to control the sun. Martial symbol of world rule, the horse was carrier of the gods, the white horse drawing the chariot as the primeval force that moves as fast as light.⁶³ Because of its antiquity, the *Rgveda* allows us to trace correspondences with mythical traditions of other Indo-European cultures migrating out of the steppes—into Anatolia, as we have seen, and west into Europe. The oldest of gods, Sanskrit *Dyaus-pitr* (Sky Father), appears in the early verses and has cognates in Greek *Zeus-pater*, Latin *Ju-piter*, and Germanic *Tyr*.⁶⁴ Similarly, the adventures of the Vedic Asvin twins have western parallels in Greek *Castor and Polydeuces*, Roman *Castor and Pollux*, and Saxon *Hengist and Horsa*.⁶⁵

Iranians, Cavalry, and Achaemenids

The war chariot would also reach China. As noted earlier, c. 3600 BC the migration of the Afanasievo culture from the Pontic-Caspian brought agro-pastoralism east to the Altai region, whence in the course of the third millennium BC cattle, goats, and sheep diffused southward to northern China; the domestic horse arrived there later, toward the end of the second millennium BC.⁶⁶ Unheralded by any previous type of wheeled conveyance, the first chariots to reach Anyang, China, appeared abruptly, fully formed at the Shang capital during the reign of

⁶² Parpola 1999, "The Formation of the Aryan Branch of Indo-European," pp. 198–199.

⁶³ Singh 2001, *Vedic Symbolism*, pp. 150, 166–169.

⁶⁴ O'Flaherty 1987, "Indra," p. 214.

⁶⁵ Mallory and Adams 1997, *Encyclopedia of Indo-European Culture*, pp. 161–163.

⁶⁶ Mair 2003, "The Horse in Late Prehistoric China: Wresting Culture and Control from the 'Barbarians,'" p. 163.

Wu Ding c. 1180 BC, displaying remarkable similarities in details of construction and horse gear to mid-second-millennium BC chariot technology encountered in the west.⁶⁷ But another momentous development had occurred in the west around this time. Various graphic representations of horse riders wearing pants and wielding bows and arrows, also, in the Tarim, a Europoid trousered mummy interred with a saddle, conclusively indicate that fully competent riding had finally been achieved. It appears changing ecology and climatic deterioration on the steppes had forced pastoralists to move their large herds through an annual circuit, hundreds of kilometers long, to exploit seasonal availability.⁶⁸ This transfer to extensive pastoral nomadism had certain drawbacks, however. In remote regions of the steppes, herds were ever vulnerable to alien predation. This stimulated the intensification and diversification of offensive weapon production, with horse-riding now at a premium. Earlier organic bits and cheek pieces were replaced by superior metal fittings. Along with these improvements went the progressive development of other horse equipment and better defensive armor for the equestrian combatant.⁶⁹

During the first millennium BC, other Aryan speakers of the Srubnaya culture, a western counterpart of Andronovo, migrated south from the steppes along the shores of the Caspian toward Iran. Later in the millennium, these Iranian speakers would invade the Middle East. In the seventh century BC, Cimmerian cavalry attacked Urartu in Anatolia, then Assyria and Phrygia, while Scythian horsemen undertook devastating raids into Mesopotamia and Syria.⁷⁰ Other Iranians, the Medes, had bred the famous Nisaeen cavalry mount, the finest horse of antiquity.⁷¹ In 612 BC Medean cavalries sacked Assur and Nineveh. The Achaemenid Cyrus II later would storm Sardis; his cavalry dominating the battlefield. As successful in the east as in the west, Cyrus also consolidated Medean territories as far away as remote Gandhara.⁷² By 539 BC

⁶⁷ Bagley 1999, "Shang Archaeology," pp. 206–207.

⁶⁸ Kuzmina 2000, "The Eurasian Steppes: the Transition from Early Urbanism to Nomadism," p. 121.

⁶⁹ Kuzmina 2007, *The Origin of the Indo-Iranians*, p. 412.

⁷⁰ Melyukova 1990, "The Scythians and Sarmatians," pp. 99–100.

⁷¹ Kuzmina 2007, *The Origin of the Indo-Iranians*, p. 149.

⁷² Humphreys 1991, *The Royal Road: a Popular History of Iran*, pp. 24–25.

Babylon too had fallen. This last conquest brought Cyrus control over all the former dependencies of the Babylonian Empire, vast territories extending to the Mediterranean and to the borders of Egypt. Cyrus is known to history as a benevolent ruler, generously tolerating free exercise of religions in order to promote peace throughout his dominions.

Like Cyrus, Darius I's vision of government also exceeded that of the circumscribed riverine state. To promote integration, he organized his far-flung equestrian empire into satrapies. Transportation was critical as much for security as for the promotion of trade and commerce. He built the Royal Road, stretching 2,600 km from Sardis to Susa. Fast-riding travelers could speedily cover great distances, stopping when fatigued at post houses to change horses; a postal service delivered messages to far-off destinations. To promote the opening up of barren lands, long underground aqueducts (*qanats*) were constructed. Darius recognized the importance of codified law and his economic reforms included the standardization of weights and measures and the systematization of a monetary system using gold and silver coins of specific weights.⁷³ He further established Aramaic, with its system of writing adapted from the Phoenician consonantal script, as the official lingua franca.⁷⁴ The Achaemenid Empire would endure until confronted by Alexander's cavalries in 333 BC.

Equestrian China

As noted earlier, the horse-drawn chariot reached Shang China from the steppes in 1180 BC, but likely was first used there only as a mobile command platform. A rare item imported from the northwest, the horse was reverentially interred in magnificent funerary context. In 1045 BC, the Shang were overthrown at Muye by Zhou tactical use of 300 chariots, deployed as agile combat machines equipped with the recurved composite bow. Wen, founder of the Zhou dynasty, was recognized by Mencius "as a man of the Western Yi," i.e., of steppe origin.⁷⁵ In the centuries that followed, massed chariotry-against-chariotry style of combat spread throughout much of China. By the Spring and Autumn period, four-horse chariots had become widespread,

⁷³ Daniel 2001, *The History of Iran*, pp. 10, 41–42.

⁷⁴ Comrie, Matthews, and Polinsky 1996, *The Atlas of Languages: the Origin and Development of Languages Throughout the World*, p. 177.

⁷⁵ Mair 2005, "The North(west)ern Peoples and the Recurrent Origins of the 'Chinese' State," p. 56.

and even small states were capable of fielding several hundred chariots in war.⁷⁶ But steppe nomads persistently encroached upon Chinese borders. Iron was first introduced from the steppes c. 800 BC. Also bronze representations indicate that hunting was conducted in chariots and on horseback at this time.⁷⁷ Steppe cavalry attacked the Chinese heartland in 307 BC, at which date King Wuling of Zhao, in order to address this military threat, formally instructed his people to learn the arts of horseback riding and archery.⁷⁸

From his base in northern China, Qin Shi Huangdi (first sovereign emperor of China), equipped with iron and bronze weapons and deploying both chariots and cavalry, undertook a long series of military campaigns that in 221 BC unified all the warring kingdoms into one imperial state. Rapid horse communication and transport allowed national boundaries to be established and defended that would define China for the next 2,000 years. Amazingly, at the opposite end of Asia, the introduction of advanced horse technologies to China would bring about almost identical advances to those developed 300 years earlier by Achaemenid Persia. In unifying his diverse territories, like Darius, Shi Huangdi embarked on an ambitious program of large-scale road construction across China, affording an efficient network of highways for pack and vehicular traffic.⁷⁹ Additionally, reform of the written language was undertaken; characters were made universal throughout the empire, and a standard script ("small seal") was used in all official communications. Major efforts were made to impose standards of uniformity on coinage, weights, and measures, even the axle lengths of carts.⁸⁰ Besides land routes, water transportation was improved. While Darius, to complement his equestrian land empire, had built a canal from Bubastis to Suez to facilitate maritime trade, similarly in China canals were constructed for transportation as well as irrigation. The Linzhu canal, connecting the Li River of Guangxi with the Xiang River of Hunan, was to play a key role in future overseas trade. It allowed foreign

⁷⁶ Lu 1993, "Chariot and Horse Burials in Ancient China," p. 831; Shaughnessy 1988, "Historical Perspectives on the Introduction of the Chariot into China," p. 228.

⁷⁷ Mair 2003, "The Horse in Late Prehistoric China: Wrestling Culture and Control from the 'Barbarians,'" pp. 170–171.

⁷⁸ Yu 1990, "The Hsiung-Nu," pp. 118–119.

⁷⁹ Yu 1967, *Trade and Expansion in Han China: a Study in the Structure of Sino-Barbarian Economic Relations*, pp. 30–31.

⁸⁰ Roberts 1999, *A History of China*, p. 23.

commodities from the port of Panyu (Canton) to be transported entirely by water route to the Yangtze River region thereby stimulating maritime commerce.⁸¹ Under equestrian control, Chinese populations were relocated to colonize underdeveloped regions, where efficient iron ploughs opened up new lands for Chinese agriculture.⁸²

But Qin Shi Huangdi was tyrannical, not a tolerant ruler as Cyrus, his subjects pushed to the limits of their endurance. In steppe fashion, he had constructed a funerary kurgan surrounded by an immense series of subsidiary burial pits, in which were interred life-size terracotta figures of 500 horses and 130 battle chariots, not to mention thousands of larger-than-life warriors. Following his death, civil war raged until 202 BC, at which point the Han dynasty was established. To maintain military readiness, Han emperors constantly needed to obtain large numbers of steppe horses. This was accomplished by exporting silk and other products westward. Soon, mediated by the nomad, the Silk Road bustled with international trade between Occident and Orient; western religions also diffused eastward. First Buddhism, offshoot of Vedism, traveled northward to China, where outside Loyang, the White Horse Temple was erected to honor its missionaries; a Parthian monk subsequently translated Buddhist texts into Chinese.⁸³ Later, Judaism, Manichaeism, Nestorian Christianity, and Islam would reach China. Horse power had effectively transformed the vast inhospitable wastelands of the Eurasian steppes into an intercontinental corridor of rapid communication. From nomadic roots, the horse thus facilitated the rise of mighty equestrian empires, opening up Eurasia to technological advances and commerce.

Horses of the Desert

Greco-Rome, of course, was very much a consumer of the exotic stuffs of the Orient. The war chariot, however, was unsuited to the mountainous terrain of mainland Greece and was never used there in the full-speed massed charge that had been the mainstay of Near Eastern warfare on more level battlefields. While horse- and chariot-racing were wildly applauded, both

⁸¹ Yu 1967, *Trade and Expansion in Han China: a Study in the Structure of Sino-Barbarian Economic Relations*, p. 29.

⁸² Wright 2001, *The History of China*, pp. 45–47.

⁸³ Foltz 2000, *Religions of the Silk Road: Overland Trade and Cultural Exchange from Antiquity to the Fifteenth Century*, p. 50.

Greece and Rome's early military focus was on infantry. That changed, though, with the Carthaginian invasion of Italy, during which the Roman army suffered repeated, ignominious defeat by Hannibal's Numidian cavalry. Once triumphant, Rome in effect established its cavalry base at Milan, the extensive road system allowing this mobile force to nip a revolt in the bud anywhere in the empire.⁸⁴ Roman cavalry also defended the empire against nomads invading from the steppe: Alans, Huns, Avars, the latter delivering from China the metal stirrup that would make possible the couched lance of the European medieval knight. Important Chinese inventions, the highly efficient breast-strap and collar harnesses, would also reach Europe from across the steppes. As political power shifted to Constantinople, the Byzantines incorporated nomads as mercenaries into their armies, deploying steppe long-range archery, feigned retreats, and sudden ambushes against a long-term foe to the east—Sasanian Persia.

Hostilities between Rome and Persia were to rage on for several centuries. To the south, with successful domestication of the dromedary, the Arabs commanded the strategic overland trade routes between the Indian ocean and the Mediterranean. During the seventh century AD, Byzantine and Sasanian imperial policies vied to gain control of this lucrative Arabian trade. But in the southern deserts, there arose a new religion led by the prophet Muhammad, which afforded Arabs a means to transcend tribal loyalties and to successfully challenge the predatory empires to their north.

In this confrontation, the Arabian horse, more gracile and long-limbed than its steppe counterpart, everywhere was the preferred steed in armed hostilities. While fighting with lance from camelback was practiced, it was not the easiest mode of combat, since the camel was notoriously unresponsive to rider command. Also, even at a gallop, the dromedary could never deliver the momentum and impact of the cavalry charge.⁸⁵ Thus, in the waterless desert, the dromedary came to fulfill the important function of supporting the war horse, which to conserve energy during travel was tied to the cinch of the camel's saddle and mounted only at time of attack. The Arab's camel transported containers of water for horse consumption. It also provided as much as 10 kg of milk per day for horse nourishment en route. In addition in time of dire emergency, by initially withholding water, Arabs would force the thirsty camels to drink copious

⁸⁴ Hyland 1990, *Equus: the Horse in the Roman World*, pp. 192–193.

⁸⁵ Bulliet 1990, *The Camel and the Wheel*, p. 99.

amounts then tie the camels' mouths to prevent their chewing cud and contaminating water in the stomach. Thus, when traveling distances over arid territory, each day a specific number of camels would be slaughtered, their stomachs slit to provide water to the men and horses.

In their early wars, the Arabs soon gained advantage over the enemy through the superior mobility afforded by dromedary support of the horse. Accustomed to the meager diet of Bedouin existence, without supply trains they traversed barren and inhospitable lands, traveling at night with the bright light of the desert stars. By using the desert for passage, raiding base, and refuge, they were able to cover long distances rapidly and to concentrate their forces at the point of greatest danger. Their central stratagem was to mount surprise attacks across desert borders. In situations of adversity they could retreat back into the desert, without fear of Byzantine or Persian pursuit, to await a more favorable opportunity to rally. With these tactics, their rear and lines of communication were safe from enemy interference and their dispatch of reinforcements was free of hazard.⁸⁶

Moving across Asia, Islam extended southeast to the Sind on the lower Indus and northeast to Samarkand. Moving across North Africa, Arab cavalries first reached the Atlantic, then engulfed Visigothic Spain, penetrating as far north as Poitiers, where, blocked by the Frankish resistance of Charles Martel in 733, they retreated to south of the Pyrenees. Enjoying greater fortune in the east, in 751 the Arabs crushed the Tang army at the battle of Talas, expelling the Chinese permanently from Central Asia, although not before seizing Tang captives expert in paper manufacture. This marvelous new material speedily diffused westward with revolutionary economic and cultural ramifications.⁸⁷ The Arabs also appropriated wootz steel, initially developed by Indians of Hyderabad, to produce the fearsome swords arming Muslim warriors in their conquests.⁸⁸ But by far the most extraordinary advance encountered by Muslims was the zero, which, first conceptualized by Hindu scholars, facilitated complex computations and greatly stimulated the growth of mathematics and science. Arab equestrians transmitted the zero west to North Africa, whence it spread across Italy to Europe.⁸⁹

⁸⁶ Hill 1975, "The Role of the Camel and the Horse in Early Arab Conquests," pp. 34, 41–42.

⁸⁷ Soucek 2000, *A History of Inner Asia*, pp. 67–69.

⁸⁸ Raymond 1984, *Out of the Fiery Furnace: The Impact of Metals on the History of Mankind*, p. 80.

⁸⁹ Seife 2000, *Zero: The Biography of a Dangerous Idea*, pp. 67–79.

These inventions ushered in the great efflorescence of Islamic learning. Employing Arabic as the universal language of communication, philosophers and scientists from the borders of China to the Atlantic pursued knowledge in diverse disciplines and engaged in an exchange of ideas unprecedented in earlier civilizations. Everywhere there was high mobility and efficient communication. Horse-spurred, scientific knowledge diffused rapidly over large segments of the educated elites, across different regions of the Islamic world and beyond—as Jewish and Christian scholars translated Arabic works into Latin.

But rebellions were simmering on the fringes of empire. From the deserts of North Africa, nomadic Berber Almoravids invaded Spain to inflict cruel victories on Christian knights battling to regain their homeland.⁹⁰ And in the east, Turkic nomads infiltrated from the steppes to seize control of the Abbasid caliphate in Baghdad and to threaten Constantinople in the west.⁹¹

Mongol Equestrian Expansion

As seen above, from 2000 BC to 1000 AD nomadic peoples of the peripheral steppes and deserts had invaded sedentary centers of civilization, but succeeded only in partial conquests of Eurasia; this invasion pattern, however, was shortly to escalate. Early in the second millennium AD, there erupted in the furthest margins of the Mongolian steppe an equestrian military force that would engulf the vast breadth of the Eurasian landmass. Its leader Genghis had grown to maturity in a climate of extreme tribal turbulence, outfighting hostile tribes to form against all odds a grand confederation of nomads. His forces consisted entirely of cavalry and were rigorously organized on a decimal basis, as much to achieve political control as to ensure military discipline.⁹² Other than a large reserve of horses, the army did not travel with a cumbersome supply train. Each trooper had at least three remounts, when velocity dictated changing horses to cover distances at speeds inconceivable to the enemy. The Mongols lived off the horse; as they travelled, they milked and slaughtered for food. They consumed a steady diet of milk and yoghurt, drank the horse's blood, and placed raw meat under the saddle to make it supple and edible. In 1211 Genghis moved south to attack Jin China. In the course of hostilities,

⁹⁰ Hrbek and Devisse 1988, "The Almoravids."

⁹¹ Donner 1999, "Muhammad and the Caliphate: Political History of the Islamic Empire up to the Mongol Conquest," pp. 54–55.

⁹² Allsen 1994, "The Rise of the Mongolian Empire and Mongolian Rule in North China," pp. 346–347.

the Mongols conscripted Chinese siege experts into their armies and adopted Jin weapons and gunpowder. Finally, Zhongdu (Beijing) was sacked.⁹³

Militarily triumphant, in control of the immense wealth of the Silk Road that flowed into northern China, Genghis khan did not contemplate any fresh offensive. He was however almost immediately challenged on his western borders by the Khwarizm-shah. Thus, in 1219 Genghis khan again mobilized for war. A vanguard of 25,000 men, yak skins wrapped around their horses' legs, crossed the Tian Shan at 4,000 m midst 1.5 m of snow. Genghis then divided his forces among his elder sons and himself in order that their armies converge on Khwarizm from four separate directions. This ingenious maneuvering of independent bodies of troops while maintaining effective communication would assure Mongol success in the campaign at hand, also in later campaigns across Europe; in fact it would furnish a future model for modern armies. In the midst of great devastation and carnage, deploying siegecraft as no nomad before, the Mongols overwhelmed Khwarizmia, capturing Samarkand after only three days of resistance.⁹⁴ While his generals reconnoitered eastern Europe, for military training of new recruits, Genghis khan cordoned off a vast area on which several armies converged from different directions. The ensuing lengthy hunt was every bit as much a test of horsemanship as it was of hunting skills. Strict military discipline was imposed; great care was taken that no animal should escape; and the severest penalties were meted out to anyone breaking rank. These maneuvers, entailing rapid coordination of individuals and units, accurate signalling, reconnaissance scouting, and hard riding, readied men for the hardships of war.⁹⁵

Genghis khan died in Mongolia in 1227, but his sons and grandsons would extend his conquests from the Pacific to the Baltic. Of the four khanates that resulted, Yuan China and the Persian Ilkhanate would most energetically set about reconstructing the lands the Mongols, barely two generations earlier, had utterly devastated. For the steppe nomad, horse mobility and speed were paramount. To promote rapid commerce, roads shaded by willow trees were constructed, along which equestrian messengers could travel as fast as 400 km a day.⁹⁶ By far

⁹³ Weatherford 2004, *Genghis Khan and the Making of the Modern World*, pp. 86–89, 94–95.

⁹⁴ Dupuy 1969, *The Military Life of Genghis, Khan of Khans*, pp. 62–64, 67–73.

⁹⁵ Allsen 2006, *The Royal Hunt in Eurasian History*, pp. 23–27, 215–217.

⁹⁶ Rossabi 1988, *Khubilai Khan: His Life and Times*, p. 124.

the most coveted items of trade were *nasij* (luxury cloths of gold-wrapped thread), traded to as far away as Edward III's England.⁹⁷ To produce these exquisite textiles, Yuan China and the Ilkhanate cooperated closely in the interchange of specialists from different ethnic backgrounds, who working alongside one another revitalized weaving techniques and created a climate of great artistic innovation.⁹⁸ This comparative approach was further implemented in the spheres of metallurgy, agriculture, architecture, literature, medicine, and science. As a result of cross-cultural experimentation and far-flung trade, cluster diffusion of several technologies occurred, in which perhaps the most significant, printing, gunpowder, and cast-iron/steel technology, reached the Rhineland from eastern Asia in the fourteenth and fifteenth centuries.⁹⁹ Just as earlier in the diffusion of silk, stirrups, paper, wootz, and the zero, once again the horse was the instrument of transmission. Technologically, these latest advances bridged the gap between the medieval and modern eras.

⁹⁷ Allsen 1997, *Commodity and Exchange in the Mongol Empire: a Cultural History of Islamic Textiles*, pp. 1–2.

⁹⁸ Watt 2002, "A Note on Artistic Exchanges in the Mongol Empire," pp. 70–71.

⁹⁹ Flemings 2002, "Traveling Technologies," p. 118.

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