

# Preface

This *History of Cartography* was born of a belief in the importance of maps, and their underlying cartographic concepts and techniques, in the long-term development of human society and culture. Curiosity about space—no less than about the dimension of time—has reached from the familiar immediate surroundings to the wider space of the earth and its celestial context. On another plane, men and women have explored with the inward eye the shape of sacred space and the realms of fantasy and myth. As visual embodiments of these various conceptions of space, maps have deepened and expanded the consciousness of many societies. They are the primary medium for transmitting ideas and knowledge about space. As enduring works of graphic synthesis, they can play a more important role in history than do their makers. In this sense their significance transcends their artifactual value. As images they evoke complex meanings and responses and thus record more than factual information on particular events and places. Viewed in such a light, as a focus for social and cultural history, the history of cartography can be placed in its proper context, an essential part of a much wider humanistic endeavor. In number and scale, the six volumes of this *History* have been planned accordingly.

The present *History* has had to build on new foundations.<sup>1</sup> As an independent subject, the history of cartography occupies a no-man's-land among several paths of scholarship. History, geography, and bibliography, for instance, are well represented in its literature,<sup>2</sup> but the treatment of maps on their own terms is sketchy. Theoretical studies of the nature and historical importance of maps are relatively few. Even basic definitions have not been clearly formulated. As editors, therefore, we have had to turn first to the concepts carried by terms such as “cartography,” “map,” and “history of cartography,” since it is on such clarifications that the scope and content of the entire work must rest. In this Preface, therefore, we will attempt to convey our understanding of these key words.

In existing histories of cartography the current definitions of “map” and “cartography” seem to have been accepted uncritically. Their subject matter has accordingly been selected on the basis of the perceived func-

tions, areas, or periods of map production rather than on the basis of an objective definition. At most there may be a simple statement that the main area of study is geographical maps. One of the more explicit in this respect was Leo Bagrow, in his *History of Cartography*, who quoted the French mathematician J. L. Lagrange (1779): “A geographical map is a plane figure representing the surface of the earth, or part of it.”<sup>3</sup> Although Bagrow considered Lagrange’s definition “perfectly adequate” for the purposes of his book,<sup>4</sup> it is clear today that it imposed an undue restriction on the scope of the history of cartography. In recent decades, as cartography has become a more distinct field of study, a broader outlook has emerged. In 1964, for instance, the newly established British Cartographic Society clarified its own terms of reference by adopting a much more catholic definition. The society saw cartography as “the art, science and technology of making maps, together with their study as scientific documents and works of art,” and it amplified this by explaining that “in this context maps may be regarded as including all types of maps, plans, charts and sections, three-dimensional models and globes, representing the earth or any heavenly body at any scale.”

In particular cartography is concerned with all “stages of evaluation, compilation, design and draughting required to produce a new or revised map document from

1. For a fuller discussion see pp. 24–26.

2. The aims of the project are described in J. B. Harley and David Woodward, “The History of Cartography Project: A Note on Its Organization and Assumptions,” *Technical Papers*, 43d Annual Meeting, American Congress on Surveying and Mapping, March 1983, 580–89.

3. “Une carte géographique n’est autre chose qu’une figure plane qui représente la surface de la Terre, ou une de ses parties.” J. L. Lagrange, “Sur la construction des cartes géographiques,” *Nouveaux Mémoires de l’Académie Royale des Sciences et Belles-Lettres* (1779), 161–210, quotation on 161.

4. Leo Bagrow, *History of Cartography*, rev. and enl. R. A. Skelton, trans. D. L. Paisley (Cambridge: Harvard University Press; London: C. A. Watts, 1964), 22; Bagrow does, however, discuss on the same page the etymology of the word “chart” (*Karte*), which can also mean “map.” For his textbook, Gerald R. Crone, *Maps and Their Makers: An Introduction to the History of Cartography*, 2d ed. (London: Hutchinson University Library, 1962), xi, also defines the purpose of maps in relation to the “earth’s surface.”

all forms of basic data. It also includes all stages in the reproduction of maps. It encompasses the study of maps, their historical evolution, methods of cartographic presentation and map use.”<sup>5</sup>

Such a definition, when also linked to the concept of a history of communication by maps, enlarges the proper subject matter of the history of cartography, as will be made clear below.<sup>6</sup> It is significant that “all types of maps” were specifically included, as were the technical processes of mapmaking. The present *History* will survey a similarly broad field.

Another conceptual obstacle in the history of cartography has been a confusion over the meaning associated with the word “map” in different periods and cultures. In a sense the subject has become a prisoner of its own etymology. The fundamental problem is that in many ancient languages there was no exclusive word for what we now call a map. In European languages such as English, Polish, Spanish, and Portuguese, for example, the word map derives from the Late Latin word *mappa*, meaning a cloth. In most of the other European languages, the words used for map—French *carte*, Italian *carta*, Russian *karta*—derive from the Late Latin *carta*, which meant any sort of formal document. These distinctly different derivations result in ambiguities that persist to this day, since these words continue to carry more than one meaning.<sup>7</sup> In Russian, for example, the word for picture is *kartina*, and in fact in many early historical societies, those of medieval and Renaissance Europe, for instance, it was common to use words such as “picture” or “description” for what we would today call a map. Thus the apparently simple question, What is a map? raises complex problems of interpretation.<sup>8</sup> The answer varies from one period or culture to another. This issue is particularly acute for maps in early societies, but it also occasions difficulty, if not confusion, with those maps that can be regarded as a type of picture and indeed were often produced as such by painters or artists who were not specialist mapmakers.<sup>9</sup> We have not therefore assumed that the lack of vocabulary is in itself sufficient grounds for dismissing the map as a latecomer to the cultural scene. On the contrary, this volume provides ample evidence that maps existed long before they entered the historical record and before their makers and users called them maps.<sup>10</sup>

We have therefore adopted an entirely new definition of “map,” one that is neither too restrictive nor yet so general as to be meaningless. What has eventually emerged is a simple formulation:

Maps are graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world.

Such a definition reflects the fundamental concern of the *History* both with maps as artifacts and with the way maps store, communicate, and promote spatial understanding. It is also designed to free the subject from some of the more restrictive interpretations of its scope. The words “human world” (in the widest sense of man’s cosmographic surroundings) signal that the perspective of the *History* is not confined to those maps of the earth whose description constitutes so much of the existing literature. Our treatment thus naturally extends to ce-

5. *Cartographic Journal* 1 (1964): 17. One of the earlier acts of the International Cartographic Association in 1962 was to agree to set up a commission to study the standardization of technical terms. It was formally established in 1964, with national subcommittees, among which the British subcommittee adopted this definition in its *Glossary of Technical Terms in Cartography*, British National Committee for Geography (London: Royal Society, 1966). In an abbreviated form, omitting the final paragraph, it was incorporated in International Cartographic Association, *Multilingual Dictionary of Technical Terms in Cartography*, ed. E. Meynen (Wiesbaden: Franz Steiner Verlag, 1973), and to this extent at least it came to represent an international consensus about the scope of cartography. A revised edition of the *Dictionary* is in preparation.

6. For a discussion of the development of the concept that the mapping process functions as a formal system of communication, see pp. 33–36, and the references cited there.

7. P. D. A. Harvey, *The History of Topographical Maps: Symbols, Pictures and Surveys* (London: Thames and Hudson, 1980), 10. The Latin word *carta* is from the Greek χάρτι (chartes, papyrus). Harvey notes that we find a similar pattern in non-European languages. In most Indian languages the word for map derives from the Arabic *naqshah*, but other meanings attached to it include picture, general description, and even official report. In Chinese, *tu* is no less ambiguous: besides map it can also mean a drawing or diagram of any kind.

8. For a discussion of this problem in a prehistoric context see pp. 60–62. In the early literate societies of Europe and the Mediterranean the problem remains, and it is particularly difficult to resolve in archaic and classical Greek—where the two most common words for a map are *periodos* and *pinax*—as well as in Latin, where *forma* can also mean shape. To some extent the problem still exists. In Italian, for example, owing to the various meanings of *carta*, Osvaldo Baldacci invented the word *geocarta*; he has used the new word in his historical work for the past several years. In particular, it is a key word of Baldacci’s journal *Geografia*, founded in 1978 in Rome, in the same institute formerly directed by Roberto Almagià. The invention of *geocarta* is an attempt to specify the content of a *carta* (geo stands for geography) in order to avoid confusion with *carta*, a document on paper. Nevertheless, historians of cartography, as we assert in this preface, do not deal only with geographical maps.

9. Examples recur throughout the volume.

10. Mircea Eliade, *A History of Religious Ideas*, trans. Willard R. Trask (Chicago: University of Chicago Press, 1978), vol. 1, *From the Stone Age to the Eleusinian Mysteries*, 7 and n. 4, points to this problem in general in the history of culture. With maps, analogies can be drawn with other classes of objects that existed—and that are shown to exist in the archaeological record—long before the specific words for them are found in the historical record. This applies, of course, to all prehistoric objects; but from the classical period, for example, itineraries are preserved from Augustus’s time onward, yet the word *itinerarium* first occurs in Vegetius, writing after A.D. 383, and we know of no equivalent Latin word or phrase. We owe this example to O. A. W. Dilke.

restrial cartography and to the maps of imagined cosmographies. In implementing this definition we have also sought to avoid criteria specific to particular cultures based on the historical-literate experience. Consequently, discussion in this work is not confined, like Samuel Johnson's definition,<sup>11</sup> to those maps revealing a graticule of latitude and longitude. Nor do we necessarily require that they incorporate the projective, coordinate, and Euclidean geometries currently associated with maps and usually linked with systems of numeration and metrology. Many early maps did not possess these geometries, being topologically structured in relation to networks of routes, drainage systems, coastlines, or boundaries.<sup>12</sup>

Some of these points also apply to the word "cartography." This word is a neologism, coined by Manuel Francisco de Barros e Sousa, Viscount of Santarém, in the mid-nineteenth century in particular reference to the study of early maps.<sup>13</sup> The meaning of the word cartography has changed since Santarém's day. It has broadened to include the art and science of contemporary mapmaking as well as the study of early maps. On the other hand, it has also narrowed to such an extent that it is difficult to relate an interpretation of the scope of cartography, as defined for the *History*, to the realities of cartographic practice in the 1980s. The diversification of mapping techniques in recent decades has led to a tendency to divorce from cartography subjects that are nevertheless crucial to our enterprise. International practice in this respect is extremely varied: in some countries modern cartography is defined to exclude the processes of data collection in mapmaking, such as land and hydrographic surveying, aerial photography, and, most recently, remote sensing.<sup>14</sup> There are, moreover, signs that cartography itself is seeking a still narrower perspective. Suggestions have been made that the subject might be confined to those operations concerned with the design of maps or even, more radically still, solely with philosophical and theoretical foundations.<sup>15</sup> Whatever the merits of such definitions in the context of contemporary practice, they have been firmly rejected for the *History*, even though such a decision greatly increases the variety of topics, size of the literature, and diversity of methodology, and thus the problem of synthesis, particularly for the two volumes concerned with the nineteenth and twentieth centuries.

The meanings thus attached to the words "map" and "cartography" in this *History* have also led us to a specific understanding of the "history of cartography." This term too has frequently been a source of confusion. For example, for some the distinction between "history of cartography" and "historical cartography" still remains unclear.<sup>16</sup> Another problem can be anticipated. It is already clear that in the later volumes of the *History* a

distinction will have to be drawn between the history of cartography defined, on the one hand, as the history of methods of making and using maps and, on the other, as the history of the discipline of cartography in terms of its theoretical foundations, principles, and rules for

11. Samuel Johnson defines a map as "a geographical picture on which lands and seas are delineated according to the longitude and the latitude," in *A Dictionary of the English Language* (London, 1755).

12. The cartographic significance of topology as a branch of mathematics is discussed with historical examples by Naftali Kadmon, "Cartograms and Topology," *Cartographica* 19, nos. 3–4 (1982): 1–17. See also Carl B. Boyer, *A History of Mathematics* (New York: John Wiley, 1968); Klaus Mainzer, *Geschichte der Geometrie* (Mannheim: Bibliographisches Institut, 1980); or Nicolas Bourbaki, *Éléments d'histoire des mathématiques*, new ed. (Paris: Hermann, 1974).

13. The word cartography is derived from the Greek word *chartes* used in Late Greek, meaning a sheet of paper or papyrus, that is, the material on which the map was drawn in later times. See p. 12 for further documentation.

14. In fact some of these activities—surveying, photogrammetry and, in particular, remote sensing—have become increasingly independent, with their own literature and their own international organizations. On the other hand, the definition of cartography adopted by the United Nations is very broad: "Cartography is considered as the science of preparing all types of maps and charts, and includes every operation from original surveys to final printing of copies"; *Modern Cartography: Base Maps for World Needs*, document no. 1949.I.19 (New York: United Nations Department of Social Affairs, 1949), 7. It is noted in *Glossary*, 11 (note 5 above), that British practice excluded land and hydrographic surveying and photogrammetry from the field of cartography; similarly, in Austria and Germany a narrower interpretation is given to cartography: see, for example, Erik Arnberger, "Die Kartographie als Wissenschaft und ihre Beziehungen zur Geographie und Geodäsie," in *Grundsatzfragen der Kartographie* (Vienna: Österreichische Geographische Gesellschaft, 1970), 1–28; Günter Hake, *Der wissenschaftliche Standort der Kartographie*, Wissenschaftliche Arbeiten der Fachrichtung Vermessungswesen der Universität Hannover, no. 100 (Hanover, 1981), 85–89; and F. J. Ormeling, "Einige Aspekte und Tendenzen der modernen Kartographie," *Kartographische Nachrichten* 28 (1978): 90–95. The *Multilingual Dictionary* (note 5) excludes from consideration terms relating more specifically to methods and processes of surveying, photogrammetric compilation, and general printing. Remote sensing and photogrammetry now have their own equivalent dictionary: George A. Rabchevsky, ed., *Multilingual Dictionary of Remote Sensing and Photogrammetry* (Falls Church, Va.: American Society of Photogrammetry, 1983).

15. Arthur H. Robinson and Barbara Bartz Petchenik, *The Nature of Maps: Essays toward Understanding Maps and Mapping* (Chicago: University of Chicago Press, 1976), 19. Phillip C. Muehrcke, *Thematic Cartography*, Commission on College Geography Resource Paper no. 19 (Washington, D.C.: Association of American Geographers, 1972), 1.

16. These are still loosely employed as synonyms by some writers. It is now generally accepted that "historical cartography" is conveniently reserved for the practice of compiling maps in the present from historical data: for a discussion see R. A. Skelton, *Maps: A Historical Survey of Their Study and Collecting* (Chicago: University of Chicago Press, 1972), 62–63; David Woodward, "The Study of the History of Cartography: A Suggested Framework," *American Cartographer* 1, no. 2 (1974): 101–15, esp. 107–8; Michael J. Blakemore and J. B. Harley, *Concepts in the History of Cartography: A Review and Perspective*, Monograph 26, *Cartographica* 17, no. 4 (1980): 5–8.

maps and mapping procedures. Setting aside such complications, the definitions adopted for the *History* are thus not an attempt to cater to every major (still less minor) cartographic event that has taken place but an effort to establish broad criteria to underpin the universal aims of the entire work. These criteria can be precisely spelled out. They involve, first, acceptance of a catholic definition of “map”; second, commitment to a discussion of the manifold technical processes that have contributed to the form and content of individual maps; third, recognition that the primary function of cartography is ultimately related to the historically unique mental ability of map-using peoples to store, articulate, and communicate concepts and facts that have a spatial dimension; and fourth, the belief that, since cartography is nothing if not a perspective on the world, a general history of cartography ought to lay the foundations, at the very least, for a world view of its own growth.<sup>17</sup> Together these four criteria summarize the basic scope of the *History of Cartography*.

The organization of the *History* arises from these principles. In planning the volumes it soon became clear that the choice of appropriate time periods, world regions, and identifiable themes would in itself considerably influence not only the choice of the cartographic events described but also the nature of the theories advanced in their interpretation. The overall framework of the *History* is simultaneously chronological and geographical. It is chronological inasmuch as both the individual volumes and their principal sections are generally organized in terms of broad time periods. It is geographical in the sense that the continents of the Old and New Worlds, the major cultural provinces within them, and specific areas of national interest are also used to structure the narrative.<sup>18</sup> In five of the six volumes, the major chronological divisions reflect those devised by Western historians.<sup>19</sup> Thus this first volume, devoted to cartography in Europe and the Mediterranean down to about 1470, is subdivided into sections for the prehistoric, ancient, and medieval periods. Subsequent volumes deal first with the cartography of Renaissance Europe and then in turn with mapping in the eighteenth, nineteenth, and twentieth centuries. In these volumes the perspective is at first European but increasingly becomes a world view corresponding to the growth of international relationships in cartography. These time periods do not avoid the limitations that beset any attempt at periodization in historical writing: by their very nature they are artificial divisions. Even so, we believe they are indispensable and unavoidable. They do provide a means by which the history of cartography can be related to the wider context of other aspects of historical change.<sup>20</sup> They allow us to view individual events within the long-term processes of their own development, and they will

eventually facilitate comparative judgments about the cartography of different ages and societies. Indeed, that such comparative judgments cannot be properly made, and that maps cannot be fully understood historically unless we recognize that they are an integral part of the simultaneous histories of art and of science as well as of the wider realms of political and social activity, emerges constantly from each volume. Accordingly, though it is possible to debate the precise meaning and exact limits of such Western terms as the Renaissance or the Enlightenment—and their relevance to all aspects of cartography will indeed be often questioned—they have been retained to help bridge the gap between the specific subject matter of the *History* and the broader context of social and cultural history necessary for its interpretation.<sup>21</sup>

17. We do this despite several distinguished precedents for confining general history to a largely European perspective. See, for example, the argument advanced for this course of action in Charles Singer et al., eds., *A History of Technology*, 7 vols. (Oxford: Clarendon Press, 1954–78), vol. 1, *From Early Times to Fall of Ancient Empires*, vi. See also J. H. Clapham and Eileen Power, *The Cambridge Economic History of Europe from the Decline of the Roman Empire*, 7 vols. (Cambridge: Cambridge University Press, 1941–78), vol. 1, *The Agrarian Life of the Middle Ages*, v, and vol. 4, *The Economy of Expanding Europe in the Sixteenth and Seventeenth Centuries*, ed. E. E. Rich and C. H. Wilson, xiii–xiv, where the “uncompromisingly European” approach was justified on the “conviction that the world-economy which resulted *was* European in incentive, in organization, and in its pre-occupations.” Although cartographic history has sometimes been written in terms of these assumptions, we have tried to preserve a balance by allowing Asian developments to be reported on their own terms.

18. It is, however, our intention to try to avoid creating, especially in later volumes, what has been described elsewhere as a mere “collection of separate national histories bound together in the same covers”: George Clark, “General Introduction: History and the Modern Historian,” in *The New Cambridge Modern History* (Cambridge: Cambridge University Press, 1957–79), vol. 1, *The Renaissance, 1493–1520*, ed. G. R. Potter, xxxv.

19. Volume two deals with the cartography of the Asian societies in their traditional periods.

20. The issues of periodization are discussed in Gordon Leff, *History and Social Theory* (University: University of Alabama Press, 1969), 130–51. See also Fritz Schalk, “Über Epoche und Historie,” part of “Studien zur Periodisierung und zum Epochebegriff,” by Hans Diller and Fritz Schalk, *Abhandlungen der Akademie der Wissenschaften und der Literatur, Mainz, Geistes- und Sozialwissenschaftliche Klasse* (1972): 150–76. The problems of periodization also feature prominently in Marxist historiography; see, for example, *A Dictionary of Marxist Thought*, ed. Tom Bottomore (Oxford: Blackwell Reference, 1983), 365–68.

21. The more extreme view of Otto Neugebauer, *The Exact Sciences in Antiquity*, 2d ed. (Providence: Brown University Press, 1957), 3, that in “the history of mathematics and astronomy the traditional division of political history into Antiquity and Middle Ages is of no significance,” for example, has not been accepted for cartography. Nor for the purposes of the general *History* have we adopted Ulrich Freitag’s interesting division of the history of cartography into eras of communication: Ulrich Freitag, “Die Zeitalter und Epochen der Kartengeschichte,” *Kartographische Nachrichten* 22 (1972): 184–91; see also Ulrich Freitag, “Zur Periodisierung der Geschichte der Kartogra-

The sequence adopted for the individual volumes has also been designed to mitigate the usual tendency to write cartographic history only as seen through European eyes. As editors, we have been all too conscious of the extent to which a deeply entrenched Eurocentricity has dominated the literature of the subject.<sup>22</sup> To redress this imbalance somewhat, volume 2 has been devoted entirely to cartography in the historical Asian societies. The fundamental links between East and West have long been expounded in the literature of the history of cartography,<sup>23</sup> but the three indigenous spheres of Asian mapping—the Islamic, the South and Southeast Asian, and the East Asian—have received very uneven treatment and have been virtually ignored in the standard histories of cartography. Thus we have particularly welcomed the opportunity to create a cartographic history corresponding to the major civilizations of Asia and structured independently of the chronologies, priorities, and values of mapping in the Western world. In so doing, we explicitly recognize that Asian cartographies, just as much as European, have been fundamental pillars of cartographic development when viewed on a world scale. A single volume cannot, of course, entirely compensate for historical imbalances in the literature, but we believe it is at least a step in the right direction.

The detailed subdivisions of the volumes are also an attempt to do justice to the great richness and variety of map genres in different cultures, to the multiplicity of uses to which they have been put, and to the complexity of the technical and social processes that underlie them. In such chapters, more localized chronologies of mapping structure each narrative, along with regional subdivisions or thematic essays where these reflect distinctive cartographic cultures. Indeed, a principal aim of the *History* is to highlight these map-using cultures. The work as a whole has been designed to emphasize the creative contribution of the mapping undertaken *within* such areas, rather than to be a mere commentary on the content of specific landmark maps that happen to show the particular region irrespective of their context or origin.<sup>24</sup> Such a distinction has not been clearly made in previous histories of cartography. It is important because it lets us spotlight the making and using of maps in their primary historical contexts rather than focusing on changes of representation divorced from cartographic process.<sup>25</sup>

Finally, we would like to comment on one aspect of the organization of the *History* as a whole. From the outset, the *History* was planned as a multi-author work. In taking this road we were aware that some might see a collaborative venture on this scale as more cumbersome than a work of individual or dual authorship. Thus Toynbee, in an attack on “synthetic histories” (which to him represented the “industrialization of historical

thought”), forcefully expressed his preference for the “works of historical literature . . . created by single minds.”<sup>26</sup> It is arguable, however, that in the present stage of the subject’s development a satisfactory general history of cartography could only with the greatest difficulty be created by a single mind. If Max Eckert could make this point in 1921, there is a much stronger basis for our concurrence today.<sup>27</sup> A project such as the *History* is achievable only through a division of labor. No single scholar with the necessary breadth of linguistic and methodological skills and subject background (and without the commonly revealed nationalistic bias) has emerged to write it alone. The risks of multiple authorship should be no greater for a general history of cartography than for existing specialist works on science, technology, astronomy, and music, or for the collective social, economic, and political histories that have inspired our present plan.<sup>28</sup>

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phie Thailand,” in *Kartenhistorisches Colloquium Bayreuth '82: Vorträge und Berichte* (Berlin: Reimer, 1983), 213–27. For a recent discussion of periodization in the history of cartography, see also Pápay Gyula, “A kartográfia történet korszakolásának módszertani kérdései,” *Geodézia és Kartográfia* 35, no. 5 (1983): 344–48.

22. See pp. 28–29.

23. Most convincingly by Joseph Needham, *Science and Civilisation in China* (Cambridge: Cambridge University Press, 1954–), vol. 3, *Mathematics and the Sciences of the Heavens and the Earth*.

24. This has been described as an approach that can “all too easily become little more than a catalogue, a set of descriptions of one map after another”; Harvey, *Topographical Maps*, 7 (note 7).

25. In the case of North America, for example, no detailed review will be provided on how its different regions were portrayed by map-makers in Berlin, London, Paris, and elsewhere; for example there will be no chapter detailing the history of the representation of California as an island. Such themes have already been extensively described, and some may here form part of the study of the mapping, or map trades, of those European countries in the appropriate volumes.

26. Arnold J. Toynbee, *A Study of History*, 12 vols. (London: Oxford University Press, 1934–[61]), 1:4–5. See also the arguments set out in E. A. Gutkind, *The International History of City Development*, 8 vols. (New York: Free Press of Glencoe, 1964–72), vol. 1, *Urban Development in Central Europe*, 10–11.

27. Max Eckert, *Die Kartenwissenschaft: Forschungen und Grundlagen zu einer Kartographie als Wissenschaft*, 2 vols. (Berlin: Walter de Gruyter, 1921–25), 1:26. “Als ein grosser Mangel ist in der geographischen Wissenschaft das Fehlen einer Geschichte der Karte und damit einer Geschichte der Kartographie empfunden worden. Sie dürfte bis auf weiteres noch kaum geschrieben werden. Die Zeit scheint noch nicht reif dazu zu sein. Es fehlen noch zu viele Vorarbeiten.” (The absence of a history of the map and hence a history of cartography has been perceived as a great shortcoming in the science of geography. It probably won’t be written in the foreseeable future. The time doesn’t seem to be ripe for it yet. Too many preliminary studies are missing. Translation by Guntram Herb, University of Wisconsin–Madison.)

28. Among the works that have especially influenced our design, the following most closely parallel our own intentions: René Taton, *Histoire générale des sciences*, 3 vols. in 4 parts (Paris: Presses Universitaires de France, 1957–64; English edition, *History of Science*, trans. A. J. Pomerans, 4 vols. (London: Thames and Hudson, 1963–66); Singer et al., *History of Technology* (note 17); and *The New*

Given the real possibility of a team of specialist scholars working toward a common goal, the concept of a general *History of Cartography* at once became feasible. It could be amply justified not only by the historical importance of maps, as already asserted, but also in view of the inadequacy of existing general works.<sup>29</sup> Equally persuasive was the urgent need to integrate an increasingly technical and analytical yet highly fragmented literature on the various types of maps. Even where genres belong together, within the same cartographic culture, they have often been treated separately. For instance, globes and other geographical instruments have been studied as independent artifacts and reported in specialized journals; celestial mapping has often been regarded as a branch of the history of astronomy rather than cartography; the history of hydrographic mapping is being drawn into the history of nautical science; and the history of thematic mapping is written about in specialist journals of the natural or social sciences. This is entirely proper from the viewpoint of those other subjects, but it does not deny that there is also an overwhelming case for reintegrating these genres into a single developmental account of the historical meaning, relevance, and significance of maps in general.

It could be said, perhaps, that the moment is never right for this kind of general synthesis. This *History* will certainly reveal its share of the gaps and imbalances in our existing knowledge. Nevertheless, it could—and should—act as a springboard for future developments in the subject as a whole. A particular aim is that it will be able to contribute, as its assumptions and research priorities are developed in line with the wider currents of ideas in the humanities and social sciences, to a strengthening of interest in the history of cartography.

Since the preliminary planning for the *History of Cartography* began in 1975, we have accumulated more scholarly debts than we can ever properly acknowledge or repay. The research foundations and other bodies that, together with a number of individuals, have given us such generous financial support have already been named separately. Their faith in our enterprise has been crucial in developing the concept of a multivolume history, and it has enabled us to build up a small organization to administer the project as a whole. Through this, we have been able to undertake essential research, to mount seminars and discussions, to carry on bibliographical checking, and to search for illustrations with a thoroughness that would have been impossible without such resources. Similar thanks must go to our own parent institutions—the Universities of Exeter and Wisconsin—who not only have provided us with basic facilities to carry on our work but have also granted generous periods of study leave since 1975 so that we could undertake research, writing, and editing.

The Newberry Library, Chicago, where David Woodward was director of the Hermon Dunlap Smith Center for the History of Cartography when the project was conceived, has continued to be its spiritual home. Its president and librarian, Lawrence W. Towner, has lovingly supported it from the very beginning. The present director of the Hermon Dunlap Smith Center for the History of Cartography at the Newberry Library, David Buisseret, has continued to welcome us to seminars and lectures and has provided accommodation for some of the *History's* editorial meetings. Likewise, the Newberry map curator, Robert Karrow, has remained a fountain of bibliographical knowledge for the project as a whole. In the matter of bibliographical research, the resources of the American Geographical Society Collection at the University of Wisconsin—Milwaukee have also proved indispensable, and we are grateful to its director, Roman Drazniowsky, and the director of libraries, William Roselle, for so helpfully smoothing the path of our many inquiries.

In a collaborative work of this nature our greatest academic indebtedness has been to our advisers and fellow authors. The members of our Editorial Advisory Board have all played far more than a nominal role, and they have greatly assisted us in the initial planning of the volumes, in the difficult task of recruiting authors, and, lately, in discussing a series of structural changes in the organization of the volumes as the scope has continued to evolve. It is with great sadness that we record that three of our most valued editorial advisers in the early years—Maria Luisa Righini Bonelli, Marcel Desombes, and Avelino Teixeira da Mota—did not live to see the publication of this first volume. On a happier note, though, we have discovered that authors can become firm friends while remaining our sternest critics. In this volume, together with other readers, they have read and commented freely on chapters other than their own, and we have no doubt that—though the final responsibility lies elsewhere—the text has benefited considerably from the advice of Michael Conzen, Catherine Delano Smith, D. R. Dicks, O. A. W. Dilke, P. D. A. Harvey, G. Malcolm Lewis, David Quinn, A. L. F. Rivet, and Arthur H. Robinson. All the authors are thanked for their stoical patience as we have wrestled with a series of editorial changes designed to bring the content of

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*Oxford History of Music*, 10 vols. (London: Oxford University Press, 1957–82). Methodologically as well as substantively we also owe a tremendous debt to the Cambridge Histories: *The Cambridge Ancient History*, orig. 12 vols. (Cambridge: Cambridge University Press, 1924–39); *The Cambridge Medieval History*, orig. 8 vols. (Cambridge: Cambridge University Press, 1911–36); *The Cambridge Modern History*, orig. 13 vols. (Cambridge: Cambridge University Press, 1902–10). Among comparable works in progress there may be noted the multivolume *General History of Astronomy* (Cambridge: Cambridge University Press, 1984–).

29. See pp. 24–26.

specific chapters in line with the broader aims of the *History* as a whole. Our personal authors' acknowledgments, like those of the other contributors, are recorded as the first footnote to each chapter.

As the *History* has grown in substance and complexity, supported by its funding, we have also been fortunate to work with staff whose efficiency and loyalty prevented the ship from foundering on the rocks of correspondence and footnotes and, in the early days at least, on the arcane mysteries of the word processor. The main office has been in Madison, and here Maureen Reilly has been a tower of strength since the formal inception of the project. For bibliographical checking and research inquiries we were extremely fortunate to have the services of a historian of science, Elaine Stroud, until June 1984. Since then the bulk of this work has been taken on by Judith Leimer, assisted by Gary Chappell, Matthew Edney, Kevin Kaufman, Chingliang Liang, and Barbara Weisman. In the design and production of the line drawings we wish to acknowledge Onno Brouwer and James Hilliard of the University of Wisconsin Cartographic Laboratory. The Inter-Library Loan Department of the University of Wisconsin Memorial Library has likewise provided essential and efficient support.

In January 1984 we were able to appoint Anne Godlewska as assistant project director, and though her main editorial responsibilities lie in future volumes, we have both benefited enormously from her enthusiasm and from having a fresh mind brought to bear on the final effort of getting volume 1 to the Press.

In Exeter, Judy Gorton and Denise Roberts have between them coped with a voluminous correspondence as well as with typing manuscripts. Among graduate students in the Department of Geography, Michael

Turner and Sarah Wilmot have provided much intelligent research assistance. In London, Francis Herbert of the Royal Geographical Society has answered numerous bibliographical queries. In their customary fashion, staff members of the British Library, in both the Map Library and the Department of Manuscripts, have assisted us greatly in our capacity both as authors and as editors.

Even a single book is a partnership between author, editor, and publisher. Given the complexity and length of the present *History*, these relationships have become an especially necessary condition of success. We feel indeed fortunate, therefore, that the University of Chicago Press had sufficient faith to take up the idea of a general history of cartography and a commitment that must have seemed, in its early days in particular, very open-ended. For his initial support and enthusiasm and for piloting our proposal toward a contract, we are especially grateful to Allen Fitchen, now director of the University of Wisconsin Press. Barbara Hanrahan, his successor at the University of Chicago Press, was equally positive and supportive. In the designing of the book and in copyediting, as in all other matters, it has been a pleasure to work with the Press.

Especially when they have families, editors cannot shut themselves away in ivory towers. As the *History* has increasingly encroached on our private lives—as it is discussed at the dinner table and the authors become household names—even our younger children sometimes sense the traumas of editorship. We should both like to thank our families for their forbearance, support, and love while we have been engaged in a seemingly endless task. Without them, especially, we would be neither writing this Preface nor contemplating five more volumes.