

The Biogeographic Roots of World Inequality: Animals, Disease, and Human Settlement Patterns in Africa and the Americas Before 1492

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Summary. — Building on recent insights from archeology, genetics, and linguistics I challenge Jared Diamond’s grand narrative of the biogeographic roots of world inequality. I argue that this narrative pays insufficient attention to contrasting patterns of human settlement in Africa and the Americas. I develop alternative hypotheses concerning the role of domesticated animals in shaping human disease environments and processes of state formation prior to the Columbian exchange. My overarching objective is to enhance the debate on the deep roots of world inequality by tackling Eurocentric conceptions of world development and exploring the potential of new comparative and multi-disciplinary research perspectives.

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1. INTRODUCTION

Columbus’ crossing of the Atlantic heralded an era of European conquest and colonization at an unprecedented scale. In the centuries following 1492, Europeans established and extended global trade networks and exported their languages, values and norms to distant corners of the world. The scientific and industrial revolutions of the 18th century unleashed a second wave of imperial expansion in the long 19th century. During the 20th century Europe’s hegemonic power started to evaporate. Not only had a former British colony, i.e., the US, overtaken Europe in terms of technological leadership, the global diffusion of industrial technologies also spurred economic growth in former ‘developing’ regions. At the start of the third millennium it seemed that the era of major economic divergence had given away to a new era of economic convergence.

The historical roots of Europe’s path to world dominance have been intensively debated by scholars from the humanities, social sciences and natural sciences (Allen, 2011; Diamond, 1997; Jones, 1981; Landes, 1998; Lal, 1998; Mokyr, 1990; North & Thomas, 1973; Tilly, 1990; Turchin & Nefedov, 2009; Welzel, 2014; Wittfogel, 1957). This debate has stimulated the search for new historical sources and empirical insights, but failed to reach a conclusive stage. Asia’s economic ‘renaissance’ during the second half of the 20th century has provoked fundamental re-interpretations of the historical meaning of European or Western ‘dominance’. Some scholars have even argued that, viewed from the wider scheme of human history, European expansion was not much more than a temporary aberration of the standard historical pattern in which Asia, rather than Europe, rules the world (Frank, 1998; Morris, 2010). This has clear repercussions for the way history is written.

Most historians now acknowledge that *Eurocentric* explanations of world inequality have impeded a deeper understanding of what was essentially a global, rather than an exclusively European phenomenon. In the debate on the nature and timing of the *Great Divergence* between Western Europe and China the problem of Eurocentrism has been explicitly brought to the fore (Bin Wong & Rosenthal, 2011; Pomeranz, 2000). The critiques reside in a broader current

of discontent, especially voiced by world historians, regarding the use of Western economic and political concepts in the study of non-Western historical developments; the use of biased historical sources and one-sided benchmarks in global comparisons; and the lack of attention being given to non-European perspectives on world development (Austin, 2007; Carney & Rosomoff, 2011; Ringmar, 2011; Said, 1979; Wolf, 1982).

This study aims to break new ground in the debate on the deep roots of world inequality, by exploring the potential of unconventional comparative and multi-disciplinary research perspectives. I develop my argument by scrutinizing a famous popular account of Europe’s ascendancy, that is Jared Diamond’s thought-provoking study of the biogeographic roots of world inequality. His central argument is that Eurasia had a clear biogeographic advantage in the evolution of peasant-based states over other world regions, and that current global inequalities in wealth and power can be traced back to these environmental conditions. In his widely praised *Guns, Germs and Steel* (1997), Diamond argues that complex social orders emerged predominantly in Eurasia because of favorable biogeographic conditions for the development of stratified societies, centralized states and advanced military and naval technology. The diffusion of sedentary agriculture in Eurasia was facilitated by a (much) larger pool of domesticable plants and animals than in Africa or the Americas, which could spread along a horizontal continental axis with limited variation in climate zones. In addition, longstanding proximity to

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domesticated animals gave Eurasians a comparative advantage in disease resilience, which created a highly unequal playing-field in the confrontation between Europeans and native American peoples after 1492.

Since Diamond's thesis is largely based on insights from evolutionary biology, he claims that his account avoids the pitfalls of Eurocentrism. According to Diamond, Europe derived its technological and military supremacy from an environmental comparative advantage, and not from innate racial, intellectual, or cultural superiority (1997, pp. 18–22). Moreover, by sidestepping the question why Europe, and not Asia, heralded the industrial revolution, Diamond reserved space for historical contingency: no matter where path-breaking technological innovations were made first (Europe, China, India, or Japan), they were just more likely to occur in Eurasia than elsewhere.

A closer inspection of Diamond's thesis reveals problems of reciprocal comparison that are typical for such one-dimensional narratives of world development. Since the central tenet is to explain why Eurasia was *exceptional*, the two vertical-axis continents, Africa and the Americas, are predominantly analyzed and discussed *in comparison to* Eurasia, but not in comparison to one another.¹ Diamond argues that Africa and the Americas both disposed of a smaller pool of domesticable plants and animals than Eurasia; that they both enjoyed less favorable conditions for the diffusion of high-productive species because of their vertical axes; that in both regions this resulted in less diverse agricultural systems and lower rates of population density; and that in both continents this yielded less favorable conditions for the development of sophisticated military technology, fiscal capacity, and centralized states. In other words, the biogeographic roots of world inequality are primarily understood in terms of Eurasian unicity.

Does Diamond's explanatory framework keep up when shifting the comparative lens toward the vertical-axis continents? Building on recent insights from archeology, genetics, and linguistics I argue that the Africa–America comparison confronts Diamond's meta-narrative with three fundamental problems. First, Africa and the Americas were lowly populated regions around 1500 AD, but they were lowly populated for different reasons. Africa, the cradle of humankind, was lowly populated because of specific environmental constraints to agricultural productivity growth, comparatively favorable conditions for nomadic pastoralism and an exceptional human disease environment. However, these three conditions cannot explain why the Americas were lowly populated. In fact, being the last region to be settled by humans in the global migration chain, the Americas may have been lowly populated because of late human presence, rather than specific biogeographic constraints to sedentary agriculture. This argument will be developed in Section 3.

Second, Diamond's account of the role of domesticated animals in shaping comparative disease environments requires revision. Diamond argues that the intimate contact of European farmers with livestock produced hotbeds for new human diseases and that European resilience against these diseases gave rise to a highly unequal Atlantic exchange of 'germs' after 1492. That native Americans died in large numbers from diseases introduced by Europeans is beyond doubt, even though the arrival of African slaves played a major role as well (Mann, 2011; McNeill, 2011). However, I will argue in Section 4 that new insights from genetic research emphasize the importance of wild animals in the evolution of human pathogens and point to Africa as the source region of smallpox, the biggest killer disease introduced in the Americas. Genome sequence studies of other disease vectors call for a rethinking

of the environmental conditions that gave rise to Old World epidemics.

Third, Diamond argues that the availability of domesticated animals – especially the 'big five' of horse, cattle, sheep, goat, pig – created conditions for mixed farming that supported the rise of powerful peasant-based states capable of large-scale imperial conquest. These domesticated animals contributed to the agricultural surpluses that formed a precondition for the evolution of 'large, dense, sedentary, and stratified societies' (1997, p. 87). In Section 5 I will argue that contrasting trajectories of state formation in Africa and the Americas do not fit the casual argumentation very well, especially if one considers the role of domesticated animals in the development of state taxation. I will argue that the *absence* of livestock may have supported the rise of strong central states in Mesoamerica, while the *presence* of livestock in the African savannah areas may have severely complicated state centralization. Agropastoralism in the African savannah served to mediate subsistence risks in climatologically instable environments, but gave rulers hard times in mobilizing resources to centralize power. Without reaching firm conclusions, I argue that the role of domesticated animals has been much more variegated than Diamond's account leads us to believe. But most important, I contend that there is enormous scope for Africa-America comparisons in gaining a deeper understanding of diverging regional development trajectories.

2. GUNS, GERMS, AND STEEL

According to Diamond, Eurasia enjoyed three advantages for the development and diffusion of sedentary agriculture. First, Eurasia is the largest continent of the world, covering ca. 36% of total land mass, thus raising the odds. Second, Eurasia has been blessed with an exceptionally large pool of wild plant and animal species suitable for domestication, including the most productive species. Third, the horizontal orientation of the continental axis facilitates the diffusion of domesticated plants and animals in comparatively homogeneous eco-zones. Compared to Eurasia, Africa and the Americas are smaller sized continents with smaller pools of plants and animals suitable for domestication, whose diffusion has been hampered by the vertical orientation of their continental axes. The American axis stretches all the way from Alaska to Cape Horn, with enormous varieties in climate zones and a tight bottleneck in Central America. In Africa, the Sahara desert and the rainforest belt were additional barriers to the continental diffusion of plant and animal species (1997, pp. 186–189).

Village-based agriculture evolved in the *fertile crescent* around 11,000–10,000 BC with the domestication of starch wheat (emmer), protein-rich chickpeas, oil-rich olives, goats, and sheep. Diamond argues that it is no coincidence that the Neolithic revolution originated in Southwest Asia and spread from there across Eurasia and the Mediterranean shores of North Africa, but not further south. The Mediterranean disposed of excellent climatological and ecological conditions for the evolution of annual grasses, with large varieties in altitudes and season-bound temperatures (1997, pp. 135–142). The diffusion of domesticated plants and animals in Eurasia was enhanced by an independent agricultural revolution in East Asia (China), where early agricultural societies emerged on the basis of domesticated rice, millet, pigs, and silkworms (1997, p. 100; Barker, 2006; Smith, 1995).

Independent domestication of plants and animals also occurred in sub-Saharan Africa and the Americas, but these had smaller productive potential. West Africa and the Sahel

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