



Cartography between Europe and the Islamic World 1100–1600



The Leverhulme Trust



Cartography between Europe and the Islamic World 1100–1600

September 8–9, 2014

Queen Mary University of London

Monday September 8

9.15-10.30 **Welcome and Plenary**

Emilie Savage-Smith (University of Oxford): Shared or Divergent Traditions?

Respondent: Alfred Hiatt (Queen Mary)

10.30-11.00 **Coffee**

11.00-12.15 **Session 1** Chair: Yossef Rapoport (Queen Mary)

Jean-Charles Ducène (École pratique des hautes études): The Map entitled *Geography* used by Ibn Saʿīd (13th c.) and al-ʿUmarī (d. 1348) as Source

Ramon J. Pujades i Bataller (Archivo de la Corona de Aragón): On the Proposed Arabic Roots of Hybrid Late Medieval *mappae mundi*: A Reconsideration of the Evidence.

12.15-1.00 **Lunch**

1.00-2.00 **Session 2** Chair: Alfred Hiatt (Queen Mary)

Technology and Innovation in the History of Cartography (*Pelagios*)

2.00-3.45 **Session 3** Chair: Alessandro Scafi (Warburg Institute)

Stefan Schröder (University of Helsinki): Transcultural Knowledge and Latin-Christian Cartography in the First Half of the Fourteenth Century. Impact and Function of Arabic Elements in the World Map of Pietro Vesconte.

Robin Seignobos (Université Paris-I Panthéon-Sorbonne): The Nile in Arabic and Latin Cartography (14th Century): The “Idrisian” Model and their Latin Adaptations

3.45-4.15 **Coffee**

4.15-5.30 **Session 4** Chair: Ingrid Baumgärtner (Universität Kassel)

Emmanuelle Vagnon (Laboratoire de médiévistique occidentale de Paris): The Islamic Sources of the Catalan Atlas (1375)

Piero Falchetta (Marciana National Library Venice): Influences of Islamic Geographic Knowledge in Fra' Mauro's World Map, c. 1450

5.30 **Reception**

7.30 **Conference Dinner** (invited guests and conference speakers)

Tuesday September 9

9.00-10.15 **Session 5** Chair: Alfred Hiatt (Queen Mary)

Elly Dekker (Independent Scholar): The Pair of Celestial Maps in MS Schoenberg LJS 057. A Case of Transmission from the Islamic World to Europe?

Ilana Wartenberg (University College London): Geographical Elements on the Medieval Hebrew Scientific Bookshelf

10.15-10.45 **Coffee**

10.45-12.30 **Session 6** Chair: Peter Barber (British Library)

Pnina Arad (Hebrew University of Jerusalem): Maps of the Holy Land: Objects of Devotion

Zur Shalev (University of Haifa): Geography and Orientalism: The *Cippi Hebraici* of Johann Heinrich Hottinger (1659)

Joachim Gierlichs (Qatar National Library): From Claudius Ptolemaeus to Carl Ritter: Qatar and the Gulf in Early European Maps

12.30-1.30 **Lunch**

1.30-2.45 **Session 7** Chair: Jerry Brotton (Queen Mary)

Zsolt Gyöző Török (Eötvös Loránd University): Opposite Views: Source, Audience and Cartographic Representation of the 1566 Siege of Sziget in Hungary

Marian Coman (Nicolae Iorga Romanian Academy): Turks and Sea Monsters in Renaissance Cartography

2.45-3.15 **Coffee**

3.15-4.30 **Session 8** Chair: Tony Campbell

Jeremy Ledger (University of Michigan): Geographies of Conquest: A Maghrebi Chart of the Western Mediterranean, c. 1350

Dimitris Loupis (Harvard University): Exploring the Exchange of Skill and Style in Mediterranean Nautical Cartography. Piri Reis's *Babriye* and its Sources.

4.30-5.30 **Concluding Round Table:** Comparative Approaches to the History of Cartography

Chair: Alfred Hiatt (Queen Mary)

Participants: **Yossef Rapoport (Queen Mary), Emilie Savage-Smith (Oxford), Alessandro Scafi (Warburg Institute), Hilde de Weerd (Leiden)**

ABSTRACTS

Pnina Arad (Hebrew University of Jerusalem): Maps of the Holy Land: Objects of Devotion

During the fifteenth century the map of the Holy Land came to be associated with pilgrimage, with a new trend of making such a map after completing a journey. One may think that such a map served both as a practical tool for would-be pilgrims or for recollection of a particular excursion. I suggest that the iconic nature of the Holy Land map, and not any putative practical purpose, was the reason for its association with pilgrimage and with devotion to Christ. At a time of increasing demand for contemplative visual images of the Passion, the conceptualized image of the Holy Land conveyed by the map could well have met this need.

Like the icon, which is not merely a “portrait” of a saint but a medium to approach the sacred personage, the Holy Land map provided much beyond a delineation of geography combined with biblical myth; it was a medium to penetrate the deepest mystery of faith.

The paper will discuss the devotional use of maps of the Holy Land in the fifteenth century and will relate this trend to the increasing Passion piety at that time. More specifically, the paper will concentrate on a hitherto unstudied map, made by the fifteenth-century Italian pilgrim, Gabriele Capodilista.

Marian Coman (Nicolae Iorga Romanian Academy): Turks and Sea Monsters in Renaissance Cartography

In 1530 a *hydra monstrosa* was brought from the Ottoman Empire to Venice, where it immediately became an object of interest and controversy and one of the most notorious Renaissance examples of sea-monster trade. The seven-headed monster can be admired in Conrad Gesner’s *Historia animalium*, but, to my view, even more spectacular than its physical appearance, is its provenance. The *hydra* was allegedly traded in the Ottoman Empire and sold into Christian Europe, and one cannot help but wonder how similar or different the views held by the two cultures on sea-monsters actually were. My paper aims to explore this question by analysing the sixteenth-century European and Ottoman cartography of sea-monsters within a larger cultural framework.

My approach to the topic will be from a cultural-historical point of view, as I intend to scrutinize the significance of the presence and absence of sea-monsters on maps. The only depiction of a sea-monster in Ottoman cartography is Piri Reis’s whale, influenced by the European *mappaemundi*, as he explicitly acknowledged. From a cultural viewpoint this is rather surprising, as sea-monsters are ubiquitously present in the Ottoman society, both textually, in an impressive variety of sources ranging from geographical treaties to chancery documents, as well as visually, in miniatures. This absence is even more striking considering that Cetus, a sea-monster, is usually depicted on Islamic celestial maps, while terrestrial creatures do sometimes appear on Ottoman maps (e.g. the topographical maps from *Mecmû A-I Menâzîl*).

In contrast, Renaissance European cartographers regularly depicted sea-monsters on their maps. They were continuing a medieval tradition, adding nevertheless a different element: a new location. As Chet van Duzer argued, medieval sea-monsters were placed at the edges of the known world, and for a long time the Mediterranean Sea was secure from their presence. A marine creature found its way on the 1457 Genoese world-map in the middle of the Indian Ocean, although it was supposedly living in the waters near Candia. In the sixteenth-century, sea-monsters infiltrated through the Pillars of Hercules and began to infest the Mediterranean, mostly its eastern half, and the Black Sea (e.g. on Nikolaos Sophianos’s map of Greece, a galley is desperately fighting a sea-monster; on Giacomo Gastaldi’s maps monsters rule over the Black Sea and can even be seen in the waters near Venice and on Porcacchi’s *Isolario* the marine creatures surround the most important Mediterranean Islands). I suggest that this proliferation of Mediterranean monsters is directly connected to the increasing Ottoman sea-power. In my view,

the interpretative key is Renaissance apocalyptic literature and imagery (Nanni di Viterbo, Wolfgang Aytinger, Dürer) that overtly identifies the Ottoman Empire with the sea-monster of Revelation. The main contention of my paper is that the Eastern Mediterranean sea-monsters on Renaissance maps should be read as an allusion to the, otherwise cartographically invisible, Ottoman Empire.

Elly Dekker (Independent Scholar): The Pair of Celestial Maps in MS Schoenberg LJS 057. A Case of Transmission from the Islamic World to Europe?

The pair of celestial maps in a compendium of Hebrew astronomical and astrological treatises (MS Schoenberg ljs 057, pp. 112–13), presents an intriguing puzzle in the history of celestial cartography. The compendium was written in Spain at the end of the fourteenth century. The pair of celestial maps precede an illustrated Ptolemaic star catalogue which suggests that these maps were added to serve as an illustration to the catalogue. Although produced at the same time, the maps and the catalogue may have different backgrounds, if only because the design of the constellations on the pair of maps differs significantly from the images in the catalogue. Another remarkable distinction is that the maps appear to represent the sky as it would have been observed in the middle of the tenth century whereas the star catalogue is adapted to the epoch 1391 in keeping with the date of the manuscript. The maps are clearly stemming from a tradition not related to that of the star catalogue.

The lack of stars on the present maps is reminiscent of the Greco-Roman descriptive tradition, that is a tradition in celestial cartography based on verbal descriptions of the locations of the stars. However, the format of the pair of maps, extending, respectively, from the north and south ecliptic poles to beyond the ecliptic to include the zodiacal constellations, is not known in this tradition. This particular format is eminently suited to plot the stars described in the Ptolemaic star catalogue. It is used for the pair of maps in the Österreichische Nationalbibliothek, MS 5415, f. 168r and f. 170r. Until now these Vienna maps, which are dated 1424, were believed to be the oldest of their kind but they postdate the present maps and are of no help in recovering their early history. The Schoenberg pair is in all probability a copy of an older, presumably tenth-century mathematical model. Among the feasible hypotheses is the notion that the maps may stem ultimately from an Arabic source dating from the tenth century. Maps are not known from the Arabic world but celestial globes were made from the ninth century on. The presence of such early globes in Spain is attested by two copies from the eleventh-century. The impact of an Islamic celestial globe is clear from the fact that the maps show a number of features that until now were thought to be unique to Islamic celestial globes. For the hypothesis to hold two steps are required in the transmission process, namely the conversion of a globe into a map and the adaptation of the iconography to a western, Spanish-Jewish taste. At present one can unfortunately only speculate when these steps were taken.

Jean-Charles Ducène (École pratique des hautes études): The Map entitled *Geography* used by Ibn Saʿīd (13th c.) and al-ʿUmarī (d. 1348) as Source

Many medieval Islamic maps have disappeared, however we have some useful descriptions in general treaties of geography, like the “map” named *Geography* (*Jughrâfiyâ*) which was used separately by Ibn Saʿīd (13th c.) in his geographical work and by al-ʿUmarī (d. 1348) in the introduction of his encyclopaedia. A careful reading of these books shows that one of their sources was a document designed with a particular iconography as well as some explicative captions. In both books, we notice that the iconographical document showed a special division of the earth by imaginary lines, many geographical coordinates and the description of some original topographical elements. It seems that these elements were described by Ibn Saʿīd and al-ʿUmarī as they had seen them. Particular care has been taken with the representation of the

islands of the Indian Ocean and the mountain ranges in North Africa and Asia. If the toponymy of the map partly reproduces some place-names given by previous authors as al-Kwârizmî and al-Idrîsî, there is an original toponymy for East Africa, the Indian Ocean and Asia in particular. In some cases, it is difficult to judge its realism because of the lack of sources, but in Asia we recognize place-names and ethnonyms that appeared in the 12th or in the beginning of the 13th century with the emergence of the nomadic peoples of Central Asia (Khitay and Qifchaq). Furthermore, al-'Umarî's encyclopaedia shows a circular map that some scholars related to this description and to the map designed for the caliph al-Ma'mun in the 9th century.

In this paper, I aim to clarify systematically the geographical elements given by the map described by Ibn Sa'îd and al-'Umarî, through a comparison with the maps already known, and I will eventually attempt an identification.

Piero Falchetta (Marciana National Library Venice): Influences of Islamic Geographic Knowledge in Fra' Mauro's World Map, c. 1450

The great world map drawn by the Venetian monk Fra' Mauro about 1450 is represents a remarkable act of witness of the cultural shift in geographic knowledge from the Middle Ages to the Early Modern era. One of the most significant elements of novelty introduced by Fra' Mauro in his map concerns the depiction of Africa and the Indian Ocean; actually, in these geographic areas it is possible to recognize the relevant influence of cultural elements and specific geographic details (place names etc.) coming straight or indirectly from Islamic sources and authors.

Such information was brought to Mauro by means of some religious men of the Ethiopian church, who provided him with information on, and maps of, Africa and the India Ocean: 'Because to some it will appear as a novelty that I should speak of these southern parts [of Africa], which were almost unknown to the Ancients, I will reply that this entire drawing, from Sayto upwards, I have had from those who were born there. These people are clerics who, with their own hands, drew for me these provinces and cities and rivers and mountains with their names'.

My paper is intended to analyze such elements, in order to reconnect them to their cultural sources, when possible, and to demonstrate in which measure Fra' Mauro's map was influenced by information and geographic theories coming from a different linguistic and cultural area.

The presence of some place names along the eastern African coast not registered by any western text and map, the name 'Sea of Shadows' for the oceans recurring as the *mare oscuro* and *tenebre* in Fra Mauro, the geography of Madagascar and the description of the ocean currents in that area, the name of different tribes settled in up country Africa, and many other details witness that the "Ethiopian" maps contained a great deal of information that have their roots in Islamic experience of travel, trading and navigation.

Jeremy Ledger (University of Michigan): Geographies of Conquest: A Maghrebi Chart of the Western Mediterranean, c. 1350

Medieval Islamic geography has been well studied. The wealth of extant sources has stimulated a number of critical editions, translations, and studies. The majority of these works have focused on early Muslim geography from the Near East, and have consequently relegated the Maghreb to the margins. Rather than focus, as has traditional historiography, on early medieval Near Eastern geography, this paper shifts the spotlight to the late-medieval Maghreb via a close examination of an anonymous, c. 1350 Arabic-language nautical chart drawn in the Maghreb. I focus, in particular, on this chart's relationship to contemporary "Muslim" and European geography, especially regarding how knowledge circulated among Muslim, Christian, and Jewish scholars and

non-scholars alike in the Mediterranean region and beyond. At a basic level, this paper reveals the possibility of transmission of knowledge in a world fragmented by violence and religious divisions, but more precisely, I argue that while the chart exhibits considerable influence from Mallorcan, Genoese, and Venetian charts in both its visual representation of space and toponymy, it nevertheless conveys a distinctively Maghrebi-Muslim representation of the world in part through the provenance of its materials and in part through its inclusion of toponymy that recalls Muslim rule and conquest of the Iberian Peninsula. The cartographer mapped an Islamic framework over the transmitted topography of Christian nautical charts. In addition to contributing to a little-studied aspect of Muslim geography and history, this paper offers a nuanced view of interfaith relations in a critical period of Mediterranean history, the circulation of geographical knowledge among Muslim, Christian, and Jewish inhabitants of the medieval Mediterranean, and examines ways in which cartographers could blend ancient, local, and distant knowledge in their works to construct a unique, culturally-bound representation of the world.

Dimitris Loupis (Harvard University): Exploring the Exchange of Skill and Style in Mediterranean Nautical Cartography. Piri Reis's *Babriye* and its Sources.

Piri Reis, the Ottoman cartographer of sixteenth century, is widely known for his world map that depicts America. His other work, named *Babriye*, is a voluminous maritime atlas of Mediterranean shores, ports and islands, more comprehensive than any other product of this kind produced in the Mediterranean world. It is a work that combines a variety of genres of manuals on maritime technology, navigation and sailing directions. The result is a manual of both textual and visual character unique not only in Ottoman history, but also in the Mediterranean history of Late Middle Ages and Early Modern times. As mariners had a life on board, which was shared with fellows of other ethnic groups and religions, the exchange of experiences and navigational know-how was a natural result of co-existence while sailing. Piri Reis crossed the Mediterranean sea for many years as pirate and naval officer. Being open to maritime technological developments that were taking place in the central and western areas of that sea, he gathered material, which he used together with his own observations, measurements, and charting on the spot. Both on his world map and *Babriye* he refers to cartographical and geographical sources he made use of, nevertheless there are several unrevealed, but evidently present genres of manuals behind his text or chart design. This paper explores these genres, which were defined as *isolario*, *rutter*, *portolan text*, *portolan chart*, *portolan atlas*, *nautica*, *geographia*, *mappamundi* that were in circulation among mariners in the Mediterranean compiled in several languages such as Latin, Italian, Spanish, Portuguese, Greek, Arabic, and Turkish. The resonance of these manuals in the Ottoman world and the reaction of the Ottomans towards them through Piri Reis's work displays the shared character of maritime powers of that time and space. On behalf of the Ottomans it also frames the real and practical sides of their needs, aspirations and potentials.

Stefan Schröder (University of Helsinki): Transcultural Knowledge and Latin-Christian Cartography in the First Half of the Fourteenth Century. Impact and Function of Arabic Elements in the World Map of Pietro Vesconte.

Combining knowledge from ancient and contemporary written sources with traditional and new cartographical techniques, the Genoese mapmaker Pietro Vesconte created an innovative spatial concept around 1321. Because of the significant differences for instance to the *mappaemundi* of Ebstorf, which is only a few years older, Vesconte's world map is labelled as a 'transitional map' in the history of cartography. It is part of the *Liber secretorum fideles crucis*, a call for a new crusade written by the Venetian merchant Marino Sanudo. That Vesconte based his representation also on an Arabic template like the famous round world map in al-Idrīsī's mid-12th century *Nuṣṣat al-mushīṭa fī khtirāq al-āfāq*, was suggested already in the 19th and early 20th century.

Yet the amount of the Arabic impact and its function for image and text is still not fully explored. While some researchers stated a very close connection between the maps of Vesconte and al-Idrīsī, others were more skeptical and voted only for an indirect use. The recent discovery of the *Book of Curiosity* has changed the situation even further. This cosmological work, probably written in Egypt in the 11th century and preserved in a manuscript dated to the 13th century, includes a map similar to al-Idrīsī. This evidence suggests that a map of this kind was more common in Arabic cartography as assumed. It was not necessarily an invention of al-Idrīsī himself and, therefore, Vesconte's design may not have been based only on al-Idrīsī.

My paper revisits the results of previous research and analyses the use and transformation of the Arabic elements in Vesconte's map. Firstly, I will examine the correlations between his map and the potential Arabic counterparts. Secondly, I ask how this knowledge was adapted to Latin spatial conceptions and what contradictions between different traditions had to be solved. This includes comparisons of Vesconte's map with other 'transitional maps' for instance in the *Chronologia magna* of Paulinus Minorita and in one copy of Brunetto Latini's *Livres dou tresor*. The analysis leads to the general question of the reception of Arabic knowledge in Late Medieval Latin maps. Thirdly, I will explore the relationship between the image and Sanudo's text by discussing possible functions of the Arabic elements in the Latin maps. I will argue that Sanudo included Vesconte's map not to present a more realistic representation of the world. The transcultural knowledge rather helped to visualize the strategic ideas of Sanudo's *Liber secretorum*.

Robin Seignobos (Université Paris-I Panthéon-Sorbonne): The Nile in Arabic and Latin Cartography (14th Century): The "Idrisian" Model and their Latin Adaptations

The aim of this paper is to assess the influence of Islamic cartography on the Medieval Western representations of the Nile. The main focus will be on the circular world maps ascribed to Pietro Vesconte (fl. c. 1310–1330) and inserted in Marino Sanudo's *Liber secretorum fidelium crucis*, which are amongst the few Latin maps where Islamic influences can be ascertained. The close resemblance of Vesconte's maps with those usually accompanying the mss of al-Idrīsī's *K. Nuzhat al-Mustaḡ* has been noticed for a long time, but we still lack a careful comparison of their content and features that would take into account all the witnesses known to us so far. This also includes similar maps found in other contexts such as the recently discovered *Book of Curiosities* or the often overlooked *mappamundi* inserted in the ms Bodleian Douce 319. In this paper, the discussion shall be restricted to the case study of the Nile, which offers the opportunity to address some fundamental questions concerning the relationship between Western and Islamic mapmaking traditions. Leaving aside the overall resemblance in outline, so often observed by modern scholars, a closer look at the depictions of the river in the aforementioned world maps reveals some slight but significant differences such as the absence of the three lakes at the sources of the Nile, or the lack of connection between the Egyptian Nile and Idrīsī's "Nile of the Blacks". As minor as they may appear, these differences give some insights into the ways in which Islamic maps were used and interpreted by western mapmakers and allow us to shed some light on the process of adapting an Islamic model to a western audience.

Zur Shalev (University of Haifa): Geography and Orientalism: The *Cippi Hebraici* of Johann Heinrich Hottinger (1659)

In 1659 the Swiss theologian and Orientalist Johann Heinrich Hottinger published in Heidelberg the *Cippi Hebraici* (Hebrew Tombstones). This is an annotated edition and Latin translation of a late medieval Hebrew text, *Yihus ha-Avot* (Genealogy of the Fathers), describing the Jewish sacred geography of Palestine. The richly illustrated original offers a schematic itinerary map between holy sites, leading the reader/viewer from Jericho through Hebron and Jerusalem to the Galilee and beyond the borders of Palestine. This object, at once map, icon, and pilgrimage guide, was

designed as a scroll, which might suggest some form of liturgical use. Hottinger worked with a copy he had obtained at Frankfurt. This version of the *Yihus* was brought to Europe from Safed, Palestine in the late 16th century by a Polish-born Jewish messenger, Uri Ben Simeon of Biala, who may have printed it in Venice. Hottinger provided a bilingual edition, reproduced the visual material in an alternate form, and added a wealth of annotations, in which he also employed his considerable Arabic learning.

The curious itinerary of this geographical visual/textual piece, between periods, regions, languages, religions and media, allows a consideration of two broad themes which I aim to bring up in my paper. First I would like to locate the *Cippi* within the sphere of early modern Christian Hebraism. While the religious, philological, and political aspects of Hebraism are well studied, the translation and circulation of Hebrew geographical texts in the republic of letters are not as well known. This broader context might help explain what brought a Reformed Heidelberg professor to devote his energies to this unique object. On the one hand, adoration of holy men and saints was radically opposed to Calvinist tenets. It was Catholics who at the same period were printing rich cartographic representations of apparitions, martyrologies, and shrines. On the other hand, Hebrew materials provided access to hidden truths and ultimately to a better understanding of scripture.

Secondly, Hottinger's *Cippi Hebraici* enables a close inspection of contacts between geographical traditions, Christian, Jewish, as well as Islamic. In early modern Europe, geography and cartography were in many cases inseparable from Oriental scholarship. For example, Hottinger, author of a monumental *Historia orientalis* (1651), published together with the *Cippi* two antiquarian treatises on Hebrew and Arabic numismatics and measures. The early history of the original text and its arrival in Europe also provides an opportunity to consider the migration of geographical knowledge across the Mediterranean.

The notion of translation as a cultural act is central to this investigation. I am interested in the process of turning the Hebrew *Yihus* to the Latin *Cippi* as a way of remapping the sacred topography of Palestine. I will pay particular attention to the transition of the illustrated material from the manuscript scroll to the printed treatise. It both helped to preserve the illustrations, being one of the early examples of printed facsimiles of manuscripts, and at the same time to disrupt its original unity and iconicity.

Zsolt Gyözö Török (Eötvös Loránd University): Opposite Views: Source, Audience and Cartographic Representation of the 1566 Siege of Sziget in Hungary

The representation of the Hungarian fortress of Szigetvár has a distinguished position in the history of Ottoman topographical illustration and the miniature showing the 1566 siege in Ahmed Feridun's contemporary account is probably one of the best known and most decorative examples of Turkish topographic miniatures. Celebrating Sultan Suleyman the Magnificent's victorious military campaign and, at the same time, a visual memory of the ruler who died during the siege in his camp, Feridun's view was made for an Ottoman audience. On the other hand, in the absence of visual material from Turkish sources, the miniature painters in the palace used Venetian prints for creating vivid illustrations for their historical chronicles.

The representation of Sziget in Feridun's account is closely related to the European siege views printed by Domenico Zenoi and Paolo Forlani in Venice in 1566/7. However, the Italian commercial publishers, possibly inventors of the concept of Renaissance city atlas, were actually not the sources but intermediaries of visual information. These almost simultaneously published and closely related products were actually the forerunners of a new cartographic genre, the printed city atlases.

Based on the analysis of the content of their little known and early city atlases and the comparison between Zenoi's and Forlani's prints and Italian manuscript fortification atlases we could demonstrate that the Venetian publishers acquired secret military material from Habsburg imperial sources. The fortification plans and views were transformed and annotated by the commercial printers who provided the Italian readers with visual news about the events of the Turkish wars.

Beginning in 1566, Emperor Maximilian II sought to organize a new military border zone across what had been the Kingdom of Hungary. The construction and maintenance of a two-thousand-kilometre long chain of fortifications required the extensive planning and the use of natural land barriers. The Angelini family was commissioned to undertake this grand cartographic enterprise. They responded to the challenge with exceptionally productive and original mapping activity. Along with fortification plans and city views, some of their atlases include maps, each representing a section of the border. Their highly original manuscript collections represented the beginning of a systematic military cartography in the Habsburg Empire. Based on the culture of architects and the practical organization of the work of Italian master builders, the wider context of these little known volumes was imperial court cosmography and Christian imperial ideology.

The Angelinis' project was military in nature and their manuscript plans and maps represented secrets, so they were not printed. However, their functional and decorative value was appreciated and versions were to be published. Georgius Hoefnagel based his perspective view *Javerinum vulgo Rab* (1598) on an earlier, 1566 manuscript made by Nicolo Angelini. The Angelinis were also referred to on Sambucus' 1573 map of Illyricum, and included in Abraham Ortelius's famous *Theatrum Orbis Terrarum* (1570). Some of the Angelini's views were printed in Daniel Speckle's influential treatise on fortification (1589).

Beyond these sporadic appearances, traces of the cartographic output of the Italian master builders in the service of the Habsburg imperial army apparently survived in contemporary Venetian print culture. From this context images were transferred to Ottoman Turkey and adopted for topographic miniatures. For the representation of the events of Suleyman's 1566 Hungarian campaign the same visual sources were used by Habsburg, Venetian and Ottoman cartographers. It is instructive to observe how the different audiences influenced the map makers' practice and how the decisions of the designers resulted in similar but culturally different realizations and receptions of images.

Emmanuelle Vagnon (Laboratoire de médiévistique occidentale de Paris): The Islamic Sources of the Catalan Atlas (1375)

The Catalan Atlas (Bibliothèque nationale de France, ms Espagnol 30) is one of the most famous cartographic artefacts of the Middle Ages. It was made in 1375, according to the cosmographic calendar displayed at the beginning of the manuscript, and was part of the library of King Charles V of France by 1380. It is generally attributed to the Jewish cartographer Abraham Cresques, 'master of compasses' in Majorca.

The Catalan Atlas, composed both from medieval *mappaemundi* and nautical maps, offers a well documented representation of the whole inhabited world, as it was known in 14th century Europe, from England to China. Although several studies have underlined the links between the Catalan Atlas and Marco Polo, the direct or indirect Islamic sources of the Atlas have been mainly underestimated.

This paper will analyse the oriental sources of the Catalan Atlas and will explain the position of Majorca as a center of international cultural exchanges.

Ilana Wartenberg (University College London): Geographical Elements on the Medieval Hebrew Scientific Bookshelf

In my talk I will discuss geographical information and diagrams of the *Oikoumene* found in three Hebrew scientific treatises from the 12th and the 14th centuries: *Sefer ha-Ibbur* (The Book on the Calculation of the Jewish Calendar) and *Tsurat ha-Arets* (The Shape of the Earth, A Treatise on Geography, Cosmology and Astronomy), written by the Jewish polymath Abraham bar Hiyya from 12th century Barcelona. The third tract is the monumental *Yesod 'Olam* (The Foundation of the World), a vast book which aims to teach the foundations of the Jewish calendar with all the mathematical, geographical and astronomical knowledge required for the learner. *Yesod 'Olam* was composed by the sage Isaac Israeli in 1310 in Toledo and often refers to Abraham bar Hiyya.

Both authors had a solid scientific background that derived directly from their learning of Arabic sources and contact with Muslim scholars. The geographical elements from Ptolemy's *Geographia* found in all these tracts, originate, almost with certainty, from the Arabic chain of transmission of this book and not from Greek. Not only does the content seem to have strong Arabic roots but also linguistically, we discern a strong link to the Arabic language. For example, Hebrew neologisms inspired by Arabic terminology and citations of Muslim sages.

When we examine the geographical data regarding the boundaries of the climes in Abraham bar Hiyya's texts we remark a strong variation between the texts and also within their chains of transmission. In general, there is higher numerical accuracy level in *Tsurat ha-Arets* than in *Sefer ha-Ibbur*, which is no coincidence, as I will explain. Also, the diagrams of the *Oikoumene* found in Bar Hiyya's work (in some manuscripts they are missing in spite of space that was allocated for them) we find various orientations of the maps, which reflect the different cartographical traditions in Antiquity and the Middle Ages.