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Collective Learning and the Silk Roads*

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Abstract

The Silk Roads are the quintessential example of the interconnectedness of civilizations during the Era of Agrarian Civilizations, and the exchanges that occurred along them resulted in the most significant collective learning so far experienced by the human species. The primary function of the Silk Roads was to facilitate trade, but the intellectual, social, and artistic exchanges that resulted had an even greater impact on collective learning. The Silk Roads also illustrate another key theme in Big History – evolving complexity at all scales. Just as the early universe was simple until contingent circumstances made it possible for more complex entities to appear, and that the relatively simple single-cell organisms of early life on the planet were able to evolve into an extraordinary, complex biodiversity, so human communities and the connections between them followed similar trajectories. The comingling of so many goods, ideas, and diseases around a geographical hub located deep in central Eurasia was the catalyst for an extraordinary increase in the complexity of human relationships and collective learning, a complexity that helped drive our species inexorably along a path towards the modern revolution.

Keywords: *Silk Roads, Collective Learning, Agrarian Civilizations, Afro-Eurasia, trade.*

Introduction

During the Era of Agrarian Civilizations (*c.* 3000 BCE – 1750 CE) human communities did not exist in isolation. As confederations of pastoralists, states and large-scale agrarian civilizations expanded and stretched their boundaries, they joined together to form larger systems. Sometimes they joined up simply because their borders met and merged, but more often they joined in a looser sense as people from one region traded with, or traveled to, or borrowed ideas from, or fought with people from other regions within and beyond agrarian civilization. Because of this regular commingling the very idea of distinct agrarian civilizations with rigid borders is misleading. Borders that we identify

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on maps are, for the most part, modern inventions. The borders of agrarian civilizations were more often vague regions within which the control of rulers fluctuated or was contested by the claims of neighbors or local rulers.

Despite the complexity and fluidity of these processes, the slow linking up of different agrarian civilizations was immensely important because it facilitated a dramatic expansion in the size and diversity of collective learning, which can be described as the human capacity to share ideas so efficiently that they accumulate in the collective human memory from generation to generation. From the very beginning of human history the exchange of information and ideas between diverse peoples and cultures has been a prime mover in promoting change through this process of collective learning. As the smaller exchanges of the Early Agrarian Era began to expand, the enhanced collective learning that followed led to more and more significant changes in the material, artistic, social, and spiritual domains of human history. Eventually within the Afro-Eurasian world zone in particular, every human community was connected together within a vibrant web. This was true within each of the individual world zones, although not between them. Significant linkages developed during the era in the Americas, Australasia, and the Pacific, but the four zones were so isolated from each other that human populations in each remained utterly ignorant of events in the others.

The most influential of the intensified Afro-Eurasian exchange networks emerged around a trading hub located deep in Central Asia, along the Silk Roads. The trans-civilizational contacts that occurred through this exchange resulted in the most significant collective learning so far experienced by the human species. The first important period of the Silk Roads was between roughly 50 BCE and 250 CE, when material and intellectual exchange took place between the Chinese, Indian, Kushan, Iranian, steppe-nomadic and Mediterranean worlds. The demise of the Western Roman, Parthian, Kushan and Han Chinese empires resulted in several centuries of less regular contact, but the second 'Silk Roads Era' subsequently operated for several centuries between *c*. 600 and 1000 CE, connecting China, India, Southeast Asia, the Dar al-Islam, and the Byzantines into another vast web based on overland and maritime trade. The primary function of the Silk Roads during both periods was to facilitate trade. Not only material goods were carried along the Silk Roads, however, but intellectual, social, and artistic ideas as well, which together had an even greater impact on collective learning (Christian *et al.* 2013: 174–175).

An early example of intellectual exchange, which took place before the Silk Roads had started to operate with real intensity, was the spread of Greek and Hellenistic culture from the Eastern Mediterranean to Central Asia and India. This happened because Greek merchants and colonists followed in the footsteps of Alexander and spread Greek language, art, religion, philosophy, and law throughout much of the region. Perhaps, the most important spiritual consequence of material exchange was the spread of religions across Afro-Eurasia, particularly Mahayana Buddhism, which moved from India through Central Asia to China and East Asia. An example of cultural exchange that led

to enhanced collective learning was the spread of artistic ideas and techniques, particularly the diffusion eastwards of syncretistic sculptural styles that developed in the second century CE in the workshops of Gandhara (in Pakistan) and Mathura (in India), where the first ever representation of the Buddha was conceived (*Ibid.*: 176).

The major biological consequence of Silk Roads trade was the spread of diseases and plague. Not only did the passing of disease bacteria along the Silk Roads by traders play a significant role in the depopulation and subsequent decline of both the Han and Roman Empires, but the exposure of millions of humans to these pathogens meant that antibodies spread extensively throughout the Afro-Eurasian world zone, and important immunities were built up within populations. These immunities proved of great significance in the pre-modern age, when Muslim, Chinese, and particularly European traders and explorers carried Afro-Eurasian diseases to the other world zones, with disastrous consequences for native populations (McNeil 1998). These four brief examples all support the claim that the Silk Roads profoundly affected the subsequent shape and direction of all human history.

Commercial and cultural exchange on this scale became possible only after the small river valley states of the early era had been consolidated into substantial agrarian civilizations, a process that was largely the result of warfare. Continuing expansion by the major civilizations meant that, by the first Silk Roads Era, just four imperial dynasties – those of the Roman, Parthian, Kushan, and Han Empires – controlled much of the Eurasian landmass, from the Pacific to the Atlantic. The consolidation of these states established order and stability over a vast and previously fragmented geopolitical environment. Extensive internal road networks were constructed, great advances were made in metallurgy and transport technology, agricultural production was intensified, and coinage appeared for the first time. By the middle of the last century BCE, conditions in Afro-Eurasia were ripe for levels of material and cultural exchange – and collective learning – hitherto unknown (Benjamin 2009: 30–32).

Also critical in facilitating these exchanges were the pastoral nomads, who formed communities that live primarily from the exploitation of domestic animals such as cattle, sheep, camels, or horses. The exact chronology of the origins and spread of pastoralism remains obscure, but certainly by the middle to late fourth millennium BCE the appearance of burial mounds across the steppes of Inner Asia indicates that some communities that were dependent upon herds or flocks of domestic animals had become semi-nomadic. There were varying degrees of nomadism, ranging from groups that had no permanent settlements at all to communities like the Andronovo that were largely sedentary and lived in permanent settlements. The highly mobile, militarized pastoralism of Inner Asia, associated with the riding of horses by the Saka/Scythians and other groups, probably did not emerge until early in the first millennium BCE (Christian *et al*. 2013: 177–178).

In Afro-Eurasia, by the time the first cities and states appeared, the technologies of the secondary products revolution had generated more productive ways of exploiting livestock, some of them so productive that they allowed

entire communities to depend almost exclusively on their herds of animals (Sherratt 1981: 261–305). The more they did this, however, the more nomadic they had to be, so that they could graze their animals over large areas. The result was that there developed, over several millennia, entire lifeways based mainly on pastoralism, capable of exploiting the arid lands that ran in a long horizontal belt from northwest Africa through Southwest Asia and Central Asia to Mongolia.

By the middle of the 1st millennium BCE, a number of large pastoral nomadic communities had emerged with the military skills and technologies, and the endurance and mobility, to dominate their sedentary agrarian neighbors. Some of them, including the Saka, Xiongnu, Yuezhi, and Wusun, established powerful state-like confederations that formed in the steppe lands between the agrarian civilizations. These confederations demonstrated the ability of pastoral nomads to prosper in the harsh interior of Afro-Eurasia. Once such communities emerged, they facilitated the linking up of all the different lifeways and communities. Prior to the success of pastoralists in these more marginal zones, agrarian civilizations were considerably more isolated from each other. Ultimately it was the role of pastoralists as facilitators and protectors of trade and exchange that allowed the Silk Roads and other networks to flourish (Christian *et al.* 2013: 177–178).

First Silk Roads Era (*c.* 50 BCE – *c.* 250 CE)

With these preconditions in place, it was the decision by the Han Chinese to begin to interact with their western neighbors and engage in long-distance commerce that turned small-scale regional trading activity into a great trans-Afro-Eurasian commercial network. The Han became involved in the late-second century BCE after Emperor Wudi dispatched envoy Zhang Qian on a diplomatic and exploratory mission into Central Asia. When Zhang Qian returned after an epic journey of twelve years, he convinced the emperor that friendly relations could be established with many of the states of the 'Western Regions' because they were 'hungry for Han goods' (Benjamin 2007b: 3–30). Those that were not eager to trade could be subdued by force and compelled to join the Han trade and tributary network. Within a decade the Han had established a tributary relationship with dozens of city-states of Central Asia, and mercantile traffic began to flow out of China along the ancient migration routes into Central Asia. Half a century after the Han began to engage with their western neighbors, Augustus came to power in Rome following a century of civil war. This restored peace and stability to much of Western Afro-Eurasia, leading to a sharp increase in the demand for luxury goods in Rome, particularly for spices and exotic textiles like silk (Benjamin 2009: 30–32).

The major Chinese export commodity in demand in Rome was silk, an elegant, translucent, sensual material that soon came to be regarded as the last word in fashion by wealthy patrician women. The Chinese, realizing the commercial value of their monopoly on silk, carefully guarded the secret of silk production, and border guards in Dunhuang searched merchants to make sure they were not carrying any actual silk worms out of the country. The Han iron

was prized in Rome for its exceptional hardness. Fine spices were imported into the Roman Empire from Arabia and India, notably nutmeg, cloves, cardamom, and pepper, prized as condiments, but also as aphrodisiacs, anesthetics, and perfumes. Trade with China and Central Asia for such high-value goods cost the Romans a fortune. In 65 CE, Roman Senator Pliny the Elder wrote that trade with Asia was draining the treasury of some 100 million sestercii every year (*Ibid.*: 30–32). Even though Pliny's figure is undoubtedly exaggerated, it provides evidence of the incredible scale of Silk Roads commercial exchanges. In return for their high value-exports, the Chinese imported a range of agricultural products (including grapes), Roman glassware, art objects from India and Egypt, and horses from the steppes.

The major Silk Roads land routes stretched from the Han capital, Chang'an, deep into Central Asia by way of the Gansu Corridor and Tarim Basin. The animal that made Silk Roads trade possible in the eastern and central regions of Afro-Eurasia was the Bactrian camel. Native to the steppes of Central Asia, the two-humped Bactrian camel is a supreme example of superb evolutionary adaptation. To survive the harsh winters, the camel grows a long, shaggy coat, which it sheds extremely rapidly as the season warms up. The two humps on its back are composed of sustaining fat and its long eyelashes and sealable nostrils help to keep out dust in the frequent sandstorms. The two broad toes on each of its feet have undivided soles and are able to spread widely as an adaptation to walking on sand. The bulk of overland Silk Roads trade was literally carried on the backs of these extraordinary animals (Christian *et al.* 2013: 178).

In Western Eurasia, the major land route departed from the great trading cities of Roman Syria, crossed the Euphrates and Tigris Rivers, then climbed across the Iranian Plateau toward Afghanistan (then known as Bactria). Significant information on the geography of the western part of the Silk Roads has come to us from a document produced early in the first century CE – *Parthian Stations* – written by a Parthian Greek merchant Isodorus of Charax (Benjamin 2009: 30–32). Around the time *Parthian Stations* was being composed, the amount of trans-Afro-Eurasian trade taking place by sea was also increasing, particularly between Roman Egypt and the coast of India. The survival of the first century CE seaman's handbook, the *Periplus of the Erythrian Sea*, has provided historians with a detailed account of maritime commerce at that time (*Ibid.*: 30–32). The *Periplus* demonstrates that sailors had discovered the secrets of the monsoon 'trade' winds. The winds blow reliably from the southwest in summer, allowing heavily laden trade ships to sail across the Indian Ocean from the coast of Africa to India. In winter the winds reverse, and the same ships carrying new cargo would make the return journey to the Red Sea. Whether by land or by sea, however, no traders we are aware of ever made their way along the entire length of the Silk Roads during the first era of its operation. Instead, merchants from the major eastern and western civilizations took their goods so far, then passed them on to a series of middlemen, including traders who were operating deep within the Kushan Empire.

At the heart of the Silk Roads network, straddling and influencing both the land and maritime routes, was the Kushan Empire (*c.* 45–225 CE), one of the most

important yet least known agrarian civilizations in world history (Benjamin 1998, 2009). By maintaining relatively cordial relations with Romans, Parthians, Chinese, Indians, and the steppe nomads, the Kushans were able to play a crucial role in facilitating the extraordinary levels of cross-cultural exchange that characterize this first Silk Roads Era. The Kushan monarchs were not only effective political and military rulers; they also demonstrated a remarkable appreciation of art and were patrons of innovative sculpture workshops within their empire. The output from these workshops reflects the sort of synthesis typical of the intensity of collective learning during the Era of Agrarian Civilizations.

The sculpture produced in the workshops of Gandhara and Mathura during the first two centuries of the Common Era was created by the combined talents of Central Asian, Indian, and probably Hellenistic Greek artists who placed themselves at the service of a resurgent Buddhist spirituality and created a whole new set of images for worship. Until this moment the Buddha had never been depicted in human form, but had instead been represented by symbols including an umbrella or footprints in the sand. The first ever representation of the Buddha, which appeared in Gandhara (in modern-day Pakistan), was influenced by depictions of Greco-Roman deities. This physical representation then spread along the Silk Roads, penetrating south to Sri Lanka and east to China, Japan, Korea, and Southeast Asia (Benjamin 1998, 2009).

An equally striking example of this cross-fertilization of ideas and traditions is the spread of Buddhist ideology along the great trade routes. Buddhism first emerged in northern India in the 6th century BCE. Eight hundred years later, according to ancient Chinese Buddhist documents, the Kushan king, Kanishka the Great (*c*. 129–152 CE?) convened an important meeting in Kashmir at which the decision was taken to rewrite the Buddhist scriptures in a more popular and accessible language. This helped facilitate the emergence and spread of Mahayana (or Great Vehicle) Buddhism, partly because the scriptures were now written in a language the common people could understand, and not one that could be read only by religious elites (Benjamin 2013).

The well-traveled trade routes from India through the Kushan realm and into China facilitated the spread of Buddhist ideas which, because they offered the hope of salvation to all regardless of caste or status, was already popular with India's merchants and businessmen. The Chinese merchants active in the silk trade became attracted to the faith, too, and returned home to spread the Buddhist message. Chinese edicts of 65–70 CE specifically mention the spread of Buddhism and opposition to it from imperial scholars devoted to Confucianism. By 166 CE, the Han emperor himself was sacrificing to the Buddha, and the Sutra on the 'Perfection of the Gnosis' was translated into Chinese by 179 CE. By the late fourth century, during a period of disunity in China, much of the population of northern China had adopted Buddhism, and by the sixth century much of southern China as well. The religion also later found ready acceptance in Korea, Japan, Tibet, Mongolia, and Southeast Asia (Benjamin 1998, 2009).

The Silk Roads also facilitated the spread of Christianity, Manichaeism and, later, Islam. Christian missionaries made good use of the superb Roman road and sea transportation networks. The Christian missionary, Paul of Tarsus, may have traveled as many as 8,000 miles along the roads and sea-lanes of the eastern Roman Empire preaching to small Christian communities. Christianity eventually spread further to the east along the Silk Roads, through Mesopotamia and Iran, into India, and eventually into China. One branch of Christianity, Nestorianism, became particularly strong throughout the central and eastern Silk Roads. The Central Asian religion of Manichaeism also benefitted from the silk routes after it emerged in Mesopotamia in the 3rd century CE. Its founder, Mani (216–272 CE) was a fervent missionary who traveled extensively throughout the region and also dispatched disciples. Like Buddhism, Manichaeism was particularly attractive to merchants, and eventually most of the major Silk Roads trading cities contained Manichaean communities (Christian *et al.* 2013: 180).

During the 3rd century of the Common Era, the Silk Roads fell gradually into decline as both China and the Roman Empire withdrew from the trans-Afro-Eurasian web. Ironically, Silk Roads trade itself was at least partly responsible for this disengagement, because it contributed to the spread of disastrous epidemic diseases. Smallpox, measles, and bubonic plagues devastated the populations at either end of the routes, where people had less resistance. Population estimates from the ancient world are always difficult, but the population of the Roman Empire may have fallen from 60 million to 45 million between the mid-1st and mid-2nd centuries CE. As smallpox devastated the Mediterranean world late in the second century, populations declined again, to perhaps 40 million by 400 CE. In China, populations fell from perhaps 60 million in 200 CE to 45 million by 600 CE (Bentley and Zeigler 2010: 282).

These huge demographic losses, which happened at the same time as the decline of previously stable agrarian civilizations (the Han Dynasty disintegrated in 220 CE, the Kushan and Parthian Empires collapsed under pressure from Sasanian invaders a decade or so later, and the Roman Empire experienced a series of crises throughout the first half of the 3rd century) meant that, for the next several centuries, the prevailing political situation in many parts of Afro-Eurasia was not conducive to large-scale commercial exchange. However, with the creation of the Dar al-Islam in the 8th and 9th centuries CE, and the establishment of the Tang Dynasty in China at the same time, significant Silk Roads exchanges along both land and maritime routes revived.

Second Silk Roads Era *c.* 600 – *c.* 1000 CE

Both the Tang Dynasty (618–907 CE) and its successor, the Song Dynasty (960–1279 CE), presided over a vibrant market economy in China, in which agricultural and manufacturing specialization, population growth, urbanization, and infrastructure development led to high levels of internal and external trade.

New financial instruments (including printed paper money) were devised to facilitate large-scale mercantile activity. At the same time, Arab merchants, benefiting from the stable and prosperous Abbasid administration in Baghdad, began to engage with Chinese merchants in lucrative commercial enterprises. Large numbers of Muslim merchants actually moved to China where they joined communities of Byzantine, Indian, and Southeast Asian migrants in the great Chinese trading cities. As maritime trade gradually eclipsed overland trade in volume, merchants and sailors from all over Afro-Eurasia flocked to the great southern port cities of Guangzhou and Quanzhou (Christian *et al.* 2013: 180–181).

The recent discovery of a sunken ninth-century CE Arab ship – the so-called Belitung Wreck – in the waters of Indonesia has provided historians with tangible evidence of both the intensely commercial nature of Chinese-Muslim trade and the significance of maritime routes in facilitating it (Worrall 2003: 112ff.). The dhow was filled with tens of thousands of carefully packaged Tang ceramic plates and bowls, along with many gold and silver objects. The Tang bowls were functional and intended for the ninth-century equivalent of a 'mass market'. Their almost factory-like manufacture demonstrates the existence of a well-organized commercial infrastructure. The bowls required the use of cobalt for blue coloring, which was imported by the Chinese manufacturers in significant quantities from Iran. The firing date of the bowls was carefully noted in the ship's manifest. The cargo also included large quantities of standardized inkpots, spice jars, and jugs, clearly export goods manufactured for specific markets. Decorative patterns painted or glazed on the various items – including Buddhist, Iranian, and Islamic motifs – show the specific market the goods were intended for. China and the Dar al-Islam were clearly engaged in intense commercial exchanges during this second Silk Roads Era, and Arab mariners undertaking lengthy seagoing voyages were maintaining this vibrant trans-Afro-Eurasian web late in the 1st millennium of the Common Era.

As with the first Silk Roads Era, although the material exchanges were important and impressive, the cultural exchanges seem in retrospect of even greater significance. As noted above, long before the Tang came to power, many foreign religions had made their way into East Asia. With the advent of Islam in the 7th century and the establishment of substantial Muslim merchant communities in the centuries that followed, mosques also began to appear in many Chinese cities. Yet of all the foreign beliefs that were accepted in China, only Buddhism made substantial inroads against Confucianism. Between 600–1000 CE, thousands of Buddhist stupas and temples were constructed in China. With its promise of salvation, Buddhism seriously challenged Daoism and Confucianism for the hearts and minds of many Chinese, and in the end the syncretic faith of Chan Buddhism (Zen Buddhism in Japan) emerged as a popular compromise (Christian *et al.* 2013: 181).

Conclusion

The Silk Roads, both the land and maritime variants, are the quintessential example of the interconnectedness of civilizations during the Era of Agrarian Civ-

ilizations. Along these difficult routes through some of the harshest geography on earth traveled merchants and adventurers, diplomats and missionaries, each carrying their commodities and ideas enormous distances across the Afro-Eurasian world zone. Each category of exchange was important, but perhaps the most significant consequence was the spread of religion, particularly Buddhism, which became one of the key ideological and spiritual beliefs of South and East Asia during the Era. To this day Buddhism remains one of the great cultural bonds shared by millions of Asian people, one of the many legacies that the modern world owes to the Silk Roads. As a result of this interaction, despite the diversity of participants, the history of Afro-Eurasia has preserved a certain underlying unity, expressed in common technologies, artistic styles, cultures and religions, even disease and immunity patterns, a unity that was to have profound implications for subsequent world history.

Silk Roads exchanges play an even more significant role in the Big History narrative. The physical contexts that made the Silk Roads possible were the product of billions of years of geological change and biological evolution. Geography made it possible for the first agrarian civilizations of western Eurasia and northeastern Africa to form cultural and commercial connections, but geography also prevented Chinese civilization from joining these developing networks in any substantive way. Only with the biological evolution and then human domestication of the silk worm and the Bactrian camel did the Chinese have an export commodity valuable enough, and a transport mechanism hardy enough, to justify and facilitate the expensive and complex expeditions necessary to allow the Chinese merchants to join the pre-existing Afro-Eurasian exchange network. This joining together of previously separated human communities led to a steep increase in levels of collective learning and complexity that had regional and global ramifications.

The development of the Silk Roads is also an example of another key theme in Big History – evolving complexity at all scales. In the same way that the early universe was simple until contingent circumstances made it possible for more complex entities to appear, and that the relatively simple single-cell organisms of early life on the planet were able to evolve into an extraordinary, complex biodiversity, so human communities and the connections between them followed similar trajectories. The commingling of so many goods, ideas, and diseases around a geographical hub located deep in central Eurasia was the catalyst for an extraordinary increase in the complexity of human relationships and collective learning, a complexity that drove our species inexorably along a path towards the modern revolution.

References

Benjamin C. 1998. An Introduction to Kushan Research. *Worlds of the Silk Roads: Ancient and Modern* / Ed. by D. Christian, and C. Benjamin, pp. 31–50. Silk Roads Studies Series. Vol. II. Turnhout: Brepols.

Benjamin C. 2007a. *The Yuezhi. Origin, Migration and the Conquest of Northern Bactria*. Silk Roads Studies Series. Vol. XIV. Turnhout: Brepols.

Benjamin C. 2007b. Hungry for Han Goods? Zhang Qian and the Origins of the Silk Roads. *Toronto Studies in Central and Inner Asia* / Ed. by M. Gervers, and G. Long. Vol. VIII. pp. 3–30. Toronto: University of Toronto Press.

Benjamin C. 2009. The Kushans in World History. Vol. XXV. *World History Bulletin* 1: 30–32.

Benjamin C. 2013. The Great Deliverer, the Righteous, the Just, the Autocrat, the God, Worthy of Worship. Kanishka I, Kushan Dynastic Religion, and Buddhism. *Toronto Studies in Central and Inner Asia* / Ed. by M. Gervers, and G. Long. Vol. IX. Toronto: University of Toronto Press, forthcoming.

Bentley J., and Zeigler H. 2010. *Traditions and Encounters*. 5th ed. New York: McGraw-Hill.

Christian D., Brown C. S., and Benjamin C. 2013. *Big History: Between Nothing and Everything*. New York: McGraw-Hill.

McNeil W. H. 1998. *Plagues and People*. New York: Anchor.

Sherratt A. 1981. Plough and Pastoralism. Aspects of the Secondary Products Revolution. *Pattern of the Past: Studies in Honor of David Clarke* / Ed. by I. Hodder, G. Isaac, and N. Hammond, pp. 261–305. Cambridge: Cambridge University Press.

Worrall S. 2003. 'Made in China'. *National Geographic Magazine* (June 2009): 112–123.