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# Natural Constraints to Cultural Relativism

## Example: Ricci's Pacific-Centered World Maps

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**Abstract:** Not everything that is logically possible and technically feasible is also natural, for example, placing China in the exact center of a world map. Such a map would not correspond to the laws of perception.

Matteo Ricci, who was the first to create Chinese world maps on which the Americas were depicted, had to choose between two ideals, between a world map that obeys the gestalt principles of perception and a world map with the “Central State” China in its center. The first ideal mattered more to him than the second, although he took the latter into account as well. The result was a Pacific-centered map.

Since we live on a sphere, what we perceive to be in the East and in the West depends on our location. It is therefore natural that in East Asia, world maps show America in the East and not – as in Europe – in the West. This was the argument underlying Ricci's creation of Pacific-centered maps, and not the intention of depicting China as close to the center of the map as possible.

It is only in East Asia that Ricci was the first to create Pacific-centered maps. World maps with the Pacific in the midfield were made in Europe before Ricci, motivated by the traditional unidirectional numbering of the meridians (0°–360°) from West to East starting with the Atlantic Insulae Fortunatae (Canary Islands).

**Keywords:** culture, nature, relativism, cartography, Matteo Ricci, China

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Translated by Donald Goodwin

One of the popular views in today's human sciences is the opinion that there is nothing in nature, whether in the physical nature of the Earth or in the mental nature of the human being, that requires us to see the Earth in a certain way. Many believe that we see nothing on the Earth, much less on maps of it, as it is in reality. What we see are products of mental processes formed by the dominant

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ideas and interests of the society in which we live. If we leave the question as to how the mental processes come about, we can speak of mentalism or constructivism. If it is assumed that the ideas and interests dominant in a society are decisive, we speak more narrowly of social constructivism. For many social constructivists, there are no constraints founded in the mental nature of the human being on how cartographers form their geographical constructs. Everything seems to depend on their particular locations and their interests, which vary from social setting to social setting. This gives rise to the impression that everything is subjective and relative.

Three theses congregate here, theses for which there are good reasons, but which nevertheless are only of limited validity. They are three relativistic theses that themselves have to be seen to be relative.

The first one is the thesis of arbitrariness: the world can be perceived and conceptualized at will. Accordingly, it is to be expected that the conceptual systems of the various civilizations differ from each other “in infinitely manifold and heterogeneous ways”.<sup>1</sup>

It is indeed true that civilizations differ from each other remarkably in many respects and often in ways that deserve to be protected. The thesis that everything could be different is fashionable among philosophers of science; it is important, but it should not tempt us to become blind. We have considerable formative possibilities, but not all of them are stable.

My counter-thesis to the thesis of arbitrariness is thus: Not everything that is logically possible and technically feasible is also natural.<sup>2</sup> The prime example of this is a linguistic one because it can be readily explained in physiological terms. The number of phonemes, that is, meaning-differentiating sounds, varies considerably in human languages; according one count, there are between 11 and 141. But it does not vary arbitrarily within the range of all conceivable possibilities. There is no natural language that uses only two sounds, for example *a* and *b*. Such a language is logically and, as we now know, technically possible; and indeed in special cases it is even of advantage. Computers transfer information with only two symbols (0 and 1). For them, this is the most elegant way to process language. But that would not be a natural human language. It would be completely beyond the reach of human beings to deal with only two sounds or letters in sequence in various numbers and alternations. With a view to the speech organs with which we are born, it would be arduous to formulate statements in such a language. It would be even more difficult to distinguish the

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1 Cf. Cassirer 1923: 1.83.

2 ‘Natural’ must not be confused with ‘essential’ (‘necessary’). On Leibniz’s distinction, cf. Holenstein 1980: 68f.

various long repetitions of the two sounds or letters from each other with the human sense of hearing or seeing. Natural constraints can be overcome, but not without effort and not without a price. If the price is too high, no attempt is made to defy them. Feyerabend's proclamation "Anything goes" is valid "from a logical point of view".<sup>3</sup> It is not valid in the human sciences and apparently not in the physical sciences either.

The second thesis is egocentric relativism: On the basis of our psychophysical nature, as human beings we involuntarily see and judge the world to be centered with ourselves or the community to which we belong in the zero-point of orientation; this centering can never be completely overcome. Accordingly, our view of things has an unavoidable perspectival form.

This applies in many cases, but not in all. When we are standing on the periphery of a large square in the middle of which a huge monument rises, we see this monument and not ourselves in the center of our field of perception. By no means is the point of origin of our perception under all circumstances also the center of our perceptual space. The decisive fact is what is to be seen in the perceptual space. Large structures dominate and have a centering effect.<sup>4</sup> On maps, we involuntarily see the Japanese Islands off the coast of Asia rather than the continent off the coast of this relatively thin archipelago. Moreover, on some maps it is irrelevant what is placed in the center. We pay no attention to this because we are focused on something else, namely on the theme of the map. In the late nineteenth century, thematic maps depicting transoceanic steamship lines were frequently centered on South America [<sup>↑</sup>Map 1874].<sup>5</sup> None of these maps was made in South America; on none of them did South America play a central part. Something else was important on navigation maps: the view of the two largest oceans had to be as continuous as possible. This was possible with maps centered on South America. The focus and center of a map must be distinguished. They can coincide, but they do not have to.

The third thesis is the thesis of power dependency: Striving for power is decisive for how we divide the world both really and conceptually. The geographical divisions of the Earth presented to us on maps are without exception a fabrication dictated by power interests.

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<sup>3</sup> *From a logical point of view* is the title of an anthology by W. V. Quine (1953) in which he advocates an ontological thesis that is no less radical than Paul Feyerabend's.

<sup>4</sup> More on this point in my article "The Zero-Point of Orientation" (1972/99).

<sup>5</sup> I refer to maps listed in the index of maps with an online address with [<sup>↑</sup>Map and the year of publication] or, when the map and its year of publication is already mentioned in the text, with a simple arrow in square brackets [<sup>↑</sup>] following the year.

There is also a harmless variation of the thesis of power dependency, one that is unobjectionable in terms of morals, politics and psychology of perception. Whatever we do is interest driven. A simple cartographic example: instead of aligning a country to the north, which is the usual procedure, it can also be mapped in alignment to a non-cardinal direction so that the country can then be accommodated in a smaller, rectangular map, thus saving space and paper [↑Map 1888].

Scientists with a classical notion of their profession attempt to describe the world in the way that it is regarded as objectively existing by the critical realists among philosophers and as a simple matter of course by engineers, mariners and air pilots. In so doing, they are also pursuing practical interests. Many of these interests are of a purely scientific nature. The production of science is, of course, itself an action, which is expressed clearly enough by the wording. In the “pure” foundational sciences, it is also possible to speak of power interests. Scientists wish to have a scientific command of their discipline. But that is not what social constructivists have in mind. According to them, scientific objectivity is always a means to non-scientific ends. To have a command of the country and the people, it is of advantage to possess objective data. No one knows this as well as military strategists.

However, there are simply too many maps that cannot be explained to have originated due to social or political, much less military power interests. It is remarkable that the social constructivist thesis is not applicable to some of the most important historical world maps to have been produced in Europe. A prime example is Martin Waldseemüller’s map “*Universalis Cosmographia*” dating from 1507 [↑]. It is famous as the earliest map on which America was depicted as a “fourth part of the Earth” (*orbis quarta pars*) independent of Asia, and even more so because it is the first on which the name “America” can be found. It is also the first map of the world on which America is seen both to the west of Europe on the main map and to the east of Asia on the inset maps; I shall discuss this point in more detail in the last part of my essay. The middle of these maps is not occupied by Europe, from which America was discovered as a new continent and from which claims to dominion over it were immediately made and put into force. Rather, on the main map the central meridian runs through western Asia, more precisely through the Persian Gulf, as on Waldseemüller’s classical model, Ptolemy’s map [↑Map 150]; and on the inset maps it runs through eastern Asia, indeed through China, of which Waldseemüller knew no more than what was reported by medieval travelers from Europe to China such as Marco Polo.

As a matter of course, that is, naturally (in view of the complex nature of the human being) this historical account does not preclude the possibility that

maps that were produced with purely scientific intentions with only aesthetic notions as subsidiary motives can be deployed by users to pursue power interests. Nothing is immune to misuse.

There are more important cultural phenomena than geography. But there are few that are as easy to grasp and to demonstrate visually on a map as geographical phenomena are thanks to their spatial nature. From the study of geography I therefore hope to gain insight into the ways in which cultural relativism, which is currently widespread even in educated circles, and the social constructivism that supports it, can be curtailed. The formal philosophical objection that absolute relativism nullifies itself is not enough. Concrete substantiation and concrete reasons are required. What can be concretely substantiated and justified by the example of geographical maps is a differentiated relativism. The result, I hope, will be a qualified pluralism that structures the view of the world and its diverse civilizations in an illuminating way.

The guiding question to which I restrict myself in pursuing this goal in the present paper is this: Why did the Jesuit father Matteo Ricci (Li Madou 利瑪竇),<sup>6</sup> who was the first to design Pacific-centered world maps in East Asia, not create maps with China in their very center?<sup>7</sup> They are called “Pacific centered” to distinguish them from the Europe-centered world maps common in “the West”. However, their central meridian generally does not run through the middle of the Pacific Ocean, but rather through its western segment. Today it usually coincides with the 150th or 160th eastern meridian, 10° or 20° east of the Japanese capital Tokyo.

The treatment of this question is of more than merely historical interest and it explains why world maps found in China today are not centered in China, but rather in the Pacific, even though the official self-designation of the country is still “Zhongguo (Central State)” or “Zhonghua (Central Florescence)”.<sup>8</sup>

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<sup>6</sup> Born in Macerata near the Adriatic Coast in central Italy in 1552, died in Beijing in 1610.

<sup>7</sup> In a preliminary version in a lecture in Vienna in 2016, I tried to answer three further questions (Holenstein 2018). (1) Why did it come about that in Europe in the course of the post-1500 era Europe moved into the center of world maps, although only gradually? (2) Why are America-centered maps not even the rule in America? (3) Why are Pacific-centered maps also gaining ground in Australia today, but not south-up maps on which the southern continents are placed on the upper half?

<sup>8</sup> It should be noted in this context that with these endonyms China has always primarily claimed to be central in political and cultural terms, but not necessarily geographical (Yee 1994: 173). It is not unusual for the “Central State” to be placed off-center on traditional world maps [↑Map 1390].

# 1 Both a Chinese and a Christian ideal: A harmonious image of the world

Matteo Ricci, who used to introduce himself as a European (Ouluobaren 歐羅巴人),<sup>9</sup> had a European world map hanging in his house in Zhaoqing northwest of Guangzhou, his first domicile in China.<sup>10</sup> He then had to explain to his surprised guests why their “Central State” – that is today the preferred translation of “Zhongguo” – is located on the eastern edge of the map and America to the west of Europe. He did so with reference to the spherical form of the earth, which was either completely unknown to them, no longer familiar or only imagined in a scientifically inadequate form. On the terrestrial sphere there is “no proper West and East” (wu zheng xi dong 無正西東). Indirectly and discreetly Ricci thus suggested that there is no proper center on the globe either. What is in the West and what in the East depends on the “big land” (da bang 大邦) in which one dwells.<sup>11</sup> That America lies to the west and Asia to the east of Europe on European maps is primarily due to the fact that from Europe they are seen in this position, which can be simply explained in physiogeographical terms. From a point of view in China, by contrary, Europe is to the west and America to the east. Accordingly, Ricci drew up world maps on which America lies to the east of China and Europe to the west. The most famous is his “Comprehensive Map of All Countries of the Earth” (Kunyu Wanguo Quantu 坤輿萬國全) of 1602 [↑].<sup>12</sup> It has become the mother map for all Pacific-centered world maps common today in East Asia.

Thinking that a map with China in the middle was *the* cartographic means by which Ricci sought to win the goodwill of the Chinese scholarly world would be an underestimation of his genius and intellectual capacity, as well as that of the Chinese with whom he discoursed. Ricci impressed them primarily with the sciences developed in Europe. These were the soundest sciences of his time: geometry, astronomy and geography; geography was gaining ground strongly at

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<sup>9</sup> Literally: “Europe man”.

<sup>10</sup> Ricci 1610: 1.207–211 (Gallagher 1953: 165–167); D’Elia 1938: 24–32.

<sup>11</sup> Quoted from D’Elia 1938: 154. Similarly, Ricci writes in a legend on his map of 1602 [↑] that there is no ‘above’ and ‘below’ on the globe. In support of this, he refers to his experience sailing around the southern tip of Africa on his journey to China. There, too, he saw the sky no differently than in China on the northern half of the globe above his head and not beneath his feet. (D’Elia 1938: Tavola III; English translation: Ch’en 1939: 327.)

For patient advice in translating and interpreting Chinese texts, I thank Kwan Tze-wan (Chinese University of Hong Kong) and Wolfgang Behr und Marc Winter (University of Zurich).

<sup>12</sup> Colorized version: ↑Map 1602/03.

the time, and required mathematics and astronomy as its bases. Ricci believed that the results of these sciences would ultimately demonstrate the greatness and kindness of God and thus further the Christian faith.<sup>13</sup>

Ricci had to choose between two cartographic ideals highly esteemed in his host country, namely either to place China as the greatest and mightiest nation of the Earth conspicuously in the center of his map or to present a harmonious image of the world corresponding as far as possible to cosmological ideas current in China, that is, a map conforming to the gestalt principles.<sup>14</sup> This includes a symmetrical distribution of the large land and water areas and a coherent rendition of the largest landmasses, the continents, on which his maps were more focused than on the oceans. Ricci chose the second ideal, which also corresponded to his own theological ideas and admittedly to his missionary interests, too, without completely neglecting the first. The result was a Pacific-centered map. Asia is positioned on it in the upper midfield, symmetrically flanked to the west by the continents Europe and Africa and to the east by the two Americas. These continents, between which the largest water surface, the Great Eastern Ocean (Pacific), can be seen, are surrounded on both sides by the Great Western Ocean (Atlantic).

An earlier, simpler map [↑Map 1600/09]<sup>15</sup> can be cited to illustrate more impressively to what extent Ricci was intent on respecting the Chinese ideas of symmetry with paired designations above all of the seas in the four cardinal directions. A prime example is the pairing of the Red Sea between Egypt and the Arabian Peninsula as the “Western Red Sea” (Xi Hong Hai 西紅海) (from the Chinese perspective) with the Gulf of California, for which Ricci used the designation “Eastern Red Sea” (Dong Hong Hai 東紅海), echoing the Spanish name of the time, “Mar Vermejo”.<sup>16</sup>

The standard explanation for the fact that Ricci shifted the Americas from the west to the east is that he was intent on placing China in the center of the map in order to gain the benevolence of the Chinese. The goal guiding all his scientific activities is said to have been to draw China in the course of time in its full magnitude to the bosom of the Catholic Church, which would thus become truly universal. Pasquale d’Elia, the author of the standard editions of Ricci’s

<sup>13</sup> See his “preface” on his map of 1602 [↑] and his avowel in Ricci 1610: 2. 50f. (Gallagher 1953: 325f.)

<sup>14</sup> For a recent overview of the most important principles of perceptual organization, see Goodwin 2008: 299–302.

<sup>15</sup> Cf. the Chinese rendition of Ricci’s “Complete Map of the Mountains and Oceans of the Earth” (Shanghai Yudi Quantu 山海輿地全圖) with English translations by Roderich Ptak [↑Map 1600/09/2008; Ptak 2006]; Ricci’s original is no longer extant.

<sup>16</sup> Today: Mar Bermejo (Vermilion Sea).

main works, considers that to be “a tenacious legend”.<sup>17</sup> On Ricci’s maps, China is located in the upper midfield, but by no means in the center of the map as such. For this reason, he was quite fiercely criticized by an eminent contemporary Chinese scholar-official, the notorious eunuch Wei Jun (魏濬) (Ch’en 1939: 348), and even toward the end of the 18<sup>th</sup> century by the renowned geographer Zhuang Tingfu (Smith 1998: 86).<sup>18</sup>

In the discussion of this question Ricci’s prudently chosen words are disregarded. Ricci knew quite well what was fitting as an explicit expression of courtesy in a foreign country, especially in China. In a commentary to one of his earlier maps he wrote: “Asia (Yaxiya 亞細亞) receives [on this map] the most important place in order to do honor to the ‘Central Florescence’ (Zhonghua 中華 [China]).”<sup>19</sup> Take note: it is not China, but rather Asia that receives the most important place; before Ricci Asia was unknown in China as one continent among others and accordingly had no name of its own. What is meant is obviously the place in the midfield of the map. China is only a part, although a mighty one, of this continent, which occupies a privileged place on his map.

In addition to this major shift, Ricci did not place the border of his map on the prime meridian running through the Insulae Fortunatae (Fudao 福島 | Good-Fortune Islands, today known as the Canary Islands), nor with Ptolemy [↑Map 150/1482] one longitude, but rather a full ten longitudes to the west of the islands. To evaluate this small shift of the border of the map away from the Canary Islands into the Atlantic, all advantages that it involves must be considered, and not only the fact that China thus moves a bit closer to the center of the map, which is cited in the literature as the sole motive. The most obvious advantage that Ricci gained by choosing this boundary of the map is the nearly symmetrical distribution of the water surfaces of the Atlantic Ocean on the eastern and western edges of the map. At the same time, the picture that Ricci thus achieved approaches the traditional Chinese idea that the Earth is

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<sup>17</sup> Ricci 1610: 1.209f., n. 3; D’Elia 1938: 25–28, n. 2. D’Elia traces this “leggenda tenace” back to an interpolation by Nicolas Trigault (Nicolaus Trigautius | Jin Nige 金尼閣) in the Latin translation of Ricci’s record of the history of the introduction of Christianity to China (Trigautius 1615: 183; Gallagher 1953: 166f.).

<sup>18</sup> In addition to the off-center placement of China, Chinese readers of Ricci’s maps were shocked even more by the relatively small size of their realm in relation to the earth as a whole (see Ricci 1610: 1. 209f.; 2.472f.). Apparently they were particularly disturbed by the fact that China was placed, in their opinion, too far north on the north-south axis, which is more important in terms of climate theory, than by the off-center placement on the east-west axis.

<sup>19</sup> Quoted from D’Elia 1938: 154. Of course, it is impossible to refute the view that every expression of respect is an indication of the conscious or unconscious intention to gain the addressee’s goodwill.

surrounded by seas. There is a second advantage, a less substantial one, but nonetheless worthwhile: the Cape Verde Islands off the coast of Africa can be rendered together with all the Canary Islands as belonging to Africa. The boundary of his map runs through the Azores in the middle of the Atlantic. A third advantage is that the open seas provide space for map legends.

## 2 Ricci's maps of the northern and the southern hemisphere

Even if Ricci's primary concern was a symmetrical map, the consequence that China was placed more towards the center of the map was certainly quite welcome to him. It can be assumed that he would have placed China directly in the center if this had been possible without a cartographical disadvantage, that is, the division of the Americas along a north–south line. It is all the more remarkable that he did not do this on a map on which it would have been easily possible, namely on his map of the northern hemisphere of the Earth (Chidao Beidi Banqiu Zhitu 赤道北地半球之圖) [↑Map 1602a]. As a cartographer with classical notions of what a good map is, he obviously had more important things in mind than to place his hosts' land in the center of his maps.

In the left corners of his monumental map of 1602 [↑] Ricci drew smaller maps of the Northern and the Southern Hemisphere. Their central axis coincides with the prime meridian of the main map along the coast of Northwest Africa and with its antimeridian ( $180^\circ$ ), which together form a great circle running through the poles. Why did he not take the opportunity to create maps with the central meridian in the middle of the Ming Empire of his time? One indication can be inferred from the text accompanying the two inset maps. Since it is difficult, he writes, to render the ball-shaped Earth as such on a map with a flat surface in such a way that it can be readily recognized, he drew two hemispheres showing the Earth from the equator to the poles. His point in drawing these circular maps centered on the poles was thus to visualize the spherical form of the Earth, and not to render the special physical character of these regions, which is the intent of many present-day cartographic depictions.

Now in accordance with the nature of human visual perception, the most obvious – and thus also natural – thing to do with a circle that is divided into 360 degrees is to begin numbering the degrees at its highest point. On clock faces, the numbering of the hours also begins at their zenith. On the more important map of the northern hemisphere, Ricci was able to begin numbering the longitudes at the top, just as on his map of the southern hemisphere. The

result is a symmetrical rendition not of the land and water surfaces, but of the numbers around the hemispheres. The visualization of the spherical form of the Earth that Ricci intended with his pole-centered circular maps is enhanced by the symmetrical arrangement of the numbers  $360^\circ$  ( $0^\circ$ ),  $90^\circ$ ,  $180^\circ$  and  $270^\circ$  at the four cardinal points of the circle. Again, symmetry seems to have been more significant for Ricci than placing China on the central meridian.

The non-centering of China on Ricci's map of the northern hemisphere is all the more remarkable inasmuch as, in one respect, he renders both hemispheres China centric after all, namely, by viewing them from an East Asian-Pacific perspective. On his map of the northern hemisphere, East Asia and the Pacific, from which one looks up to the North Pole, are on the lower half of the map, whereas Europe, North Africa and the Atlantic are on the opposite side of the pole on the upper half of the map. This is the reason why he can begin the numbering of the longitudes in the ideal manner at the tip of the circular map. On European maps of the northern hemisphere, it is the other way round. Europe, from which one looks up to the North Pole, is found together with North Africa and the Atlantic on the lower half of the map, whereas East Asia and the Pacific are on the other side of the pole on the upper half of the map.

Ricci's choice of the prime meridian of his main map as the central meridian of the inset maps of the northern and southern hemisphere is remarkable in our context primarily because due to this choice China appears ten degrees of longitude more decentered than on the main map. The Central State is not located where it could have been expected on a circular map of the northern hemisphere, namely on the vertical centerline of the map and vertically beneath the north pole. The core territory of the Ming Empire of the time is located together with its official name Da Ming Yi Tong 大明一統 (United Great Ming) between the 120th and 130th meridian as on the main map. On the map of the northern hemisphere it is thus located visibly further from the centerline, which runs along the 180th meridian, than on the main map with its centerline on the 170th meridian.

The respect for numerical symmetry in the choice of the central meridian is something which Ricci shares with many classical cartographers concerned about aesthetics. In atlases in which another meridian than the prime meridian drawn through Greenwich is selected as the central meridian for world maps, it occurs with significant frequency that the great circle formed by the prime meridian and its antimeridian functions as the vertical centerline.<sup>20</sup>

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**20** A prominent example are the maps in the *Allgemeiner Handatlas (Universal Atlas)* [↑Map 1881] by Richard Andree, who was famous for the prudent drafting of his maps. But it is not always the axis  $0^\circ$ – $180^\circ$ . Sometimes and obviously not by chance it is on older maps also the axis  $90^\circ$ – $270^\circ$ , and on recent maps the axis  $90^\circ$ E– $90^\circ$ W (for example in English atlases destined

### 3 Ricci's maps of the western and the eastern hemisphere

A further indication that for Ricci as perfect a depiction of the Earth as possible had priority over a central positioning of China is his two small sketches of maps of the Afro-Eurasian and the American hemisphere [↑Map 1601].<sup>21</sup> They are characterized by the fact that in contrast to European twin hemisphere maps the American hemisphere is rendered on the right, to the east of the Afro-Eurasian hemisphere and is accordingly called the “Eastern Hemisphere” (Dong Banqiu 東半球), whereas the Afro-Eurasian hemisphere is correspondingly referred to as the “Western Hemisphere” (Xi Banqiu 西半球).

Ricci's maps gained greater influence in Japan than in China. There the most widely discussed twin hemisphere map is the “New Revised Complete Map of All Countries” (Shintei Bankoku Zenzu 圖全國萬訂新) that Takahashi Kageyasu 高橋景保 created at the beginning of the nineteenth century [↑Map 1810]. It is famous not only because the American hemisphere with the two American continents is located to the east of the Afro-Eurasian hemisphere, but also because it is entitled “Eastern Hemisphere” (Higashi Hankyū 球半東), while the Afro-Eurasian hemisphere is correspondingly labeled “Western Hemisphere” (Nishi Hankyu 球半西). On earlier East Asian twin hemisphere maps and hence probably on Ricci's lost sketches, these designations are found only in notes to the maps.<sup>22</sup>

In our context, not only the exchange of the placement of the two hemispheres and their designations is interesting, but also the fact that as a result of the underestimation of the expanse of Asia at the time it was possible for Ricci to accommodate the entire Afro-Eurasian landmass in one hemisphere.<sup>23</sup>

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primarily for American readers [↑Map 2014]) or the other way round 90°W–90°E (in Chinese atlases). The 90<sup>th</sup> meridian west does not coincide with the central meridian of American world maps nor with that of maps of the United States. Similarly, the 90<sup>th</sup> meridian east does not coincide with the central meridian of Chinese atlases nor with that of maps of China. On the maps of the polar regions with the meridians 90° E and W as the vertical axis, the axis 0°–180° functions as the horizontal centerline.

**21** They are only extant in Chinese and Japanese renditions or imitations [↑Map 1601/10, 1601/13, 1601/10//1719].

**22** In order to avoid mistakes, it is better to replace the location-relative designations “eastern” and “western hemisphere” with labels such as “Afro-Eurasian” (or simply “Afro-Asian”) and “American hemisphere”.

**23** This is why Guillaume Sanson, in the 1681 *Introduction à la Géographie*, prefers the “ptolemaic meridian” along the Canary Islands and the coast of Northwest Africa as the prime meridian for counting the longitudes instead of the then growing preference for a prime

This is more obvious on the twin hemisphere that Rumoldus Mercator, his older contemporary, created [↑Map 1587/95] than on the Chinese renditions of Ricci's maps. Asia's breadth on Ricci's map of 1602 is just under 180 instead of 219 longitudes.<sup>24</sup> On Mercator's map, it is four longitudes less, only 175. Mercator's hemisphere map is interesting for a comparison with Ricci's circular maps for yet another reason: it is especially apt to make a strong impression of the spherical form of the Earth due to its equatorial projection<sup>25</sup> This impression was also, as I have already mentioned, the motive for Ricci to produce pole-centered hemisphere maps. He expected to attain the same effect with the design of circular maps of the eastern and western hemispheres.

One presupposition for the fact that in accordance with his state of knowledge Ricci was able to accommodate the Afro-Eurasian landmass as a whole, undivided, in one hemisphere was that he retracted the shift of the western border of his large maps by ten degrees of longitude into the Atlantic so that it now ran along the northwest African coast, coinciding with his prime meridian.<sup>26</sup> This had the additional advantage that the Americas were then located almost symmetrically in the middle of the second hemisphere. There is reason to say provocatively that for Ricci the central position of the Americas in his "eastern hemisphere" may have been more important than the central position of China. The disadvantage of the map borders chosen for the hemispheres was indeed that China was more decentered on them (as it was on his north hemisphere map as well) than on his large maps.

If Ricci had moved the Song Shan 嵩山, China's "Center Great Mountain" (Zhong Yue 中嶽), or even the capital Beijing into the center of his twin hemisphere maps, the two largest inhabited landmasses of the earth, the Afro-Eurasian and the American twin continent, would not have been depicted as a whole on the two circular maps. In contravention of the laws of gestalt, the

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meridian drawn through European capitals: "[puisque] ce méridien ainsi placé, considéré comme entier, c'est-à-dire avec son supplément [scil. son antiméridien], enferme dans son hémisphère l'Ancien Continent" (1681: 208). In an earlier passage he writes more correctly and, in the late seventeenth century, less anachronistically: "Entre les différentes manières de représenter le Globe Terrestre en deux hémisphères, celle dont les deux hémisphères sont coupés par le premier méridien [scil. le méridien par les îles Canaries] est préférée à toutes les autres par les géographes, parceque chaque hémisphère comprend presque [!] entièrement l'un des deux continents connus; [...]" (1681: 13f.).

**24** This also applies to the Chinese rendition of Ricci's Afro-Eurasian hemisphere in *Fangyu shenglüe* [Map 1601/10]. It is even more truncated on the rendition in *Tushu Bian* [↑Map 1601/13].

**25** Accordingly, Mercator's map became the model for the construction of twin hemisphere maps (Forstner 2005: 91), including, for example, Verbiest's map [Map 1674].

**26** This can be seen most clearly on Tachibana Morikuni's imitation [↑Map 1601/10//1719].

eastern half of South America would have been cut off from the rest of America and placed on the western boundary of the map of the western hemisphere. Above all, the “Central State” China would not only have been split in two, the two parts would also have drifted apart on opposite circles. This can be illustrated with the twin hemisphere map “The Oceans” by Erwin Raisz [↑Map 1944]. In order to render the two largest oceans, the Pacific and the Atlantic, with as little distortion as possible and as wholes, Asia is cut in half in the center. According to the fundamental law of perception of gestalt psychology cited at the beginning, we perceive what is given together as coherent. Accordingly, it is disconcerting and seems unnatural when on a map it is not also rendered as cohering. On Raisz’s map, the division of Asia and the allocation of the Americas to two hemispheres is less disturbing than it would be on Ricci’s maps because, as the title says, the oceans are the theme and accordingly in focus<sup>27</sup> and are thus rendered coherently. On Ricci’s maps, the continents are more important.

## 4 The historical background of Ricci’s maps

There is a simple cartographical fact that may well have made it easier for Ricci to think of drafting Pacific-centered world maps. For the arrangement of the continents, Ricci relied exclusively on world maps on which the longitudes were numbered in the manner customary at the time, continuously from 0° to 360° going east from the Canary Islands or other Atlantic islands. On Atlantic- or Europe-centered maps, the numbering is interrupted on the right edge of the map, to the east of Japan [↑Map 1570]. It is absurdly continued on the left edge, to the west of the Americas.<sup>28</sup> Was it then not sensible, especially in East Asia, to draft maps on which the numbering was continued steadily beyond 180° on their eastern half?<sup>29</sup>

Aside from the unidirectional numbering of the longitudes, which was the rule at Ricci’s time, a second fact from the history of cartography must be taken into consideration as a possible motive for him to produce maps with America to the east of Asia. There were models. The first to create maps with America in the

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<sup>27</sup> On the continents, only port cities are entered.

<sup>28</sup> Seen from another perspective, this is not at all absurd. It can be construed as an indication that the Earth is round and that the continuation of the map can be found on the other edge.

<sup>29</sup> The only author of whom I am aware who explains Ricci’s placement of America with reference to the unidirectional Ptolemaic numbering of the longitudes towards the east starting with the *Insulae Fortunatae* is Evangelos Livieratos (2016). However, he did not refer to examples such as Waldseemüller’s inset and gore maps to support his justified thesis.

east was Martin Waldseemüller in Saint-Dié-des-Vosges, a town in northeast France. His monumental world map of 1507 [↑] is, as I explained in the introduction, the first map on which America was depicted as a continent independent of Asia. To my astonishment, up to now I have found no reference whatever to the fact that Waldseemüller was also the first to draft maps on which America was placed to the east of Asia and that these maps date from the same year as the map on which America can be seen for the first time as a continent independent of Asia to the west of Europe. These are the two inset maps on his famous world map and the gore map, which he put up for sale the same year. The left, western inset map, placed next to a bust portrait of Ptolemy, is an updated Ptolemaic world map. The inscribed longitudes  $0^\circ$  to  $180^\circ$  are readily visible. The right, eastern map, presented next to a portrait of Amerigo Vespucci, whom Waldseemüller then regarded as the discoverer of the American mainland, renders that part of East Asia which is not depicted on the Ptolemaic map together with America, of which Ptolemy had no knowledge whatever. The longitudes  $180^\circ$  to  $360^\circ$  are inscribed onto it. The two maps were imitated numerous times within a very short period. The most famous imitations are those by Johannes de Stobicza [↑Maps 1512].

Gore maps are two-dimensional maps whose segments (gores) are cut so that they can be pasted onto a three-dimensional globe without gaps or wrinkles. The earliest such maps, including the very first one, Martin Waldseemüller's gore map [↑Map 1507a], are centered on Asia or China and not on the Pacific, as are Ricci's. If in producing these maps, the traditional numbering of the longitudes from  $0^\circ$  to  $360^\circ$  begins on the East Atlantic meridian islands, it is conspicuous that the Americas come to the east of Asia. Thus, in the same year 1507 a world map was published for the first time with America in the west and two world maps with America in the east, all three rendering America for the first time as a continent independent of Asia.

More than a dozen gore maps dating from the sixteenth century are known.<sup>30</sup> Even if Ricci did not encounter imitations of Waldseemüller's China-centered inset maps, it is likely that he knew Asia- or Pacific-centered gore maps from the instruction in geography and cartography that he received in Rome. There he was presumably also instructed in the production of globes, both celestial and terrestrial. He produced globes of these kinds himself in China.<sup>31</sup>

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**30** See Shirley 1983. One of them was produced by Mario Cartaro, a friend of Ricci's teacher Christopherus Clavius, in 1577, the year that Ricci left Rome [↑Map 1577].

**31** See Ricci 1610: 2.50f. (Gallagher 1953: 329). However, nothing is known about the geographic design of his terrestrial globes.

## 5 Conclusion

The earliest China- and Pacific-centered world maps on which America is depicted to the east of Asia were created in Europe by Europeans. It was not by any means their intent to move China into the center of the world. Claims to political, economic or religious power played no part.<sup>32</sup> Two historical factors were decisive for maps centered on China or on the Pacific: (a) geographical information provided by medieval travelers such as Marco Polo about Asian territories (China, Japan and the islands called “Java”) in the east outside of Ptolemy’s hemisphere, which extended only a little beyond the Gulf of Thailand, and (b) the unidirectional eastward numbering of the longitudes starting from the Atlantic islands, which goes back to Ptolemy. The result was that not only the East Asian regions unknown to Ptolemy, but also territories found and explored by Europeans in the west were added on hemisphere maps and on gore maps with the longitudes 180° to 360° to the east of the classic Ptolemaic hemisphere with its longitudes from 0° to 180°. That was all the more natural inasmuch as the territories discovered in the west were long thought to be Asian regions.

These European maps must be taken into consideration as models and together with the unidirectional numbering of longitudes as possible motives for the Pacific-centered maps that Ricci created. However, the decisive motive for the production of such maps in China and Japan was and is to this day simply the position of America as perceived from these countries: to the east. From 1565 on, Manila Galleons sailed eastwards from China across the Pacific to America and not westwards across the Indian and the Atlantic Ocean. The same applies today to air-traffic routes. Why should East Asians call the American hemisphere, which from the perspective of their countries is to the east, the “Western Hemisphere” instead of “Eastern Hemisphere”? What exactly is placed in the center of the maps is in most cases of secondary importance.

The history of cartography has failed to address the fact that the West Pacific and not China or Japan was in the center of the maps produced by Ricci and his successors; two gestalt theoretical factors have to be taken into consideration as the decisive reasons for his choice. The one is the natural tendency to render something on the map without interruption if in reality it is perceived without interruption and not to divide it between the eastern and

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<sup>32</sup> An exception was Franciscus Monachus’s twin hemisphere map centered on Alta India (East Asia) [↑Map 1527]: the Molucca Islands were inscribed too far to the east in order to place them in the hemisphere “ceded” by the pope to the Spanish king. The reason for the fraud (which incidentally was unsuccessful) was not to place the own country in the center of the map.

western border. This applies primarily to the most important entities. On world maps, these are usually the continents.<sup>33</sup> The other factor is an aesthetic one: as balanced and harmonious a rendition of dominating geographical data as possible. Until well into the nineteenth century, which became increasingly nation-centric, these two factors proved to be more powerful than claims to status and dominance, which could prompt one to place one's own country as close to the center as possible. This does not preclude the possibility that nationalistically and ethnocentrically biased people may suit themselves in seeing, reading and abusing maps on which their country is in a central position, sometimes even centuries after they were created.

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<sup>33</sup> If the designation "continent" is used for these large land masses, the usage is in conformity with the language. In Latin, "continens" means "holding together" or "enclosing".

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