Maps of the 15th century

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Data de publicació: 13-06-2020

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Theme:Transforming topography

P.D.A. Harvey explores the development of world maps and portolan charts in the 15th century.

Three developments in the 15th century particularly affected the content of world maps and portolan charts. The first was the translation into Latin of Ptolemy's Geography. The second was the growth of philosophical interest in theoretical geography, in the calculation of geographical coordinates and their use in constructing maps. The third was the succession of voyages along the African coast, culminating in Bartolomeo Dias rounding the Cape of Good Hope in 1488 and presaging voyages of exploration still further afield, in the new world as well as the old. In the early 14th century Pietro Vesconte used portolan charts in constructing a world map; in the 15th century this kind of cross-fertilisation between the two sorts of map became much more common, but it was still an occasional rather than a regular occurrence. At the end of the century these two traditions of map-making were still distinct; a single general pool of geographical information and cartographic expertise was just starting to come into being, to be drawn on alike by the portolan chart makers and the compilers of world maps.

Chart of the central Mediterranean by Giacomo Giroldi

This mid-15th-century chart shows Italy with the Adriatic, Sardinia, Corsica and the north African coast; west is at the top.

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Claudius Ptolemy worked in Alexandria in the early and mid-2nd century AD and we know of him only through his writings on a variety of scientific subjects. Among these is the work known from the Arabic version of its title as the Almagest, which catalogues over 1,000 stars, defining the position of each and explaining how to construct a celestial globe. His Geography can be seen as a logical sequel. It gives the latitude and longitude of places, ideally from astronomical observation, as a basis for drawing maps of individual regions and of the whole world, and discusses possible ways of projecting the curved surface of the world on to the flat surface of a map. Ptolemy saw the world as a complete sphere, but the inhabited area only a part of it, stretching south some 16 degrees beyond the Equator, north to about the Arctic Circle, east a little beyond Malaya, and bounded on the west by the Atlantic. Although his lists locate places by their geographical coordinates it is clear that these did not all come from immediate observation but were worked out from whatever information was available, such as accounts of journeys giving distances from one place to another; this means that their appearance of great accuracy is often spurious.

Ptolemy's World map

Ptolemy himself left no surviving maps, but rather a set of texts from which his world map was reconstructed possibly over 1000 years after his death

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The oldest surviving manuscript of Ptolemy's Greek text was copied more than 1,000 years after he wrote; it dates from the late 12th or early 13th century. Enough other copies survive from the 13th and 14th centuries to show that it was – perhaps had suddenly become – a popular work in the Byzantine Greek cultural world. Some, not all, of these manuscripts include maps, and of these there are two versions. In both there is a world map, but one has 64 regional maps while the other, following Ptolemy's text more literally, has 26. These maps may or may not have been compiled by Ptolemy himself. His book gives instructions for making the maps but does not say in so many words that he has actually drawn them. They may have been constructed from the text and added to the book by a copyist at any date between Ptolemy's own time and the earliest known manuscripts. There is also some reason to suppose that the world map was constructed separately from the regional maps of either version.

Map of the Bay of Bengal from Ptolemy's Geography

From a 15th century manuscript of Ptolemy's Geography showing the Bay of Bengal with sea areas coloured yellow.

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It was a text with maps that was translated into Latin by Jacobus Angelus in about 1406 and first introduced Ptolemy's

Geography into western Europe. Its impact is shown by the number of surviving 15th-century manuscripts of the Latin version and by the succession of early printed editions. The first, at Vicenza in 1475, had no maps, but it was then published with maps at Bologna in 1477, Rome in 1478 and 1490, Ulm in 1482 and 1486, and so on. It is shown too by the way other world maps quickly assimilated elements from Ptolemy's. Thus the map copied by Pirrus de Noha about 1414 to illustrate a quite different geographical text of the Roman period, the Chorography of the 1st-century author Pomponius Mela, takes from Ptolemy its land-locked Indian Ocean, the shapes of Malaya and Sri Lanka (Taprobana) and much else. Much later in the century we see Ptolemy's influence just as clearly in the world maps of Henricus Martellus, who was working at Florence in the 1480s and 1490s. But not all world maps were affected. We see little trace of the Ptolemy maps in Andrea Bianco's world map of 1436; instead we see the portolan charts and the tradition represented by the Cotton map.

World map by Henricus Martellus

This world map of Henry Martellus shows many of the 15th-century's developments in map-making.

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In fact, although this will not have been apparent in the 15th century, the Ptolemy maps, while impressive in their detail and their scope, were not so very much more accurate than those already available in western Europe. With hindsight and a knowledge of correct coastal outlines, we can see this in their depiction of Britain. It is closer to reality than the Cotton map in the shape it gives east, south-east and north-west England, but in south-west England and Scotland the Cotton map is more accurate. Indeed, the outline of Scotland on the Ptolemy map is spectacularly wrong, with an eastern protuberance extending far towards Denmark; this feature appears on many later maps down to the 16th century so that, for instance, Scotland protrudes on to the maps of Germany with north Italy that Erhard Etzlaub published at Nuremberg probably in 1500 and in 1501. Again, the portolan charts of the early 15th century had achieved a better coastal outline of Italy than the Ptolemy map.

The importance of the Ptolemy maps does not lie in their accuracy, which people in the 15th century could not easily assess. Partly it lay in the detailed coverage of maps and text alike – they were systematic and comprehensive. But much more it lay in the merits of the method, irrespective of the accuracy of the information. Any of the geographical coordinates could be checked, however crudely, by actual observation and corrected. Ptolemy's text could be seen as a starting point for a process of correction and improvement. Moreover, by defining so many fixed points it provided a check on the accurate copying of the maps. Ptolemy's maps may – or may not – have been copied for 1,000 years before the earliest known manuscript; but insofar as the locations of the places they name accord with the lists of coordinates we know that they differ little from their prototypes. This is very different from, say, the Cotton map, where we have no fixed points, only a shape that might all too easily be distorted either by careless copying or by ill-judged attempts to edit and amend the outline; we need not doubt that the Cotton map had an ancient prototype, but we can do little more than guess how far it reproduces that prototype's actual appearance.

World map in a printed edition of Ptolemy's Geography

This world map from the edition published in 1478 illustrates the strange shape of Scotland.

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We see how the newly discovered Ptolemy stimulated new geographical work in a manuscript of the Geography that was prepared in 1427 for Cardinal Guillaume Fillastre, the aged French humanist scholar and expert in canon law. An extra regional map has been added, of Scandinavia, an area represented in Ptolemy's work only by Denmark. A corresponding section has been added to the text, listing some 130 places in Scandinavia with their coordinates, and both list and map are ascribed to the work of Claudius Clavus. A slightly later version of the written text is also known, but without a map; however, the influence of the Scandinavian map based on this revised list of coordinates has been traced in later world maps. Clavus was Danish, but he was living in Rome and his information was far from reliable. Nonetheless his map and lists are of great interest, partly as a first attempt to improve and expand the work of Ptolemy, partly because they extended mapping into an area beyond the limits of the portolan charts, an area to which world maps did less than justice.

Scientifically more respectable than Clavus's work, but probably even less influential, was the work on geographical coordinates that a small group of scholars carried out in the 1420s and 1430s at Vienna and nearby Klosterneuburg. It was part of a much larger sequence of astronomical and mathematical work, and it took as its starting point not the work of Ptolemy but the so-called Toledo tables, compiled in Arab Spain in the 11th century. Of its products there survive only a couple of diagrams plotting the positions of places on a grid of latitude and longitude, coordinate tables for constructing world maps, and fragments of a few rough sketch maps. The importance of the work lies not so much in what was achieved as in its recognition of the method's theoretical value; but theoretical value was mostly all it could have in an age when, for want of mechanical time-pieces, simple measurement on the ground – dead reckoning – was the only practicable way of measuring longitude.

However, the ideas embodied in the Ptolemy maps were carried forward by a small number of maps, drawn with latitude and longitude, to supplement the regional maps in the Geography. Some, both manuscript and printed, were included in copies of Ptolemy's work: a modern map to set beside the ancient one. Others were drawn for independent use. Most are of Italy, but alongside these we can place the two maps of Germany, one manuscript and one printed, attributed to Nicholas of Cusa, philosopher, cardinal and papal diplomat. The origins of both maps are mysterious; they were certainly produced long after Cusa's death in 1464 but may derive from a map he drew. Work on geography, geographical coordinates and maps would be in keeping with what we know of his scholarly interests and wide travels.

A portolan chart of Europe by Grazioso Benincasa

This map of Europe from 1470 shows the detailed complexity of later portolan charts.

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More immediately important for 15th-century maps than the work of theoretical geographers was the empirical knowledge gained by gradually lengthening voyages of discovery. Earlier travels had been slow to affect maps. Marco Polo's journeys in central Asia and China were made in the late 13th century, but the first map to incorporate their evidence was the Catalan atlas compiled in 1375; this is a large world map in folding form, drawn for the king of France.

Chart of the Atlantic coastline by Grazioso Benincasa

This chart from 1469 shows how little the map-makers view of north-west Europe had changed over 150 years.

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The new discoveries made in the 15th century reached the maps much quicker. In the early years of portolan charts their coastlines of north-west Europe had been rapidly extended and corrected. By about 1330 Britain had changed from the rough rectangle of the carte pisane to more or less recognisable shape, Ireland had been added and the continental coast extended from Frisia beyond Jutland, with the Danish islands and Gotland making an appearance. But there the process had stopped. It had in fact gone as far as – indeed farther than – the needs of practical navigation demanded. The regular 'Flanders voyages' of Italian galleys had begun from Genoa in the late 13th century and from Venice in the early 14th; they went each year to ports on either side of the English Channel, but further north, in the North Sea and the Baltic, trade was in the hands of the Hansa merchants. Expansion – nautical and cartographical – continued, but in a different direction: south-west to the Atlantic islands and along the west coast of Africa.

Portolan chart by Grazioso Benincasa

This chart from 1473 shows the Cape Verde islands and other new discoveries made on voyages beyond Europe; west is at the top.

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The Canaries appear on a chart three years after their discovery in 1336, but it is much harder to pinpoint the first mapping of the island groups discovered in the 15th century – Madeira, the Azores and the Cape Verde Islands. Legendary Atlantic islands, some with names later given to real ones, appear on portolan charts long before these groups are first known to have been visited. It is difficult to tell at what point reality overtook myth. On the other hand, successive advances along the African coast can be fairly easily followed on portolan charts and when, exceptionally, there is independent evidence of a chart's date there seems little time-lag between discovery and appearance on the map. Thus Cape Verde (by Dakar), reached by Dinis Dias in 1444, appears on a chart drawn in 1448 by Andrea Bianco; Bianco was an officer on a Venetian galley, and the chart was drawn at London, where a Flanders voyage must have taken him. However, it was the Portuguese who led the way in exploring the African coast, and they presumably recorded their discoveries on charts of their own – but these have not survived and the earliest known Portuguese portolan chart dates from the late 15th century. It is believed that knowledge of what was found on these voyages was in Portugal carefully guarded as a state secret, so these maps would not have been widely copied and recopied in the way that portolan charts were made in contemporary Italy and Spain.

Chart of the Aegean from the Cornaro atlas

Copy of an early 15th century chart by Nicolo Pasqualini in an atlas made for the Cornaro family of Venice at the end of the century; east is at the top.

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It was not only on portolan charts that these new discoveries were recorded. The Cape of Good Hope, reached by Bartolomeo Dias in 1488, appears on the globe made in 1492 by Martin Behaim of Nuremberg and on the world maps that Henricus Martellus drew at Florence about the same time. In the 13th century England seems to have been the centre of production – or at least the source of inspiration – for the best world maps. For most of the 15th century it was Italy that held this position, but some of the products were little different in concept, style or content from those of England two hundred years earlier. The Borgia map, engraved on iron in the early or mid-15th century and named from its later owner, presents a world outline scarcely more recognisable than the Hereford map, with a similar miscellany of information in the notes and pictures on the map surface. But in Fra Mauro's world map of 1459 we are in a new intellectual climate. Fra Mauro was a monk of Murano, near Venice, distinguished in his own time for his geographical work; his final achievement, produced with the help of Andrea Bianco, was a world map commissioned by the king of Portugal and now lost, but we have a contemporary copy that was made for the Venetian government. It is a large map, nearly 2 metres in diameter, and is covered with a mass of minute notes and other detail. But, though the change may be only in emphasis, geography has taken over. It is not just that we now have the more familiar European outline taken from the portolan charts and see the influence of the Ptolemy maps in other regions. The whole basis of the map, its raison d'être, is geographic. It is no longer a world diagram on which geographical information is simply one element among several others; it is, whatever its limitations, a map as we understand the word, in a way that the Ebstorf and Hereford maps are not.

This is an updated version of a text first published in P.D.A. Harvey, Medieval Maps, British Library, 1991.

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