# The Eastern Origins of the Rise of the West and the "Return" of Asia

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## Introduction

It is a Eurocentric commonplace within International Relations and various related disciplines that the place of Asia in world history, past and present, is considered to be below that of Europe and the West. That is, the West is generally thought to be the prime mover of the international system and of progressive economic development in the last 500 years while the East is demoted to the status of passive recipient of Western actions – whether these take the form of either Western largesse or exploitation. With current interest in Asia in general and of the "rise" of China in particular surging within the Western Academy, it seems an opportune moment to re-evaluate this Eurocentric conception. In this article I shall effectively invert the standard Eurocentric conception of globalization and world history by arguing that this phenomenon *preceded* the rise of the West and that the West emerged in the latter part of the second millennium in significant, though by no means complete, part as a function of Eastern-led globalization (or Orientalization). Moreover, one of the most significant aspects of the Eastern-led global

economy is that it was along its sinews that Eastern 'resource portfolios' (ideas, technologies and institutions) diffused across to enable the rise of the West.

While significant parts of Asia played key roles in reproducing the nascent global economy that emerged after 1450/1492, China was the leading economy. After about 1850 Europe began to eclipse the economic power of China and India and clearly the West became the dominant region of the world thereafter. However, since 1978 China's development has been such that by the early 2000s it had caught the headlines across the world. Indeed only very recently we learned that Chinese national income has eclipsed that of America's (when measured according to purchasing power parity). Nevertheless, while many Western scholars assume that China's rise can be traced back to 1978 – the notion of "1978-as-year-zero" – I will suggest that China's rise stems back almost exactly 1000 years to 960, when the Sung Dynasty emerged. By the end of the eleventh century China was the leading economy in the world and after about 1450 it was the key player in the nascent global economy. It remained at the centre until about 1830 and while it clearly took a backseat to the West for the ensuing 150-odd years, nevertheless today it is not so much "rising" but "returning" to the centre of the global economy. It is this long historical process of development that yields the notion of China's "return" today rather than its contemporary "rise" that this article is particularly concerned with.

The article proceeds through four sections. I begin by outlining the Eurocentric "big bang theory" that constitutes the dominant trope found in Eurocentric world history and Eurocentric theories of globalization. The second section considers the Afro-Eurasian process of regionalization that wove together these continents while the third section discusses the period of Eastern-led early globalization. Finally, the long fourth section

reveals some of the many non-Western influences that enabled the rise of the West, which comprise: the Renaissance and Scientific Revolution, the European Age of Discovery, the Enlightenment and the British industrial and agricultural revolutions. That said, though, it would be wrong to assume that the lines of impact and transmission went only from East to West. Certainly after the seventeenth century the West impacted the East; and this two-way interaction process has been no better captured than in C.A. Bayly's magisterial volume, *The Birth of the Modern World 1780–1914* [3]. My point here is not to dismiss Western influences on the world but to hone in on the manifold Eastern influences which have been marginalised within Eurocentric world history.

**The Eurocentric "Big Bang" conceptual narrative of Europe and Asia**

Asia and Europe are generally situated within what I call the Eurocentric "big bang theory" of globalization/world history and of the global political economy/world politics. This comprises a two-step narrative wherein the first step Europe rises to the top of the world economic hierarchy and then, in the second step, exports its civilizational attributes so as to remake the world, so far as it can, in the image of the West. Of course my reader might well think that such a claim is entirely unproblematic. So to be more specific: the first step of the big bang theory holds that by, or during, the 16$^{th}$ century Europe had risen to the top of the world material power hierarchy *entirely of its own accord*. Here it is assumed that the West is a *self-made* civilization which developed through the Eurocentric "logic of immanence" insofar as Europe contained within itself the seeds of its own rise such that it had all the necessary social energies/ingenuities and above all, the rational institutions and culture, to be able to *self-generate* [13, 14]. And this in turn rests

on the assumption that Europe, and later the United States, are deemed 'exceptional'. In the process the story of the rise of the West is related in terms of an endogenous, evolutionary, unfolding intra-European process, wherein Europe's development into modernity was inscribed within its social structure such that its rise to the top was but an (a)historical *fait accompli;* that it was foretold, pre-ordained or written.

No less critically for many, though not all, Eurocentrics, such a developmental journey is deemed to have been absent in the East, wherein the East is constructed as the West's inferior opposite Other and is denied the progressive ability to self-generate. Thus the East is said to be governed by "irrational", regressive institutions – eg., Oriental despotic states rather than Western liberal states, mystical other-worldly religions rather than rational Protestantism, collectivist rather than individualist social structures, superstitious mentalities rather than scientific ones, and so on. All of which culminates in the point that for many, though not all, Eurocentric scholars, because the East is deemed to be incapable of self-development so it was incumbent upon the West to engage in an imperial or global civilizing mission in order to 'kick-start' the East so that it could join the Western developmental track that would eventually deliver it to the terminus of Western-based capitalist civilization (or communism for Marxism).

At this point, the second-step of the Eurocentric big bang theory cuts in. For having risen to the top the West expands outwards to remake the world in its own image. Or, to complete the metaphor: the big bang of capitalist development exploded spontaneously in Europe in the 16$^{th}$ century and thereafter Western civilization diffused outwards to remake the earthly universe in its own image. After 1492 European civilization is thought to have diffused through trading-post empires in Asia and formal

imperialism in the Americas and, later on, through formal imperialism in large parts of Asia and Africa as well as through informal imperialism in the Middle East. In the Eurocentric vision the period covering 1492 to 1945 is in effect thought of as one that is marked by Western-led "proto-globalization" and is narrated in terms of a Western relay race wherein the baton of global power was passed from the Spanish and Portuguese to the Dutch, who then passed it to the British and French, while the final leg of global economic power and of globalization was run in record time by the American anchor man. The essential task performed by these Western runners was to smash down the obstructive walls or "regressive barriers" that allegedly divided a barbaric and savage East from the civilized West.

In this article I advance an alternative non-Eurocentric vision which, in effect, inverts the standard Eurocentric chronology and explanation. This comprises three key inversions:

1) Europe was not the early but a *late-developer* and that East Asia, the Middle East and North Africa as well as India were the original earlier developers. Consistent with late development theory I argue that the West was only able to develop and break through to modernity because it borrowed, assimilated and appropriated the more advanced Eastern technologies, ideas and institutions.
2) Eurocentric world history assumes that the rise of the West came first and then globalization followed. Instead I shall argue that Europe modernized in the first global era (1492–c.1830) that was dominated by Orientalization or Easternization. That is, Orientalization enabled the rise of the West.

3) Standard Eurocentric world history presumes that Europe dominated world progress between 1500 and the present only to be challenged by the rise of East Asia since the 1960s/1970s. That is, the mainstream of world economic history in the last half millennium has been Western-led. But I shall argue that between 650 and 1830 significant parts of the East – again, the Middle East and North Africa, China and India – were the key global economic players and that while the West came to dominate the global economy between 1830 and 2010 the mainstream is now shifting back to China, East Asia (and India). Thus the mainstream of global progress has been Eastern for the majority of the last 1500 years and with a brief, albeit hugely significant, Western interlude, is now returning to the East whence it came. Thus I prefer to talk about the "return" of Asia rather than the "rise" of Asia.

**Afro-Eurasian Regionalization/Eastern-led Proto-Globalization**

Here I break the long period of c.650–1800 into two phases beginning with the Afro-Eurasian regionalization/proto-globalization between 500–1450/1492. While Eurocentric history proclaims that the birth of proto-globalization occurred during the European Age of Discovery, this occludes what might be called the Eastern Age of Discovery that occurred between about c.500 and c.750 [13].

While numerous Eastern traders were important, including Jews, Armenians, Javanese, Africans, Indians and Chinese, nevertheless, the key pioneering role was performed by the West Asian Muslims. The Muslims sought initially to unify West Asia

through Islam and trade, before they spread outwards to Africa in the south, India, Southeast Asia and China in the east and Europe (or "Christendom") in the west. Their economic reach was extraordinary for the time such that West Asia in effect constituted the pivot of Afro-Eurasian trade with Mecca lying at the centre. As early as the ninth century one long, continuous line of transcontinental trade had been established by Islamic merchants, spanning the space between China, Europe and Africa [1, 16]. Not just trade, but Islam's power too spread rapidly after the seventh century with the Mediterranean becoming in effect a Muslim Lake, and "Western Europe" a promontory within the Afro-Eurasian regional economy.

Janet Abu-Lughod has provided a detailed picture of this trans-continental trading network (although she dates it to the 12$^{th}$ and 13$^{th}$ centuries, whereas I see them developing earlier). The Islamic Ummayads, Abbasids and North African Fatimids were vital in uniting various arteries of long-distance trade known in antiquity between the Indian Ocean and the Mediterranean. These refer principally to the Northern, Middle and Southern routes [1], though the latter two routes were key. The middle route began on the Mediterranean coast of Syria/Palestine, crossed over to Baghdad and then forked either along the land route to the east or southward to the Persian Gulf, which then linked up with the Arabian Sea, the Indian Ocean and beyond into the China seas. The land route tracked eastward across Persia to Transoxiana, before bifurcating into a southern link to India and an eastern link to China. The Southern route linked the Alexandria-Cairo-Red Sea complex with the Arabian Sea and then the Indian Ocean and beyond. The fall of Baghdad in 1258 saw the capital of the Islamic world shift to Al-Qahirah – later

Europeanised to Cairo – which then became the pivotal centre of Afro-Eurasian trade (though this latter process began during the Fatimid era back in the tenth century).

The lucrative Eastern trade diffused across these commercial routes into Africa and Europe (principally via Italy) at the far western end of this regional system, which in turn enabled the Venetians to perform their intermediary role between Europe and the East. Then, with the Fall of Acre in 1291, which marked the end of the Crusades, the Venetians came to rely on the southern route which was guarded over by the Egyptians. So pivotal was Egypt in this respect that Abu-Lughod [1] declared that "[w]hoever controlled the sea-route to Asia could set the terms of trade for a Europe now in retreat. From the thirteenth century and up to the sixteenth that power was Egypt". Strikingly, some 80 per cent of trade that came from the East in the period 1291–1517 was controlled by the Egyptians. And even after 1517 (the year that Egypt succumbed to the Ottoman Empire) Venice continued to survive through its links with Egypt.

Accordingly, we need to qualify the common claim that Venice and Genoa were pioneers of global trade. Rather, we might better understand them as intermediaries or even adaptors, whose success was dependent upon their ability to insert themselves into the interstices of the Afro-Asian-led trading system. And this is reinforced by the point that they entered the nascent global economy on the strict conditions that were imposed by the Egyptians and West Asian Muslims.

**Early Eastern-led Globalization, 1450/1492-c.1830**

In the general Eurocentric narrative of world history it is largely assumed that before 1492 the world was segmentalized or sub-divided into autonomous and isolated regions,

such that it was only with the initiation of the European Age of Discovery that these walls were gradually broken down. This constituted, in effect, the age of primitive global accumulation which prepared the launching pad for the take off of thick globalization under the auspices of the United States after 1945. But in the light of the discussion thus far it becomes apparent that all that was really happening was that the Europeans were finally joining in a direct way the nascent global economy, the foundations of which had been laid by the numerous eastern traders following the Asian Age of Discovery around the sixth century. That is, 1492 and the rise of globalization or proto-globalization did not come out of nowhere but was preceded by the intensive integrationist tendency of Afro-Eurasian regionalization. Moreover, it might be fairer to conclude that the Iberians in their travels to India discovered nothing that had not already been known to the many Eastern traders who had engaged it for some 800 years previously; hence they might be better labelled the European voyages of Re-Discovery.

It is at this point that we encounter one of the most profound paradoxes of world history. For it is a Eurocentric axiom that after 1434 the Chinese withdrew from international trade and retreated into an isolationist phase, thereby allegedly creating a vacuum into which the highly charged Iberians avidly poured to initiate the phase of primitive global accumulation [20, 25]. But the first paradox emerges in the point that after 1434 the Chinese in fact moved to the centre of the nascent global economy; and the second paradox emerges in the point that European trading connections with Afro-Asia intensified in this period in significant part as a function of the role played by the Muslims, Indians and, above all, the Chinese. How then can we understand China's move to the centre of the nascent global economy?

One significant moment lay in the conversion of the Chinese economy onto a silver standard in the mid-fifteenth century. For this created a huge demand for silver that flooded in as a result of Europe's encounter with the Americas. But this huge demand was in turn a function of the strength of the Chinese economy, which had undergone a kind of industrial miracle in the 10th and 11th centuries [13]. The strength of the Chinese economy issued a large export drive. But because Chinese had no appetite for European goods so the only way that Europe's structural trade deficit could be financed was through exchanging Chinese goods for silver. Not surprisingly this issued a strong gravitational pull for the world's silver into East and South Asia.

But it was not just the systemic European trade deficit with China that was important when trying to understand China's place in the emergent global economy. As Dennis Flynn and Arturo Giráldez [8] have argued, after 1492 there developed a global arbitrage system (or a "global silver-recycling process"), with China constituting its pivot. Because the Chinese economy was the strongest in the world right down to the nineteenth century [9, 13], that its monetary system was based on silver and that it enjoyed significant trade surpluses which were financed by silver meant that the price of silver relative to gold in China was about twice that of the equivalent figure in Europe (1:6 in China, 1:12 in Europe). This fuelled the global silver arbitrage system whereby American silver was shipped by the Europeans into China whereupon it was exchanged for gold. This was then shipped back to Europe where it was exchanged for twice the amount of gold before this was then shipped back to China where the process began anew. Profits were realized at each stage of the process, thereby fanning the development of the Chinese and European economies. Also of significance is that the various East

India Companies inserted themselves into this system and derived about 75 per cent of their profits from shipping the gold and silver across the world. This yields several conclusions: first, that China was a key player within this global trading system and second, that European economic success was a function of the various East India companies' ability to plug themselves into this Chinese pool (or what Andre Gunder Frank [9] refers to as the "Chinese silver sink"). This is reinforced by a third point: that the Europeans relied for much of the rest of their profits not by monopolizing Asian trade as Eurocentric world history presumes but by acting as intermediaries within the intra-Asian trading networks (or the 'inter-country trade'). So while the Europeans played a role in the emergent global economy it was secondary to that played by China as well as other major actors such as India and West Asia.

The bigger point is that various Eastern agents played key roles in driving the global economy forward after the fifteenth century. Of course, this vision conflicts directly with the one that is constructed by Eurocentric world historians, which focuses on not just Europe's opening up of Asia but also Britain's central role that hinged on the creation of the triangular trading system (usually referred to as the Atlantic system). This refers to the way in which Britain linked West Africa with the Americas and created one continuous trading system, wherein African slaves were purchased in West Africa, who were then shipped via the Middle Passage to the Americas where they were put to work in the mines and plantations, the products of which were then shipped back to Britain before the whole process began anew. While this was certainly a significant development so far as linking up the world was concerned nevertheless the key point is that much of the impetus to the Atlantic system was provided by the gravitational pull of the East –

India and China in particular. For, as we have seen, a good proportion of the silver that was plundered by the Europeans in the Americas – somewhere between a third [7] and two-thirds [9] – wended its way across to China and India, either eastwards via the Cape Route and the West-Asian dominated overland and sea routes or westwards via the trade route that went from Chile to China via the Philippines on board the Spanish Manila galleons. It might even be the case that Indian and especially Chinese demand for this silver was crucial in maintaining the profitability of the American mines [9].

Pulling all this together it can be concluded that both the Pacific and Indian Ocean economies, which were dominated by Asian merchants, provided a strong input into the reproduction of the Atlantic economy. And while this is not to say that the European role in the Atlantic system was unimportant it is, nevertheless, to say that the Pacific/Indian Ocean trading systems helped suck the Europeans into both these systems as well as sustain Europe's role in the Atlantic system. This is brought into further relief by the point that the Europeans before 1800 did not dominate the Asian trading system but in fact played a subordinate role, being dependent upon local Asian knowledge, Asian capital (much of which was provided by rich Indian Banians), and the goodwill of Asian rulers – in addition to the point that the EICs derived their profits from inserting themselves into the Asian-led system [9, 13]. Indeed they even had no choice but to cooperate with the Asians in such matters as the sharing of trading ships.

However, standard Eurocentric narratives deny that the period between 1450/1492 and 1830 qualified as "global", preferring to see it as an era of proto-globalization wherein the Europeans broke down the walls behind which "barbaric" and "savage" societies hid from the world thereby preparing the ground for the future emergence of

thick globalization. It is certainly true that the quantity of trade in this era was well below that of the post-1945 era. But trade was only one factor of relevance here. Most important of all was the diffusion of "resource portfolios" from East to West. As I mentioned earlier, all the key developments that we associate with the rise of the West were significantly enabled by the borrowing or assimilation of Eastern resource portfolios. This is important to rethink the way that we traditionally conceive of the rise of the West. But at this stage of proceedings another key point emerges. For one of the key properties of globalization is that which David Held and his co-authors [12] describe as high "impact propensity", by which they are referring to the point that globalization only properly exists when it can be demonstrated that global flows can re-organize societies that are geographically very far apart. In the following section I shall argue that various global flows that went from East to West were so significant that they enabled a fundamental re-organization of Europe – specifically enabling its transition from feudalism to capitalism – thereby suggesting that the impact propensity of such flows was in fact sufficiently high to warrant the term globalization. Space precludes a full discussion here but to illustrate my claim I shall consider some of the influences that India, the Islamic Middle East and China imparted on the rise of the West.

**Indian, West Asian and Chinese influences on the rise of the West**

Before I chart some of the key non-Western influences on the rise of the West it is worth pausing for a moment to consider a key issue that addresses one of the enduring challenges to global-dialogical history – notably the problem of proof concerning transmissions. For the response, often made by Eurocentrics, when confronted by the

claim that a certain idea/institution/technology came from outside Europe, is that it could have been an independent European invention, thereby rendering its non-European origins either irrelevant or simply coincidental. Often it is not possible to prove a particular transfer, with circumstantial evidence often being the only "proof" offered. This is discussed by Arun Bala [2]. He agrees that it is insufficient simply to assert cross-civilizational transfer in those cases where an idea that appeared in Europe was invented previously elsewhere. Nor is it sufficient to offer up circumstantial evidence. Instead he argues that we can reasonably infer transmission in those situations where a particular culture (say Europe) is interested in understanding an earlier invention in a non-Western civilization, and when the non-Western invention (ideational, institutional or technological) appears soon after that interest is displayed within Europe. Thus he asserts that "[t]o claim transmission we must… show that the new theme developed shortly after a corridor of communication opened between two cultures, and that the new idea was a dominant theme in the influencing culture, but not in the [receiving] culture" [2]. So with this in mind I shall consider some of the key non-Western influences that enabled the rise of the West.

*Chinese, Indian and Islamic origins of the Renaissance and Scientific Revolution*

It is often held that the Italian Renaissance and the Scientific Revolution constituted key epistemic turning points insofar as they retracked Europe away from its old theological *modus operandi* and pointed it toward a more modern rational and scientific way of thinking. These twin epistemic revolutions are usually thought to constitute "pure European" moments insofar as they led the Catholic Christians to reach back to the

progressive, rational and scientific ideas that were developed in Ancient Greece. Put differently, Europe in effect regained its original progressive stance during the 15th to 17th centuries, casting the so-called dark ages that unfolded after the end of the Roman Empire to the periphery of European history.

However, there is now a significant literature that re-casts these epistemic revolutions in an eastern light, wherein many of the key breakthroughs found their invention earlier in India, China but most especially in Islamic West Asia and the Levant [2, 10, 11, 13, 14, 17, 21, 22, 23, 24, 26]. Islamic breakthroughs in mathematics, many of which were reliant upon previous Indian breakthroughs (to be discussed below), especially that of algebra and trigonometry, were pivotal. "Algebra" was derived from the title of one of al-Khwārizmī's mathematical texts (following Robert of Ketton's translation in 1145). Moreover, by the early tenth century CE all six of the classical trigonometric functions had been established by Muslim mathematicians. Developments in public health, hygiene and medicine were also notable. Al-Rāzī's medical works were translated and reprinted in Europe some forty times between 1498 and 1866. Ibn Sīnā's (Avicenna's) *Canon of Medicine* became a founding text in European medical schools between the twelfth and fifteenth centuries. The Muslims developed numerous medicines and anaesthetics and pioneered the study of anatomy. And the Egyptian physician, Ibn al-Nafis (d. 1288), whose work on the human body, which contradicted the traditional position of the Greek physician, Galen, fully pre-empted the work of William Harvey by some 350 years.

The Muslims were also expert cartographers, astrologers and astronomers such that many of these ideas were drawn upon by the Europeans (see below). Interestingly,

Ibn al-Shātir's mathematical models bore a very close resemblance to those used by Copernicus some 150 years later. Noel Swerdlow has suggested that it "seems too remarkable a series of coincidences to admit the possibility of independent discovery [on the part of Copernicus]" (cited in [26]). Bala argues that Copernicus inherited his trigonometric methods from Indian mathematical astronomers and took various insights from Muslim astronomers. Drawing on Joseph [17] he singles out three key Indian mathematicians in the period covering the period from 476 through to 1185: Aryabhata, Brahmagupta and Bhaskara II [2]. Their pioneering developments in mathematics comprised vital breakthroughs in the absence of which the Europeans would not have been equipped sufficiently with the requisite knowledge to undertake the Renaissance and Scientific Revolution. He emphasizes too that Indian mathematical development did not dry up after the 14th century, as is commonly assumed. Here, he and others [17, 24] reveal the vital role played by the Kerala school between the 14th and 16th centuries with the breakthrough in developing the "infinite series" being crucial. Again, this period was marked by three key thinkers – Madhava, Nilakantha, and Jyesthadeva.

One of the defining aspects of the Renaissance is the concept of perspectivism; something which is said to have originated within Italian art. But perspectivism reaches back to the prior work of Ibn al-Haytham (Alhazen, 965–1030 CE) and his optical revolution that emerged at the turn of the second millennium CE. His unique move was to replace the medieval "extramission theory" with his "intromission theory". He also drew on many of the mathematical breakthroughs that were pioneered by other Muslim thinkers such as Ibn Sīnā (Avicenna) and al-Biruni. The upshot was that it entrenched mathematical realism (which went beyond the stage reached by the ancient Greeks).

Moreover, the new optical theory led to a shift in the perceptual sensibilities of the Europeans, bringing to light "perspectivism" wherein the artist represented objects as they appeared to the observer. Given that mathematical perspectivism was central to the Renaissance, al-Haytham's position within this epistemic revolution was probably highly significant [2].

Last, but certainly not least, the Muslims (especially the Mutazilites) propagated the idea that man was a free and rational agent – supposedly one of the leitmotifs of modern European thinking. Such an idea emerged not long after the Prophet Mohammed's death signifying a move towards 'rational Islamic theology' (so that the Prophet Mohammed's teachings could not be distorted by subsequent political authorities). Known as *Ijtihad*, it involved the exercise of independent judgement and, above all, the notion that God could only be comprehended through unaided and individualistic human reason. This idea was incorporated into the works of scholars such as al-Kindī (800–873), al-Rāzī (865–925), al-Fārābi (873–950), Ibn Sīnā (980–1037), al-Zahrāwī (936–1013) and Ibn Rushd (1126– 98). Moreover, Ibn Rushd called for a separation of religious and scientific truth. It is also noteworthy here that while a key leitmotif of the Scientific Revolution was the idea of the experimental method this was, nevertheless, first expounded by the Muslims (not the Greeks).

The question now becomes: were there plausible transmission paths that could enable this knowledge diffusion or was it all just a case of coincidental and independent inventions in the West and East? Bala points out that there was a clear transmission path that reached from India to Europe at the very time that the Europeans were seeking to develop mathematical understanding [2]. Given that when Vasco da Gama landed in

India he arrived in Calicut, which comprised the centre of mathematical developments undertaken by the Kerala school, so he would have had plenty of opportunity to encounter this school. Significantly, Jyesthadeva's text, *Yuktibhasa* (1550), was circulated among the Portuguese missionary schools in India. No less importantly, it was very shortly after this that the Europeans began to approach problems connected to the infinite series using the methods laid out in the *Yuktibhasa*. Bala also singles out other very close links, thereby consolidating his claim concerning the Indian contribution to Europe's epistemic revolution (though this should not obscure the Islamic and Chinese contributions which he also discusses). But, in any case, much of the Islamic mathematical knowledge was informed in various ways by the Indian breakthroughs.

What then of the transmission paths connecting Islamic West Asia/North Africa to Italy and, moreover, did the absorption of Islamic ideas occur at the time when the Europeans were exhibiting signs of interest in such knowledge? First, increasingly after about 900, Europeans began translating Islamic texts into Latin. Islamic scholarship developed not only in West Asia but also in Spain, where it was proactively encouraged by the second Ummayad Caliph al-Hakkam II (961–76). The fall of Spanish Toledo was vital for it was from its vast library where the Europeans accessed many of the relevant books, which were then rapidly translated into Latin. Learning from Islam was actively continued by the Spanish King, Alfonso X (1252–1284), though largely through Jewish intermediaries (given the political difficulty of employing Muslims during the Crusades). Much the same was true of the situation in Portugal. Second, Islamic ideas also entered Europe via the Ottoman Empire, which was heavily embroiled in Eastern Europe, especially in the Balkans. Third, Islamic ideas also entered Venice through the trade route

that went from West Asia and North Africa as well as from Islamic Sicily after 902 (something that was reflected in the Arabic influence on the School of Salerno after 1050). In short, then, there were indeed sufficient and abundant transmission paths.

*Chinese and Islamic origins of the European "Age of Discovery"*

In Eurocentric world history the Renaissance is thought to have triggered the European Age of Discovery as the highly curious Iberians, furnished with all this new and pure "European" knowledge, sought to go out and explore what is thought to have been a backward Asian world that was mired in stagnation and irrational institutions. But it is highly possible that the Voyages were enabled in the first place by the transmission of Eastern knowledge and technologies, much of which emanated from West Asia and China. It is highly likely that it was the Muslims who had invented the lateen sail which enabled them to sail into a headwind. For European oceanic sailing relied on the lateen sail; something which proved to be vital for the Portuguese as they explored the western coastline of Africa given that strong headwinds blew up in just south of Cape Bojador. Because the lateen sail led to a zigzagging (triangular) path so the use of geometry and trigonometry was required in order to calculate the linear distance path travelled. As I have argued already, these mathematical procedures were passed on to the Iberians primarily by the Muslims. And because the strong tides south of Cape Bojador off the west coast of Africa could beach a ship, so knowledge of lunar cycles were required (given that the moon governs the tides). These too were passed on by the Muslims via the Jewish cartographer Jacob ben Abraham Cresques, who resided in Portugal. Added to this was knowledge of solar calendars, more accurate navigational charts, latitude and

longitude tables, as well as the astrolabe and quadrant [13, 27], all of which originated in West Asia. Notable too is that the square hull and stern-post rudder (which was a crucial nautical technology that enabled oceanic sailing) was invented in China around 400 CE. Moreover, the triple mast system and the compass also emanated from China and the latter was deployed in Chinese ships by 1090 with this invention reaching Italy around 1185.

The European voyages were, however, unique in one sense: that the European ships were armed with cannon. For prior to the European incursion into the Indian Ocean Asian trade was a largely peaceful affair. But there is evidence to suggest that the cannon was invented by the Chinese around 1290 (where it was known as the "eruptor"). This is significant because the first European cannon is dated to 1326 in Florence and 1327 in England (the latter is illustrated in the manuscript of Walter de Millemete) [15]. Crucially, the cannon presupposes a significant amount of developmental time prior to its final invention; something which is clearly absent in the extant discussions of the invention of the first European cannon. But such a line of prior development is clear in the Chinese context (covering the period from c.800–1290 stemming back over some five centuries).

Ascertaining the transmission of the cannon to Europe is, however, based only on circumstantial evidence. Joseph Needham and his colleagues [22] suggest that this could have been achieved either by the Italian merchants who resided in Tabriz, or by the European friars who sojourned in China in the 13$^{th}$ century, or by the various Muslims who were employed in the Chinese military service after 1260. Certainly there was enough contact between Europe and China to enable the transmission of the idea of the

cannon, perhaps through pictorial representations and/or the actual information concerning its construction. While these claims are merely speculative it is obvious that the cannon cannot simply come out of nowhere. Claims for an independent European invention are problematic, though not simply because the earliest extant cannon is dated almost forty years after the invention of the Chinese Eruptor. For as noted above, the clue here is that no expert has revealed the evidence for the necessary European developments that must have preceded the first European cannon of 1326/7. Without these the diffusion of Chinese knowledge of the cannon provides a plausible answer.

Of course the cannon presupposes the use of gunpowder. Eurocentric scholars often attribute the discovery of gunpowder to the European scientist Roger Bacon in 1267. But the recipe for gunpowder stems back to China in c.850 and it was publicly available in print form in 1044. Needham also notes that in Bacon's published statement on gunpowder it seems clear that he was describing Chinese firecrackers [22]. It is possible that Bacon had gained access to the already published Chinese recipe for gunpowder. How could this knowledge have been transmitted across from China to the West? Paul Cressey [6] and Arnold Pacey [23] single out William of Rubrick (a personal friend of Bacon's), who returned from China in 1256/7. Though he could very well have brought back the information there was a series of Europeans (mainly friars) who travelled to China and back ever since 1245, any one of whom could have relayed the recipe [22].

*Chinese origins of the Enlightenment?*

Turning to the post-1700 era of European history the next key developments were the Enlightenment and the British agricultural/industrial revolutions. It is a staple of Western text-books that the Enlightenment was a vital European cultural/epistemic innovation that ushered in the modern industrial period. But this obscures the point that between 1700–c.1780, much of Europe drew heavily from many aspects of Chinese civilization, particularly the idea of "rationality". And such ideas were readily available given that there was a wealth of Chinese texts and pamphlets that flooded into Europe throughout much of the 18th century, many of which were brought back by the Jesuits [18].

In the Anglo-Saxon canon *the* central European political economist was the Scotsman, Adam Smith. But while Anglo-Saxons celebrate Smith as the first political economist nevertheless, as is well-known among political economists, behind Smith lay François Quesnay, the French physiocrat. But less well-known is that behind Quesnay lay Confucius. So profound was the Confucian element in his thinking that Quesnay was frequently referred to as the "European Confucius" at the time. And it was, in fact, Quesnay rather than Smith, who was the first European to critique the ideas of mercantilism. The term "physiocracy" means the "rule of nature". This was important insofar as it located agriculture as a vital source of wealth (which later informed the idea of the British agricultural revolution). Critically, though, Quesnay argued that agriculture could only be fully exploited when producers were set free from the arbitrary interventions of the state. For only then could the "natural laws" of the market cut in (as the Chinese had long realized). Quesnay's debt to Chinese conceptions of political economy was found in many ideas, the most important being that of *wu-wei* – which is translated into French as *laissez-faire*. Indeed as early as about 300 CE Kuo Hsiang

described *wu-wei* as that which lets "everything be allowed to do what it naturally does, so that its nature will be satisfied" (although it should be noted that the concept pre-dates the start of the Common Era).

The upshot of all this is not to say that the European Enlightenment was the *pure* product of Chinese ideas, for clearly there were some Enlightenment thinkers who rejected China as a model for Europe – most notably Montesquieu and Fénelon. But it would be remiss to entirely ignore some kind of Chinese input in this major epistemic turning point of Western civilization.

*Chinese origins of the British agricultural revolution?*

Turning now to the British agricultural revolution it is fair to say that the key inventions comprised: the iron mouldboard plough, Jethro Tull's seed drill and horse-drawn hoe, the horse-powered threshing machine and the rotary winnowing machine, as well as breakthroughs in crop rotations. But all of these found precedent in sixth-century China. Taking each in turn it is notable that the iron mouldboard plough was first invented in China before the sixth century. It is curious that this was not copied before the eighteenth century given that the European medieval plough was so inefficient and that knowledge of this Chinese technology could have been relayed back in the thirteenth century. Nevertheless, what we do know is that in 1730 the Rotherham plough made its appearance in England and that this plough was borrowed from the Dutch (who termed it the "bastard plough"). But were the Dutch the original inventors of the bastard plough?

It might be thought that the Rotherham and bastard ploughs were invented independently of the Chinese curved iron mouldboard plough. But Francesca Bray has

dismissed this possibility on the grounds that the new European ploughs far too closely resembled the much earlier Chinese invention. Indeed, Chinese iron mouldboard ploughs perfectly pre-empted the model that was described as late as 1784 by the European, James Small (who is usually credited as the pioneer of the plough). Moreover, the sudden emergence of the new European ploughs, which were so radically different to those that had been used for about a millennium, suggests that this could not have been mere coincidence. In any case, it is clear that the Dutch (who had resided in East Asia in the seventeenth century) had brought back the actual Chinese model and created the bastard plough [5].

The rotary winnowing machine was a major breakthrough in that it separated out the husks and stalks of the grain after the harvest. But it was long preceded by the Chinese rotary winnowing machine which stems back to the second century BCE [5]. Once again there is evidence that it was brought over from China, having been brought to France by the Jesuits in the 1720s and the Netherlands at the hands of Dutch sailors between 1700 and 1720. Additionally, various models were brought back to Sweden, where they were adapted by Swedish scientists such as Jonas Norberg. Interestingly, Norberg openly announced that 'I got the initial idea… from three separate models brought here from China' [5].

Prior to the deployment of the seed-drill, seeds were laboriously planted by hand, which was a highly inefficient business given that so much of the crop was lost since much of the sown-seed ended up with a clumping of the plants that then had to compete for light, moisture and nutrients. This contrasted with the Chinese multi-tube seed drill first invented in the third century BCE., which had enabled the development of a highly

efficient agricultural system [28]. Europe very belatedly caught up with China once Jethro Tull had apparently discovered the seed-drill. This device sowed the seed in regular rows and at a specific depth while the hoeing device was responsible for keeping the weeds down and ventilating the soil.

Tracing the diffusion of this invention from China is not easy. Here we come across one of the dilemmas of the diffusion process for what diffused was not the model but the idea, given that Tull's model was quite different in various aspects to the Chinese models. But it is highly likely that the *idea* of the drill was transmitted through the diffusion of books and manuals on this device that were readily available at that time. For example, in his book, *The History of the Great and Renowned Monarchy of China* (1655), Alvarez Semedo tells us that:

> As I passed by *Honum* [Honam], I saw one plowing with a plow of 3 irons, or plough-sheares, so that at one bout he made 3 furrowes; and because the ground was good for the seed which we here call Feazols or Kidney-beanes; this seed was put, as it were, in a bushel, or square dish fastened upon the upper part of the plough, in such manner, that with the motion thereof the Beanes were gently scattered upon the earth as some falleth upon a Milstone, at the moving of the Mill-hopper; so at the same time the land is plowed and sown with hopes of a future crop (Semedo cited in [19]).

It is striking to note that Tull's basic principles of the seed drill, outlined in his book, *Horse-Hoeing Husbandry* (1733), were a near word-for-word reproduction of those laid out in the original Chinese manuals, which dated back to the third century BCE [5]. Indeed, Bray claims that Tull's system so closely resembles 'the farming practice of Northern China that one is tempted to assume that Tull borrowed the system lock, stock and barrel from China' [5]. Moreover, Bray also points out:

> One might argue that the European seed-drill was a logical development from earlier [European] horticultural techniques such as setting, yet it cannot be fortuitous that European inventors suddenly started working on machines to sow several rows of corn simultaneously in straight lines, just like the Chinese machines, precisely at the period when information about Chinese agriculture was becoming freely available [5].

Last, but not least, there is the issue of crop rotations, which are largely associated with Turnip Townshend's innovations. The new crop-rotation systems, which were heralded by the British as one of *the* crucial agricultural breakthroughs, were fully pre-empted by the Chinese. Strikingly, the Chinese had developed many such systems as early as the sixth-century, all of which were reported in the *Chhi Min Yao Shu* [5]. Once again, it is likely that this information, which was contained in various Chinese manuals that entered Europe after the mid-seventeenth century, could have directly influenced Townshend, particularly as that it was round about this time that the British were interested in developing agriculture.

*Indian and Chinese origins of the British industrial revolution*

Building on the original insight of Marshall Hodgson's epic work [14], a similar story can be told of the British industrial revolution. Thus while British economic historians celebrate James Watt for his skills in inventing the steam-engine, it is possible that he owed some kind of a debt to the Chinese. The essentials of the steam-engine go back to Wang Chên's *Treatise on Agriculture* (1313) that in turn reach back to the Chinese invention of the water-powered bellows (31 CE). While it is usually acknowledged that Watt's engine stems back to Wilkinson's, nevertheless it is not usually acknowledged that the latter's engine shared many similarities with Wang's. Moreover, the Chinese box-bellows was a double-acting force and suction pump, which at each stroke expelled the air from one side of the piston while drawing in an equal amount of air on the other side. This shared a "close formal resemblance" to Watt's engine and, by the late-seventeenth century, the Chinese had developed a steam turbine [21]. Moreover, Chinese breakthroughs in gun manufacturing were significant, enabling the later invention of the steam-engine (given that the cannon or gun is in effect a one-cylinder combustion engine). And a further link of note is that one of the major challenges confronting James Watt was the need to bore an airtight cylinder and that he had turned to John Wilkinson for help in this matter, given that Wilkinson owned a boring mill that was designed for cannon production.

Iron (and later steel) production formed, alongside cotton manufacturing, the twin pillar of the British industrial revolution. However, we know that the Chinese and the Indians were developing such industries well before the British. Given this, it is not

surprising that British producers (including Benjamin Huntsman of Sheffield) studied Chinese and Indian production methods as late as the eighteenth century in order to develop their own iron and steel manufacturing techniques [4, 22]. The other great pillar of the British industrial revolution, cotton-manufacturing, might also have benefited from prior Eastern initiatives. Thus, while it is recognized that the British inventor, John Lombe, set up the silk machines that would later become the model for the Lancashire cotton machines and that he borrowed his idea from the Italian machines, nevertheless it turns out that the latter were a replica of the earlier Chinese inventions from the thirteenth century [18].

All in all, though, none of this is to say that the British were merely passive benefactors of Indian and especially Chinese, inventions for they surely did much insofar as they put everything together, the outcome of which was the development of per capita income at levels that had previously not been witnessed before in world history. And for all the Chinese technological prowess it is clearly the British, not the Chinese, who managed to invent the steam engine. Overall, then, part of the skill of the British was the ability to be open to the inventions of others.

**Conclusion**

Returning to the key goals of this article, the upshot of the discussion is three-fold. First, it challenges the first-step of the Eurocentric big bang theory of modernity/globalization, which presumes that the West was entirely *self-made*. For this obscures the point that the West benefited from adapting earlier Eastern inventions. Second, the discussion suggests

that the rise of the West occurred in significant part during the early global age in which Orientalization was the dominant process and Occidentalization the subordinate one. The discussion of the diffusion of Eastern "resource portfolios", therefore, performs a dual intellectual task: first, that it problematizes the self-made status that Eurocentrism awards the Europeans (and simultaneously brings into play the role of various Eastern peoples); and second, that this diffusion constitutes a litmus test for the presence of early eastern-led globalization after about 1492 insofar as it evoked an impact propensity whereby Europe was, at least in part, remade as a result of such global diffusions.

The third key point is that while Europe overtook China in the nineteenth century and indeed became the dominant region in the world, coupled after 1945 with the United States, such that China took a great leap backwards, nevertheless what we witness today is not so much the rise but the return of China to the centre of the global economy, where it had lain between c.1450 and c.1830. Moreover, China's leading position was largely the result of the industrial developments that had occurred during the Sung period, which suggests that 960 rather than 1978 might more appropriately constitute the year-zero of China's development.

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