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Digital Mappaemundi: Changing the Way We Work with Medieval World Maps

By Asa Simon Mittman, Arizona State University, and Martin Foys, Hood College

Are there any dog-headed *cynocephali* on the Hereford Map? If so (and indeed there are three sets), are they in the same place on the Cotton Map, the Psalter Map, and all others medieval world maps? What texts served as the source for these images? These *mappaemundi*, or maps of the world, pose such questions (and of course we might ask the same questions about cities, about biblical events or holy figures, about geographical features and landmarks) but these highly complex documents can be daunting and difficult to understand. Such challenges inspired the creation of *Digital Mappaemundi: A Resource for the Study of Medieval Maps and Geographic Texts.* This interactive digital resource will allow users to freely link between medieval world maps and the geographical texts on which they were based. Created by Martin Foys, Associate Professor of English at Hood College and Asa Simon Mittman, Senior Lecturer of Art History at Arizona State University, this resource is designed to help students and scholars alike.

Medieval mappaemundi ("maps of the world") present, literally, some of the earliest Western worldviews. Derived from classical and Biblical literature, as well as from local lore, mappaemundi reveal significant facets of the European cultures that produced them. These maps are not only geographical but also spiritual and political documents: they showcase how religion informed the worldview of those used them, and also chart medieval societies senses of their

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place in the world, as compared to the nearest neighbor or the most distant lands. The Cotton Map (British Library, Cotton Tiberius B.v, ca. 1050), for example, which is the earliest surviving detailed English world map, and reveals the Anglo-Saxon state's cultural insecurity as a remote corner of the world (graphically rendered by England's own depiction in the map) and the culture's sense of the larger world around it, as derived from local knowledge, and classical and Biblical literature. As such, this document stands as a unique testament to the cultural origins and aspirations of the nascent English state, simultaneously referring back to its past history as a Roman colony, and anticipating its own six century growth and development into a colonial empire. In effect, this thousand-year old map charts the earliest stages of the process by which an arguably insignificant ex-colony, on the margins of the world (as depicted on the map), began to explore and desire to affect the world around it—a process that, ultimately, led to the English settlement of the 'New World' and other territories around the globe.

In contrast to medieval art and literature, such maps remain relatively unknown and under-studied. This neglect is in part because the boundaries of traditional academic disciplines have not accommodated them, and in part because all of these maps are located in European collections, inaccessible to many researchers. To compound the problem of study, these maps' layers of representation encompass manifold academic fields, including geography, art, literature, history, ethnography, mythology, theology and science, as well as flatten considerable chronology onto a single two-dimensional plane. Such "thick" data, to borrow a term from New Media studies, has remained difficult to study, parse and disseminate within the limitations of print media. But cartography is a field of increasing interest in cultural studies and the humanities, with many major publications in recent years and an increase in conference sessions

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on the theme. Such maps should be accessible and of use to any scholars interested in the study of medieval culture, regardless of disciplinary affiliation.

Digital Mappaemundi will provide an entirely new mode of interaction with these complex medieval documents, allowing them to be accessed in ways not possible with traditional print sources. In essence, the project will provide a simple, intuitive user interface through which researchers of all levels can examine medieval maps, and the texts on which they were based, not only individually but relationally, thereby examining points of correlation and difference. The software will allow a user to begin with a map, a geographical text, or a search for any keywords to be found in the database, and them will be able to move fluidly between documents, tracing connections and points of difference.

The planned user interface contains a series of frames, as depicted in the mock-up in **Fig. 1.** The **Search** tab (shown selected here) is the basis for much of the functionality of the program. It allows the user to query the database for any terms or keywords that appear in any of the maps or texts, and to choose what types of documents will be included in the results (i.e texts, maps, secondary supporting materials). The list of results presents small thumbnails icons of the maps (and a generic icon for all the texts), with basic information and links to more detailed information as well as to the documents, themselves, which can be viewed in the frame to the right. Up to four documents can be simultaneously viewed here in frames-within-frames, as the larger frame dynamically splits into two, three, or four sub-frames, as additional documents are opened. The number, size and position of these frames can be adjusted as necessary.

If an image is opened in the right frame, the user has access to a standard set of navigational tools, including pan and zoom, but in addition, the program allows the user to select any inscription or visual detail (e.g. cities, bodies of water, peoples, animals, monsters,

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landmarks and depictions of historical events) on the map, and link from this not only to a transcription and translation, but also to the appearance of this feature on any of the other maps and within any of the texts in the database. Such cross-referencing simply cannot happen in
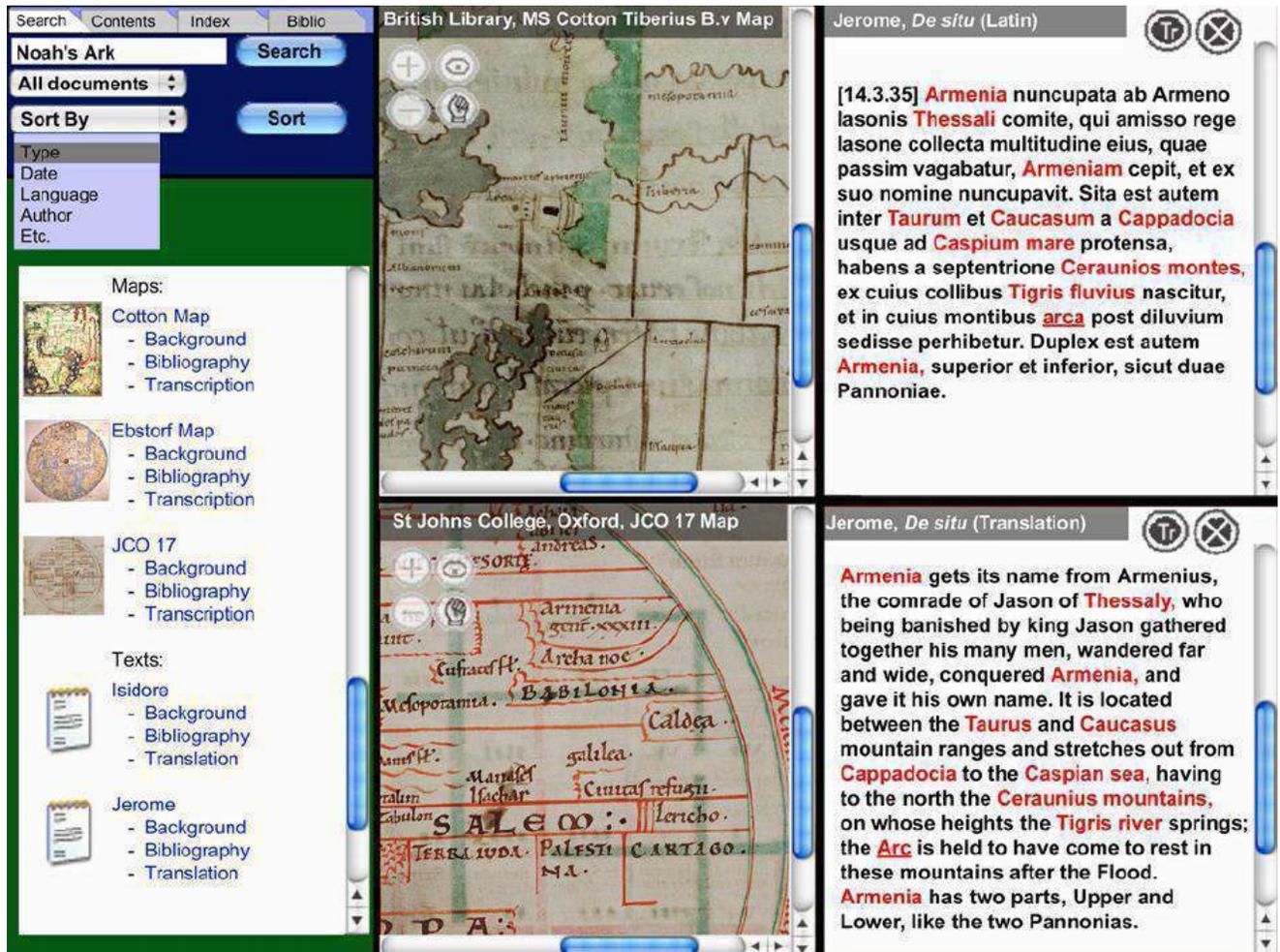

Fig. 1

traditional modes of study for such materials, and provides users the ability to swiftly identify connections and correspondences between these documents, thereby gaining a rich understanding of the role geographical texts played in the construction of medieval *mappaemundi* and also of the manner in which content of the maps relate to one another.

If a text is opened in the right frame, all tagged passages can be highlighted. Clicking on these presents the user with the same set of options. These links within and between documents

allows for a completely fluid association of texts and images which, instead of functioning as static documents, become incorporated within a complex nexus of interactive information. In traditional print sources, associations between works are by necessity linear in nature, which does not accurately represent the process of reading and interpreting images. Instead, in digital form, a researcher can proceed according to the dictates of the maps, themselves.

The functionality of this project is perhaps best illustrated through example. A researcher working on Noah's Ark could enter this in the search tab (as shown, with the option to search all document types, as opposed to searching only maps, texts or secondary materials, selected below) and among the results would be Jerome's *De Situ*, where we reads "Si quidem in montibus Ararat arca post diluvium sedisse perhibetur: et dicuntur ibidem usque hodie eius permanere vestigial." ("The ark is indeed regarded to have settled in the mountains of Ararat after the flood, and its vestiges are said to remain in that very place up to today.") With the linked passages highlighted in red, the user could click "arca" ("ark") and instantly be taken to this text and location on, for example, the Cotton Map, as shown in Fig. 1.

While this screenshot is only a conceptual mockup of the user interface, it nonetheless indicates much of the intended functionality. It shows in the left frame the search results, including Jerome's *De Situ* and the Cotton and JCO 17 Maps. The right portion of the screen is divided into four sub-frames, as if the user has already opened four documents. In the upper left frame, we see a detail of the Cotton Map, zoomed in on "Arca noe" ("Noah's Ark," with an accompanying image). Below this is the same detail on the JCO 17 Map. To the right, above we have Jerome's Latin text, and below this we see a translation into English. Clicking on the inscription or image on either map gives the user the option of viewing this same location on the other maps or in other texts.

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Function buttons appear on the texts and images. In the image frames, the buttons bearing plus and minus signs are for zooming in and out. The Eye button puts the program in rollover mode, in which the user can mouse over map details, tagged in XML, so that the content (i.e. inscription, translation, notes) will appear in a pop-up box. This feature toggles with the Hand button, which instead allows the user to grab and drag the image. In the text frames, the "**Tr**" button allows (through AJAX protocol) each section of a text to be interspersed with its original or modern English form (depending on the current display). The "**X**" Button highlights all cross-referenced passages tagged in XML (as shown in red, here).

A user might have taken any number of paths through the documents to arrive at this screenshot. For example, a user might have selected all four documents from the search results, but also might have opened only one, and then linked from that to the other three, or from one to the next to the next. The user might begin with an image detail on the Cotton Map, link from this to the Latin Jerome text, then open the translation, and link from that to the JCO 17 Map, or alternately from the English translation of the Jerome to the Latin to the JCO 17 Map to the Cotton Map, and from there on to any number of other maps and texts in the database. The paths are not predetermined, but rather, chosen by the researcher in the process of investigating these inherently trans-disciplinary documents.

The details will be tagged in XML (extensible markup language), a programming language that allows us to associate data with particular points on the images and particular passages in the texts, so that all of the texts and images can be easily linked together. Through this unique interface, which will eventually be hosted on the Internet, we will provide access to previously inaccessible information by transcribing the texts on all of the digitized maps,

translating all materials and writing a series of critical essays, thereby facilitating research on all levels from high school students to professional scholars.

This project is significant in four ways. First, cartography is a field of increasing interest in cultural studies and the humanities, with a number of major publications in recent years and an increase in conference sessions on the theme. Second, this project is a trans-disciplinary exploration of material that is difficult to access through traditional means. Maps are both text and image, simultaneously, and need to be dealt with as such. We are developing a research tool that will facilitate the study of these complex objects by those who would come at the subject of medieval geography from either the study of images or texts. Since geography is a reflection of world view, this tool should be of use to any scholars interested in the study of medieval culture, regardless of disciplinary affiliation. Third, as all of these maps are located in European collections, many of which are inaccessible to any but the most advanced scholars, the interface would greatly expand basic access to these works. Finally, we hope that this progressive use of digital technologies will inspire other projects in the humanities to move beyond the basic model of putting books on-line.

We are now seeking funding to expand a limited prototype into a full version, and to launch it online. As we will need to raise a substantial amount, we are looking as broadly as we can, at both large grants and small donations. With proper funding, the potential of the technology of *DM* could in the future feasibly expand past medieval content, and the nature of the site could be transformed to accommodate historical maps from all periods and regions, to allow users to compare how geographic concepts change in an individual location—say, how Rome's view of its own location develops from Classical Antiquity through the Middle Ages, into the Early Modern period. *Digital Mappaemundi* hopes to lay a foundation for a future

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resource that will become a tool not only useful to those interested in the European Middle Ages, but to the growing field of Comparative Humanities, facilitating trans-disciplinary approaches to maps that will drastically alter and improve how historical maps and geographic texts are studied and used.