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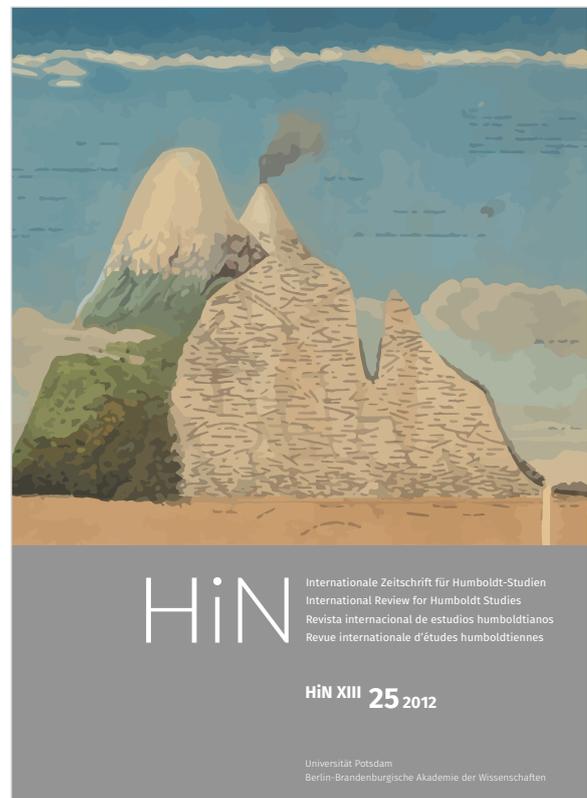
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Moritz von Brescius

Connecting the New World

Nets, mobility and progress

in the Age of Alexander von Humboldt

Abstract

This article explores the link between the profound technological transformations of the nineteenth century and the life and work of the Prussian scholar Alexander von Humboldt (1769-1859). It analyses how Humboldt sought to appropriate the revolutionary new communication and transportation technologies of the time in order to integrate the American continent into global networks of commercial, intellectual and material exchange. Recent scholarship on Humboldt's expedition to the New World (1799-1804) has claimed that his descriptions of tropical landscapes opened up South America to a range of 'transformative interventions' (Pratt) by European capitalists and investors. These studies, however, have not analysed the motivations underlying Humboldt's support for such intrusions into nature. Furthermore, they have not explored the role that such projects played in shaping Humboldt's understanding of the forces behind the progress of societies. To comprehend Humboldt's approval for human interventions in America's natural world, this study first explores the role that eighteenth-century theories of progress and the notion of geographical determinism played in shaping his conception of civilisational development. It will look at concrete examples of transformative interventions in the American hemisphere that were actively proposed by Humboldt and intended to overcome natural obstacles to human interaction. These were the use of steamships, electric telegraphy, railroads and large-scale canals that together enabled global trade and communication to occur at an unprecedented pace. All these contemporary innovations will be linked to the four motifs of nets, mobility, progress and acceleration, which were driving forces behind the 'transformation of the world' that took place in the course of the nineteenth century.

Zusammenfassung

Dieser Artikel untersucht das Verhältnis zwischen den revolutionären technologischen Neuerungen des 19. Jahrhunderts und dem Leben und Wirken Alexander von Humboldts (1769-1859). Dabei wird gefragt, wie Humboldt versuchte, die neuen und sprichwörtlich bahnbrechenden Kommunikations- und Transporttechnologien seiner Zeit zu nutzen, um den amerikanischen Kontinent in globale kommerzielle und kulturelle Austauschprozesse zu integrieren. Jüngere Forschungen zu Humboldts amerikanischer Expedition (1799-1804) haben behauptet, dass seine Beschreibungen Südamerikas den Kontinent für zahlreiche 'transformative interventions' (Pratt) von Seiten europäischer Kapitalisten und Investoren zugänglich gemacht hätten. Diese Studien haben jedoch nicht analysiert, aus welchen Motiven heraus Humboldt diese Eingriffe in die Natur unterstützte. Darüber hinaus wurde nicht der zentralen Frage nachgegangen, welche Rolle diese Projekte in Humboldts eigener Auffassung über die Kräfte des gesellschaftlichen Fortschritts gespielt haben. Um Humboldts Unterstützung für tiefgreifende Eingriffe in die Natur Amerikas nachvollziehen zu können, analysiert dieser Artikel zunächst, welche Rolle der ‚Geodeterminismus‘ und die Fortschrittstheorien der Aufklärung in seinem Verständnis von zivilisatorischer Entwicklung spielten. Dabei sollen solche Beispiele menschlicher Interventionen in die Natur Amerikas untersucht werden, die Humboldt selbst aktiv förderte – nicht zuletzt, da sie geeignet schienen, ‚natürliche‘ Barrieren für gesellschaftliche Austauschprozesse zu beseitigen. Dies waren vor allem die Nutzung von Dampfschiffen, elektrischer Telegrafie, Eisenbahnen und großangelegten Kanalprojekten, deren gebündelte Effekte zu einer signifikanten Beschleunigung von Welthandel und Kommunikationsprozessen führten. Diese zeitgenössischen Innovationen sollen mit den vier Motiven ‚Netz‘, ‚Mobilität‘, ‚Fortschritt‘ und ‚Beschleunigung‘ analytisch verbunden werden, da diese Faktoren eine zentrale Rolle für die ‚Verwandlung der Welt‘ im 19. Jahrhundert spielten.

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Resumen

Este artículo examina la relación entre las profundas transformaciones tecnológicas del siglo XIX y la vida y obra del estudioso prusiano Alexander von Humboldt (1769-1859). Para ello, analizaremos cómo Humboldt trató de apropiarse de las nuevas y revolucionarias tecnologías de comunicación y transporte de su tiempo, de cara a poder integrar el continente americano en redes globales de intercambio comercial, material e intelectual. Estudios recientes sobre la expedición de Humboldt al Nuevo Mundo (1799-1804) han demostrado que sus descripciones de los paisajes tropicales americanos abrieron Sudamérica a una serie de 'intervenciones transformativas' (Mary Louise Pratt) lideradas por capitalistas e inversores europeos. No obstante, estos estudios no han analizado las motivaciones que llevaron a Humboldt a prestar su apoyo a tamañas intrusiones en la naturaleza. Más aún, tampoco han intentado analizar cómo estos proyectos influyeron sobre Humboldt, sobre su manera de entender las fuerzas motoras que se escondían tras el progreso de las sociedades. Con el objetivo de entender la aprobación de Humboldt a las intervenciones humanas que se llevaron a cabo en el suelo americano, este estudio se centrará primero en explorar el papel que las teorías sobre el progreso del siglo XVIII, así como la noción de determinismo geográfico, tuvieron en la concepción que tenía el investigador prusiano del desarrollo de las civilizaciones. Se estudiarán, para ello, algunos casos concretos de intervenciones transformativas que se llevaron a cabo en el hemisferio americano y que, propuestas con entusiasmo por el mismo Humboldt, intentaron superar los obstáculos naturales que dificultaban la intervención humana. Nos

referiremos, más particularmente, al uso de barcos a vapor, telégrafos eléctricos, vías férreas y canales de gran escala. En definitiva, elementos que dieron lugar, en su conjunto, a un comercio y una comunicación global que se llevaron a cabo a un ritmo sin precedentes. Una serie de innovaciones que habrá que relacionar con cuatro temas fundamentales: redes, movilidad, progreso y aceleración; fuerzas motoras de la 'transformación del mundo' que tuvo lugar a lo largo del siglo XIX.¹

¹ I would like to thank Carolina Obradors for her kind help with the Spanish abstract.

Chapter I

On June 5, 1799, the Prussian scholar Alexander von Humboldt embarked at Coruna on a sailing ship tellingly named 'Pizarro' to set sail from Spain to the New World. After a fatiguing voyage of more than forty days – one partly delayed by Humboldt's visit to the Canary Islands – the 'Pizarro' finally brought a very different type of 'conquistador' to America, one who would study the continent's bountiful nature and its human cultures with such empathy and thoroughness that Simón Bolívar would later call him the 'true discoverer of the New World'.¹ Half a century later, in the year 1850, the technically advanced steamship 'Humboldt' would be launched by the U.S. Mail Steamship Company to operate between New York and Le Havre/Bremen, thus connecting the Old and the New World according to a strict timetable.²

The passage from sailboats to steamships is emblematic of the development of new technological devices in the nineteenth century that enabled global connections and interchange to occur at an unprecedented pace, and it reveals many of the leitmotifs that stand at the heart of this paper.³ First, the ocean liner 'Humboldt' running between two continents formed part of a growing infrastructural net that increasingly linked far-flung territories and their human cultures on a regular – and more often than not commercial – basis. Second, the steamship embodied the growing mobility of goods, peoples and ideas that transcended political boundaries and supposedly confined cultural entities. Third, and in accordance with the perception of contemporaries, steamships were not only the technical epitome of progress, but they also showed how human ingenuity could lead man to dominate Nature: the steam-driven ships were not dependent on external energy resources such as wind and hence free from the vagaries of nature.⁴ The construction of ambitious canal projects on a new scale, intended to facilitate in-

tercontinental trade, equally provided new capabilities of forging nature according to human requirements. Fourth, the nineteenth century was an age marked by the increasing acceleration of communication systems and material exchange.⁵ The speeding up of long-distance communication was not only due to the invention of steamships, but was equally caused by further innovative technologies that linked together human societies to a hitherto unknown degree. Above all, the railway and the electric telegraph formed transportation and communication nets on their own that radically increased the pace of human interaction. Indeed, the invention of these new communication technologies – and their far-reaching impact on the functioning of human societies – formed part of what the historian Jürgen Osterhammel has called the 'transformation of the world' (*Verwandlung der Welt*) that we can detect in the course of the nineteenth century.⁶

The name of the steamship 'Humboldt' is more than a dedication to one of the most distinguished scientists of the nineteenth century. It is an expression of the important role played by Humboldt in promoting the ever-increasing density of global interconnections. In what follows, the four motifs – nets, mobility, progress and acceleration – that are embodied in the different types of ships are linked to the life and work of Alexander von Humboldt (1769-1859).⁷ His life, which spanned the late Enlightenment and the beginning of the Industrial Age, will be used as a window into the technological progress and global developments the Prussian scientist partly propagated and, at the same time, critically reflected upon. Such technologies could be – and indeed were – effectively used for political, economic and mili-

1 Quoted in Frank Holl, 'Alexander von Humboldt - Geschichtsschreiber der Kolonien', in Ottmar Ette and Walther L. Bernecker, (eds.), *Ansichten Amerikas. Neuere Studien zu Alexander von Humboldt* (Frankfurt a. M., 2001), 51-78, p. 74.

2 See Ulrich-Dieter Oppitz, 'Der Name der Brüder Humboldt in aller Welt', in Heinrich Pfeiffer (ed.), *Alexander von Humboldt. Werk und Weltgeltung* (Munich, 1969), 277-429, pp. 349-50.

3 The 'age of sailing ships' came to an end in the two decades from 1860-1880. See Jürgen Osterhammel and Niels P. Petersson, *Globalization: A Short History* (Princeton, 2005), p. 67; and Gary B. Magee; Andrew S. Thompson, *Empire and Globalisation: Networks of People, Goods and Capital in the British World, c. 1850-1914* (Cambridge, 2010), p. 67.

4 Jürgen Osterhammel, *Die Verwandlung der Welt. Eine Globalgeschichte des 19. Jahrhunderts* (Munich, 2009), p. 1014.

5 Christopher A. Bayly, *The Birth of the Modern World 1780-1914. Global Connections and Comparisons* (Oxford, 2004), p. 20.

6 This is also the title of Osterhammel's seminal work, *Die Verwandlung der Welt. Eine Globalgeschichte des 19. Jahrhunderts*.

7 Here, I take up insights provided by the literary scholar Ottmar Ette in his work on Humboldt and 'globalization', *Alexander von Humboldt und die Globalisierung. Das Mobile des Wissens* (Frankfurt a.M. and Leipzig, 2009). Ette focuses on the importance of mobility, global connections and comparisons for Humboldt's *Wissenschaftsverständnis* (concept of science), and does not primarily engage with Humboldt's support of technical imperial projects on the American continent. A recent work by Ulrich Päßler provides a useful reflection on Humboldt's geographical thinking and his engagement with the idea of a Central American canal, see idem, 'Die Perfektibilität des geographischen Raumes – Alexander von Humboldt und Carl Ritter über den zentralamerikanischen Isthmus', *Das Achtzehnte Jahrhundert*, 34, 2 (2010), pp. 232-239. However, we still lack a comprehensive study how Humboldt sought to combine the headline technologies of the nineteenth century to better integrate the American continent into transcontinental flows of material and intellectual exchange. This article intends to fill this gap.

tary purposes.⁸ European colonial powers, for instance, drew upon them for the efficient expansion, rule and exploitation of their empires in parts of Asia, Africa, and the American hemisphere. 'Progress' then reveals itself as a double-edged sword. Whereas such new technologies were applied to the advantage of settlers, imperial powers and global 'big business', they caused at the same time depredations of nature and led to the destruction of indigenous people on a global scale.⁹

In her influential work on 'Imperial Eyes', the literary scholar Mary Louise Pratt has argued that Humboldt's descriptions of tropical 'primeval nature' opened up South America to a range of 'transformative interventions' by European investors and capitalists.¹⁰ Pratt does not, however, engage with the crucial questions of why Alexander von Humboldt supported such intrusions into nature – e.g. the building of large-scale canals and the implementation of railway systems. Neither does she identify what role such projects played in Humboldt's world-view and his understanding of the forces behind the progress of society. Instead of depicting Humboldt simply as an agent of European commercial expansion into the New World, we ought to ask what expectations he placed in such transformative projects, especially regarding the long-term consequences of connecting the different human cultures on the American continent with their Asian and European counterparts. It will be shown that Humboldt's support for the emergence of global trade and intercontinental exchange can be linked to both his concept of science as well as to the importance he attached to processes of intellectual and material exchange for the advancement of societies.

What makes the study of Alexander von Humboldt's ideas of progress and the role he attached to human agency for any civilisational development so revealing is that his life literally spanned different worlds: on one level, his various scientific travels and global correspondence with men of letters made him acquainted with the geographic and social circumstances in both the New and the Old World. On another level, due to a scientific career embracing seven decades, he seemed to stand between two socio-historical worlds, which made him a transitory figure between the eighteenth and the nineteenth centuries.¹¹ To portray Humboldt only as a

figure of the Enlightenment, as a relict of the 'age of philosophy' reaching into the Industrial Age, would imply flattening out the different strands of his thought. Furthermore, it would overlook his extraordinary capacity to perpetually integrate new scientific knowledge into his works, and his ability to appropriate novel technologies in support of his widespread activities as a scientist – notably in a time of accelerated scientific and technological breakthroughs. Conversely, we can only fully comprehend Humboldt's support for human intervention into nature if we ask what role did eighteenth-century theories of progress and the notion of geographical determinism play in shaping his conception of civilisation development. It seems therefore necessary to set Humboldt into his historical context, and to detect the different intellectual formations that shaped his thinking throughout his life.

For this analysis, my paper will be divided into two parts. In the first part, I will look at Humboldt's position on eighteenth-century theories of environmental determinism. It will be shown that Humboldt transcended a strict climatic determinism by stressing the role that human agency played in modelling nature according to the needs of man. Here, I shall argue that the notion of 'geographic possibilism' – as elaborated in the work of the French geographer Paul Vidal de la Blache (1845-1918) – seems much more suitable to describe Humboldt's understanding of the *dialectical relationship* between nature and culture.¹² This part will provide crucial insights into the way Humboldt stressed the role of human initiative and ingenuity in overcoming 'natural barriers' to social progress. This section of my study will mainly be based on Humboldt's published works as well as on the partly unpublished diaries of the American expedition. In my second part, I will look at concrete examples of 'transformative interventions' that Humboldt actively proposed with regard to the American hemisphere. The close analysis of some of his most favoured projects – including the construction of railways and canals to connect oceans and cultures – will be used to reveal the limitations of Humboldt's supposedly universal cosmopolitanism. At the same time, it will also shed light on the intricate relations between technology and empire in the nineteenth century – and the role that scientists played in their dual advancement.

8 See Daniel R. Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (New York, 1981).

9 See Christopher A. Bayly, *The Birth of the Modern World*, pp. 444-450 and p. 481.

10 Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London and New York, 1992).

11 See with regard to Humboldt's position in the scientific culture of Enlightenment and Romanticism Michael Dettelbach, 'Alexander von Hum-

Chapter II

Identifying the forces that impelled human progress and that led to the emergence of 'civilisations' was

boldt between Enlightenment and Romanticism', *Northeastern Naturalist*, 8, (2001), 9-20.

12 Paul Vidal de la Blache's *opus magnum* is the posthumously published, *Principles of human geography* (London, 1926).

amongst the central preoccupations of eighteenth-century men of letters. Alexander von Humboldt's perceptions of the New World and the varying degrees of human cultures he encountered in America were profoundly shaped by Enlightenment philosophies of history and by widespread assumptions about the decisive influence of climatic and geographic factors on the trajectories of societies. In particular, the theory of geographical determinism was highly influential in the 'age of reason' for the understanding of man in his different stages of development. The concept of environmental determinism itself had been part of the western tradition of thought since Greek Antiquity. It is apparent, for instance, in the classical Greek division of the natural world into various *klimata* that represented clearly defined zones, each of them characterised by particular geographic and character traits.¹³ The long lasting influence of ancient writers on the world-view of scholars in the Enlightenment is well-known – and their classical works still resonate in Humboldt's writings on his American encounters.

What were, then, the basic assumptions of this kind of determinism that pervaded so many works of eighteenth-century *literati* – and to what extent did Humboldt draw upon, but also challenge, such theories? At its core, the framework of geographical determinism allowed 'linkage of climatic conditions and other aspects of the physical environment to virtually everything, from culture, regional character, and political organization to the rise of civilisation.'¹⁴ In the wake of Montesquieu's influential work on *The Spirit of the Laws* (1748), it had become a commonplace in European thought to claim that hot locales were less suitable for human habitation. By contrast, only in moderate zones – as found in Europe – was the human reason stimulated to such a degree that new intellectual faculties could freely unfold and give rise to civilisation. According to Montesquieu, the higher refinement of man in northern climes found its expression in the emergence of complex industry and the formation of well-regulated societies. This was contrasted with the negative effects of hot latitudes, which seemed to go along with idleness, indolence, rampant sexuality and the occurrence of despotic forms of government.¹⁵

13 See Thomas J. Barfield, *The dictionary of anthropology* (Oxford, 1997), p. 223.

14 Stephen Frenkel, 'Geography, Empire, and Environmental Determinism', *Geographical Review*, 82, (1992), 143-153, p. 144.

15 See Nancy L. Stepan, *Picturing tropical nature* (London, 2001), p. 41. On Montesquieu's geographical determinism see also David N. Livingstone, *The geographical tradition: episodes in the history of a contested enterprise* (Oxford, 1992), esp. pp. 121-122.

In the eighteenth century, such treatises by armchair travellers about 'exotic' peoples and their 'primitive' state of development coalesced with the intellectual engagement of European scholars with the American continent and her supposedly noxious climate. Numerous writers felt entitled to participate in the so-called 'dispute of the New World' and to indulge in speculative theories about the supposedly inferior organic life that nature produced on the New Continent.¹⁶ This organic inferiority was not confined to the living kingdom, but was also believed to affect the state of man. It was almost a truism that nature and climate in America were so hostile to human beings that European emigrants to the New World would suffer a loss of physical and intellectual powers once they were acclimatised to the new environment. This degeneration thesis – first elaborated by the French natural historian Comte de Buffon (1707-1788)¹⁷ – found wide acceptance among scholars, and it echoed equally in the most erudite work of the Enlightenment about the New World: William Robertson's *The History of America*, first published in 1777.¹⁸ The argument that Humboldt mediated between the Old and the New World becomes evident in his achievement of dissipating 'the fog of Buffonian speculation that still clouded the study of America'.¹⁹ Through his painstaking empiricism – typified in the 36 scientific instruments that accompanied his journey – and the thorough study of the New World's flora and fauna, Humboldt sought to test the speculations of the European Enlightenment against the reality of the American continent.²⁰ In view of the abundance and superfecundity of the tropics that Humboldt experienced at first hand, any conjectures by armchair scholars about the inferiority of America's nature could only lead to absurdity. Quite on the contrary: faced with the richness and vitality of the tropical flora, Humboldt noted in his travel diary that it is 'in the tropics' that man find 'the highest physical perfectibility of the organic nature'.²¹

16 This term has been coined by Antonello Gerbi in his work, *The Dispute of the New World. The History of a Polemic, 1750-1900*. Revised and enlarged by Jeremy Moyle, (Pittsburgh, 1973).

17 See Cornelius Jaenen, "'Les Sauvages Amériquains': Persistence into the 18th Century of Traditional French Concepts and Constructs for Comprehending Amerindians', *Ethnohistory*, 29 (1982), 43-56, p. 49.

18 See William Robertson, *The History of America*, (London, 1828), pp. 135ff.

19 David A. Brading, *The First America. The Spanish monarchy, Creole patriots, and the liberal state 1492 – 1867* (Cambridge, 1991), p. 520.

20 On Humboldt's strong empiricism and the significance of his measuring instruments for the *Humboldtian project*, see David N. Livingstone, *The geographical tradition*, p. 137.

21 Humboldt's only partly published diaries are located in the form of copies at the Alexander-von-Humboldt-Research Centre in Berlin. See *ibid.*, Cu-

Whereas Humboldt's work forcefully disproved the fantastic ideas about the meagreness of the natural world in America, his relation to notions of geographical determinism appears more complex than has sometimes been claimed.²² In his writings on the American journey, we constantly find passages in which Humboldt seemingly accepted the contemporary theory that climatic and geographical circumstances profoundly affect which 'forms of life thrived or wilted in any given regions, including under this rubric the rise and fall of human society'.²³ This notion was most clearly advanced in Humboldt's work on the *Vues des cordillères et monumens des peuples indigènes de l'Amérique*, published in 1810. Here, as David Brading has convincingly shown, Humboldt combined textual information with graphic depictions of volcanic mountains, indigenous codices, and the ruins of the Mexican and Inca cultures, thus evoking the impression that the 'barbaric grandeur' of the Andean mountains and the Sierra Madre had indeed strongly determined the achievements of local indigenous cultures.²⁴

At the heart of Humboldt's affirmation of a geographical determinism stood his assumption that 'the civilisation of peoples is almost constantly in inverse ratio to the fertility of the soils they inhabit'.²⁵ This assumption allowed him to explain the superior cultural achievements of indigenous people in the highlands, where the harshness of the soil evoked a strong human 'response' that subsequently led to the development of refined agricultural techniques and higher 'intellectual faculties' [*les facultés intellectuelles*].²⁶ In search of

maná (Venezuela), October (?) 1799, Diary I, p. 157 R,1; originally: 'Die höchste phys. Vollkommenheit der organ. Natur in den Tropen', my translation. I am grateful for the support of the Alexander-von-Humboldt-Research Centre Berlin, whose staff provided me with useful information.

22 See on this aspect also Ulrich Päßler, 'Die Perfektibilität des geographischen Raumes', p. 233.

23 David Brading, *The First America*, p. 521. See also Nancy Leys Stepan, *Picturing tropical nature*, p. 40; Malcolm Nicolson, 'Alexander von Humboldt and the geography of vegetation', in Andrew Cunningham and Nicholas Jardine (eds.), *Romanticism and the sciences* (Cambridge, 1990), 169-186, p. 172.

24 David Brading, *The First America*, p. 523.

25 Alexander von Humboldt, *Ideen zu einer Geographie der Pflanzen nebst einem Naturgemälde der Tropenländer* (Tübingen and Paris, 1807), p. 168; translated by David Brading in, *The First America*, p. 522.

26 Alexander von Humboldt, *Personal Narrative of Travels to the Equinoctial Regions of America during the years 1799-1804. By Alexander von Humboldt and Aimé Bonpland*. Transl. by Helen Maria Williams, Vol. III (London, 1818), p. 14. Originally published as, Alexander von Humboldt, *Voyage aux régions équinoxiales du Nouveau Continent: fait en 1799, 1800, 1801, 1802, 1803 et 1804 par Al. de Humboldt et A. Bonpland, [Relation Historique]* Tome Troisième (Paris, 1817), p. 18.

universal patterns of human progress, Humboldt drew comparisons between Mesoamerican cultures and European civilisations. The latter, living under a 'rigorous sky', were also forced to cultivate the land in a 'perpetual struggle with the elements', thus changing the character of men and 'the physical appearance of the country'.²⁷ The meagreness of the highland terrains – like the ruggedness of European topography – seemed to provide the crucial stimuli for the advancement of human society.

By contrast, the abundance of nature that Humboldt perceived in the tropical lowlands was consequently seen as a natural obstacle to progress. In the midst of profuse vegetation, as Humboldt constantly noted in his travel diaries, man lacks the need to advance to the socio-cultural phase of agriculture²⁸ – with far-reaching consequences for the trajectories of indigenous societies:

It is easy to conceive how much the force of vegetation, and the nature of the soil and climate, within the torrid zone, embarrassed the natives in regard to migration in numerous bodies, prevented settlements requiring an extensive space, and perpetuated the misery and barbarism of solitary hordes.²⁹

This passage provides important insights into Humboldt's understanding of the man-nature relationship. It reveals the crucial importance of the state of *isolation* in which the native population was seemingly forced to remain, surrounded by impenetrable forest, 'amidst the stupendous display of wild and gigantic nature'.³⁰ Whereas agriculture is associated with human settlement into larger socio-economic entities, human isolation is closely linked with the state of 'barbarism'. At this

27 Alexander von Humboldt, *Personal Narrative*, Vol. III, pp. 14-15; originally published as Alexander von Humboldt, *Voyage aux régions équinoxiales*, Tome Troisième, pp. 18-19.

28 This, of course, reveals that Humboldt's perception of the progress of man was partly influenced by William Robertson's seminal work on the 'History of America' and the latter's application of the Smithsonian Stadial theory. For Humboldt's argumentation that the abundance of nature impedes man to advance to the state of agriculture, see his treatise in Margot Faak (ed.), *Alexander von Humboldt. Lateinamerika am Vorabend der Unabhängigkeitsrevolution. Eine Anthologie von Impressionen und Urteilen aus seinen Reisetagebüchern* (Berlin, 1982), p. 157.

29 Alexander von Humboldt, *Personal Narrative*, Vol. V (London, 1821), p. 161; originally published as Humboldt, *Voyage aux régions équinoxiales*, Tome Septième (Paris, 1824), p. 198.

30 Alexander von Humboldt, *Personal Narrative*, Vol. I, p. xlv; originally published as Humboldt, *Voyage aux régions équinoxiales*, Tome Premier (Paris, 1816), p. 53.

point, Humboldt transcends the static concept of a facile geographical determinism and emphasises the role of mobility and human interaction in the further advancement of people. Reaching the age of agriculture is decisively more than to acquire sophisticated techniques of extracting resources from nature's soil. According to Humboldt's conception of progress, it is, first, linked to the human domination of nature, with the overcoming of the natural state, in which man had not yet subjugated his environment.³¹ Second, the emergence of agricultural societies is fundamentally related to an increase in human exchanges. The intensified social interactions in settled communities almost inevitably trigger processes that help to spur further technological progress and social refinement: above all, contacts lead to both physical and intellectual 'competition' among man, which helps to spur 'industry' and subsequently leads to the 'perfection of agriculture'. Likewise, the rise of sociability and personal virtue creates more complex demands and desires, which in turn stimulate further technological inventions.³² Humboldt succinctly expressed this dialectic of social refinement and technical progress in the phrase: 'Das Bedürfnis erzeugt die Künste'.³³ In his view, the dynamic 'circle of progress' would finally result in the ever-more polished 'culture of humanity'.³⁴

In the end, the monocausality of a strict geo-determinism thus proved to be insufficient for Humboldt's holistic approach to the man-nature relationship. The author of the *Cosmos* therefore differs from eighteenth-century thinkers and their dogmatism in regarding nature as the decisive force in the shaping of civilisations.³⁵ Humboldt rather seems to suggest that geographical determinants of culture are more influential for man in his initial, or 'primitive', stage of development. The more the human mind and man's ingenuity develop, so Humboldt argues, the less the trajectories of societies are

shaped by the static character traits of a particular environment.³⁶ Instead of reducing Humboldt's complex views of the interrelationship between man and earth to mechanic physical causalities (as has sometimes been claimed), it is more convincing to explain his understanding of the dynamic reciprocity between nature and culture in terms of a 'geographical possibilism'.

In geographical thought, 'possibilism means the acknowledgement that nature only has the possibility of influencing the organisational forms of the territory developed by man'. This possibility of nature, however, is seen in profound interaction with the 'will and capacity' of people to shape nature for their own ends.³⁷ This concept, therefore, indicates that man finds himself in a *dynamic* relationship with nature. Whereas the rather *static* environment provides a set of given possibilities – or the 'natural framework' –, the mobility and inventiveness of man provide him with the active role in 'taking possession of and transforming the environment' for creating his habitat.³⁸ The theory of geographical possibilism was developed by Paul Vidal de la Blache, one of the founders of human geography in France. It is noteworthy that Vidal had extensively studied Humboldt's works on the natural world of the Americas.³⁹ Vidal's geography favoured the study of natural regions and landscapes in a 'new humanistic framework that emphasized man-land interaction rather than positivist certainties', thus rejecting the notion of environmental determinism.⁴⁰ Similar to Alexander von Humboldt's contemplation of nature, *Kultur*, and their intricate interplay, Vidal avoided monocausal theories in explaining the various paths of development that human cultures take. Like the Prussian scholar, Vidal was equally committed to the idea of intentionality and the importance of human agency.⁴¹ It is striking that both Vidal's and Humboldt's perceptions and theories were deeply influenced by their personal experiences as scientifically

31 See, for instance, Humboldt's remarks that man in the tropical regions had until now failed to dominate the natural world: 'Daher diese Sanftheit der Sitten, da der Mensch fast nie dem Menschen entgegensteht, mit den Pflanzen lebend, gleichsam ihren Charakter annimmt.' Quoted from Margot Faak (ed.), *Alexander von Humboldt*, p. 157.

32 Alexander von Humboldt, Diary No. I., 'Voyage d'Espagne aux Canaries et à Cumana. Obs. astronom. De Juin à Oct. 1799', p. 51 R,1, originally: '... so erzeugt die Nähe anfangs Wettstreit der physischen Kräfte, Krieg, nochmals Wettstreit der intellekt. Kräfte, Kunstfleiß. Vervollkommnung des Ackerbaus, Vorbereitung des Bodens, Leitung der organischen Kräfte ... Kultur des Menschengeschlechts', my translation.

33 Alexander von Humboldt, *ibid.*, p. 50V. 'Desire generates the arts', my translation.

34 See footnote 32.

35 See Richard Konetzke, 'Alexander von Humboldt als Geschichtsschreiber Amerikas', *Historische Zeitschrift*, 188 (1959), 526–565, p. 538.

36 See Franklin Thomas, *The Environmental Basis of Society. A Study in the History of Sociological Theory* (New York, 1965), p. 232.

37 Alicia Lindón, 'Between organicism and romanticism: exploring Reclus's thought through Hiernaux's Geography as a Metaphor of Freedom', *Environment and Planning: Society and Space*, 8 (2000), 557–574, p. 563.

38 Lucian Boja, *The weather in the imagination* (London, 2005), p. 95.

39 See Lucien Febvre, *A geographical introduction to history: an introduction to human geography* (London, 2003), p. 63.

40 John A. Marino, 'On the Shores of Bohemia: Recovering Geography', in *idem* (ed.), *Early modern history and the social sciences: testing the limits of Braudel's Mediterranean* (Kirkville, 2002), p. 20.

41 See *ibid.*, p. 19.

interested travellers within, and far beyond the boundaries of Europe.⁴²

Humboldt himself practised science literally in a global context, and his scholarly activities were carried out within a worldwide epistolary network. The Republic of Letters in which Humboldt took part during the course of his life amounted to over 30,000 documents. By means of those letters, Humboldt collected and integrated data from all parts of the world into the stock of European knowledge.⁴³ His dedication and engagement in such a transnational network of scholars not only puts into question the supposedly 'natural end' of the *Res Publica Litteraria* during the closing decades of the eighteenth century⁴⁴, but it moreover proves the centrality of connectedness and human exchange in Humboldt's understanding of the forces that could advance social progress. Humboldt was undoubtedly convinced that the production of knowledge was the outcome of scholarly cooperation rather than the result of isolated contemplation.⁴⁵

The centrality of interaction between people for the advancement of science was in Humboldt's world-view also applicable to the necessity of the interconnectedness of whole continents and their respective human cultures. The way he promoted the integration of the New World into world markets and scholarly networks reflects his conviction that mobility and exchange of people and ideas were driving forces behind social and scientific progress. By contrast, isolation was in his view closely associated with stagnation and would prevent cultures from leaving the natural state, in which nature has originally kept them. Isolation in its various forms was, therefore, a constant preoccupation in Humboldt's engagement with the Americas in a global context. It included the system of Spanish colonialism with its restrictive trade policies and Spanish attempts to enclose their American possessions from foreign scientific scrutiny⁴⁶; the ambiguous role of religious missions in their attempt to form confined and controlled entities in which to convert native people into 'good Chris-

tians⁴⁷; and the global phenomenon of forced labour, for example, in plantation societies. Humboldt reflected and commented upon all these forms of unnatural isolation that he thought would affect human societies in the New World, as well as the American continent as a whole. However, as the following analysis will show, he did not confine himself to such scholarly reflections, but rather used his international scientific standing time and again to actively propose a wide range of technological intrusions on the continent, which he thought would positively influence economic and cultural developments (not only) in the New World.

Chapter III

From the beginning of the nineteenth century, the relations between western countries and the non-European world were increasingly influenced by the scientific and technological innovations that had spurred the Industrial Revolution.⁴⁸ The process of Western industrialization had a twofold impact on extra-European countries, namely the creation of 'demand for its products and the means of conquest and colonization.'⁴⁹ The headline technologies of the century, above all steamships, electric telegraphs and railways connected and integrated the European colonial possessions overseas, thus leading to a significant 'time-space-compression' between the imperial 'metropole' and the colonial 'periphery',⁵⁰ These technologies, as Daniel Headrick has forcefully demonstrated, served as 'tools of empire' that translated scientific knowledge of the natural world into concrete power devices, which benefitted European political elites and globally operating merchants and investors.⁵¹ Undoubtedly, the construction of railway lines, the digging out of large-scale canal projects, and the wiring of cities and the countryside were all 'transformative interventions' that left physical traces on the landscape, destroyed 'natural barriers' to efficient com-

42 See for Vidal, Febvre, *introduction to human geography*, p. 18.

43 See Ottmar Ette, *Alexander von Humboldt und die Globalisierung. Das Mobile des Wissens*, p. 20.

44 Anthony Grafton in his recent work on the Republic of Letters, *Worlds made by Words: Scholarship and Community in the modern West* (Cambridge, Mass. and London, 2009), p. 7.

45 A remarkable acquisition has recently been made by the *Staatsbibliothek Berlin* of Alexander von Humboldt's address book, containing on over 200 pages details of his global web of correspondence. It is now being edited by the Alexander von Humboldt Research Centre Berlin.

46 See Charlotte Kellner, *Alexander von Humboldt* (London, 1963), p. 29.

47 See Alexander von Humboldt, *Personal Narrative*, Vol. III, p. 4; originally Alexander von Humboldt, *Voyage aux régions équinoxiales*, Tome Troisième, pp. 4-5.

48 See Margaret C. Jacob, *Scientific Culture and the Making of the Industrial West* (New York and Oxford, 1997).

49 Daniel R. Headrick, *The Tools of Empire*, p. 8.

50 This expression was introduced by David Harvey in his work, *The condition of postmodernity: an enquiry into the origins of cultural change* (Oxford, 1989).

51 Idem, *The Tools of Empire*, and more recently: *Power over peoples: technology, environments, and Western imperialism, 1400 to the present* (Princeton, 2010). For the British context see the work of Ben Marsten and Crosbie Smith, *Engineering Empires: A Cultural History of Technology in Nineteenth-Century Britain* (New York, 2005).

munication, and embodied man's increasing taming and domination of nature.⁵²

In this section, I will analyse how Alexander von Humboldt conceived of the impact of those devices on the American continent. At the same time, I shall demonstrate that Humboldt's belief in the blessings of free trade was in accordance with his world-view that stressed the crucial role of exchange for the advancement of societies – as opposed to the harms of (intellectual) isolation of man. From a postcolonial perspective, however, the question also arises as to who actually profited most from interventions that were intended to connect the New World with other continents. Clearly, the use of cables, canals, steamships and railways was primarily driven by commercial and political interests. Their implementation required significant investments of capital and was always accompanied by considerable financial risks. Once implemented, however, the use of such new technologies had almost ubiquitously the same consequences for the movement of peoples and settlement processes on different continents, as they led to a significant increase in *intercontinental* migration.⁵³

On the American continent, the deeper penetration of settler communities into hinterlands resulted in the complex processes of *intracontinental*, or frontier migration. The North American territories into which settlers expanded were, of course, not uninhabited, but served as living spaces for groups of indigenous peoples. In the eyes of the settlers, the 'winning of the west', or the penetration of Europeans into unconquered territories in South America, seemed to represent the advance of 'civilised man' into a pristine 'wilderness'. From the 'native' point of view, however, such intrusions meant a deadly attack on their – occasionally nomadic – forms of life. In the following analyses of Alexander von Humboldt's favoured projects to connect the New World, we shall take into account those different dimensions that accompanied the opening up of the American continent.

THE MECHANIZATION OF MOVEMENT: STEAMSHIPS

Among the most stunning changes that deeply transformed the world in the nineteenth century was the revolution in communication devices that found its

52 A good case study in this context is: Ann Moyal, 'The History of Communication in Australia: Aspects of the Technological Experience, 1854-1930', in Nathan Rheingold and Marc Rothenberg (eds.), *Scientific Colonialism: A cross-cultural Comparison* (Washington and London, 1987), 35-54.

53 See Adam McKeown, 'Global Migration, 1846-1940', *Journal of World History*, 15, (2004), 155-189, pp. 156-157.

physical expression in the increasingly dense networks of transport and communication lines.⁵⁴ In particular, the use of steam-driven ships, an invention of the Industrial Age, promised 'freedom from the fickle winds that made even the best sailing voyage a gamble against time.'⁵⁵ The history of the transatlantic passage by ship is of interest since the increasing interconnectedness of Europe and America in the age of Alexander von Humboldt owed much to the technological advances of the time. Almost forty years after Humboldt had crossed the Atlantic in the sailing ship 'Pizarro' in 1799, the two steamers 'Sirius' and the 'Great Western' made the passage between the New and the Old World, solely driven by the new technology – within the record-breaking time of fifteen days.⁵⁶ Further technological breakthroughs in the first half of the nineteenth century – among them the construction of iron-hulled ships, propellers, and high-pressure engines – allowed steamboats to have higher freight rates, and to transport goods and peoples with greater speed, at an increasing level of security.⁵⁷ These developments would have significant ramifications for the contact between Europe and the Americas, in particular with regard to growing trade volumes and the mass movements of people crossing seas, especially from the 1820s onwards.

Not surprisingly, Humboldt was at the forefront in promoting these new dimensions of human exchange. It is, for instance, instructive to consider the way Humboldt propagated the use of steamships to open up the New World to European commerce. On July 2, 1847, Humboldt, then almost eighty-years-old, invited the North American explorer, writer and investor John Lloyd Stephens (1805-1852) to his residence in the Royal court at Potsdam. Stephens was at that time a director of the *Ocean Steam Navigation Company*, based in New York. As a patriot – and successful capitalist – Stephens was determined to break the English monopoly of the new mode of conveyance by steamboat.⁵⁸ During his stay in Prussia, Stephens had the chance to make Humboldt's acquaintance, and he subsequently published an account of his meeting with the distinguished scholar under the title *An Hour with Humboldt*.⁵⁹ This document,

54 See Headrick, *Tools of Empire*, p. 130.

55 *Ibid.*, pp. 130-131.

56 See Lionel T. C. Rolt, *Victorian Engineering* (Harmondsworth, 1974), pp. 85-88.

57 See Headrick, *The Tentacles of Progress. Technology Transfer in the Age of Imperialism, 1850-1940* (New York and Oxford, 1988), pp. 18-24.

58 See Francis L. Hawks, 'The Late John L. Stephens', *Putnam's Monthly Magazine of American Literature, Science and Art*, I (1853), 64-68, p. 65.

59 This account is reprinted in Ingo Schwarz (ed.), *Alexander von Humboldt und die Vereinigten Staaten von Amerika. Briefwechsel* (Berlin, 2004), pp. 527-530.

written from the investor's perspective, is revealing of Humboldt's full awareness of the striking process of modernization then underway in Germany. The document equally demonstrates Humboldt's profound support for the growing commercial links between Europe and the Americas. Stephens's account allows us to reconstruct Humboldt's clear perception of the increasing net of communication and transport, which helped to link the German states among each other – and with the wider world:

He spoke of the long lines of railroads now constructing in Germany, to connect the Rhine and the Danube, the Adriatic and the North sea, with branches from towns and manufacturing districts, winding into each other all over the country, furnishing facilities for travel and transportation to the sea-board, such as had never been known before, the greater part of which, both as a matter of feeling, and on the score of interest, must in the first instance turn towards the United States.⁶⁰

In the course of this telling conversation, Humboldt expressed his endorsement of establishing further lines of communication 'for a commercial people' like the North Americans with the European continent. The benefit, in his view, would be more than mutual. Stephens emphasises that Humboldt 'himself felt a lively interest' in the growing commercial exchanges, 'believing that the Germans of all classes were desirous of direct intercourse with us; that they had a great variety of manufactures which might be exchanged to advantage for the large amount of our staples now consumed in that country, when more frequent intercourse should give a better knowledge of each other's wants and resources.'⁶¹ Here, in stark contrast to the mercantile doctrines of the eighteenth century, Humboldt emerges as a strong supporter of free trade. It equally shows that Humboldt had a sound understanding of the mechanisms that lay behind the emergence of world markets in his lifetime, in particular of the economic importance of raw materials and manufactured goods, which European states had to export to foreign consumer societies. The rapidly industrializing United States were to take part on an equal basis in the interconnectedness of the economies. As we shall see, the South American republics, by contrast, had to play a quite different role in the global trade than their Northern counterpart. Humboldt concluded this telling conversation that 'between the United States and Germany there never could be any feeling of rivalry or any cause of collision, and the closer

we could be drawn together, the more advantageous would it be to both countries.'⁶²

The description of Humboldt, which the (by no means disinterested) investor Lloyd Stephens gave on this occasion, seems to have been accurate. It is further substantiated by a letter written by Humboldt to the American businessman two months after their first encounter. In the document, he not only thanked the Ocean Steam Company of baptizing one of her steamboats 'Humboldt' – here the circle closes – but he also personally repeats, in his favoured French language, his strong support for direct trade between Prussia and the United States. Humboldt describes himself as being, 'par mes travaux aux nobles destinées du Nouveau Continent, vivement intéressé aux *liaisons de commerce les plus directes et les plus intimes* entre les États Unis et ma Patrie.'⁶³ This conviction of the blessings of a mutual commercial exchange can clearly be linked to Humboldt's broader world-view: it meant, again, an overcoming of the state of isolation that would lead to intellectual and technological competition. This notion of 'positive' challenges between nations would entail their mutual refinement, finally culminating in the growing 'perfectibility of mankind'.⁶⁴ Thus, commerce was for Humboldt closely linked to progress, and lastly, to the rise of civilization.

Owing to his five-year journey through various regions and climates in Spanish and North America, Humboldt was well acquainted with the widely ramified river systems of the continent, which could be used as corridors for trade and exploitation. In his analysis of the 'vegetable productions', and hence the commercial prospects of Venezuela, Humboldt provides his readership with a long list of the natural resources 'that may one day become objects of traffic'.⁶⁵ The numeration of the country's most valuable resources included 'precious gums of the Upper Oroonoko', 'fine colouring substances' for clothing industries, prized spices such as 'vanilla', as well as raw materials like 'the precious wood

62 Ibid., pp. 528-529.

63 Letter from Humboldt to John L. Stephens, Berlin, 21 September 1847, *ibid.*, p. 251, emphasis mine.

64 In quoting his brother Wilhelm, Alexander von Humboldt described this state as the ultimate goal of mankind in his magnum opus, *Kosmos: a sketch of a physical description of the universe*, translated by Augustin Prichard, Vol. 1 (London, 1845), p. 391. Originally: 'Vervollkommnung des ganzen Geschlechts', *idem, Kosmos. Entwurf einer physischen Weltbeschreibung*, erster Band (Stuttgart und Tübingen, 1845), p. 385.

65 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I (London, 1826), p. 211; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième (Paris, 1825), p. 286.

60 Quoted from *ibid.*, p. 529.

61 *Ibid.*, p. 528.

for the cabinet-maker, such as mahogany'.⁶⁶ Needless to say, those were items that promised high profit margins in Asian, North American, and European markets. At that period, fine woods, spices, and colonial foodstuffs such as sugar and coffee were truly global commodities.⁶⁷ How could those resources, ready to be extracted from Venezuela's natural world, be efficiently transported, using the system of 'internal navigation'?⁶⁸ Due to the capability of steamships to run both up- and down-stream, Humboldt suggested that 'the use of steam boats would be of the greatest utility' to connect Venezuela's interior cities with the country's ports, leading to a significant acceleration in trade.⁶⁹ Humboldt equally proposed the construction of canal projects, which would allow a closer linkage between the river systems of Venezuela with the Atlantic coast 'for the facility of inland trade'.⁷⁰ Lastly, the emergence of steamboats now allowed, in Humboldt's view, the opening up of new coastal areas for the transatlantic trade. With regard to 'the coast of Peru, south of Lima, and that of Chilli', Humboldt pointed to the fact that in these difficult waters, trade would be significantly improved 'when the coasting is made by steam-boats'.⁷¹ This new technology therefore enabled not only a significant speeding up of commercial exchanges – it was also to be used for overcoming 'natural barriers' to efficient trade.

We can conclude the analysis of Humboldt's perception and proposed appropriation of steamboats with his remarks on the considerable friction of space that accompanied the technological advances, leading to a remarkable acceleration of transport systems and a new level of intercontinental integration. Hence,

It may be said, that the immense progress of the art of navigation has narrowed the basin of the seas. The Atlantic Ocean already appears to us in the form of a narrow channel, which as little removes the New World from the commercial states of Europe, as the basin of the Mediterranean, in

66 See *ibid.*, pp. 286-87 the whole list of materials.

67 On sugar as a global commodity, see Sidney Mintz, *Sweetness and power: the place of sugar in modern history* (Harmondsworth and New York, 1985); for the demand of wood, especially with regard to shipbuilding, see Headrick, *Tools of Empire*, pp. 145-146.

68 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 239; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 320.

69 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 238; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 324.

70 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 239; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 324.

71 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 296; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 396.

the infancy of navigation, removed the Greeks of Peloponnesus from those of Ionia, Sicily, and the Cyrenaic region.⁷²

The deeper meaning of this comparison between the Atlantic and the Mediterranean Sea reveals itself only in conjunction with further passages of Humboldt's work. In a revealing diary entry about the role of geography for the advancement of civilisation, Humboldt laid out his idea that the Mediterranean – which enabled close exchanges between its adjacent cultures – was in fact the birthplace of the high civilisations of Antiquity. According to him, the 'breakthrough of the sea through the columns of Hercules, the creation of the Mediterranean Sea, was the most important geognostic phenomenon in the history of humankind'.⁷³ Now, however, human *Kultur*, once in his view concentrated in the European climes, was to be spread to other worlds – by means of revolutionary technological devices.

THE SHRINKING OF THE WORLD AND THE COLLAPSE OF TIME: ELECTRICAL TELEGRAPHY

Along with colonial expansion, in particular from the sixteenth century onwards, European merchants, missionaries and scholars took part in vast overseas epistolary networks that effectively linked the Old World with scholars from Peru to China.⁷⁴ In this truly international web of exchange, letters were the primary medium of communication. Since the imperial communication networks in the early modern period had to rely upon the comparatively slow means of exchange – *inter alia* galloping horses and sailing ships – a considerable time gap always separated the imperial centre from the periphery. To be sure, until the 1840s it took, for instance, between five to eight months for a single letter from Britain to arrive in India. Due to the monsoon season in the Indian Ocean, the author could not expect an answer to arrive in Europe in less than two years.⁷⁵ Given that information was the 'lifeblood of European

72 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 118; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 145.

73 See Humboldt, 'Reise von Cumana nach der Havana. (Altes von der Reise Dresden, Wien Salzburg.)', Alexander von Humboldt Research Centre Berlin, Diary V, 79V, 1, originally: 'Der Durchbruch des Oceans durch die Herkulesssäulen, die Bildung des Mittelmeeres, ist das wichtigste geognost. Phänomen für die Bildung der Menschheit', my translation.

74 The astonishing transnational web of Jesuit missionaries and scholars has been recently described by Anthony Grafton, *Worlds made by Words*, pp. 160-175.

75 See for the communication between Britain and India, Headrick, *Tentacles of Progress*, pp. 97-101.

imperialism' on which merchants, politicians and military troops strongly depended for their services, it is not surprising that they enthusiastically embraced the new possibilities of linking Europe more tightly to her colonies and other overseas territories with commercial prospects.⁷⁶

The invention of efficient steamships, as we have seen, was a fundamental step in increasing the speed of communication and trade on a global scale. However, even with this new mode of transportation, the process of sending a letter and waiting for the return still took several weeks between Europe and Asia – in each direction. It was the arrival of electric telegraphy in the nineteenth century that allowed the transmission of messages over far-flung distances at a formerly unimaginable pace. Scientists played a crucial role in what Patricia Fara has called the 'imperial-technological-commercial complex' of the telegraph system.⁷⁷ New and groundbreaking scientific insights into the field of electromagnetism had spurred those inventions that paved the way to electric telegraphy. And the British, eager to expand and integrate their Empire, were thrilled to promote and improve this prospective technology.

Owing to heavy government subsidies and the people's electric expertise, England took the lead in its further development from the 1850s onwards. In an interesting case of global standardisation, Britain became so dominant in the field of telegraphy that she could effectively 'impose her electrical units on international science'.⁷⁸ The country did not only invest larger sums into the new technology than her rivals, it could also – by a bitter irony of history – draw on natural resources from her colonies to significantly improve her cables, which were soon to be laid underwater.⁷⁹ Two decades after land telegraphy had become a reality in Western Europe and North America in the 1830s and 1840s, the first underwater telegraphs were successfully installed.⁸⁰ This was the beginning of a time in which

'electrical tentacles of communication wrapped themselves round the globe' and subsequently allowed the British Empire to expand to new and formerly inaccessible regions.⁸¹ According to the historian Bernard Finn, the global cable network was nothing less than the 'the grand Victorian technology'.⁸²

Although this point has received little scholarly attention, I argue that it is important to note that Humboldt was at the forefront in actively encouraging this new communication device. His dedication towards appropriating it for his vision of a more entangled world is the more striking, as Humboldt himself was arguably the last personification of the Republic of Letters that had existed in Europe since the Renaissance.⁸³ Humboldt's personal epistolary net spanned the globe, thus literally connecting worlds, communities and generations of scholars in the course of his long scientific career. One of his many correspondence partners was the North American painter and inventor Samuel F. B. Morse, who made central contributions to the development of the *electric* telegraph.⁸⁴ In 1832, Humboldt had made Morse's acquaintance in Paris. Six years later, when Samuel Morse exhibited his telegraph apparatus to the members of the Parisian Institut de France, Humboldt was present – and realized the potential utility of the technique.⁸⁵ In the following years, a scholarly exchange emerged between Humboldt and Morse who, for instance, sent the Prussian scientist his latest publications on the subject, and provided him with exact information about the fast spread of his technology in the United States.⁸⁶ Like Humboldt, Samuel Morse was convinced that he had developed a technology that would link people in a veritable *net* of communication. In 1838, Morse wrote about the United States: 'It [will] not be

Darwin, *After Tamerlane: the rise and fall of global empires, 1400-2000* (London, 2008), p. 300.

81 Patricia Fara, *Science*, p. 213.

82 This was the title of Finn's work, *Submarine telegraphy: the grand Victorian technology* (London, 1973).

83 See Grafton, *Worlds made by Words*, p. 16.

84 Visual telegraphy, of course, had already existed in the eighteenth century, based on the inventions of Claude Chappe (1763-1805), see Headrick, *When information came of age: technologies of knowledge in the age of reason* (London, 2000), pp. 197-202. For important contributions to the new technology by other European scholars and inventors, see Hurdeman, *Worldwide History of Telecommunications*, p. 141.

85 See James Wynne, 'Samuel F. B. Morse', *Harper's New Monthly Magazine*, 24 (1862), 224-232, p. 227.

86 See the letter, for example, from Morse to Humboldt, 8 May 1846, in Ingo Schwarz, *Humboldt und die Vereinigten Staaten von Amerika. Briefwechsel*, p. 247.

76 See *ibid.*; see also, *idem*, *Tools of Empire*, p. 157.

77 Patricia Fara, *Science: A Four Thousand Year History* (Oxford, 2010), p. 213.

78 *Ibid.*

79 In particular, *gutta-percha* was a 'natural plastic', gained from the Palaquium tree in Malaysia, that was used for a better insulation of underwater cables, enabling engineers to penetrate into the depths of the oceans, see Headrick, *Tentacles of Progress*, p. 98; see also John Tully, 'A Victorian Ecological Disaster: Imperialism, the Telegraph, and Gutta-Percha', *Journal of World History*, 20, 4 (2009), 559-579.

80 For a concise overview of the introduction the telegraph in various European countries and the United States, see Anton A. Hurdeman, *The worldwide history of telecommunications* (Hoboken, 2003), pp. 48-84; see also John

long ere the whole surface of this country [is] channeled for those *nerves* which are to diffuse, with the speed of thought, a knowledge of all that is occurring throughout the land; making, in fact, *one neighborhood* of the whole country'.⁸⁷

Morse's utopian vision of the annihilation of distance by means of his communication system might not have materialized. Nonetheless, Morse's contribution to long-distance communication did not only allow him to link people on one continent, but his device was equally capable of facilitating overseas transmission. To that end, man had to penetrate into another dimension of space, namely the floor of the seas. In the third and revised edition of his work on the *Aspects of Nature* (1849), Humboldt still wrote about the 'unfathomed depths of the ocean'.⁸⁸ In the 1850s, however, increasing efforts and high investments were made by governments and investors to complete the 'sounding of the Atlantic Ocean', as Morse wrote to Humboldt in 1856.⁸⁹ In this letter to Humboldt, the American inventor seemed optimistic that his recent activities 'satisfactorily solved the problem of the practicability of telegraphing' between different continents.⁹⁰ According to Morse, mankind then only lacked 'the proper manufacture of the cable and the nautical skill in laying it in its oceanbed' to finally set up a particular telegraph line – a connection that Humboldt had himself strongly promoted. It was the matter of, in Morse's modest words, 'the accomplishment of the grand enterprise of uniting the two worlds in telegraphic bonds'.⁹¹

Before such a vision could become a reality, Humboldt followed with eager interest the study of the best location and the technical refinements of the submarine cable. Finally, in 1857-58, the vision turned into reality when two steamers stretched a transatlantic cable from Britain to the American continent. Although the initial line broke down after a few messages, this short state of connectedness between the two continents had, how-

ever, high symbolic significance.⁹² The pace with which information could now be conveyed between Europe and North America was in fact 'increased by a factor of ten thousand'.⁹³ Subsequent research – considerably financed by the British government – led to technological improvements that allowed Europe to be linked to most parts of the world in the course of the following decades. Apart from the successful attempt in 1866 to establish a lasting transatlantic cable connection between Europe and America, it is telling that at the same period of time other ties were established which connected European powers with their key colonial possessions.⁹⁴ The first cable linked France to her precious colony Algeria in 1861; the second one, after several setbacks, realized in 1865 the transatlantic connection of the telegraph systems that had already existed both *in* India and Britain.⁹⁵ Seven years later, in 1873, also South America's west coast had become linked to Europe by a cable connection. The Atlantic world was now effectively wired.

In peacetime, those cables were useful links for the increasing commercial interactions between the centres of European empires and their colonies. In times of conflict or war, they provided a crucial means for diplomacy and the exchange of strategic information. The emerging global cable network – in conjunction with steamships and railways – thus formed part of a *web of power* that primarily served the interests of European imperialists.⁹⁶ Humboldt's endorsement of this technology was undoubtedly linked to other motives, as he perceived of the telegraph as an enabling mechanism to establish closer links between Europe and the American continent. However, his support of this, effectively, imperial device can open up a much-needed reflection on the complicity of scholars in the imperial machinery of European powers – in a period that would eventually see Europe's rise to global dominance in the nineteenth century.

87 Samuel F. B. Morse, *His Letters and Journals*, ed. by Edward Lind Morse, 2, (Boston, 1914), p. 85.

88 Humboldt, *Aspects of nature: in different lands and different climates; with scientific elucidations by Alexander von Humboldt*. Transl. by Elizabeth J. L. Sabine, Vol. II (London, 1849), p. 6; originally published as Humboldt, *An-sichten der Natur, mit wissenschaftlichen Erläuterungen. Dritte verbesserte und vermehrte Ausgabe*, Vol. II (Stuttgart und Tübingen, 1849), p. 7.

89 Letter from Samuel F. B. Morse to Humboldt, 7 October 1856, in Ingo Schwarz, *Humboldt und die Vereinigten Staaten von Amerika. Briefwechsel*, p. 406.

90 *Ibid.*

91 *Ibid.*, p. 407.

92 See David M. Henkin, *The postal age: the emergence of modern communications in nineteenth-century America* (Chicago, 2006), p. 217.

93 Jürgen Osterhammel and Niels P. Petersson, *Globalization*, p. 67.

94 See Headrick, *Tools of Empire*, p. 160.

95 See *ibid.* It is noteworthy that the Indian telegraph played an important role during the Great Mutiny of 1857-58. The chief commissioner of the Punjab, John Lawrence, declared, clearly from a British point of view: 'the telegraph saved India', Headrick, *Tentacles of Progress*, p. 121.

96 *Ibid.*, p. 98.

THE OPENING-UP OF SPACE: RAILWAYS

It was one of the most profound transformations of transportation systems in the nineteenth century that from now on steam energy could be used 'to mechanize movement'.⁹⁷ This fundamental invention not only changed the character of sea navigation as it led to the development of steamships. Steam-power also found an important application for the faster movement of people on land. The 'age of the railroad' began in Europe in the 1840s, when this new mode of transportation began effectively to shape societies.⁹⁸ The construction of railroads was generally accompanied by a deep intrusion into natural landscapes and it left visible traces of human ingenuity on the environment. This was most obvious in the case of forest clearances, which were necessary to make way for the rail line and to provide – in the form of timber – the necessary raw material for its construction.⁹⁹ The literally *groundbreaking* technology of railways can also be seen as emblematic of the increasing interconnectedness of human societies in the nineteenth century. Similar to telegraphic cables, railway systems formed nets of exchanges and communication between formerly less integrated or utterly isolated regions.¹⁰⁰

The experience of such a deeply improved transport system is well reflected in contemporary theories such as geographical possibilism. As we have seen, both Alexander von Humboldt and the French geographer Paul Vidal de la Blache stressed human domination over nature as an indicator for technological progress and civilization. Crucially, their thoughts were imbued with the experience of the age of railways.¹⁰¹ Although nature might set certain restraints on human cultures and their development, man is – according to Humboldt and Vidal – able to respond effectively to such challenges. The power and effectiveness of railways seemed to prove that man was, in Vidal's words 'henceforth *master of distances*', and the dominant agent in the dynamic relationship between human cultures and their environment.¹⁰²

Indeed, the deep transformation that the railway brought to human interaction with nature becomes strikingly evident if we consider its impact on the New World. Like all the technological devices discussed so far, it was also the railway that was applied to the American continent soon after its invention. Before its arrival, North America had mostly been a rural world of provincial towns. In the 1830s, however, unprecedented urbanisation processes took off in the United States that would continue for the next hundred years. This increase in urbanisation depended – more strongly than in the European context – on the new transportation systems of canals and railways.¹⁰³ A large flood of European settlers 'spread on the back of the steamship' and the railway to the expanding North American frontier.¹⁰⁴ Once they had been constructed in the Americas, railways were efficiently used for agricultural schemes and to extract and exploit raw materials from nature. For example, rail lines allowed landowners to run plantations more productively. As a result, the 1840s saw an increase of sugar cultivation in the Americas. In this context, it is telling that the first construction of rail lines began in the 'ever faithful' Spanish colony Cuba as early as 1834.¹⁰⁵ When the first section of the track was opened four years later, neither the independent states of Spanish America nor Spain itself had any railway lines in operation. The Creole planter class in Cuba soon benefitted from the introduction of the railway into their production schemes. Communication between sugar estates and the ports was greatly facilitated, and the fall in transportation costs even allowed the expansion of areas of cultivation.¹⁰⁶

In his *Political Essay on Cuba*, published in 1826, Humboldt provided an insightful analysis of the damaging effects of restrictive trading policies in an age when Cuba greatly profited from international trading routes. In Humboldt's view, the removal of trade restrictions formerly imposed by Spain had been crucial for the country's development.¹⁰⁷ In his work on Cuba, Humboldt stressed the role of *exchange* as a driving force for

97 Jürgen Osterhammel and Niels P. Petersson, *Globalization*, p. 67.

98 See *ibid.*, pp. 67-68.

99 See Michael Williams, *Americans and their forests: a historical geography* (Cambridge, 1989), pp. 347-349.

100 See for the European context Matthew Smith Anderson, *The Ascendancy of Europe: 1815-1914*, 3rd. ed. (Harlow, 2003), p. 162.

101 For Vidal's still highly illuminating reflections on this new technology see his seminal work, *Principles of human geography*, esp. pp. 383ff.

102 Quoted from *idem*, 'Meaning and Aim of Human Geography', in John A. Agnew et al. (eds.), *Human geography: an essential anthology* (Oxford, 1996), 181-191, p. 191, my emphasis.

103 See Osterhammel, *Verwandlung der Welt*, p. 378.

104 See Bayly, *Birth of the Modern World*, p. 439.

105 See Tulio Halperín Donghi, 'Economy and society in post-Independence Spanish America', in Leslie Bethell (ed.), *The Cambridge History of Latin America*, III (Cambridge, 1985), 299-345, p. 319.

106 Clifford L. Staten, *The history of Cuba* (Westport, 2003), p. 21.

107 See Alexander von Humboldt, *Political Essay on the Island of Cuba. A Critical Edition. Edited with an Introduction by Vera M. Kutzinski and Ottmar Ette. Translated by J. Bradford Anderson, Vera M. Kutzinski, and Anja Becker. With Annotations by Tobias Kraft, Anja Becker, and Giorleny D. Altamirano Rayo* (Chicago and London, 2011), p. 25; originally Humboldt, *Essai Politique sur l'île de Cuba*, Vol. I (Paris, 1826), p. 2.

progress and condemned all forms of forced isolation. Humboldt therefore criticised the prevailing system of forced labour in Cuba not only on moral grounds, but he also pointed to its dangerous effects for the political stability of Cuba – obviously against the background of the Haitian Revolution (1791-1804). Moreover, Humboldt illustrated the economic irrationality of slavery, as compared with the benefits of free labour.¹⁰⁸ Once the railway had arrived in Cuba, it was both a communication as well as a transportation device, which enabled the almost uninterrupted flow of goods from the island's interior to its seaports, above all to Havana. This important trading port was, according to Humboldt, especially favoured for commerce by its particular geography, as it was closely linked to the Gulf of Mexico 'where the trade routes of many peoples cross' each other.¹⁰⁹

Here, as in other writings, Humboldt strongly emphasised that geography could either impede, or greatly facilitate human interactions within a particular region. In doing so, he took up the widespread assumptions of contemporary European scholars and merchants who favourably compared the shape of the American continent with that of Africa. Whereas the latter was generally seen as 'one vast solid mass, unbroken by arms of the sea penetrating into its interior part' which, moreover, had only 'few large rivers',¹¹⁰ the geographical form of the New World, by contrast, seemed to provide many natural advantages for sea-trade and 'commercial intercourse'. Unlike Africa, the American continent possessed a variety of bays and large river systems that 'naturally' opened up the interior to the outside world.¹¹¹ Humboldt was particularly aware of the strategic importance of the Gulf of Mexico. Due to his large-scale expedition, he was well acquainted with the sea currents in the region. Drawing global comparisons between local phenomena, Humboldt noted that the 'northern Caribbean Sea, known as the Gulf of Mexico, forms a circular basin of more than 250 leagues in diameter. It is a *Mediterranean* with two outlets'.¹¹² This comparison of the European inland sea with its American counterpart is reveal-

ing because Humboldt was (as we have seen) deeply convinced that the high human civilisations of Antiquity had developed around the former.

The great importance that Humboldt attached to this 'Mexican Mediterranean' reveals itself when we consider his plea for an investment in new technologies that would transform the natural world in this area.¹¹³ These were primarily aimed at improving the commercial interactions between the neighbouring states of the Gulf. In view of the importance of this nodal point for world trade, Humboldt sought, for example, to establish a closer connection between the Southern States of the U.S. and the Gulf of Mexico by means of a railway.¹¹⁴ Given the lack of transport facilities at that time, the majority of imports and exports of several southern states first had to pass through New York City on their way to or from Europe.¹¹⁵ Humboldt's proposed rail line therefore aimed to accelerate overseas trade within the broader web of transportation routes that he suggested to link the interior of the New World with the seaports – and, ultimately, with global markets.

Both in published works and private letters, Humboldt indefatigably analysed the significance of the Gulf of Mexico for intercontinental trade. In his opinion, the latter should by no means be confined to the commercial intercourse between Europe and the American continent. Since Humboldt was convinced that *global trade* ('Welthandel') would be beneficial for all 'trading nations', he emphasised time and again the possibility of linking the Atlantic with the Pacific Ocean, thus bringing Asia closer to the Americas and Europe. One possible means was the construction of a railway over the Isthmus of Panama, which Humboldt said he had proposed as early as the year 1805.¹¹⁶ In the wake of the publication of Humboldt's travelogues and the independence from Spanish rule, many European investors seized the moment to travel to the New World in order to pursue commercial schemes.¹¹⁷ For example, the American John Lloyd Stephens was encouraged by Humboldt's work to undertake two expeditions to Central America and the Yucatán Peninsula in search of the best route for an interoceanic railway. The California Gold Rush in

108 See Jürgen Osterhammel, 'Alexander von Humboldt: Historiker der Gesellschaft, Historiker der Natur', *Archiv für Kulturgeschichte*, 81 (1999), 105-131, p. 122.

109 Alexander von Humboldt, *Political Essay on the Island of Cuba. A Critical Edition*, p. 23; originally originally Humboldt, *Essai Politique sur l'île de Cuba*, Vol. I, p. 2.

110 This unfavourable description of Africa's geography was given by William Robertson, *History of America*, p. 132.

111 Ibid.

112 Alexander von Humboldt, *Political Essay on the Island of Cuba. A Critical Edition*, p. 23, emphasis mine; originally Humboldt, *Essai Politique sur l'île de Cuba*, Vol. I, p. 1.

113 Alexander von Humboldt, *Political Essay on the Island of Cuba. A Critical Edition*, p. 23, originally Humboldt, *Essai Politique sur l'île de Cuba*, Vol. I, p. 2.

114 Humboldt to Lionel Gisborne, Berlin 1853 (?), in Ingo Schwarz, *Humboldt, Briefwechsel*, p. 328.

115 See John D. Majewski, *Modernizing a Slave Economy: the Economic Vision of the Confederate Nation* (Chapel Hill, 2009), p. 94.

116 See Humboldt's letter to Alexander W. Thayer, 5 May 1858?, in Ingo Schwarz, *Humboldt, Briefwechsel*, p. 451.

117 See Mary Louise Pratt, *Imperial Eyes*, pp. 141-147.

1848/1849 led to a significant increase in traffic to that region, which provided a strong incentive for the realisation of such a project. As a result, between 1850 and 1855, the first transcontinental railway in the world – the so-called Panama Railroad – was built under the control of a group of American businessmen.¹¹⁸

Humboldt, however, thought on a larger scale. In a letter to the American State geologist Oscar M. Lieber, he dismissed the ‘miserable railroad of Panama’¹¹⁹, which should not distract the world’s attention from a truly *revolutionary* project (Humboldt) that would have far-reaching consequences for global trade and the power relations between Europe, America, and Asia. It was the matter of Humboldt’s most forward-looking technological project in the New World: the construction of a large-scale canal, cutting through the Isthmus of Panama and thus connecting not only two oceans, but also human cultures on different continents to an unprecedented degree.

CONNECTING THE OCEANS: THE PROJECTED CANAL OF CENTRAL AMERICA

Since the arrival of the first Spanish Conquistadores in the early sixteenth century, the idea of an interoceanic canal that would cut through Central America had attracted the attention of European states and private merchants.¹²⁰ Even though repeated attempts were made in the following three centuries by the Spanish colonial administration, either to find a natural passage between the Atlantic and Pacific Oceans, or to detect the most suitable spot for an artificial breakthrough, the realisation of such a momentous project was still pending when Humboldt undertook his scientific expedition to the New World.¹²¹ However, after the independence of the Spanish viceroyalties in the Americas and the

opening up of these formerly rather isolated regions, new impetus was given to the construction of such a canal. In 1827, an engineer and surveyor of British origin, John Augustus Lloyd (1800-1854), was commissioned by the Latin American statesman and General Simón Bolívar to make a comprehensive survey of the Isthmus of Panama. Lloyd subsequently published his results in the *Philosophical Transactions of the Royal Society of London*, which received great attention from European investors and spurred the interests of Europeans as well as North and South Americans to finally accomplish an interoceanic connection.¹²²

The fact that Bolívar endorsed the possibility of cutting through the Isthmus of Panama suggests that the implementation of Western technologies into non-European territories was not necessarily seen by South American elites as acting against the interests of their new nation-states. In fact, Simón Bolívar formed a partnership with Alexander von Humboldt to implement the canal project in Central America. It seems as if Humboldt had proposed the survey of Panama, which Bolívar then asked John Lloyd to carry out. In his work *Aspects of Nature*, Humboldt wrote that ‘General Bolivar at my request caused an exact levelling of the Isthmus [...]’.¹²³ In his lifelong ambition to connect the New World with other continents and civilisations, Humboldt was deeply convinced that intrusions into America’s natural world – even if carried out by interested European companies – would also be of the greatest advantage for South America. Due to his well-informed publications on America’s natural formation, Humboldt had become an international authority on the feasibility of establishing a sea-to-sea connection. He was not only consulted on this project by European investors and engineers, but also – as he wrote – by ‘well informed persons belonging to the new governments of Equinoxial America’.¹²⁴ In what follows, I will look at Humboldt’s different intentions for linking the Pacific and Atlantic Ocean, and I shall also ask what economic and political consequences Humboldt anticipated once such a canal was realised.

118 See William David McCain, *The United States and the Republic of Panama* (New York, 1970), p. 97.

119 Letter from Humboldt to Oscar M. Lieber, 6 March 1850, in Ingo Schwarz, *Humboldt, Briefwechsel*, p. 265, my translation.

120 Already Christopher Columbus and Hernan Cortez were determined to link the two seas, see Humboldt, *Aspects of nature: in different lands and different climates*, Vol. II (London, 1849), p. 320f.; originally Humboldt, *Ansichten der Natur, Dritte verbesserte und vermehrte Ausgabe*, Vol. II (Stuttgart und Tübingen, 1849), p. 389. Walter K. Frankel was therefore mistaken in claiming that Humboldt was the ‘spiritual father’ of the Panama canal, as Frankel stated in, ‘Alexander von Humboldt und der Panamakanal’, in Joachim H. Schultze (ed.), *Alexander von Humboldt. Studien zu seiner universalen Geisteshaltung* (Berlin, 1959), 235-242, p. 235.

121 See Lionel Gisborne, *The Isthmus of Darien in 1852. Journal of the Expedition of Inquiry for the Junction of the Atlantic and Pacific Oceans* (London, 1853), p. 1.

122 John Augustus Lloyd, ‘Account of Levellings Carried across the Isthmus of Panama’, *Philosophical Transactions of the Royal Society of London*, 120 (1830), 59-68.

123 Alexander von Humboldt, *Aspects of nature: in different lands and different climates*, Vol. II (London, 1849), pp. 320-321, emphasis mine; originally Humboldt, *Ansichten der Natur, Dritte verbesserte und vermehrte Ausgabe*, Vol. II (Stuttgart und Tübingen, 1849), p. 390.

124 Alexander von Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 288; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 386.

Over a span of 50 years, Humboldt was gripped with the idea of linking the two seas.¹²⁵ Both in his publications and private correspondence, he tirelessly proposed not just one possible location for the transoceanic canal – rather, he grappled with at least eight potential routes for such a maritime connection. First, he had laid them out on a map in his ‘Atlas géographique et physique du royaume de la Nouvelle-Espagne’ (1811). The different routes were then more thoroughly discussed in Humboldt’s ‘Analyse raisonnée’ as part of his ‘Essai politique sur le royaume de la Nouvelle-Espagne’.¹²⁶ Later, he again integrated the discussion of various routes for such an interoceanic canal into his *Personal narrative*, which (through H. M. William’s translation) soon became available also to broader English-speaking audiences.¹²⁷ I shall engage less with the actual suitability of each of these sites, but rather ask what importance Humboldt attached to their geographic position – and their significance for global trade.

Such is the happy position of these five points ... that they all are placed at the centre of the New Continent, at an equal distance from Cape Horn and the north-west coast [...] Opposed to each (in the same parallel), are the seas of China and India, an important circumstance in latitudes where the trade-winds prevail; all are easily entered by vessels coming from Europe and the United States.¹²⁸

Humboldt’s envisioned transoceanic canal would thus be situated at the very heart of the American continent and could therefore constitute the centre of a global web of trading routes. For an efficient commerce between the continents, Humboldt favoured a canal suitable for ‘long-distance trade’, which would allow the passage of ‘vessels fitted, from their structure and tonnage’, for overseas trade. ‘Distant communications require’, Humboldt also stated, ‘an uninterrupted navigation, requiring no unloading of the vessels’. To lead to an even

greater acceleration of intercontinental trade, Humboldt argued for a sea-level canal, ‘which would unite the two oceans *without locks* and *without tunnels*’.¹²⁹ To guarantee a continuous use of the canal, Humboldt further insisted that its water level must be high enough to allow a ship’s passage ‘at all seasons’ – thus permitting an uninterrupted yearlong flow of goods through Central America.¹³⁰ A direct and fast transoceanic connection, Humboldt knew, would significantly improve transportation and communication routes and favourably affect global trade in many regards. The lowering of the cost of transportation by means of a shorter route would make it sensible to trade goods over longer distances than before, thus widening the market for a greater number of commodities. At the same time, the increase in speed, and the potentially greater safety of voyages through an interoceanic canal would make commercial intercourse more punctual and reliable.¹³¹ In short, Humboldt was convinced that such a ‘great junction canal’ of two oceans would help to cut time, distance and costs.¹³² In his opinion, the canal would prove to be nothing less than ‘capable of producing a revolution in the commercial world’.¹³³

Apart from his constant preoccupation with the adequate locality, size and the technical realization of his ‘favourite project’¹³⁴, Humboldt also engaged with the questions of who should be in charge of its accomplishment – and to whom it would be financially rewarding. In a sophisticated plan for the execution of the canal, Humboldt argued for the ‘formation of a joint stock company’, presumably by European and North American investors. This ‘junction company’, once founded, should direct more detailed surveys of the five potential localities of the canal. Even if the realization of the great project should fail, Humboldt insisted, ‘canals of *small*

125 See the letter by Humboldt to Frederick M. Kelley, Berlin, January 27 1856, reprinted in Frederick M. Kelley, *The union of the oceans by ship-canal without locks, via the Atrato Valley* (New York, 1859), p. 88.

126 See the map in, Alexander von Humboldt, *Atlas géographique et physique du royaume de la Nouvelle-Espagne, fondé sur des observations astronomiques, des mesures trigonométrique et des nivellements barométrique* (Paris, 1811), Map Nr. 4: ‘Points de partage et communications projetées entre le Grand Océan et l’Océan Atlantique’; his discussion of the different localities can be found in Humboldt, *Essai politique sur le royaume de la Nouvelle-Espagne*, Tome premier (Paris, 1811), pp. 132ff. I would like to thank the anonymous reviewer for this reference.

127 See Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième (Paris, 1825), pp. 327–28; idem, *Personal Narrative*, Vol. VI, Part I, pp. 241–42.

128 Ibid., p. 242; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 328.

129 Quoted from Frederick M. Kelley, *The union of the oceans*, p. 88, emphasis mine.

130 Alexander von Humboldt, *Aspects of nature: in different lands and different climates*, Vol. II (London, 1849), p. 321, emphasis mine; originally Humboldt, *Ansichten der Natur, Dritte verbesserte und vermehrte Ausgabe*, Vol. II (Stuttgart und Tübingen, 1849), p. 391.

131 See Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 291; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 390.

132 This would also be the effect of the Suez Canal in 1867, a long planned project by the French of which Humboldt was aware. For its consequences see, Headrick, *Tentacles of Progress*, p. 27.

133 Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 245; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 332.

134 Ingo Schwarz, ‘Alexander von Humboldt’s Visit to Washington and Philadelphia, his Friendship with Jefferson, and his Fascination with the United States’, *Alexander von Humboldt’s Natural History Legacy and Its Relevance for Today*, *Northeastern Naturalist*, 8 (2001), 43–56, p. 55.

section [sic!] might be dug in some of the five points we have named, to the great profit' of the investors.¹³⁵ However, Humboldt continued in pointing out the even greater 'utility' of *large-scale* canal projects 'for the share-holders'.¹³⁶ Without doubt, Humboldt knew how to strike the right note in order to attract potential investors for an 'affair that interests the commerce of *both* worlds' – Europe and America, that is.¹³⁷

To raise the European and American public interest in this transformative intervention, Humboldt appropriated the new possibilities of mass communication for his own ends. In a letter to the American Consul in Leipzig, Johann G. Flügel, Humboldt expressed his hope that his published treatises on an oceanic canal will 'at last find echo in North America, and there be spread out through Newspapers'.¹³⁸ One year later, historical developments on the American continent seemed most favourable for such a public campaign. The United States had recently acquired new territories on the American west coast from Mexico through the treaty of Guadalupe Hidalgo in February 1848 – *inter alia* the region of Upper California. Shortly thereafter, the Californian 'gold rush' started and led to a considerable increase in the traffic to the region. Humboldt now seized the moment to publish a passage from his work *Aspects of Nature*, this time entitled 'Humboldt's last opinion on the Isthmus of Panama'.¹³⁹ In view of the new geopolitical situation, the affirmation of the project's feasibility by an internationally renowned scientist would, so Humboldt hoped¹⁴⁰, urge North American companies to embark upon a project which he considered 'worthy of the intellectual progress of the nineteenth century'.¹⁴¹

Humboldt's truly *global* awareness of the impact of an interoceanic canal was not confined to the anticipated dramatic changes in world trade. We still know too little about his opinion about the imperial wars of the nineteenth century, especially his view of the First Opium War of 1839-1842 between Britain and China. We

can, however, gain instructive insights into his political ideas through a close analysis of the expectations, which he expressed about the waterway across Central America. Such an enquiry will help to reveal Humboldt's political stance on Europe's and North America's relations with states 'in the east', above all India, Japan, and China. What is striking is the considerable difference in Humboldt's way of expressing himself in his officially published works and in his private correspondence with statesmen and investors. In all his official writings, Humboldt displayed fine diplomatic skills. The overarching impression of his private comments on the political consequences of the 'union of the two seas' is, however, very clear. Humboldt, it seems, was fully aware that the cut through Central America would have far-reaching ramifications for international power relations. The planned intrusion into nature would signify much more than the opening up of new trading routes, because Humboldt was convinced that it was geographical factors that had hitherto decisively shaped western relations with Asian civilisations. In a remarkable passage on the *interconnectedness* of the world, and on the geopolitical significance of the Isthmus of Panama, Humboldt wrote:

Such is the state of modern civilisation, that the trade of the world can undergo no great changes that are not felt in the organization of society. If the project of cutting the isthmus that joins the two Americas, should succeed, Eastern Asia, at present insulated and secure from attack, will inevitably enter into more intimate connections with the nations of European race which inhabit the shores of the Atlantic. It may be said, that that neck of land against which the equinoxial current breaks, has been for ages the bulwark of the independence of China and Japan. In penetrating farther into futurity, imagination dwells upon the conflict between powerful nations, eager to obtain exclusive advantages from the way opened to the commerce of the two worlds.¹⁴²

Evidently, in Humboldt's opinion, certain environmental factors had a deep influence on world history, as they shaped or restricted contact and exchange between distinct human cultures. Now, however, profound advances in technology allowed man to overcome 'natural obstacles' to interaction. The above quote seems to suggest that Humboldt did not regard contact solely as driving forces behind social progress and the establishment of friendly interaction between peoples through

135 Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 289, my emphasis; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 388.

136 Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 291; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 389.

137 Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 290, emphasis mine; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 389.

138 Letter from 22 December 1849, in Ingo Schwarz, *Humboldt, Briefwechsel*, pp. 262-263.

139 See Ingo Schwarz, *Humboldt's Fascination with the United States*, p. 55.

140 See *ibid.*

141 Quoted from Kelley, *The union of the oceans*, p. 88.

142 Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 297, emphasis mine; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, pp. 397-98. See also, Humboldt, *Political essay on the kingdom of New Spain*. Transl. by John Black, Vol. I (London, 1814), p. 45.

commercial intercourse.¹⁴³ Rather, Humboldt was conscious of the fact that increased and direct contact between states in an age of imperialism would necessarily entail intercultural tension and conflict. In this context, Humboldt does not appear to be a detached scholar, but he clearly reveals his European stance. This endorsement of European and North American expansion becomes also apparent in a letter to the American geologist Oscar M. Lieber. Therein, Humboldt expressed his appreciation of the fact that ‘your fatherland has taken such glorious possession on the west coast’ of North America, which will in the future allow the United States ‘to dominate China’.¹⁴⁴

Humboldt also left no doubt about the political implications of the interoceanic canal for the international role of the United States. In his correspondence with the North American jurist and diplomat Henry Wheaton, who represented the United States at the court in Prussia from 1835-1846, Humboldt pointed out that a canal through the Isthmus of Panama would strongly increase the political power (*‘pouvoir politique’*) of the U.S. within the South Sea. He was moreover certain that with the completion of the canal, China would become weaker ‘vis à vis l’Europe et les États Unis’.¹⁴⁵ These comments are more than just flattering words of a man who was seeking to gain support for his own projects. They also reveal Humboldt’s awareness that in the course of the nineteenth century, European powers were turning to East Asia to pursue their commercial and political interests, especially regarding the huge market potentials in China. In the wake of the First Opium War, which had allowed the British to establish a permanent base in Hong Kong and gain concessions in four other ‘treaty ports’, the United States and other European countries were eager to open up the Chinese market for their products.¹⁴⁶ It is telling that in his correspondence, Humboldt seemed to support those developments – just as he argued for using the South American republics to take up the surplus of European manufactured goods. In view of previous trade restrictions on the Spanish colonies and the damaging effects of the civil wars in the newly

independent republics, Humboldt pledged for peace as the precondition of free and unrestricted trade. Otherwise, ‘the whole of Europe ... will be deprived, for a long period of time, of a market fitted to give life to trade and manufacturing industry.’¹⁴⁷

In the end, Humboldt was convinced that exchange between Europe and America in its various forms would be beneficial for civilisational progress in *both* worlds: ‘It is a fatal, I had almost said an impious prejudice, to consider the growing prosperity of any other part of our planet as a calamity for ancient Europe.’¹⁴⁸ In an age of unprecedented global connections, trade was the key to link human cultures across time and space. For Humboldt, commercial intercourse was also the right means through which the fatal legacy of more than three centuries of European colonialism and forced isolation could be overcome for the peoples of South America: ‘The independence of the [Spanish] colonies will not contribute to *isolate* them from the old civilized nations, but will rather bring them closer. Commerce tends to *unite* what a jealous policy has long separated.’¹⁴⁹

Conclusion

In conclusion, this paper has sought to analyse Alexander von Humboldt’s expectations and intentions for a range of ‘transformative interventions’ in the New World. It has demonstrated that these intrusions into the continent’s natural world – namely the construction of railroads and canals, the use of steamboats and the connecting of America with Europe by means of a transatlantic cable – must be linked to Humboldt’s understanding of the driving forces behind progress and his personal belief in the civilising influence of free trade. As a person who literally spanned different worlds in terms of space and time, on the one hand Humboldt adopted the eighteenth-century belief that consumer societies were necessarily civilised societies, whose growing demands and desires would lead to increased human refinement and, ultimately, the perfection of civilisation. On the other hand, he experienced and reflected upon the impact of the Industrial Revolution and the concomitant revolutionary advances in technology. He was convinced that these profound improvements for the technical mastery of the world should be appropriated for increasing the global interconnections of human cultures.

143 See Alexander von Humboldt, *Political Essay on the Island of Cuba. A Critical Edition*, (Chicago and London, 2011), p. 137; originally Humboldt, *Essai Politique sur l’île de Cuba*, Vol. I, pp. 292-93.

144 Humboldt to Lieber, 6 March 1850 (?), in Ingo Schwarz, *Humboldt, Briefwechsel*, p. 265. Originally, ‘Der herrliche Besitz den Ihr Vaterland von der Westküste genommen, von dem aus sie China beherrschen werden [...]’, my translation.

145 Humboldt to Wheaton, 6 December 1845, in Ingo Schwarz, *Humboldt, Briefwechsel*, p. 244.

146 See William T. Hanes III and Frank Sanello, *The Opium Wars: The Addiction of One Empire and the Corruption of Another* (Naperville, 2007), pp. 154-155.

147 See Humboldt, *Personal Narrative*, Vol. VI, Part I, p. 229; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 312.

148 Humboldt, *Personal Narrative*, Vol. VI, Part I, pp. 116-17; originally Humboldt, *Voyage aux régions équinoxiales*, Tome neuvième, p. 143.

149 Ibid.

In his view, the interventions of Euro-American statesmen and investors in the natural world of America were not ends in themselves; rather, Humboldt saw such transformative interventions as a means to stimulate faster and more intimate human interaction. Whereas the state of unconnectedness or *isolation* in their various forms was closely associated with *stagnation* and potential 'barbarity', *mobility* and contact, by contrast, played a decisive role in Humboldt's world-view for unleashing the forces that drive technological and cultural progress. The assumption of geographical determinism that the trajectories of 'encapsulated' cultures were shaped by their natural environment was therefore increasingly challenged and finally refuted in view of the growing human capacity to dominate and forge nature according to man's requirements. Connecting the New World thus meant for Humboldt to use the new technologies of his time to effectively integrate the American continent into global intellectual and material exchanges. The notion of European superiority is, however, apparent in the fact that Humboldt called explicitly on European and North American companies to carry out his envisioned technological mega-projects – even if those interventions were intended to advance human culture in the New World. It was simply the question of who possessed the necessary *agency* as well as the financial and technological means to actually realize his visions of an interconnected American continent.

To set Humboldt's life and work in their historical context also throws light on the complex role of scholars (also from countries without colonies) within the system of European imperialism in the nineteenth century. Humboldt lived in a time of multiple empires with strong economic interests in South America and Asia. As a renowned scientist and public figure, he actively engaged in furthering European and North American control over lucrative areas of investment and production in the independent South American republics. His vision of integrating and connecting the New World through an isthmian seaway was only realized half a century later, in 1914, when the rising power of the United States completed the Panama Canal as a demonstration of its technological prowess and claim to political-economic hegemony in Central America. The interoceanic connection that Humboldt had imagined as a crucial nodal point in a global web of exchanges, intended for the benefit of all mankind, was thus turned into a national project by the United States. This country, into which Humboldt had always placed great hopes for the further advancement of human civilisation, would play an ambiguous, but certainly decisive role in shaping the historical trajectories of human cultures in the New World.

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