Part III: Between the Old and the New World: Maps as Means of Power
Chapter 8
New Maps for New Worlds? Cartographic Practices of Exploration

“The sea is by nature threefold,” writes Felix Fabri (1437/38–1502), a Dominican friar from the town of Ulm, in his Evagatorium, the detailed account of his journeys to Jerusalem. This threefold sea consists of “the great sea, the greater sea, and the greatest sea. The great sea is the Mediterranean Sea, which is called ‘our sea’; the greater sea is the Pontic Sea; the greatest sea is the Ocean, which runs round the world. [. . .] The Ocean, or greatest Ocean sea, is that which encloses the round world, running round about it like a ring. [. . .] This Ocean grows out of the world, and has its root and beginning in it.”¹ These lines, written in scholarly Latin around 1484, reflect the importance that this geographically versed traveler attributed to these bodies of water. The maritime configurations helped the author to explain the structure of the earth, and helped his readers to understand it. In the abstract T-O schema developed in the Middle Ages, the Mediterranean and the Black Sea – including the Sea of Azov at the mouth of the Don – form the T in the all-encompassing O of the encircling ocean. Such descriptions were based on the writings of the church fathers, who had added Christian symbolism to ancient models such as the Greek invention of Okeanos and the discourse on intercontinental borders.² They believed that the ocean encircled the tripartite world, with the Mediterranean connecting the known continents. The related cartographic


schema gained widespread and enduring popularity in the Middle Ages, and was reproduced in hundreds of manuscripts throughout Europe.³

Felix Fabri was able to admire a complex cartographic illustration of these ideas during his second stay in Venice, in the church of San Cristoforo (della Pace) on an island near Murano. This church contained a south-oriented wall map, completed in or before August 1460. Its creator, Fra Mauro, a Camaldolese monk from Venice, had given Africa a southern tip with sea around it, showing confidence in the ongoing success of the Portuguese voyages of discovery. This multilayered work made such an impression on the traveler from Ulm that he wrote an account of the magnificent mappa mundi.⁴ Felix Fabri and Fra Mauro shared two basic assumptions: firstly that the infinite encircling ocean determined the shape of the earth’s surface, and secondly that the three very different-sized continents were (roughly) separated by the Mediterranean and the Black Sea.⁵

Ten years after Fabri wrote his Evagatorium, in 1494, Spain and Portugal divided the world between them in the Treaty of Tordesillas. Although the negotiating parties were hardly in a better position to assess the spatial dimensions of the world than Felix Fabri and Fra Mauro, they fixed a demarcation line that was intended to run from north to south through the middle of the Atlantic, around 370 Spanish miles (ca. 1800 km) west of the Cape Verde Islands. The agreement was that everything to the east of this would belong to the Portuguese, everything

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³ Patrick Gautier Dalché, who is working on an inventory of the schematic T-O maps up to 1200, stated in 1994 that he already had a list of around 400 such maps; cf. Patrick Gautier Dalché, “De la glose à la contemplation: Place et fonction de la carte dans les manuscrits du Haut Moyen Âge,” in Testo e Immagine nell’Alto Medioevo (Settimane di Studio del Centro Italiano di Studi sull’Alto Medioevo 41) (Spoletto: Presso la sede del Centro, 1994), 693–771 at 702. Also in Gautier Dalché, Géographie et culture: La représentation de l’espace du Vie au XIIe siècle (Variorum Collected Studies Series 592) (Aldershot: Routledge, 1997), no. VIII. By December 31, 1997, further finds had raised the number to 625 maps in 465 manuscripts; see Patrick Gautier Dalché, “Mappae mundi’ antérieurs au XIIe siècle dans les manuscrits latins de la Bibliothèque Nationale de France,” Scriptorium 52 (1998): 102–62 at 102. It will be interesting to see how many T-O representations will ultimately be listed in the promised catalogue.


⁵ For ideas about whether the land gave shape to the seas or the seas to the land, see Christoph Mauntel, “Vom Ozean umfasst: Gewässer als konstitutives Element mittelalterlicher Welttordnungen,” in Ozeane: Mythen, Interaktionen und Konflikte, ed. Friedrich Edelmayer and Gerhard Pfeisinger (Münster: Aschendorff, 2017), 57–74.
to the west to the Spanish kings. The contracting parties divided up the claimed
dominions, but had no actual means of putting the agreement into practice. A
joint commission of experts began to carefully study the ancient sources and to
compare their statements. Yet it was unable to fix the line of demarcation carto-
graphically in a way that would satisfy both parties. The members representing the
two countries cited different traditions, and, most importantly, diverging calcula-
tions on the circumference of the earth. This disagreement hampered all attempts
to produce a unanimous answer. For thirty-five years, until the Treaty of Saragossa
in 1529, the only conceptualization of the division that the parties could agree on
was a textual description.6

These examples show the reception of “ancient” knowledge in different
forms and with diverging results. In the case of Felix Fabri’s account and Fra
Mauro’s mappa mundi, the ancient knowledge was interpreted through a Chris-
tian lens and modified in accordance with Portuguese hopes. In the case of the
Treaty of Tordesillas, the experts sought answers to a complex problem in ancient
writings, but these ultimately did not help them find a solution. Both discourses
revolved around the earth’s circumference and the ratio of water to land. The in-
creasing efforts to measure space were linked with the drive to establish new, in-
tersubjective methods. This led to a clash between opposing ideas about the
“right” kind of knowledge: empirical practice versus scholarly knowledge, mar-
ners versus cosmographers, the spoken versus the written word, and particular-
istic knowledge versus the desire for generalizability. The issue at the heart of this
conflict was how much weight should be given to maritime practice in relation to
the topographical representation of the world in the tradition of antiquity –
though there was no clarity about what “antiquity” actually was.

So what discourses, techniques, and practices were deployed to reflect the dif-
ferent perspectives, and to adapt map production and use to contemporary needs?
Or to put the question differently, modifying the words of Raimund Schulz,7 what

6 Ute Schneider, “Tordesillas 1494 – Der Beginn der globalen Weltsicht,” Saeculum: Jahrbuch für
Universalgeschichte 54 (2003): 39–62; Wolfgang Reinhard, Die Unterwerfung der Welt: Global-
geschichte der europäischen Expansion 1415–2015 (Munich: C. H. Beck, 2016), 107 and 139, on
the Treaty of Saragossa.
7 Raimund Schulz, “Einleitung,” in Maritime Entdeckung und Expansion. Kontinuitäten, Paral-
lelen und Brüche von der Antike bis in die Neuzeit, ed. Raimund Schulz (Historische Zeitschrift.
Beihefte Neue Folge 77) (Berlin: De Gruyter Oldenbourg, 2019), 9–57; Raimund Schulz, “Der
weite Weg nach Westen: Maritime Expansion und geographische Horizontenerweiterung in der
Antike und die Möglichkeiten des Vergleichs mit der frühen Neuzeit,” in Barrieren und Zu-
Thomas Beck, Marília dos Santos Lopes and Christian Rädel (Wiesbaden: Harrassowitz, 2004),
51–62; Raimund Schulz, “Oceanic Sea Routes to India: The Western World’s Great Dream from
role did the experiences, ideas, and thought patterns of antiquity play when it came to mapping the dynamics of early modern expansion? To answer this we need to analyze the interrelationship between the exploration of new seas and the cartographic configuration of the world between 1450 and 1550. The following discussion will give a broad outline of this struggle, considering three different aspects: firstly, the reception of diverging ancient knowledge of the world in the fifteenth century; secondly, the relevance of empirical practices and ancient models in the exploration of the world around 1500; and thirdly, the reevaluation of the world and its ancient roots in atlases and cosmographies up to the middle of the sixteenth century.

The Reception of Ancient Knowledge of the World in the Fifteenth Century

In fifteenth-century Europe, the competition between the diverse geographic models of classical antiquity and the new cartographic inventions of the Middle Ages created a rich reservoir of tools for travelers and mapmakers. They could choose from a broad spectrum of travelogues and descriptions of the world, as well as maps – ranging from T-O diagrams and Christian world maps to regional maps and portolan charts – whose content and form were often linked to insights from antiquity.\(^8\) Probably the most momentous event was the arrival of Ptolemy’s *Geographia* in Florence around 1397.\(^9\) Fragments of the geographical knowledge

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gathered in this text had been known since the fourth century in Byzantium and since the seventh century in the West, and had occasionally been incorporated into works of historiography, astrology, and geography. However, the translation of the work into Latin – completed in 1406 or, at the latest, 1409 – triggered a surge of interest. Its effect can be seen in the eighty-six extant Renaissance manuscripts and around nineteen incunabula and early prints produced after 1475.

The general interest in Ptolemy’s *Geographia* subsequently helped to diversify the types and forms of cartographic images of the world. Ptolemaic approaches spread into every part of Europe, and the methods of projection and measurement practiced in the portolan charts were transposed from the Mediterranean to the rest of the world. The dissemination of the work in humanist circles in the second half of the fifteenth century led to a pragmatic approach to the Ptolemaic model, whose statements and calculations (especially those relating to the earth’s circumference) encouraged confrontation with the new knowledge acquired from the voyages of discovery, and contributed to a mathematical orientation in cartography. In short, the reception of Ptolemy’s work dynamized the field. Reports on the Portuguese journeys along the coasts of Africa and Columbus’s later accounts of the New World then gave further impetus to rethink ancient and medieval ideas and continually revise their cartographic forms.10

No usable maps relating to the *Geographia* had been handed down from antiquity, but by the middle of the fifteenth century we find a wide range of illustrations of Ptolemy’s ideas. Around 1412, Francesco di Lapacino from Florence was working on the first versions of a Greek and a Latin *pictura*. Confronting the difficult task of creating a new visual order, he linked the Greek information with contemporary topographical references in Latin.11 Domenico Buoninsegni, also from the entourage of the humanist Niccolò Niccoli in Florence, subsequently completed one of the first compilations, combining text and maps. The resulting model was widely disseminated and encouraged the study of Ptolemy’s ideas, now presented in both textual and graphic form.

Unsurprisingly, this quest for knowledge did not proceed in linear fashion. For example, we find a significantly modified form of Ptolemy’s ideas in Fra Mauro’s unique *mappa mundi*, whose enormous size (just under two by two meters) made it possible to reference ancient authors to an almost unlimited extent, without ignoring the necessary discussion of geographic innovations.12 Thus the contours of

Africa reflect the experiences of Portuguese mariners, while images and brief inscriptions comment on what are purportedly Ptolemy’s specifications — for example, on the system of geographic coordinates, the division of the world into three parts, and the drawing of borders. Fra Mauro took great trouble to correct Ptolemaic errors, such as those about the legendary Taprobana and the representation of the Indian Ocean as an inland sea. He was also at pains to defend his own deviations regarding the form and dimensions of the world, the assignment of names, and the sizes of provinces, as well as highlighting his own additions such as the Baltic Sea. In fact, not all the knowledge he attributes to Ptolemy is actually Ptolemaic, and he uses a considerable amount of material without mentioning its origins. This is characteristic of his general approach to earlier authors, who include Aristotle, Euclid, Pliny, Poseidonios, Pomponius Mela, Solinus, and Strabo.

The cartographer also added numerous textual insertions incorporating the eyewitness accounts of travelers, so as to at least document the existing contradictions, if not to solve them. An important example was the question of whether Africa was circumnavigable, contrary to Ptolemy’s hypothesis of a land bridge to Asia. The proof would not be provided until 1488, when Bartolomeu Diaz completed a secret mission to sail around the Cape of Good Hope and enter the waters of the Indian Ocean. Yet Fra Mauro opted for this solution thirty years earlier, noting that it was contrary to the beliefs of antiquity — but not admitting that it conformed to the views of his Portuguese sponsors. It was a courageous decision,

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13 Falchetta, Fra Mauro’s World Map, see no. 2892 for coordinates, nos. 2489 and 1077 for the tripartite division of the world, no. 1117 for border demarcations; Falchetta, Il mappamondo, 60–77 for the reception of Ptolemy in the work of Fra Mauro.
14 Falchetta, Fra Mauro’s World Map, see no. 53 for the Indian Ocean, no. 215 for Taprobana; Falchetta, Il mappamondo, 60–77.
15 Falchetta, Fra Mauro’s World Map, see no. 2834 for the shape and dimensions of the world, nos. 1490 and 2828 for nomenclature, nos. 1490 and 2243 for the size of provinces; Falchetta, Il mappamondo, 60–77.
16 Falchetta, Fra Mauro’s World Map, see no. 2862 for the colfo germanico; Falchetta, Il mappamondo, 60–77.
since it determined the whole layout of his work. He personally, however, was in no doubt that he had to contradict Ptolemy and completely surround the three parts of the earth with the all-encompassing ocean.\textsuperscript{18}

Since Greek antiquity there had been debate about how to divide the ecumene. The boundaries between Europe and Asia and (even more so) between Asia and Africa were topographically unclear, and the borders could be drawn in very different ways. The church fathers had chosen the tripartite division favored by Herodotus, and the Christian authors of the Middle Ages had followed suit.\textsuperscript{19} Felix Fabri also adhered to this tradition, as well as using his personal familiarity with the local situation to describe the route of a pilgrim to Jerusalem, passing between the three known continents: “He begins his voyage in Europe; at Crete, Rhodes, and Cyprus he reaches Asia, and when he arrives at Alexandria in Egypt he will be in Africa; for the Nile divides Asia from Africa.”\textsuperscript{20} In using general knowledge to structure his personal experience, Fabri was on well-trodden ground. In contrast, Fra Mauro concentrated on recapitulating scholarly controversies, beginning with authorities such as Pomponius Mela and Ptolemy and continuing as far as the moderni. His laconic conclusion was that though such imaginary lines were popular, they were non molto necessaria, that is, not helpful, and the related discussions were materia tediosa.\textsuperscript{21} The scholarly discourse had long since moved on to more attractive topics.

Nonetheless, there is no mistaking the fact that the ancient authorities were very much present in the fifteenth century. Indeed, they had multiplied with the increasing reception of Ptolemy’s work, and offered rich potential for debate. It

\textsuperscript{18} Falchetta, \textit{Fra Mauro’s World Map}, no. 53.
was impossible to avoid engaging with their actual or supposed views, even if one had no desire to follow them. In this sense, the “ancients” provided crucial stimuli for the expansion westwards across the Atlantic. Christopher Columbus is one of those known to have profited from his contemporaries’ references to ancient authorities. Like many others, he compiled all the available statements on the size of the Atlantic and studied them attentively.

One of the documents that came into his possession was a letter sent to King Afonso V of Portugal (via Ferdinand Martins) by the Florentine geographer Paolo dal Pozzo Toscanelli. Dated June 25, 1474, the letter accompanied a map drawn by Toscanelli, which has since been lost. The news that was conveyed in word and image was revolutionary. Starting from the coasts and islands in Portuguese possession, Toscanelli had sketched the western route to the Spice Islands and the treasures of Asia. He had calculated the distances to be covered in miles, worked out how far the route was from the pole and the equator, and had assumed, most importantly, that the shortest route had to lead westwards across the sea, rather than eastwards via the south of Africa. These estimates were based on the calculations presented by Ptolemy. Toscanelli deduced from these that the distance across the Atlantic from Lisbon to “Quinsai,” the city at the end of the Silk Road, was about one third of the Earth’s circumference (hoc spacium est fere tercia pars tocius spere), so around 6,500 miles or (based on a Florentine mile of 1.653 km) around 10,745 km. Of course he was mistaken in these figures and calculations, but the underlying idea with its ancient origins was still groundbreaking.

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Christopher Columbus, fascinated by the potential of the earth’s spherical shape, seems to have copied this letter out personally and added it to his own much-read and annotated copy of Enea Silvio Piccolomini’s cosmographic/geographic description of Asia. This was the edition of the Historia rerum ubique gestarum that had been printed by Johannes de Colonia and Johannes Manthen de Gerretzheim in Venice in 1477. This work, incidentally, not only presented a description of the ecumene referring to Ptolemy, Strabo, and other geographers of antiquity, but also estimated the earth’s circumference at 180,000 stadia, so around 32,233 km – a similar figure to Toscanelli’s. Columbus’s marginal note on this statement, “totum anbitum noti orbis, scilicet 180 milibus,” shows that he must have read this passage attentively and given it serious thought.

Columbus is also known to have intensively studied another work based on ancient knowledge, the Imago mundi of Petrus de Alliaco. Again, his annotations and underlinings concern the route from the west coast of Spain to the east coast of India. Petrus argues that this is a short route, backing his assertion with reference to Aristotle, Seneca, and Pliny. According to Petrus, Aristotle claimed “that the sea between the west coast of Spain and the east coast of India was small,” and Seneca added that this “sea could be crossed in just a few days if the

24 Aeneas Silvius Piccolomini, Historia rerum ubique gestarum, cum locorum descriptione non finita Asia Minor, Venedig, Johannes de Colonia und Johannes Manthen (1477). Christopher Columbus’s personal copy, with notes in his own hand, has been preserved in Seville, Biblioteca Capitular y Colombina. Cf. Stückelberger, “Kolumbus,” 335–36.
wind was favorable.”

Columbus’s marginal note here sums up these statements, noting that the sea between the Spanish mainland and the coast of India is not excessively large and can be crossed in a few days. Columbus believed firmly in the ancient authorities, though in many cases he only knew the content of their writings from the texts of the humanists. In spite of this he referred to them repeatedly, not least in the account of his third voyage of 1498. Here he once again affirmed that Aristotle considered this world to be small, and the waters of the ocean to be so negligible that it was child’s play to pass over the sea from Spain to India.

Such examples make it easy to see how the ancient authors helped pave the way for the voyage west. They possessed great authority, and yet at the same time they were a source of ongoing uncertainty. Only a critical examination of their writings and the opinions expressed there could equip one to interpret the conditions encountered in reality. The discovery of new worlds therefore raised the question of whether unlimited faith in these authors was still justified. They also offered no solution for the division of the world in accordance with the treaties of Tordesillas and Saragossa.

**Practices in the Exploration of the World and New Cartographic Configurations**

Columbus’s voyages to America, Portugal’s forays into the Indian Ocean, and Magellan’s circumnavigation of the world in 1519 to 1522 led to a completely new definition of the realm of experience. The spherical shape of the earth,

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28 Translation based on Stückelberger, “Kolumbus,” 338. Stückelberger is able to show that Pierre d’Ailly quoted Seneca (and possibly other writers) indirectly, via Roger Bacon, *Opus maius* VII (= Moralis philosophia) pars III, 2, 7–11.


known since Greek times, had now actually been experienced for the first time, and was no longer just an abstract model. The voyages had made it possible to comprehend the distribution of the seas over the earth’s surface, and had given clearer definition to the Americas. This symbolic relevance was combined with groundbreaking procedures and deductions. By 1498, Vasco da Gama’s explorations had definitively refuted something that had already been in doubt: the subcontinent posited by Ptolemy to the south of Asia. Soon it also became clear that America had to be considered as a landmass in its own right. And then Magellan, equipped with twenty-three of the latest nautical charts, a map of the world, numerous quadrants, astrolabes, and compasses, sailed through the straits in South America that would later bear his name, landed in the Philippines, and empirically tested the navigability of the Pacific Ocean. The implications of this information were huge: this was not just about the proportion of the earth’s surface covered in seas, but about the way the whole world was divided up. Armed with this knowledge, both the Spaniards and the Portuguese refused to give up their ambitions for power, and continued the controversies with increasing vehemence on all levels – including that of cartography.

For cartography had become a political instrument – a fact confirmed when the two kingdoms attempted to concretize the line of demarcation they had theoretically agreed on in Tordesillas. Spain owed its version to Juan de la Cosa (d. 1510), a pilot who had accompanied Columbus on his travels. His depiction of the world from around 1500 placed the new continent in the west under the patronage of Saint Christopher, and presented it as belonging nearly exclusively to the king of Spain. The only extant copy is one created before 1510, in the form of a portolan chart. The earliest evidence of the Portuguese interpretation of the Treaty of Tordesillas is the Cantino planisphere of 1502. Its unknown draftsman

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treated Brazil (in the east of which his compatriot Pedro Álvares Cabral had landed two years earlier) as a kind of island, and assigned it to the Portuguese sphere. Regardless of this serious border dispute in largely unknown territory, both solutions were devised in such a way as to cleverly avoid the most urgent problem of the time, the question of whether or not the newly discovered islands and territories were part of Asia.

The cartographic definition of the demarcation line became an even greater challenge when the Portuguese reached the Moluccas, known as the “Spice Islands,” in 1511, and Magellan’s discovery of the western passage proved that the two hemispheres were connected. Beyond all feats of navigation, this meant that the demarcation line continued on the other side of the globe, along the Philippines and the Moluccas, and that the antimeridian also had to be defined.35 As a result, the Portuguese-Spanish debate over the Atlantic was suddenly extended to the Pacific. The conflict over trade rights to the Moluccas sparked intense controversies about how to delimit the two halves of an earth which had always been conceived of as a globe, and whose shape had now been empirically confirmed.

It is not surprising, then, that all the efforts to fix an antimeridian failed. This was due to differing calculations of the earth’s circumference, varying forms of projection, and most significantly, diverging views on the positions of certain places, among them the Cape Verde Islands. Nor could the writers of antiquity offer any help here. It proved difficult to define the border in a virtually unknown area, a problem exacerbated by its location in the middle of the Atlantic. The expert commission responsible for marking the border in situ (made up of equal numbers of Spanish and Portuguese representatives) never set off on its voyage, and would in any case never have been able to fulfill its mission. For technical reasons, any attempt to determine lines of longitude at the time was condemned to failure. This lent even greater relevance to topographical representations on maps and globes.36


The differences were discussed on March 1, 1524 at the Conference of Badajoz, right on the border between the two territories. In fact, the opening discussions were actually held – most uncomfortably – on the cross-border bridge, so that the secret maps demonstrating the negotiators’ claims would not have to be removed from their respective countries. Furthermore, the maps, globes, itineraries, and reports serving as evidence were deployed tactically. The Portuguese presented freshly drawn maps of the routes around Africa, so they could leave blank any delicate points and avoid revealing their secret passages. Some of the maps they had brought with them and one itinerary disappeared when the Spanish felt that these confirmed their own claims. The Spanish proposed that only very old maps created before the dispute should be recognized as proof, to exclude any manipulation. And the Portuguese, full of mistrust, argued that instead of nautical maps they should take a blank globe and only enter the information that they had agreed on. However, the goal of jointly determining a line of longitude and putting it on a map with the Moluccas was not achieved at this stage.

Eventually a practical solution was found in the Treaty of Saragossa (1529), when Emperor Charles V, always in need of funds, relinquished his alleged trading rights in the Moluccas to Portugal – which was actually the rightful owner, but unable to prove this claim – for a substantial price. From then on, Spain’s claim to hegemony was reflected in the fact that the designated line of demarcation was drawn onto a nautical chart authorized by Spain, which was then duplicated and approved by both rulers. This created a model map for the future, though not a consensual representation of geographic knowledge. There was, however, a “topographical map,” a cartographic supplement to the treaty. This constituted an attempt to establish “a uniform and binding system of reference,” into which the remote territories could be integrated in future.

One of the participants in the thirty-year political process to implement the line of demarcation was – for a few years at least – Hernando Colón, the illegitimate son of Christopher Columbus, director of the Casa de la Contratación at the time. Another was his most important collaborator, Diogo Ribeiro, who came from Portugal but had served Spain since about 1518/19. Hernando Colón, who

38 Schneider, “Tordesillas 1494,” 61.
recognized Spain’s steadily weakening position in the course of the negotiations, is said to have advised Charles V in his diplomatic stratagem. Ribeiro, in contrast, was a navigator with good maritime knowledge, an instrument builder, and the maker of cosmographically oriented nautical charts. One of the tasks entrusted to him was the cartographic illustration of Magellan’s experiences from the circumnavigation of the earth. His multifaceted knowledge suited the needs of the Casa de la Contratación, which was at the time trying to establish the cosmographic approach (based on astronomical observation and the use of astrolabes and quadrants) as a major part of the practical navigational training of ships’ captains. Previously this had focused mainly on coastlines, tides, currents, and winds.

The original map from the treaty has not survived, but there are four extant planispheres attributed to Ribeiro. These depict astronomical navigation tools – an astrolabe, a quadrant, and a table of declination – to illustrate the methods used. The third and final version of his world map was produced for Emperor Charles V in 1529, and caused a great sensation. Drawn on precious vellum and measuring 85 × 204 cm, it elaborates on an initial fragmentary draft from 1525 and a revised version from 1527. It shows a world divided into two parts, in which the Moluccas, despite Charles’s renunciation on April 22, 1529, are still under Castilian sovereignty. This impressive map, now in the Vatican Library, includes not just the Castilian and Portuguese flags, but also the papal coat of arms. Perhaps it

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was intended as a gift, to demonstrate Charles V’s global dominance to the papal authorities before his imperial coronation in Bologna on February 24, 1530.\textsuperscript{41}

Several cartographers subsequently adopted Ribeiro’s excellent mapping of the New World, including Battista Agnese of Venice, who became highly influential in the courts of Europe between 1534/35 and 1564.\textsuperscript{42} His workshop produced a large number of hand-drawn portolan atlases, of which seventy-eight copies, with a total of nearly a thousand pages, have been preserved. Nine further individual maps are also known to be extant. They all show how the outlines of a new world gradually emerge from the ocean. They also reveal how empirical surveying practices and astronomical or cosmographic views complemented each other, and how the emphasis and the forms of visualization changed over time.

In Agnese’s atlases, as in Ribeiro’s maps, the mapping of the Pacific Ocean from America to the Moluccas in the far west reflects the major new discoveries of the time. Even more significantly, it shows the process by which the contours of distant islands and of a whole landmass rose out of the waters of the sea (Fig. 8.1). The groundwork was laid by the seafarers and explorers who sailed north and south, east and west, constantly trying out new routes to explore the world. One of these was the mariner Giovanni da Verrazzano, in French service at the time.


On his first voyage to America from January to July 1524, his quest for a northern passage to Asia led him to explore the east coast of North America from present-day North Carolina to Maine and Nova Scotia. He was accompanied on the journey by his younger brother Girolamo, a cartographer, and was therefore able to bring this knowledge back to France. Another explorer known personally to Ribeiro was Estevan Gómez, a Portuguese seafarer in Spanish service. A few months after Verrazzano, but still in 1524/25, Gómez also followed the east coast of America northwards while trying in vain to find a northwestern passage. The record of this voyage has been preserved in Ribeiro’s cartographic illustration: his planispheres and maps of America repeated this coastline with slight modifications numerous times, ensuring a wide distribution.

Fifteen years later, Francisco de Ulloa (d. 1540) undertook a similar attempt on the west coast of America, starting in the Pacific. Instead of a passage to the east he found the Baja California Peninsula, a discovery that quickly circulated...
among cartographers. Ulloa investigated the exact shape of the coast by the pragmatic method of sailing into the Gulf of California and up to the mouth of the Colorado River at its northern end. He then sailed back along the opposite coast of the gulf, headed around the southern tip of the peninsula, and, despite hostile conditions and currents, continued to follow the Pacific coast. This disproved the hypothesis that Baja California was an island, but it was not until after another expedition led by Hernando de Alarcón the following year that this fact became widely known. The reason was that Alarcón not only wrote a remarkable report on his encounters with the native population, but also managed to record the outline of the coast cartographically. This made it possible to share the information gathered.

All this information was completely new; there were no prior models to compare it with. In contrast, those mapping the Atlantic and Indian oceans had to compare the Portuguese explorations in Africa and India with the heterogeneous knowledge received from antiquity (Fig. 8.2). When receiving and processing such new information, Agnese developed his own individual style. For example, the atlases from his first phase of activity depict the west coast of America without the Baja California Peninsula. But these explorations had begun to influence Agnese’s work by the beginning of his second phase of activity in 1542. This rapid transposition into the cartographic image – beginning around the same time as Gerhard Mercator – shows how attentively the market-oriented mapmakers followed the current state of knowledge. But the fragmentation of the coastlines also reveals the limits of empirical knowledge. In the case of Battista Agnese, the fragmentary nature of North America continues on the east coast. Here the Portuguese explorer Estevan Gómez and his fleet, equipped with the latest maps by Diogo

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45 Cf. e.g. Kassel, Universitätsbibliothek Kassel – Landesbibliothek und Murhardsche Bibliothek der Stadt Kassel, 4o Ms. Hist. 6; Der Portolan-Atlas des Battista Agnese von 1546 aus der Russischen Nationalbibliothek Sankt Petersburg, ed. Arthur Dürst, with a commentary on the facsimile edition by Tamara P. Voronova (Graz: Akademische Druck- und Verlagsanstalt, 1993); Der Portulan-Atlas des Battista Agnese, ed. Baumgärtner, 28–33 and the details given in the list of maps on pages 131–35.
Ribeiro, had searched for the northwestern passage for nearly eleven months, and had been forced to the conclusion that the land simply carried on forever. In the end he probably only got as far as Cape Race (44 degrees north) at the southern tip of Avalon in Newfoundland. This turning point was actually much further south than the point marked by Ribeiro and subsequently Agnese with the phrase *terra che descobrio steuen comes* (“the land that Estevan Gómez discovered”).

The coastlines of South America were also incomplete at the time: there was still a gap between Peru and the Straits of Magellan. Ultimately, all these breaks denote the end of the known world. In a sense, they separate the secured from the

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unsecured, the newly discovered from the still-to-be-discovered, the realm of ex-
perience from the realm of possibility, that is, the realms experienced in the past
from those where future discoveries were still possible. They found cartographic
expression in fragmented coastlines, which awakened expectations of the future
without using the past to define this future. The ancient models that had once
paved the way for the exploration of new realms had long since been superseded
by navigational practice and its translation into cosmographic knowledge.

The Valorization of Cosmography in Atlases and Descriptions

Antiquity nonetheless remained a crucial reference point in the development of an
independent geographic and cartographic culture. This new science, closely linked
to antiquity, concerned content and form, descriptions of the world and mapping.
The Venetian mapmakers and the workshop of Battista Agnese, who took their
cues from the market as well as from scientific and seafaring progress, can once
again be cited as telling examples.

In many of these maps, the presence of antiquity is quite inconspicuous. Agn-
ese’s maps often include undefined golden islands, far away from Europe, which
are suggestive of the ancient myth of the gold-rich island of Chryse at the extreme
eastern edge of the world. This legendary island was often equated with Taprob-
ana, later Ceylon, now Sri Lanka. After Marco Polo’s journeys it was frequently
identified as Zipangu, the largest of his 7,448 east or southeast Asian islands. It
was the unimaginable treasures of these islands that had inspired Columbus’s
quest for the east in the west. Several cartographers of the 1530s and 1540s
equated the golden island with Hispaniola or Yucatán. Even Abraham Ortelius
still included Chryse in his atlas in 1570, although Giacomo Gastaldi (Agnese’s
Venetian rival, commissioned to produce new wall maps for the senate chamber
and audience hall in the Doge’s Palace) had already broken with this tradition. In

47 Benjamin Scheller, “Erfahrungsraum und Möglichkeitsraum: Das sub-saharische Westa-
frika in den ‘Navigazioni Atlantiche’ Alvise Cadamostos,” in Venezia e la nuova Oikoumene:
Cartografia del Quattrocento/Venedig und die neue Oikoumene: Kartographie im 15. Jahrhun-
dert, ed. Ingrid Baumgartner and Piero Falchetta (Venetiana 17) (Rome: Viella Libreria Editrice,
der Europäer, die Fernhändler und die neue Erfahrung des Fremden im 14. und 15. Jahr-
hundert,” in Maritimes Mittelalter, ed. Michael Borgolte and Nikolas Jaspert (Ostfildern:
Thorbecke, 2016), 233–60.
his three world maps from 1546 to 1561, Gastaldi placed Zipangu further and further away from the American mainland, and finally dispensed with it altogether.\textsuperscript{48}

Nevertheless, the crucial factor in such modifications was not just a thirst for knowledge, but the very different availability of cartographic models for individual regions of the world. While access to colonial nautical charts was severely restricted, there was nothing to stop Venetian cartographers from studying ancient writings and incorporating these in their work. This had implications for the atlases, which—in the case of Battista Agnese—increased considerably in volume from about 1550. They now included not only the three large oceans, a few maps of Europe, a table of declination, an armillary sphere, and a planet system, but also numerous special illustrations of Mediterranean islands, and even a concluding text based on Ptolemy. In other words, the emphasis had changed: ancient traditions were used to help classify new experiences. This was, however, based on an image of antiquity which the humanists of the Renaissance had created for themselves, just as they had created the manuscript Ptolemaic maps. The incunabula and early prints of Ptolemy’s \textit{Geographia} may have contributed to this reception of antiquity, but even more important were the new editions and translations with their corrections and updates. A good example is the 1548 Venetian edition of Ptolemy’s text, with a cartographic appendix created by Giacomo Gastaldi. Here every Ptolemaic plate was accompanied by one or more contemporary maps, so as not to overlook current knowledge about land and seas.

Such examples make it very clear that Ptolemy was no longer the only authority who had to be studied for chorographic descriptions and regional maps. Nonetheless, his image of the world had become a mental schema that defined people’s everyday view of the world, including that taught in schools.\textsuperscript{49} The same applies to certain formal aspects. For example, the titles at the edge of every page of the Agnese atlases in Greenwich (London) and New Haven, dated to 1554 and 1559, even reproduce the formal details found in printed versions of Ptolemy’s work.\textsuperscript{50}

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\textsuperscript{49} Gautier Dalché, \textit{La géographie de Ptolémée}, 302–33.

\textsuperscript{50} London (Greenwich), National Maritime Museum, P/24 from May 4, 1554 and signed, with table of declination, cosmographic-astronomical synopsis, armillary sphere, zodiac, and twenty-five pages of maps, in which German titles and toponyms are added in the margins; New Haven, Yale University, Beinecke Rare Book & Manuscript Library, Beinecke Ms. 560 from August 8, 1559 and signed, with twenty-three pages of maps and cosmographic-astronomical synopsis; cf. Chet
Several atlases from this last phase of Agnese’s activities in the 1550s include cosmographic and astronomical synopses in textual form. These Latin texts evoke ancient knowledge and describe the relationship between the earth and space.\textsuperscript{51} They reproduce passages from Ptolemy’s widely disseminated \textit{Almagest} on the measurement of the earth, astronomical distances, and the movements of celestial bodies, as well as on the length of the day and the division of the world into climate zones. These are most effective when considered in the context of the armillary sphere. At the beginning of the synopsis, Agnese mentions the belief of the ancients that the spherical earth was fixed and immobile in space, that all the celestial bodies revolved around this central point, and that there was therefore a proportionate correspondence between the degrees of the terrestrial and celestial spheres. An exact measurement of the world, he says, had shown at the time that one terrestrial degree corresponded to 56 $\frac{2}{3}$ miles, assuming that one mile was 4,000 ells. Since there are 360 degrees in the equator, this means that the earth’s circumference is 20,400 miles. If this number is divided by 3 $\frac{1}{2}$, Agnese continues, this gives a diameter of 6,490 $\frac{10}{11}$ miles and therefore a radius of 3,245 $\frac{5}{11}$ miles from the center of the earth to the surface.

Even in Agnese’s time, however, it was difficult to translate these figures. Depending on whether one was using a Lombard, Tuscan, Neapolitan, or Venetian mile, a \textit{miglio di mare} of around 1,852 meters, or an Arabic mile of nearly 2,000 meters, totally different values were produced. The explorers and contemporary mapmakers generally underestimated the distances known today. But in listing these figures, which were in wide circulation at the time, Agnese was catering to contemporary tastes: his audience was willing and even eager to engage with the ancient models.


The pages\textsuperscript{52} added in the 1554 edition of the atlas, with tables of distance and coordinates, offer exemplary proof of Agnese’s unceasing efforts to broaden his horizon of knowledge beyond the coastlines, to provide more specific information about the geography of the earth’s surface, and to take into account not only maritime but terrestrial surveys. In contrast to his early maps, which mainly relied on the coastal outlines, his later work focused more on chorographic details. This meant a shift in emphasis from the sea to the land, although islands and territories close to the sea continued to receive preferential treatment. Agnese’s choice of sources reflected this new situation: for the Aegean he used the then-popular \textit{isolarii} or island books, for Africa and America he consulted the Portuguese and Spanish maps, and for most European realms he modified the Ptolemaic foundations.

A similarly relaxed approach to Ptolemy can also be observed in other cartographers. Giacomo Gastaldi, a mathematician and cosmographer of Piedmontese origin who was active in Venice between 1539/40 and 1564, made excellent use of the interplay between cartographic representations, iconographic design, and informative texts of varying form and length for his products. These included the cartographic illustrations\textsuperscript{53} for Giovanni Battista Ramusio’s three-volume collection of travelogues, \textit{Delle Navigazioni e Viaggi}. Because of the international competition, Ramusio’s first folio on the New World, actually conceived as the third in the series, was quickly brought to the market in 1550 before the other volumes on the Asian world.\textsuperscript{54} Several of the texts compiled here attempt to refer to the models provided by antiquity, for example when discussing a northern sea passage to India (supposedly much shorter than the Portuguese route) or the worldwide importance of trade and travel, seen as overcoming the limitations of the Middle Ages.\textsuperscript{55} In combination with the text, the cartographic images seek to deepen this global dimension.

On a world map from 1550 designed with Matteo Pagano, Giacomo Gastaldi uses text blocks to comment on the depiction of the earth. One of the things he explains here is how the fourth continent completes the tripartite world known since antiquity. In his opinion, the world known in antiquity (consisting of Europe,

\textsuperscript{52} For example in the codex in Venice, Biblioteca Nazionale Marciana, It IV 62 = 5067, fols. 2v–3r.
\textsuperscript{53} Milanesi, “La cartografia,” 70 and 76.
\textsuperscript{54} Davide Scruzzi, \textit{Eine Stadt denkt sich die Welt: Wahrnehmung geographischer Räume und Globalisierung in Venedig von 1490 bis um 1600} (Berlin: Akademie Verlag, 2010), 136–42 and 154–57 for the atlases of Battista Agnese in Venice.
\textsuperscript{55} Scruzzi, \textit{Eine Stadt}, 139–40. The basis for this is Pliny, \textit{Historia naturalis}, 2.67: he mentions Indians who have been stranded on the German coast.
Asia, and Africa) encompasses one half of the globe, 180 degrees of longitude. The newly discovered “West Indies,” which were unknown to the ancients, take up the remaining 180 degrees of longitude.56 Such sentences show that Gastaldi perceived the basic structure of the world as mathematically calculable. He also adorned his maps with celestial globes, signs of the zodiac, and portraits of famous geographers from Strabo to Columbus, thus establishing the iconographic foundations of geography, and elegantly incorporating the ancient traditions into the new global perspective.

Even more closely tied to antiquity, though, is Gastaldi’s revised version of Ptolemy’s Geographia, published in Venice in 1548. This was illustrated with sixty maps, of which thirty-four, so more than half, were newly drafted by Gastaldi as tabulae novae.57 It was clearly important to him to engage with the standard work, completing and correcting it. He also produced a new nautical chart and two illustrations of the hemispheres – which considerably expanded the Ptolemaic model – for Ruscelli’s edition of Ptolemy in 1561. For Gastaldi and his contemporaries, then, antiquity provided the great authorities. The task of the moderns was to continue to revise their fundamental principles, uncovering and correcting their errors. Gastaldi defended this view of geography even more vigorously in his short cosmographic text (barely twenty pages) La universale descrittione del mondo, which appeared in 1548 and provided a summary of his extensive cartographic oeuvre.58 In all these works, both maps and descriptions, antiquity was a reference to be developed and improved. This constituted a major challenge for the cartographic practices of exploration.

**Conclusion**

Geographical maps and atlases were hybrid genres, reflecting culturally ingrained habits of seeing in various ways. Though maps and atlases continued to incorporate the Ptolemaic tradition, by 1500 the ancient information had become insufficient to map empirical experiences. It was in fact the divergences and inconsistencies that stimulated cartographers to seek new visual paths and develop new practices. When it came to mapping the feats of navigation in the

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57 Scruza, Eine Stadt, 135–36 and 143.

58 Scruza, Eine Stadt, 149–50.
New World, the discourses of legitimation shifted from the ancient authorities to the relevance of empiricism. Ultimately, however, the new had to be assigned a place within the framework of the familiar, and considered in the context of the teachings of ancient and medieval cosmographers. Various experiences and models from antiquity spurred the exploration of new lands and seas between around 1450 and 1550. In the process, new discourses, techniques, and practices were developed to translate the dynamics of early modern expansion into cartographic images and descriptive texts, and to configure the world cartographically. The relevance of empirical practices in the exploration of the world around 1500 constitutes a crucial step between the reception of ancient knowledge of the world in the fifteenth century and the reevaluation of ancient models in maps, atlases, and descriptions of the world in the sixteenth century.