Journal for the History of Knowledge

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Introduction

Mapping Uncertain Knowledge

▼ **ABSTRACT** This introduction discusses each element of the central theme of this special issue "mapping / uncertain / knowledge." It claims a place for uncertainty in (between) histories of knowledge and ignorance. Moreover, this introduction argues the value of including maps in these histories. The history of knowledge and the history of maps and mappings not only share many characteristics; they can and should fruitfully inspire each other.

▼ **KEYWORDS** history of knowledge; ignorance; uncertainty; maps; mappings

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In the early eighteenth century, Herman Moll published a map of the Arctic. This German-born cartographer worked most of his career in London; he presumably never set foot above the Arctic circle, or in one of the other non-European places he showed on his many maps, such as the Caribbean or the South Pacific.[1] He is, however, responsible for having conveyed much knowledge about the whole world to a varied audience ranging from scholars to illiterates in his own time and far beyond. At first sight Moll's map presents clear geographical information about the world above 50 degrees northern latitude. On further investigation, though, the map features "parts unknown" (in the north-west of America), and no fewer than three renderings of Nova Zembla.[2] A small inset map at the top shows only the west coast of Nova Zembla; the east coast is left out. The larger map has the same delineated west coast, and the east coast sketched with a lighter line, featuring no place names such as those found on the "known" coasts. In the bottom right-hand corner there is another inset map. Nova Zembla has a complete coastline and

1 For a biography of Herman Moll, see Reinhartsz, *The Cartographer*.
2 Moll, *This Draught of the North Pole*.

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is connected to the Russian mainland. The accompanying text states that this was "discovered by the order of the Czar of Muscovy," adding "but this draught having no latitude nor scale, we dare not fully depend upon the truth of it."

This map reveals several things about the knowledge Moll was uncertain about and the strategies he used to communicate his uncertainty to the reader. He presented different kinds of graphics and text, added and left out certain elements, provided various options, and commented on his own uncertainty. The last quote, about the Czar, indicates that when faced with great uncertainty, mapmakers pushed responsibility onto their named sources, and that apparently it mattered whether certain cartographic conventions were followed.

Uncertain knowledge points us to the cutting edge of epistemic practices. Inspired by Border Studies, we realize it is fruitful to shift our focus from the center to the periphery.[3] This is where battles are fought—be they physical or intellectual. As psychologists and courses in leadership can tell us, growth derives from *conscious* incompetence. This is even truer for knowledge. Descartes's famous phrase "cogito ergo sum" started with doubt.[4] Only by being uncertain can he prove his existence. A few decades earlier, the Dutch poet Coornhert wrote: "who does not doubt, does not learn."[5] Uncertainty forms the shady gray area where knowledge was negotiated, between the "dark side" (i.e., ignorance) and the clear world of facts—as will be argued below.[6] Nota bene: "facts" are not objectively true; they can be proven wrong later. There are several geographical features in Moll's Arctic that were presented with certainty but would later be debated and removed from maps.

Uncertain knowledge (referred to by a wide array of expressions, as will be shown below) is arguably most expressively and explicitly presented in maps. The cartographer admits in plain sight what he (or she) does not know for sure. The frayed edges of his (or her) world view and knowledge are literally visualized. Thus, this special issue of the *Journal for the History of Knowledge* brings together the histories of knowledge and cartography, to the advantage of both disciplines. The history of knowledge is full of mappings, geographies, cartographies, and places, but interacts surprisingly little with the history of maps. This special issue aims to inspire new interdisciplinary dialogues, set in the gray zone between what historical actors knew and did not know.

In this introduction, I will start with knowledge—since this is the *Journal for the History of Knowledge*—and its negation: ignorance, a recently flourishing shoot on the history-of-knowledge tree. Uncertainty and its many more or less synonymous associates will be defined in between. Moreover, I will argue for the value of including maps in these histories. The history of cartography

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3 Sahlins, *Boundaries*, and many more Border Studies classics such as White, *The Middle Ground*, or Snyder, *Bloodlands*.

4 Broughton, *Descartes's Method*.

5 "Hij die niet twijfelt, leert niet …" Coornhert, *Wercken*, 238 (brief 35).

6 Zwierlein, "Introduction."

will be introduced in a nutshell, especially where it concerns the theme at hand. I will designate several parallels between the history of knowledge and the history of cartography, before explaining a bit more about the strategies of mapmakers when confronted with their uncertainties. En route, the contributions in this volume will be introduced and linked. Together, they show fascinating cases of early modern knowledge mapped and communicated, producing, discussing, and negotiating knowledge at the same time.

History of Knowledge and Ignorance

The burgeoning field of the history of knowledge may not yet be a full-fledged discipline, though considering its growing number of projects, conferences, centers, journals, book series, etc., it is rapidly becoming institutionalized.[7] This new shoot on the tree of history as an academic endeavor has even been hailed as *the* field of the 2020s, its proponents not shying away from huge ambitions.[8] When it comes to defining what knowledge is, most authors point to the comprehensiveness and versatility of the concept, concluding a single definition is impossible to achieve and agree on.[9] When "debating" this "new approach to history" a few years ago, Martin Mulsow proposed reasoning from "what was seen as knowledge at the time," though in her commentary on Mulsow, Lorraine Daston has shown how even this seemingly obvious definition is far from clear-cut.[10]

Complicating the matter even further, several protagonists of the history of knowledge have recently argued in favor of including the assessment of ignorance, failures, and not-knowing as an important part of the burgeoning field.[11] Including these topics would, according to Mulsow, Sven Dupré, and Geert Somsen, among others, foster the field's ambitions to become more than just an expansion of, and to emancipate itself from, the history of science.[12] Thus, from early on, "negative knowledge" has found its place in the history of knowledge.[13] Lukas Verburgt and Peter Burke, in their special issue of the *Journal for the History of Knowledge* devoted to "Histories of Ignorance" (2021), urge historians to make an "ignorance turn," following other academic disciplines in recent decades.[14] Since the late 1980s, anthropologists, philosophers, and

7 As stated by Daston, "The History of Science," 132.
8 Perhaps starting with Secord, "Knowledge in Transit." Other important contributions are Burke, *What is*; Daston, "The History of Science"; Dupré and Somsen, "The History of Knowledge"; Dupré and Somsen, "Forum"; Östling and Heidenblad, "Fulfilling the Promise."
9 Burke, *Social History of Knowledge*; Burke, *What is*; Daston, "The History of Science"; Mulsow, "History of Knowledge"; Joas, Krämer, and Nickelon, "Introduction."
10 Mulsow, "History of Knowledge," 161; Daston, "Comment."
11 Mulsow, "History of Knowledge"; Dupré and Somsen, "The History of Knowledge."
12 See also Verburgt, "The History of Knowledge"; Verburgt and Burke, "Introduction."
13 Knorr-Cetina, *Epistemic Cultures*.
14 Verburgt and Burke, "Introduction," 3.

social scientists have turned their attention to nothing, voids, and ignorance or agnotology; historians have followed suit.[15]

In their *Regimes of Ignorance* (2015), anthropologists Roy Dilley and Thomas Kirsch observed that "there is a lot of ignorance today."[16] The early 2020s have only confirmed this image: (scientific) knowledge, expertise, and authority are being contested and disputed throughout the world. According to Lukas Verburgt, the study of non-knowledge, unknowns, or *Nichtwissen* is the pre-eminent topic for the twenty-first century, and historians of (non-)knowledge are apparently indispensable in the so-called "fourth knowledge revolution."[17] This "epoch-defining aspect of modern society" is echoed by Renate Dürr in the introduction to her edited volume *Threatened Knowledge* (2022), where she refers to modern-day fake news, mistrust, and conspiracy theories.[18] Burke's recent overview, *Ignorance. A Global History* (2023), shows how the subject has become an accepted part of current historiography.

The volumes by Verburgt and Burke, Dürr, and the slightly older *The Dark Side of Knowledge* (2016) by Cornel Zwierlein show examples of historical research into ignorant practices, ranging from the early Middle Ages to the twenty-first century. Summarizing is impossible, and also undesirable, since it would not do justice to the width and depth of these studies.[19] We can conclude, however, that a single definition of "ignorance" seems as difficult to reach as a definition of "knowledge," though we recognize that ignorance is not just the opposite of knowledge. Verburgt, like Mulsow with regard to knowledge, proposes defining ignorance as "whatever historical actors claim it is."[20] Dürr does not define it either, but also stresses actors' categories and a praxeological lens.[21]

Uncertainty in between Knowledge and Ignorance

Uncertainty, according to the *Oxford English Dictionary*, is 1) "the state of not knowing," and 2) "something you cannot be sure of." Where the first part refers to a (presumably human?) subject in a certain state—an uncertain state, that is—the second part refers to an object. The object, which the generalized "you" cannot be sure of, is always knowledge. Knowledge, as we have seen above, is not sharply defined. Verburgt and Burke, for example,

15 Smithson, *Ignorance*; Barrow, *The Book of Nothing*; Proctor and Schiebinger, *Agnotology*; Gross and McGoey, *Handbook*; Dilley and Kirsch, *Regimes of Ignorance*.
16 Dilley and Kirsch, *Regimes of Ignorance*, 5.
17 Verburgt, "The History of Knowledge," 6, 8.
18 Dürr, "Introduction," 2–3.
19 This should be read as a recommendation.
20 Verburgt, "The History of Knowledge," 11.
21 Dürr, "Introduction," 5.

state that they aim to conceive knowledge broadly, containing "doubt, failure, error, and forgetting," a few pages later adding "certainty [*sic*], secrecy, lies, [and] confusion" to the list.[22] This already suggests that there are many terms to indicate that not all knowledge is immediately clear and accepted. The historian of cartography Carla Lois provides the following list (translated from Spanish): "the unknown, the unexplored, the assumed, the poorly known, the plausible, the credible, the implausible, the incredible, the unexpected, the expected, the desired, the sought after, what is beyond the horizon (the *plus ultra*), the other, the different, the projected, the anticipated, the unconscious, the foreign, the exteriority."[23] Apparently, there are many words signifying the lack of certain knowledge. Michael Smithson, already in 1989, published a taxonomy of ignorance, where ignorance is divided into irrelevance (including all kinds of conscious ignoring such as taboo and undecidability) and error.[24] Error, subsequently, is divided into distortion and incompleteness, and then it branches out even further. Under incompleteness we find absence and uncertainty, with the latter divided into vagueness, probability, and ambiguity. In my opinion, however, uncertainty, though vague or ambiguous, deserves an upgrade.

In this special issue we propose uncertainty as the lens through which we can understand and analyze what was/is in between knowing and not-knowing. Though several authors emphasize that there is no sharp contrast, no binary opposition, no negation between knowledge and ignorance, they do not really elucidate how these two stand in relation to each other.[25] Dürr characterizes the in-between or overlapping zone between knowing and not-knowing as "grey areas."[26] Taking into account Zwierlein's category of "dark knowledge" equating ignorance, the zone between obscure ignorance and knowledge could indeed consist of fifty (or more) shades of gray.

Like ignorance, uncertainty is a social fact.[27] Like ignorance, uncertainty is "inherent to processes of knowledge making," and it can "point to weaknesses in ways of knowledge."[28] Researching uncertainties shows knowledge in the making, the imperfections of processes of knowledge production, and the endlessness of these processes. As recent research into the history of culture, knowledge, and ignorance has demonstrated, we may perhaps better pluralize and speak of cultures, knowledges, and ignorances.[29] And uncertainties. Like knowledge and ignorance, uncertainty is not easy to define; it is a contested

22 Verburgt and Burke, "Introduction," 2, 5.

23 Lois, "Quinta Pars," 4.

24 Smithson, *Ignorance*; updated in Smithson, "Ignorance." Verburgt, "The History of Knowledge," 13 mentions taxonomies like these, but does not refer to any specific literature.

25 Dilley and Kirsch, *Regimes of Ignorance*, 20, 23; Lois, "Quinta Pars"; Verburgt and Burke, "Introduction," 5.

26 Dürr, "Introduction," 1, 6.

27 Cf. Dilley and Kirsch, *Regimes of Ignorance,* 15.

28 Dupré and Somsen, "The History of Knowledge," 191.

29 Verburgt, "The History of Knowledge"; Verburgt and Burke, "Introduction," 1.

concept. It assumes there is something like certainty, which in its turn supposes a certain [!] level of objectivity. Though what "objective" is, is not at all universally agreed on.[30]

The gray area now labeled uncertainty is filled with known unknowns. The distinction between unknown and known unknowns was made famous by US Secretary of Defense Donald Rumsfeld in 2002 (an episode dismissed as "amusing distraction" by Dilley and Kirsch).[31] It can be very helpful, though, in understanding our historical actors and their knowledge-making processes. Known unknowns can be equated with Zwierlein's "specified ignorance,"[32] though in my opinion "uncertainty" is preferred, since this makes it unequivocally clear that it is not ignorance or *Nichtwissen* we are speaking of. (Specified) ignorance and unknown unknowns refer to things which people are neither aware of nor understand and which are knowable only in hindsight. Uncertainty (known unknowns or specified ignorance), however, refer to awareness and agency.

To illustrate this with a cartographic example: from a European perspective, America was an unknown unknown in pre-Columbian times; thus it did not feature on maps (and cannot be analyzed by historians). A known unknown, in early modern times, was a north-east passage from Europa to China that was believed to exist, mapped, and sought after. In hindsight we can tell such a passage was nonexistent and impossible (at least at that time), though this uncertain passage inspired and shaped early modern maps, plans, and deeds.[33]

Uncertain things are thought to exist, but their details, limits, location, or place in time are yet to be found. This definition of uncertainty was strikingly presented in as early as 1538 by one of the most famous cartographers in history: Gerard Mercator. On the land around the South Pole on his 1538 world map in double cordiform projection, he states "it is certain that there are lands here, but how many and where the limits are is uncertain."[34] Perhaps it is no coincidence that an early modern mapmaker so aptly defined uncertainty. This was a period when, from a European point of view, many new lands were "discovered." The uncertainties on maps both spurred and shaped European voyages, expansion, and colonialism.

The articles in this special issue explore the presentation of known unknown (geographical) knowledge, especially the mapping of this uncertain knowledge. While, as Verburgt states, "we cannot have the actors themselves define what they were ignorant of,"[35] we do have them define what they were

30 Daston and Galison, *Objectivity*; Padovani, Richardson, and Tsou, *Objectivity in Science*.

31 Dilley and Kirsch, *Regimes of Ignorance*, 6.

32 Zwierlein, "Introduction."

33 Van Netten, "The Richest Country."

34 "Terras hic esse certum est sed qua[n]tus quibusq[ue] limitibus finitas incertum." Mercator, World Map (1538).

35 Verburgt, "The History of Knowledge," 11.

unsure of. As Lois justifiably states, explorers did not search for unknown parts of the world.[36] It was the known unknowns on their maps that led to exploration, research, and action.

Maps and History

How do maps, mapmakers, and historians of maps deal with uncertainty? To start with, like knowledge and ignorance, maps are not easy to define. The most referred to, though disputed, very broad definition is from Brian Harley and David Woodward, who have called maps "graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world."[37] All "maps" in this special issue, from the North Pole to southern Africa, from early sixteenth-century America to modern-day GIS maps, fit this definition. However, given the broadness of this definition, this is not really surprising and does not really help us further. All the maps discussed in this volume represent geographical, spatial knowledge, and the places are visualized to scale and on a flat surface (parchment, paper, or screen).

The longest tradition in the history of cartography is bibliographical: maps were collected, described, and presented in chronological order. There was (and still is) a strong teleological idea that maps have become ever more "correct" throughout history. In some cases, this has already brought "unknown lands" (*terra incognitae*) to the foreground of historical research into maps. Especially the (early modern) mappings of what we now call the Americas and Australia/Antarctica have received a fair share of attention.[38] These *terrae incognitae* were found already in the work of Ptolemy, whose texts from the second century CE were rediscovered in the West in the Renaissance and visualized in graphic from. We have seen how Moll still used the term in the eighteenth century. Obviously, "unknown lands" are known unknowns, specified ignorance, uncertain knowledge.

The Western focus of the history of cartography is difficult to miss, and difficult to circumvent, as this volume makes clear. It makes sense, however, since our best-known modern world maps (cf. Google) and almost all our cartographical conventions—for example, those referred to already by Moll —date from early modern Europe, in particular late sixteenth-century and early seventeenth-century Antwerp and Amsterdam. Their ways of mapping have become so dominant over the past half a century that we struggle to recognize, for example, Polynesian *rebellib*, Inca *quipu*, or Aboriginal songs as

36 Lois, "Quinta Pars," 8.

37 Harley and Woodward, *The History of Cartography*, xvi.

38 Amongst much more: Washburn, "Representation"; Padron, "Mapping *Plus Ultra*"; Lois, *Terrae Incognitae*; Lois, "Quinta Pars."

representations of geographical features.[39] It is a strong desideratum for future research to analyze how other (non-Western) cultures have struggled with the representation of uncertain knowledge. We know, for example, that Arab scholars have used comparable terms, such as during the Abbasside Caliphate (ninth and tenth centuries), where Africa south of the Sahara appears on maps as *al-Wāq-Wāq*, referring to far-away, unknown, or uncharted territory.[40] While this volume is written completely in English—in itself a sign of Western dominance—it remains to be researched how uncertainty is designated in various languages. How does semantics influence mental attitudes and practices?

This special issue demonstrates this influence and how cartography as a whole has mostly been understood as a (Western) project to diminish uncertainty. The cartographic work of the Jesuits in China in the seventeenth and eighteenth centuries forms a telling example.[41] This project can be characterized as one of continuous improvement. Paradoxically, even while this implies in hindsight that older maps are always worse, it has never belied trust in maps through the ages.[42] Chet Van Duzer and Danielle Gravon in this volume call this, respectively, the "*prima facie* trustworthiness of maps" and the "illusion of certainty," suggesting doubt and uncertainty are just behind the surface.

The *idées fixes* of continuous improvement and ever more correct information obscure the fact that maps never were (or are) correct; they never are exact models of the landscape. In the first place, it is simply impossible to represent a globe on a flat surface (recent discussions about, and alternatives for, the Mercator projection being a case in point). Moreover, maps always present selections; they contain many borders, colors, lettering, and things not found on the globe. Their "inescapable imprecision"—the term is coined by Mark Monmonier—is brought forward in all of the following articles.[43]

While traditionally maps were thus seen as mimetically mirroring reality, and cartography as embodying progress, from the 1980s onwards (inspired by Derrida, Foucault, Panofsky, and the like), a new generation of map historians, led by Brian Harley among others, has shown how maps are always subjective constructions and instruments of power, able to lie and manipulate.[44] These ideas are more or less explicit throughout the contributions in this volume. Foucauldian knowledge–power relations figure prominently, especially in the work of Harley, who points to silences on maps and links mapping to the colonial project—a link most pungently present in the articles by Gianamar Giovanetti-Singh and Petter Hellstrom.

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39 Woodward and Lewis, *The History of Cartography*.
40 Shea and Bell, "Charting the Unknown."
41 Cams, *Companions in Geography*.
42 See also Van Netten, "Mapping Travel Knowledge."
43 Monmonier, "Cartography: Uncertainty."
44 Black, *Maps and Politics*; Harley, "Maps, Knowledge, and Power"; Monmonier, *How to Lie*; Wood, *The Power of Maps*; Wood, *Rethinking the Power*; Harley, *The New Nature*.

Map historian Matthew Edney asserts that cartography itself is a modern, Western ideal, not fit to describe maps and mapping in the past.[45] By researching mapping processes (as Edney suggests), practices of ascertaining, indicating (un)certainty (Chet van Duzer), mapping uncertain places (Gianamar Giovanetti-Singh and Petter Hellstrom), the combination of various sources and modes of reasoning (Danielle Gravon), and preserving uncertainties (Weixuan Li), this volume contrasts with earlier historians of cartography who researched and questioned the accuracy of old maps, comparing them to modern maps with old-fashioned observation or digital methods. Our new approaches show that the idea that good maps are (ever more) accurate maps, and that accuracy apparently is the relative location of places in relation to one another compared with physical geography, is a Western and (early) modern idea.

Parallels and Interaction

Surprisingly, maps do not figure very often in the history of knowledge, or the history of ignorance. It seems obvious to consider maps as epistemic images, or epistemic things.[46] As Mulsow writes that the history of knowledge (as an extension of the history of science) accommodates "objects not scientific in the narrower sense, for example works of popularization and compilation,"[47] maps and atlases seem an ideal fit. They also seem ideal to secure precarious knowledge and to be an excellent example of "cooked" knowledge in relation to "raw" information.[48] However, in the literature on these topics they are conspicuous by their absence. Apparently, most historians of knowledge are hesitant (or ignorant?) to include maps in their conferences, journals, and edited volumes.

The spatial turn has not left the history of knowledge untouched.[49] The role of "places and spaces" in the history of knowledge is discussed extensively by Christian Jacob and others.[50] Furthermore, "geographies" and "cartographies of knowledge" recur in the field[51]—a field that, according to, for example, Daston, needs to be "mapped."[52] For most historians of knowledge, though, mapping has little to do with real maps. The verb is used almost exclusively in a

45 Edney, *Cartography*.
46 Lüthy and Smets, "Words, Lines, Diagrams, Images"; Payne, *Vision and Its Instruments*; Marr, "Knowing Images"; Marr and Heuer, "The Uncertainty"; Rheinberger, *Towards a History*.
47 Mulsow, "History of Knowledge," 159; Burke, *What is*.
48 Cf. Mulsow, *Prekäres Wissen*.
49 Crang and Trift, *Thinking Space*; Warf and Arias, *The Spatial Turn*.
50 For example, Jacob, "*Lieux de Savoir*."
51 For example, Dupré and Somsen, "The History of Knowledge"; Mayhew and Withers, *Geographies of Knowledge*;
Meusburger, Gregory, and Suarsana, *Geographies of Knowledge*.
52 Daston, "The History of Science," 147. See also Gehring and Weibel, *Mapping Spaces*.

comparable manner, such as Svetlana Alpers's term "mapping impulse," where mapping means mostly ordering knowledge and not the making of physical maps.[53]

While there has not been much interaction between the two disciplines so far, there are some striking parallels. Both fields examine knowledge carriers, discussing the knowledge as well as the carriers. Both regard production, dissemination, and reception. Both were traditionally more interested in great men and their printed publications, but in recent decades the context of the production of knowledge has been brought to the fore: their workplaces, families, and interests (see, for example, the article by Giovanetti-Singh).[54]

As in the more traditional history of science, the older history of cartography was much concerned with progress. If doubts, errors, and mistakes were mentioned, they were seen as failures in hindsight, and emphasis was on the overcoming of incorrect mapping. This resonates with earlier ideas about ignorance in the history of science, where ignorance was mostly considered something to overcome.[55] These ideas born with modern science itself were (and are) frequently echoed in the historiography regarding modern science. The same can be observed in the history of cartography, with its prevailing discourse of a development from uncertain to (more) certain and more accurate knowledge. Early modern maps are often titled "accurata" (accurate), "accuratissima" (most accurate), "nova" (new), "emendata" (improved), etc., and these claims are echoed in the modern history of cartography.[56] Similarly, belief in progress can be found on old maps *and* in much of the historiography. See, for example, the "the *not yet* known Southland" (*Terra Australis nondum cognita*) on Ortelius's world map of 1570.

Both the history of knowledge (especially as it evolved from the history of science) and the history of cartography have and should become less anachronistic and less Eurocentric. Not-knowing and mapping have both been considered particularly relevant to imperialist and (pre)colonialist excursions into distant lands, for example by Mulsow.[57] Zwierlein starts his *Imperial Unknowns* claiming that "empires built ignorance," adding "and knowledge" a few lines later.[58] He dismisses the replacement of uncertain locations with empty spaces to "the narrower field of the history of cartography."[59] This special issue demonstrates that this field can and should be opened up, and that there is more to these blank spaces (see especially the article by Petter Hellstrom). Moreover, certain knowledge, or knowledge presented as certain, has reinforced dominant epistemological frameworks that privilege certain

53 Alpers, "The Mapping Impulse."
54 Zandvliet, *De Wereld*, for example, shows the importance of the larger family or the Blaeus.
55 Verburgt and Burke, "Introduction."
56 Petter Hellstrom in this volume makes a comparable claim about Enlightened ideas on and about maps.
57 Mulsow, "History of Knowledge," 169.
58 Zwierlein, *Imperial Unknowns*, 1.
59 Ibid., 2.

forms of knowledge over others. European cartography can result and has resulted in the marginalization and erasure of subaltern knowledge, as shown in the articles by Hellstrom and Giovanetti-Singh. What is considered (un)interesting and (un)certain is never neutral.

Strategies

The focus of this volume is on those instances where actors express their doubts, admit to their ignorance, profess their uncertainty. Mapmakers had, and have, many options to deal with their uncertainties. Wilcomb E. Washburn (1968) listed some of their strategies in one of the first survey articles on the cartographical representation of unknown lands.[60] The articles in this special issue expand on these possibilities, and bring them into the new (postmodern) history of cartography and into the history of knowledge. Van Duzer's article in this special issue serves as an overview of methods that early modern cartographers used. On a general level, mapmakers could add, leave out, or adjust certain elements, and all these three options were available in text and/or image. The most important graphics on maps are lines.[61] Mapmakers put lines where they know, or think, or assume, borders are. The most important lines are those between land and sea, designating continents. Especially in early modern times, the largest uncertainties were found on the smallest—that is, global and continental—scale. The delineated shape of continents figures most prominently in the articles of Van Duzer and Gravon. To indicate uncertainty and a suggestion of a border, lines and colors could be vague, fuzzy, or fading (as we have seen with Moll; more examples are discussed in the articles by Hellstrom and Van Duzer).[62]

The clearest possible way of demonstrating uncertainty is to leave out (coast)lines entirely. Of course, mapmakers knew there had to be some coast, as they knew continents existed, but they did not know exactly what form they took. Leaving out unknown coastlines when charting oceans was a usual practice for hydrographers. This was commonplace in early Iberian portolan maps, and in the course of the sixteenth century this strategy became included in world maps. Elsewhere I have written about one important example of them: Joan Blaeu's enormous world map dated 1648.[63] The map has been hailed by some scholars as a very modern and even scientific endeavor, because Blaeu is said to be one of the first who did not depict an imaginary unknown or not yet known Southland. However, while his Southland may not be delineated, it is definitely there—in text: *Austrasia incognita*. Paradoxically, by leaving out the

60 Washburn, "Representation."
61 On lines, see also Ingold, *Lines*.
62 Washburn, "Representation," 17 on lines, 7 and 10 on colors.
63 Van Netten, "The New World." Blaeu, *Nova Totius Terrarum Orbis Tabula*. This map was staged in an exhibiotio I curated in the The National Maritime Museum, Amsterdam April 2017–September 2018.

coastline, Blaeu visualized his knowledge *and* his ignorance. He used the same strategy on the east coast of Nova Zembla, the whole north-west of North America, and several parts of what we now call Australia and New Zealand.

Hellstrom in his article in this volume shows how the clearance of uncertain or incorrect knowledge can happen in the midst of continents as well. Previously mapped areas of Africa were purged of unauthenticated and uncertain knowledge. Or at least this was how eighteenth-century Enlightened mapmakers and most modern historians present this leaving out of facts, as scientific progress.

Washburn asserts that mapmakers use texts when "in greatest uncertainty," the fifteenth-century Venetian *mappa mundi* by Fra Mauro being his case in point.[64] Here I can refer to Blaeu's 1648 world map as well. Below the map is a long text in Latin and French.[65] While I consider this an integral part of the map, it has never before been a subject of study. The text features several instances where Blaeu mentions knowledge that was not yet known, that is not yet known, or that is uncertain. On certain lands in the North Pole area he writes that it is not sure if they are islands or part of a continent. Furthermore, he notes there is disagreement about whether the Caspian Sea is a sea or actually a lake. The uncertainty concerning the Nordic lands is also shown on the map by omitting coastlines; regarding the Caspian Sea, on the map Blaeu does take a stance, depicting it as a lake. These interactions between text and image are worth pursuing.

Another curious strategy is to present several options of delineating (coast)lines on a single map, as Moll did with Nova Zembla. Likewise, the small inset map of the North Pole on Blaeu's world map (bottom left) does not feature exactly the same lines as occur on the main map. A comparable example on the disputed location of the Biblical place of Ophir is discussed by Van Duzer in this volume. He also demonstrates the use of known features to fill in unknown regions, a strategy named "verisimilitude" by Lois.[66]

The paradoxical practice of hiding while simultaneously demonstrating uncertainty can be discerned where mapmakers use their framing, texts, scrolls, or cartouches. They concealed their unknowns, and thus indicated their uncertainties.[67] In some cases, uncertainty is more a collective than an individual feature of cartographers, and thus recognizable only by comparing many maps of the same area (Giovanetti-Singh, Hellstrom).

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64 Washburn, "Representation," 9. On Fra Mauro also see Cattaneo, *Fra Mauro's Mappa Mundi*.

65 Joan Blaeu, *Nova Totius Terrarum Orbis Tabula* (Amsterdam [1648]). This paragraph is based on my own translation of the text.

66 Lois, "Quinta Pars."

67 See also Washburn, "Representation," 7.

Mapping Uncertain Knowledge in Present Times

A larger history of maps and uncertainty is yet to be written. As mentioned above, hitherto errors and uncertainties were mostly considered something to be overcome in the course of time. There is, however, a small set of literature on the so-called geography of uncertainty, most notably by Alessandro Ricci. These works reason from current uncertain times, and these started with modern science, early capitalism, the age of discovery, and globalism.[68] This has presumably made representations of the world (i.e., cartography) more scientific, more realistic, and above all more uncertain. Too much information has supposedly led to so-called crises of references.[69] Consequently, now we are faced with global, political-geographical, financial, and social instability, characterized by crises, chaos, and revolutions. Hence, it is concluded, we find ourselves in a general state of uncertainty.[70] Even if they probably underestimate earlier crises, chaos, and revolutions, it is interesting that these authors indicate cartography as the cause of as well as the solution to the problem of uncertainty. The canonical images in use since the sixteenth century are deemed not valid anymore. According to Ricci and Franco Salvatori, uncertain times have led to the embarrassment of cartographers, who no longer know how to represent geopolitical change and uncertainty, for example the disputed Crimean Peninsula, the aspirations for independence by Catalonia, or the presence of the Islamic State on their maps.[71] The authors demand a whole new cartography, new representations of the world.

While Ricci's work in fact deals with the present, in this special issue we investigate past mappings from the sixteenth century forward. As in Dürr's volume on ignorance, we adopt a praxeological approach, analyzing how mapmakers represented and discussed uncertain knowledge. An important, and not yet well-answered question, is whether and why uncertainty should be presented at all. Paraphrasing Monmonier, why would a mapmaker choose being frank over being effective?[72] Li delves into this issue in her article, discussing what is (not) to be gained by presenting uncertainty as a (digital) mapmaker. Her piece and the following reflection by Rombert Stapel demonstrate how twenty-first-century scholars (working on early modern [art]history) struggle with the same issues as early modern cartographers. How to present uncertainty, ignorance, and ambivalence when certain data have to be inserted? How to say "maybe" with just zeros and ones available? The literature on the digital options is too extensive to survey here.[73] The texts by Li and Stapel in this volume form an important addition to this field and to our proposed new history

68 Ricci, "Alle Origine"; Ricci, *The Geography*.
69 Salvatori and Ricci, "Quale Geografia"; cf. Blair, *Too Much to Know*.
70 Ricci, *The Geography*; Salvatore and Ricci, "Quale Geografia."
71 Salvatori and Ricci, "Quale Geografia."
72 Monmonier, "Cartography: Uncertainty," 374.
73 Already a bit outdated, but a nice summary is Monmonier, "Cartography: Uncertainty."

of mapping uncertain knowledge. More collaboration and cross-fertilization between historians of knowledge and cartography are obvious paths to take in the future, and this special issue can be considered a first step.

Bringing in the voices of current mapmakers, we bridge early modern inspiration and modern challenges. Like Ricci, we are looking for new ways of representing the world in graphic forms, though this volume is politically much less ambitious, and in general much more concrete than his publications. He rightly points out, though, that the dialogue needs to be interdisciplinary.[74]

Scholars from all kinds of disciplines make maps: medical doctors, biologists, meteorologists, archeologists, geologists, etc. Their maps influence and determine diagnoses, interventions, policies, and politics. Since most attention is focused on results, there is a large tendency of not taking into account the many uncertainties extant in the process. Various scholars in various disciplines, however, struggle with these issues. On the one hand, they are trying to overcome uncertainty, to rule out uncertainty and doubt.[75] On the other hand, they have doubts about how to present knowledge that is in itself uncertain.[76] A larger interdisciplinary debate about maps made despite vague or doubtful results, or because of doubtful results, is desirable.

Most of the maps in the disciplines mentioned above are made digitally (see footnotes below and the articles by Li and Stapel), but there are also still mapmakers who work (or at least start) with pencils on paper. One of them, Marlies Vermeulen, self-proclaimed *cartopologist*, has written an epilogue to this special issue. Vermeulen shows how mapmaking is a combination of knowledge and art. Cartopology is a contraction of cartography and anthropology, referring to its products and its methods, including the use of participant observation. In this case the cartopologist has observed not only her own mapmaking, but also historians working on mapmaking in the past. This yields an insightful view from the outside, and demonstrates once more how mapmakers can learn from historians and vice versa.

About the Author

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74 Ricci, *The Geography*.

75 Some examples: Danczak, Lea, and Murphy. *Mapping Uncertainty*; Sylvain, Anctil, and Thiffault, "Using Bias Correction."

76 Some examples: Lovejoy, "Mapping Uncertainty"; Rocchini et al., "Accounting for Uncertainty."

Competing Interests

The author has no competing interests to declare.

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