In between the Cosmos and "Thousand-Cubed Great Thousands Worlds": Composition of Uncommon Worlds by Alexander von Humboldt and King Mongkut

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Abstract: Recent scholarship on Indigenous politics has illuminated the complex entanglements of science, bureaucracy, social movements and cosmological practices that tend to occur wherever Indigenous practices meet modern environmental management. These studies have shown how the powerful operations of science and bureaucracy, instantiating Western ontology, have eliminated Indigenous ontologies from public arenas such as those of policy-making. The reductive power of a modern ontology that assumes a "one-world world," to borrow John Law's (2011) word, is abundantly visible in these ethnographies of ontological encounters. Focusing on some nineteenth-century Thai episodes, occurring at the time when the modern one-world world was still being constructed in the form of new scientific infrastructures of observation, this article examines some of the ontological consequences of these encounters.

Keywords: interstitial spaces, one-world world, mandala polity, cosmos, Thailand, indigenous ontologies

Résumé : De récents travaux universitaires sur des politiques indigènes ont mis en lumière les imbrications complexes entre la science, la bureaucratie, les mouvements sociaux et les pratiques cosmologiques qui sont susceptibles de se produire lors de la rencontre entre des pratiques Indigènes et des pratiques modernes de gestion environnementale. Ces travaux ont montré comment les puissantes opérations de la science et de la bureaucratie, instanciant l'ontologie occidentale, ont éliminé les ontologies Indigènes des sphères publiques, comme celles où sont élaborées les politiques. Le pouvoir réducteur d'une ontologie moderne qui suppose « un monde unique » (*one-world world*), pour emprunter l'expression de John Law (2011), est facilement visible dans ces ethnographies de rencontres ontologiques. À partir de faits ayant eu lieu en Thaïlande au 19e siècle, alors que le monde unique moderne était en pleine redéfinition à partir de nouvelles infrastructures d'observation scientifique, cet article aborde certaines des conséquences ontologiques de ces rencontres.

Mots-clés : espace interstitiel, « monde unique », régime politique mandala, cosmos, Thaïlande, ontologies indigènes

> Sekai [世界 World] (1) Buddhist term. (a) (From the Chinese translation of Sanskrit *lokadhātu*. "Se" means the three times of the past, present and future, "kai" means the East, West, South, North, Above and Below). The whole time and space in which *shujou* [Sanskrit: *sattva*], that which have life, lives. Land and environment where people and living things live. The *shaba* [Sanskrit: *saha*] world. *Sanzen-daisen-sekai* [thousand-cubed great-thousands-worlds].
>
> – *Nihon Kokugo Daijiten*
> (Comprehensive Japanese Dictionary)

Introduction

Recent scholarship on Indigenous cosmopolitics has shed new light on the complexity of the encounter between Indigenous practice and modern practices such as science and state bureaucracy (Blaser 2009; de la Cadena 2010, 2016). In contrast to modernist or rationalist views, these authors argue that such encounters must be understood as a meeting of divergent realities rather than in terms of an opposition between cultural world views and objective reality. Inspired by science and technology studies and actor-network theory (Law 2011; Mol 2002), scholars further insist that territories, ecologies and landscapes are not given "out there" but are rather enacted by various material-semiotic practices.

In these confrontations, scholars, including those mentioned above, have tended to locate a rather stark asymmetry between two general forms of reality. For example, in his analysis of a participatory hunting program in Paraguay, Mario Blaser (2009) has vividly shown how a Western ontology of nature and animals, instantiated in powerful operations of science and bureaucracy, has eliminated the Indigenous ontology of Yshiro people from public arenas, including policy-making. In this confrontation, Yshiro people's material and semiotic enactments of their territory and animals are reduced to a set of cultural "beliefs" in contrast with the supposedly "real" nature known and promoted by biologists, NGOs and state officials.

Blaser's work offers a lively engagement with the problems caused when the "one-world world," to borrow John Law's (2011) term, encounters non-Western or Indigenous practices.[1] This "one-world world" assumes the existence of a single and encompassing material reality. The idea, Law (2011, 3) writes, is

> that the world, let's get big and say the universe, is really something like a large space-time box that goes on by itself. And then we're adding that there are people with different beliefs living in this space-time box. If we're liberal then we will respect the differences and we won't try to impose our own version of the world on those who see it differently. But even so, and however nice we are, we haven't abandoned our basic commitment to the idea of a single all-encompassing reality.

The problem of a one-world world is noticeably similar to the one haunting the Western dichotomy between nature and culture. As Marilyn Strathern (1980) noted long ago, Western thought tends to see nature as given material reality in contrast with culture, which is regularly portrayed as a product of human creativity. Analogously, the one-world world turns multiple realities into one nature (that of scientific naturalism) and many cultures, which include the supposed "world views" of people like the Yshiro. Along with Strathern and Roy Wagner, Eduardo Viveiros de Castro (1998) has forcefully criticised the universality of this dichotomous organisation, aiming instead for a conceptualisation of reality in which there are many natures but only one culture.

The work of Viveiros de Castro and his colleagues on Amerindian cosmologies offers a rich contribution to already existing wide-ranging debates on the limits of Western nature-culture and its intersections, or forms of coexistence, with non-Western ontologies in locations from Africa (Verran 2001) and Oceania (Verran 2002) to East Asia (Jensen and Morita 2017; Law and Lin 2017; Zhan 2011) and Southeast Asia (Morita and Jensen 2017).

However, as Law (2011) has also noted, these ontological intersections are characterised by certain kinds of complexity. While the effect of science and state bureaucracy that enacts the one-world world seems evident, anthropologists and science, technology and society (STS) scholars have also indicated that scientific practice, rather than being monolithic, is itself, in fact, multiple. If one turns to scientific practice in laboratories, for example, one also never encounters an inert and given reality but is instead brought face to face with the active fabrication of scientific knowledge out of assorted material and semiotic entities (Latour 1999). Moreover, different scientific practices often produce diverse yet partially overlapping scientific objects that are rarely entirely integrated into one reality. Accordingly, partially connected yet different "versions" of reality often coexist (Mol 2002).

A key question raised by Indigenous cosmopolitics and the one-world world concerns this very tension between the complexity of science and supposedly dichotomous and reductive (neo-)colonial encounters. Suggesting that the internal complexity of science often disappears in neo-colonial encounters, Blaser (2009) argues that the scientific world that is enacted in these contexts routinely refuses to coexist with Indigenous realities.

In what follows, I aim to unpack one such encounter to *symmetrically* elucidate the internal complexity of modern science and "Indigenous" world-making projects. I focus on a historical encounter between Western scientists and Thai intellectuals in the mid-nineteenth century. As I highlight below, the practices of my two protagonists, the famed European natural historian Alexander von Humboldt and King Mongkut of Siam, were partly overlapping but also partly divergent. Since, as I show, it is possible to find internal diversity on both sides, as well as alliances and connections that move across the boundary, this is a case in which it is quite difficult to locate a clash between two distinct ontologies. Rather, what one finds in the encounter are complex entanglements of practices that can be used to compose a larger picture of the planet Earth, which became a common object of affective knowledge production for largely different reasons.

The King and the Astronomers

On 18 August 1868, an unprecedented diplomatic, scientific and social meeting was held in the midst of the jungle in Waa Kor, Prachuap Khiri Khan Province, in Siam, or what is today called Thailand (Cook 1993). The heterogeneous assembly consisted of members of the Siamese royal family, nobles, eminent court astrologers, French astronomers, diplomats from various European countries, and the governor of Singapore. These people had travelled to this remote place from Bangkok by boat, horse and elephant at the invitation of King Mongkut, with a view to witnessing the full solar eclipse predicted by the king. At the venue, the expedition set up luxury accommodations with capacity for about one thousand people, along with various instruments for astronomical observation. Amidst these facilities, foreign guests could enjoy European food cooked by a team supervised by a French chef.

Whereas the king's own astrologers and ministers were doubtful about the very possibility of a full solar

eclipse, the king himself was confident in his calculation made on the basis of both Western astronomical books and old Siamese and Mon astrological texts. In fact, due to his personal investment in astrology and astronomy, Mongkut was quite passionate about the Waa Kor expedition. Indeed, he had himself determined that this remote place would be the most suitable for observing the eclipse. To the astonishment of doubtful Siamese nobles and astrologers, the full solar eclipse occurred precisely as the king had predicted; in fact, his prediction was even slightly better than that of the French astronomers. Soon after witnessing the eclipse, the king performed a bath of purification, as prescribed by royal custom in the event of a solar eclipse.

This unlikely hybrid expedition comprised aspects recognisable from the numerous scientific travels made by European scientists to remote parts of the world at the time, along with dimensions particular to the theatrical politico-ritual court events central to the traditional kingdoms of Southeast Asia (Geertz 1980; Wolters 1999). Fitting this duality, the event has long been narrated in two contrasting ways. Contemporary Thai scientists and Europeans in Thailand at the time saw the event as representing the victory of modern science and the enlightened monarch over superstition. Meanwhile, contemporary Thai astrologers and their wide-ranging set of clients saw the event as marking the beginning of modern Thai astrology (Cook 1993).

Focusing on the nineteenth-century Thai episode, this article demonstrates that on both sides of the division between Western science and the "belief systems" said to characterise the rest of the world, one can find complex entanglements of science, diplomacy, politics, popular culture and ritual. For starters, astronomical observations were deeply entangled with both Western and Southeast Asian modes of politics. To understand the intricate relationship between these politics and their ontological underpinnings and presuppositions, I pay attention to the anthropologist Richard Rottenburg's (2009) argument on long distance collaboration in development cooperation.

Rottenburg (2009) argues that the cosmopolitan character of development requires collaboration and joint action between spatially and socially distant actors. In such situations, communication largely happens in interstitial spaces – spaces situated in between various sites and practices: those related to project implementation, ministerial oversight, donor embassies and agencies and so on. Because none of the involved parties has direct access to the situation of their several counterparts, such collaboration always entails problems of how to represent and understand spatially and temporally different realities.

In development cooperation, Rottenburg (2009, xxxi–xxxii) argues, the involved agents often try to handle this problem by the construction of a "bigger picture" of the issues they are facing via a set of intermediary steps: "The first step is to decide which tangible substitutes of the whole should be gathered … No matter how this selecting and gathering occurs, the next step will invariably consist of viewing and ordering the various substitutes. The selected and classified representations are ultimately combined into a bigger picture."

Accordingly, long distance collaboration across space is tightly tied to the depiction of a larger whole. And because this "bigger picture" tries to capture something that cannot be grasped from any single vantage point, it depends on a series of complex material-semiotic mediations. Rottenburg (2009, xxxii) summarises:

> Individual pieces [of information] are not direct substitutes for an external reality but instead bring forth a cascade of further substitutes for an external reality, one is never dealing with a single referent but rather with a diversity of internal or transversal referents that have been organized into a chain such that they support themselves as they proceed along it. From this perspective, a representation is always a cascade of re-re- … representations.

While Rottenburg focused on twentieth-century development cooperation, this quote in fact aptly describes certain problems faced by early modern attempts to depict the planet as a whole. For one thing, the ability to describe the whole earth depended on complex and intricate collaborations between natural historians and many other actors situated all over the world. In practice, therefore, depicting the planet and coordinating with dispersed collaborators were inseparable activities.

As further discussed below, the practices of knowing the world enacted by natural historians and Mongkut were both based on a search for illuminating patterns across time and space. The prediction of the solar eclipse, for example, required understanding the patterns of movement of the sun and the moon, which was made possible by numerous observations made over time in many different places. The joint venture of King Mongkut and European astronomers was part of such a cascade of representation. Moreover, for both King Mongkut and the Western observers, these patterns exhibited the universality of celestial motion, and thus the order of the world. As we shall see, however, the "world" at stake for each might not have been the same.

In what follows, I take interest in collaboration across space, because what is assumed to be universal often depends on quasi-invisible negotiations taking place within space between distant sites of practice – what Rottenburg (2009) calls *interstitial spaces*. Indeed, I think that recognition of what happens in and around interstitial spaces might hold the key to unleashing our imagination from the "one-world world" that assumes the "world" to be an all-encompassing bounded entity.

To map out these spaces, I begin by tracing the formation of the Western natural world in the early nineteenth century. As already noted, the Mongkut expedition was part of that formation. However, my focus will be on the legendary explorer and natural historian Alexander von Humboldt's (1849) magnum opus, aptly titled *Cosmos: A Sketch of a Physical Description of the Universe*. Epitomising the European endeavour to create unified knowledge about the planet, and embedding connections to King Mongkut, *Cosmos* is also key because Humboldt's travels and writings are clear evidence of the importance of interstitial spaces for composing the single world.

Cosmos: The Composition of the Single World

As indicated by the title, Humboldt's *Cosmos* was meant as a comprehensive portrait of the universe, including the geography of the terrestrial space, as well as the astronomy of the celestial spheres. The comprehensive descriptions of the universe presented in the book consisted of observations and measurements compiled by Humboldt during his own travels to the Americas and to Siberia, as well as reports and data sent to him by his global correspondents. Humboldt and his *Cosmos* left remarkable traces in the history of biology, the ecological sciences and anthropology. It inspired Charles Darwin to board the *Beagle* and Franz Boas to do fieldwork among the Inuit (Bunzl 1996; Jackson 2008). The book also achieved unexpected popular success: it was quickly translated into the major European languages and was read by the "learned public" across the continent and beyond.

One reason for this success was no doubt the book's engaging style. The *Cosmos* was beautifully written in a manner that vividly conveyed the author's awe and excitement at facing nature (Jackson 2009; Tresch 2012). Its narrative style was in line with the tradition of German romanticism that privileged direct aesthetic experience as a primary source of knowledge about nature. Akin to Goethe and Schiller, Humboldt offered passionate descriptions of the landscapes and sceneries he encountered while travelling. However, the book was also based on the synthesis of measurements done by cutting-edge instruments such as the portable barometer, the thermometer and the hygrometer. In this sense, *Cosmos* was a precursor to modern large-scale science based on global data collection (Bourguet 2002).

The popular and scientific successes of the *Cosmos* thus rested on the convergence of contrasting modes of knowing nature. Narratives of bodily and sensory encounters with nature evoked the affective experience of the "whole" so appreciated by German romanticism (Bourguet 2002). Simultaneously, systematic patterns emerging from the compilation of a large number of measurements played a central role in depicting "the world or universe as an ordered and harmonious system" (*Oxford English Dictionary Online*, n.d.). In the atlas accompanying the German publication of the *Cosmos*, detailed descriptions were complemented by visual representations of the systematic interrelations between seemingly discrete phenomena such as altitude, temperature, vegetation and topography (Jackson 2008).[2] Humboldt saw these correlations as visible evidence of the systematic nature of the whole cosmos, which deserved to become a legitimate object of science. While recognising the latent tension between romantic narratives of encounters with nature and vast datasets, Humboldt clearly viewed the two as compatible or complementary. Indeed, they were both integral components of his holistic "cosmography" (Humboldt 1849).

This dual representation of the whole world was made possible by the particular location occupied by Humboldt in the history of natural history. In the eighteenth century, naturalists mostly relied on direct sensory experience. For this reason, they had to develop certain kinds of embodied measurement skills. Natural historians, for example, often estimated the height of mountains by "measuring" visible "objects" such as snowcaps and shifts in vegetation. Only toward the end of the eighteenth century did naturalists begin to use instruments in a sustained manner. They started bringing instruments on their travels, and soon these instruments became integrated parts of their sensory skills; they used them, wrote Bourguet (2002, 119), "to engage more deeply with nature, to experience its vivid quality, to become intimately acquainted with its order."

Humboldt's career as a naturalist unfolded in the midst of this historical shift. As he set out for the Americas in 1799, he brought along the best and latest portable instruments, which became his affective travel companions (Tresch 2012). For Humboldt, it appears, sensory experiences were indeed intimately related to, and mediated by, technical equipment.

Yet his cosmography also embodied tensions. Humboldt recognised that repeated measurements using instruments carried the risk of losing a more intimate connection with nature. Thus, he experienced "the fear that nature may lose part of her charms, and part of the magic of her power over our minds, when we begin to penetrate her secrets … and to estimate numerically the intensity of forces" (Bourguet 2002, 120; Humboldt 1849, 19). Thus, he aimed to bridge the latent discrepancy between romantic narrative and quantitative analysis.

Humboldt's travelling practice was central to dealing with this tension. During his field travel, he combined the conventional practice of botany with the possibilities generated by new instruments. At the time, Linnaean botany focused almost exclusively on taxonomic issues, while being indifferent to what we would now call context. Among other things, this meant that basic information such as precise location, altitude, temperature and vegetation was rarely recorded. Given Humboldt's general aim to elucidate patterns at the planetary scale, however, the taxonomic focus on specimens was useless. Instead, in his scientific work, "the description of plants, the observation of their distribution, the precision of height-barometric measurements and the like were now merged in to a single enterprise" (Bourguet 2002, 116). This enterprise required careful comparison between Humboldt's own senses and instrumental measurements in the field. Such comparison, in turn, enabled a certain convergence between romantic and numerical modes of knowing. In other words, the narrative bridging of these modes in the *Cosmos* was not merely a matter of rhetorical strategy but also an integral part of Humboldt's material practice of travelling science.

For Humboldt, travel was therefore central for elucidating the systematic patterns of nature, thus making it possible to turn the whole planet into an object of science. By travelling, he was able to connect observations from distant places, and this made broader patterns visible. By traversing spaces, Humboldt could create interconnected but partial representations of the earth. However, Humboldt also invented another method for coordinating measurements across the interstitial spaces to depict "the big picture" of the cosmos.

Although probably the most well-travelled naturalist at the time, Humboldt's own observations were nonetheless insufficient for the demands of his *Cosmos*. Thus, he frequently corresponded with naturalists and travellers across the world to collect their measurements. Often, he offered his own data in exchange (Bourguet 2002, 117). This writing practice turned Humboldt into the centre of an international communication network. From this position, he organised an international network of geomagnetic measurements, one of the earliest efforts to coordinate global observations and a precursor of subsequent efforts to create global scientific infrastructures (Botting 1973).

The success of the geomagnetic observation network made the sciences of the earth after Humboldt's time less reliant on travelling naturalists. Instead, a growing network of observatories, research institutes and professional associations, not to mention gradually developing protocols for data exchange, emerged as the new basis of physical geography, geology and climatology (Bourguet 2002; Edwards 2010). This infrastructure represented a new way to bridge spaces between divergent observations across the globe.

King Mongkut and the Affective Globe

While Humboldt's *Cosmos* was a prominent midwife to the birth of the modern planetary world, people did not immediately start living in his "one-world" cosmos. In fact, some non-Western scholars kept constructing their own version of the cosmos, even as they adopted cutting-edge Western knowledge and instruments and collaborated with natural historians. The Thai King Mongkut provides an excellent example of this practice. Beyond his love of knowledge of the planet, the king had other reasons for wanting to manage space in and around his state. His depictions of the universe also pertained to the survival of the Thai galactic state.

King Mongkut's expedition to Waa Kor took place a decade after the death of Humboldt. Mongkut's world was, of course, very different from that of Humboldt, yet it was also connected with, and shaped by, Western scientific practice. Moreover, there were surprising and interesting affinities between these two men. Just like Humboldt, Mongkut was also passionate about scientific instruments. John Bowring, who visited Siam to conclude the infamous treaty to open the country in 1855, brought a cutting-edge telescope as a gift from Queen Victoria. To his surprise, the king already possessed several similar instruments. Bowring also found that the king's private palace chambers were "filled with … all the instruments and appliances which might be found in the study or library of an opulent philosopher in Europe" (Cook 1993, 279). Furthermore, Mongkut, again like Humboldt, was fascinated with the planet as a whole. He was probably the first person in Siam to convert to the Copernican view. In a famous conversation with a fellow noblemen recorded in 1845, Mongkut claimed that he got this idea 15 years previously, before meeting the first missionaries (Cook 1993, 280).

Before his succession to the throne, Mongkut had served as a monk for over 20 years. During this monastic

period, he spent most of his time studying Buddhist scriptures and classic astrological texts, as well as English books on natural history. His knowledge was thus based on observations, measurements and calculations of celestial motions, originating in his astrological interests. At the time of his succession, he was regarded as the most outstanding scholar in Siam.

His encounter with Western astronomy led Mongkut to perform his own synthesis between Siamese astrology and Western astronomy. It was this synthesis that resulted in the prediction of the full solar eclipse in 1868. At that time, Western astronomy had also piqued his interest in geodesic practice – the practice of measuring the globe. During his travels to the outer provinces, Mongkut frequently measured longitudes and latitudes and calculated time differences between the capital and the provinces. His fascination with the globe can be glimpsed from his eccentric insistence on locating himself on the surface of the earth with extraordinary precision. Writing to a Western correspondent, he began: "Dated a place of sea surface 13°26′ N. latitude and 101°3′ E. longitude in Gulf of Siam" (Cook 1993, 287).

Like Humboldt, Mongkut's affective knowledge of the whole planet rested on bodily practices of travel, observation and calculation. Compared with Humboldt, however, Mongkut's knowledge had a strong personal character. For one thing, most court astrologers and nobles did not share Mongkut's views (Cook 1993). They remained suspicious about the king's reliance on unorthodox Siamese texts and Western books, as well as his prediction of the solar eclipse itself. Furthermore, despite the hopes of contemporary Europeans, his concerns were not exactly the same as those of Western astronomy; his knowledge was uncommon to both Siamese and Western cosmologies.

Cook (1993) argued that Mongkut's oddly coexisting interest in astronomy and astrology may become understandable if one takes into account the cosmological responsibility particular to his office. From the viewpoint of European observers, who assumed the importance of practical technologies, such as steam engines, to local elites, Mongkut's fascination with astronomy and geodesy appeared extraordinary and esoteric, and indeed quite useless. For Mongkut, however, the introduction of Western astronomy and the reform of Siamese astrology were both significant. They allowed him to update his cosmological sovereignty in the face of the challenge of Western colonialism. To understand this, we need to look a bit more closely at the political form of galactic polities or mandala polities.

Mandalas

Scholars of Southeast Asia have long discussed the particular form taken by traditional regional polities.[3] These polities lack clear borders and tend to take the form of gradually receding concentric circles of political influence. A kingdom, for example, is centred on the capital, which is surrounded by cities directly ruled by the king or his ministers, which are further surrounded by vassals with various degrees of loyalty. The further from the capital one moves, the more autonomous the vassals become. These patterns have also been observed at smaller scales: vassals, ministers' dominions and even smaller territories consisting of hamlets are similarly arranged. Because this spatial configuration matches with Hindu-Buddhism cosmological arrangements, these polities are often called *mandalas* (Wolters 1999).

In a mandala polity, the concentric circle of influence of one kingdom regularly overlapped with that of others. This potentially troublesome situation was often mediated by autonomous vassals that affirmed nominal loyalty to both polities. For a mandala state, what held the kingdom together was thus not protection of the borders but rather intensification of political and cosmological authority at the centre, which ensured stability and reach of the circle of power (Tambiah 1977; Winichakul 1994). It has been observed that this strategy often took the form of spectacular cosmological rituals (Geertz 1980).

The central role of traditional kingships was to maintain the cosmological order by organising city space, rituals and arrangements of administrative units and social groups to mimic the cosmological form of the mandala. In these kingdoms, state organisation, city planning, geography of the state, architecture of palace, and the arrangement of deities on altars usually took a similar concentric geometric form (Tambiah 1977). One corollary of the cosmological government of mandala states was the universal nature of sovereignty. Politics centred on the maintenance of cosmological harmony, and the king's powers were derived from "a single and indivisible divine authority and each ruler claimed unique and universal sovereignty" (Wolters 1999, 27).

The endeavours of rulers to maintain these cosmic patterns focused on managing various elements that tended to diverge by their own inertia; such inertia testifies that galactic polities were not only representation of cosmology but were also materially instantiated. This intermingling of the material and the semiotic is well exhibited by a particular spatial pattern stemming from the trade-centred economy. Also known as "port polities," traditional Southeast Asian mandala states

prospered by engaging in sea trade with overseas merchants from China, Japan, India and the Middle East. Rulers gained huge profits by exporting highly valued tropical forest produce, such as sappanwood, camphor, pepper and ivory, collected from their hinterlands (Kathirithamby-Wells and Villiers 1990). This trade network depended on the particular topography of river basins. Gullick describes the relation between port polities and rivers as follows:

> The territory comprised in a State was related to … the use of rivers as the main lines of communication and trade. A state was typically the basin of a large river or (less often) of a group of adjacent rivers, forming a block of land extending from the coast inland to the central watershed. The capital of the State was the point at which the main river ran into the sea. At this point the ruler of the State could control the movement of all persons who entered or left his State. (quoted in Tambiah 1977, 87)

The mandala configuration depended significantly on this river basin trade system, in which centres of various sizes were connected in hierarchical political and economic relations, as demanded by the Hindu-Buddhist cosmology. In turn, the numerous river basin systems in the region formed an extensive trade network mediated by what the historian O.W. Wolters (1999, 44) called "the single ocean": a "vast expense of water from the coasts of eastern Africa and western Asia to the immensely long coastal line of the Indian subcontinent and on to China." Until the colonial era, numerous mandala polities cohabited around this single ocean. Several rulers, all of whom claimed universal sovereignty, coexisted and recognised the existence of their cosmopolitical rivals.

In one sense, however, the coexistence of numerous cosmological polities along the single ocean was actually in line with Buddhist cosmology, which also emphasised the immense plurality of worlds. Thus, *Abhidharma-kośa*, the founding text of Buddhist cosmology, describes a world centred on the holy Sumeru Mountain, which is surrounded by seven ranges of mountains forming concentric squares (later often represented as concentric circles) and seven seas between the ranges. Outside the seventh range, a vast ocean is encircled by a circular iron mountain range that prevents the ocean from flowing off the world. There are four continents in this ocean; on one, Jumbudvipa, people live. Taking the form of a concentric mandala, this world is called "one Sumeru world" (Sadakata 1997). The plan of the palace or the capital of a mandala polity was usually modelled after the concentric form of one Sumeru world, with a holy tower or hill representing the Sumeru Mountain at the centre (Jumsai and Fuller 1988).

Abhidharma-kośa also notes that a universe contains billions of Sumeru worlds grouped into agglomerates. One thousand Sumeru worlds make a unit called "small thousand worlds." One thousand small thousand worlds make "middle thousands worlds" or "thousands-squared middle thousands worlds." Finally, one thousand of thousands-squared middle thousands worlds make up "great thousands worlds," or "thousand-cubed great thousands worlds." The largest unit of great thousands worlds form a basic unit. These billions of worlds have a shared fate, since they come into being and collapse at once (Sadakata 1997). The traditional Southeast Asian kingdoms referred to by Tambiah (1977) as "galactic polities" can also be seen as part of this system of thousand-cubed great thousands worlds, in which any number of Sumeru worlds might coexist side by side.

The coexistence of cosmological polities brought about another regional effect of universality. Because of the presence of several smaller and larger polities taking similar form, travellers in "the single ocean" experienced what might be called *cosmological repetition* in virtually every port they visited. Traders, envoys and savants frequently witnessed recognisable or even homologous forms, not only of cosmological rituals but also of urban planning or even of the configuration of deities on altars. Wolters (1999) argues that this experience of similarity was vitally important in assuring the universality of the Hindu-Buddhist cosmology. Whereas each king was indeed "a single and indivisible divine authority," his (or occasionally her) universal sovereignty was nonetheless ensured by the cosmopolitan commonality of cosmological forms across the region (Wolters 1999, 16).

Universal Sovereignty and Management of Space

To maintain their political powers and the prosperity of the countries, the rulers of the mandalas had to deal with a complex set of relations: from cosmological patterns expressed in city planning and rituals to trade with upstream vassals, and negotiations with Chinese and Portuguese sailors who mediated trade on the single ocean. Managing these relations was an integral part of ongoing efforts to revitalise sovereignty by imitating the cosmological order.

Mongkut's absorption with astronomy was directly related to the effort to maintain cosmological order by means of ritual and proper political acts. Astrology held a central place among the political technologies of mandalas because it enabled the ruler to interpret signs,

predict coming cosmological events and take necessary countermeasures. Since rituals had to be performed at the most auspicious moments, the calibration of calendars was extremely important. Mongkut's insistence on the importance of modern astronomy arose in part from the necessity to know time precisely. Crucially, the new timekeeping technologies from the West had made apparent that traditional measurements were inaccurate. Thus, Mongkut spared no efforts in recalibrating time. Indeed, in 1852, about 30 years before the English act on Greenwich Mean Time, he established a national system based on his own calculation and the use of a cutting-edge mechanical clock (Cook 1993).

It would be out of place, however, to view his astronomical concern as a mere extension of traditional cosmology. Because Mongkut drew on unorthodox Siamese texts and Western books, he faced strong resistance from his own court astronomers, who preferred traditional sources of knowledge. For Mongkut, these astronomers did not seek true knowledge but merely followed obsolete dogma. Indeed, he had significant disagreements with his fellow astrologers on many fundamental issues, including the predictability of the solar eclipse. Mongkut also urgently felt the need to reconstruct Siamese astrological practices from being a mere timekeeping device to a method for conceptualising the form of the earth (Cook 1993). His endeavour was quite singular. Faced with the Western colonial challenge, Mongkut strove to rehabilitate cosmological sovereignty by bridging widely divergent elements: instrumental measurements, ritual practice, English books on astronomy, unorthodox Siamese texts on astrology, and, of course, sophisticated diplomacy.

The Waa Kor gathering exemplified this dual importance of the astronomical and the astrological. On the one hand, Mongkut tried to give new meaning to the solar eclipse, commonly viewed as inauspicious, by combining Western astronomy and astrological texts. Thus, he proposed a new interpretation of eclipses as predictable and manageable events (Cook 1993). On the other hand, he also aimed to showcase Siam to the Europeans as a full-fledged civilised country with its own sophisticated scientific knowledge and cosmopolitan social circles. This diplomatic attempt too, brought traditional theatrical-political strategies in line with the new Western-style diplomacy (Jackson 2004).

The political strategies of the mandala generally aimed to increase influence on the vassals by augmenting the cosmological authority of the centre; it was therefore typical to invite embassies from neighbouring countries to witness spectacular rituals (Geertz 1980; Tambiah 1977). Depending on the management of interstitial spaces between the states, rather than on direct intervention, such as military expeditions, these invitations aimed to exert influence from a distance. As noted, the concentric form of the mandala was central for conceptualising and manipulating these spaces. By arranging rituals in imitation of the form of the mandala, the king simultaneously located the vassals within the cosmological pattern and brought them under his influence (Tambiah 1977).

Mongkut's absorbing interest in geodesy and his measurements of latitude and longitude during the nineteenth century, a time when the political order was rapidly shifting from galactic to colonial form, can be understood as an attempt to reconceptualise the interstitial space between Siam and other countries. As his reliance on traditional astrology also suggests, however, he was by no means simply absorbed *by* the Western world.

Originally used to govern events across time by carefully managing auspices, astrology was turned into a means for governing space through numerical calculation of latitudes and longitudes. Deploying new technologies, Mongkut was able to locate himself on the earth and to calculate his exact spatial relation to Western countries, while simultaneously calculating auspicious moments in every part of his kingdom in order to perform proper cosmological rituals. The jungle of Waa Kor was indeed a very suitable place for the attempt to redefine the cosmological sovereignty of Siam in the face of the Western challenge.

Just like Humboldt, Mongkut, too, was concerned with the management of interstitial spaces for the depiction of the universe. However, while Humboldt aimed to depict the cosmos as a harmonious integration of affective nature, the Thai king sought to firmly locate his galactic polity as part of the great thousands world on the earth's surface.

This article has focused on two prominent figures – one in Europe and one in Southeast Asia – both of whom were enthusiastically engaged in depicting the whole earth as an object of knowledge. Whereas the worlds they constructed were significantly different, they were partially connected through the circulation of books, instruments and people.

Both Mongkut and Humboldt were concerned with the management of interstitial spaces to compose holistic pictures of their worlds. For Humboldt, travelling expeditions and correspondence with fellow natural historians worldwide were crucial in coordinating practices of observation and data gathering, as well as in detecting patterns that testified to the harmony of the cosmos. Mongkut, in contrast, remained loyal to the responsibility of his office as the universal sovereign. His astronomical, astrological and geodesic practices testified simultaneously to his

enthusiasm for explaining the planet and his careful management of interstitial spaces between the capital and provinces, vassals, rival states and European empires. As the absolute monarch of a non-Western state, the stakes were high from the viewpoint of modern international relations. But his diplomacy in Waa Kor was also aimed at maintaining auspicious cosmological sovereignty.

Combining astronomy and astrology in the dual pursuit of curiosity about worldly phenomena and sustenance of his universal sovereignty, King Mongkut offers a highly visible case of the coexistence of uncommon worlds. The apparent contradiction between his universal sovereignty and the fact that the kingdom of Siam occupied only a small spot on the earth's surface did not pose much of a problem.

Coda: The End of Cosmos

As a final note, it is worth pointing out that the episodes that have held my attention occurred on the eve of the making of the modern dichotomy between nature and culture. Mongkut's cosmos thus avoided being reduced to culture, but culture was not an issue for Humboldt either, since he and contemporary natural historians saw vegetation, topography, celestial motions and local politics and customs as inseparable. Humboldt's cosmography was indeed intended as a depiction of it all. The split of the cosmos into two realms happened only after his death, during the heyday of one of his followers, Franz Boas.

Soon after arriving in the United States, Boas (1887) published his methodological article titled "The Study of Geography," which turned out to have a lasting influence on American anthropology. Boas contrasted the law-like approach of natural science with the affective approach of history, the latter of which he attributed to Humboldt's cosmography. However, instead of the complementarity or uneasy unity between romantic narrative and quantitative description that characterises the *Cosmos*, Boas (1887, 139) emphasises incongruence and opposition:

> We shall first treat on the difference of opinion between physicists and cosmographers. The two parties are strongly opposed to each other; and it is a hard task to value justly the arguments of opponents whose method of thinking and way of feeling are entirely opposed to one's own.

For Boas, the cosmographical and physical approaches rested, respectively, on an "affective" and an "aesthetic" impulse. While the latter was characterised by the desire to find order in seemingly chaotic phenomena, to describe the former, Boas turned to Goethe, the quintessential German romanticist: "It seems to me that every phenomenon, every fact, itself is the really interesting object … [A] single action or event is interesting, not because it is explainable, but because it is true" (Boas 1887, 139).

Here, then, we are faced with the now well-known divergence between humanistic and positivistic approaches. Because Boas's (1887, 141) interest was to further the humanistic approach of affective cosmography, according to which "the geographer, in treating these subjects, approaches the domain of art, as the results of his study principally affect the feeling, and therefore must be described in an artistic way in order to satisfy the feeling in which it originated," Humboldt's compilation of quantitative data and his efforts to coordinate observation networks were of no relevance.

This, then, was also a depiction of the Humboldtian cosmos in transition, if not in a process of dissolution. Indeed, after the immense success of the *Cosmos*, both the site and agent of knowledge making about the single world quickly began to shift. For natural scientists, the emphasis shifted from the intrepid traveller to the importance of coordinated infrastructures. Meanwhile, the more Goethian enactment of the cosmos found a place among human geographers and anthropologists. As the gap between the romantic and quantitative modes widened, the affective universe of the *Cosmos* was thus swept into oblivion. While Humboldt had been among the most popular scientist of the nineteenth century, during the twentieth, his name was gradually forgotten (Jackson 2008).

On the other hand, King Mongkut died from malaria soon after the expedition to Waa Kor. This, however, was not the end of the new combination of divine kingship and modern science and technology that he helped to institute in Siam. Instead, his reforms were further promoted by his son and successor, Chulalongkorn. At the same time, Mongkut himself increasingly came to be regarded as holding divinity. Though the Siamese Revolution of 1932, led by Western-educated military officers and bureaucrats, seemed to put an end to absolute, divine monarchy, the late King Bhumibol Adulyadej gradually regained divine authority beginning in the 1970s. Paradoxically, this divine ascension appears to be related to his personal commitment to modern science and technologies, such as hydrology and new media (Jackson 2009).

Both Humboldt and Mongkut were involved in complex world-making projects. Both also had unique visions that diverged from those of their predecessors. Mongkut had serious disagreements with his astrologers

and was regarded as heretical due to his modern inventions. Less revolutionary, Humboldt's vision was part of the enormous shift from embodied measurements conducted by travelling natural historians to exchanges of technical measurements by scientists and researchers across the world. While his international network enabled the emergence of the nature–culture split, his *Cosmos* was also a significant departure.

I have highlighted in this article that the management of interstitial spaces has been central for the making of the uncommon planetary worlds. Depending on travels, the compilation of data, worldwide correspondences, and calculations of celestial motion, the worlds produced by such endeavours have never been stable. As Isabelle Stengers (2005) has argued, worlds are indeed always diverging, even from themselves.

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Notes

1 The present argument is stimulated by a dialogue I had with Mario Blaser, Heather Swanson and Casper Bruun Jensen in March 2015 in Osaka, Japan.

2 At the time of publication, Humboldt was already well known for the impressive visual representations of his seminal work, *An Essay on the Geography of Plants*, which outlined Humboldt's conceptual framework some 40 years prior to the publication of the *Cosmos* (Humboldt and Bonpland 2008).

3 Part of this section also appears in Morita and Jensen (2017).

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