Final Evaluation Report on the Perseus Project Publication Model 1997-2000

Submitted to: the Fund for the Improvement of Post Secondary Education

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Gary Marchionini, Project Evaluator
University of North Carolina at Chapel Hill
march@ils.unc.edu

Ross Scaife, Principal Investigator
University of Kentucky

Greg Crane, Co-Principal Investigator
Tufts University

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1. Introduction

The Perseus Project Publication Model Project was funded by the Fund for the Improvement of Post-Secondary Education (FIPSE) for the three-year period beginning in the Fall of 1997. This project aimed to leverage the growing resources of the Perseus Digital Library and the World Wide Web (WWW) infrastructure to develop and evaluate publication models that exert broad influence throughout the humanities and that serve the immediate needs of learners at various levels. The project accomplished its work on several fronts: a) developed exemplary new materials, each reviewed and stamped with the imprimatur of an editorial board, b) established a trained body of editors who can help others develop materials of wide utility and high scholarship for this new medium, c) published standards and "style-sheets" that new authors can use as models as they create their own materials, and d) evaluated this work. This report summarizes the evaluation results.

The evaluation focused on the creation of original content and how it was accessed and used by scholars, students, and the general public. In the first year, the Stoa consortium and website were established to provide a vehicle for scholarly publication and to leverage the experience and resources of the Perseus Digital Library. In the second year, Stoa projects began to emerge as viable public resources in the humanities and policies developed in the first year were instantiated and extended in new content. In the third year, some of these Stoa materials reached maturity and themselves became the basis for extension and instruction, and the Perseus Digital Library took new directions through a new funding award that provides support for expanded content and research. This report first summarizes the resources created over the three year period, then discusses the impact these resources have had on research and learning, and concludes with reflections on the evaluation process and the ongoing development of electronic resources in academic venues. Because the Stoa consortium and the Perseus Digital Library are intimately related through content and personnel, developments in both projects are considered in turn.

2. Development of Research and Learning Resources

2.1. Creation of the Stoa Consortium

To focus community attention on issues related to electronic publication and research in the humanities, two workshops were held in the 1997-98 academic year that brought together leaders who made suggestions and lent support to the establishment of the Stoa Consortium. The first workshop titled Electronic Publishing in the History of Science was held at Tufts University on December 6-7, 1997 and discussed different publishing models and projects. Key issues raised and discussed included: quality control, including authority of object and version control; intellectual property; sustainability (persistence of the object in next-generation forms as well as project over time); technical challenges (digitization of brittle or hard-to-acquire objects [e.g., reflective surface photos], automating markup; supporting user feedback (e.g., email); providing

dynamic objects (e.g., simulations, spreadsheets); and incentives (e.g., changing the academic reward structure). These issues remain crucial challenges today but the Stoa Consortium has taken strong positions on some issues (e.g., quality control and intellectual property) and is demonstrating leadership on others (e.g., markup and technical support).

The second workshop titled Electronic Publication in Classical Studies was held at Holy Cross College on February 5-7, 1998. This workshop turned attention to the issues raised in the first workshop and debated possible approaches and solutions. The group adopted the Stoa name and made a set of tangible recommendations for formalizing the Stoa Consortium and establishing editorial policies. Candidate projects were identified and plans were made to establish a website, mailing list, and a FAQ service. The group agreed that the consortium should develop templates for submission, validate external sites (to insure interoperability; develop standards for format, persistence, and maintenance; police the standard), and develop style sheets and guides. In the months following the second workshop a set of editors was recruited and the website was established at the University of Kentucky under Ross Scaife's direction. See the 1997-98 annual report (http://ils.unc.edu/~march/perseus/Evaluation_Report_97-98.pdf) for details on the workshops, lists of participants, and the genesis of the consortium.

2.1.1. The Stoa Website

The Stoa website serves as the primary public product of the three years of FIPSE funding. Together with the Perseus Digital Library, the Stoa website provides access to high-quality electronic content, tools for manipulating and creating content, and support for scholars and learners in the humanities. The site's goals are:

a) to foster a new style of refereed scholarly publications in the humanities not only of interest to specialists but also--and just as importantly--accessible by design and choice of medium to wide public audiences;
b) to develop and refine new models for scholarly collaboration via the internet;
c) to help insure the long-term interoperability and archival availability of electronic materials; and
d) to support resolutions to copyright and other issues as they arise in the course of scholarly electronic publication.

2.1.2. Stoa Policies, Tools, and Guidelines

The website instantiates a number of policies hammered out by Stoa members. First, all materials contributed to the Stoa (published) must be peer reviewed. Peer review has long been considered one of the chief added values of scholarly publishing. The consortium leaders aim to encourage experimental forms of scholarship but insure quality through a peer review process. This was a major point of discussion and consensus at the electronic publishing workshop. A recent submission, Trajan's Column, is a good example of how original scholarship is encouraged through community support rather than rigid gatekeeping. In this case, the work was submitted and feedback given by the Stoa editors and the work was revised and added to the Stoa site. At the time of writing, the Stoa list received a suggestion about adding contextualizing information (overview photographs, maps, etc.) and list discussions are underway to give the project greater appeal to casual users.

A second policy adopted by the consortium generated even more debate at the workshops. This policy addresses intellectual property, a complex problem traditionally faced in industry (although Open Source software raises new issues there), but receiving increasing attention in academic environments as universities examine rights to course materials. The policy adopted by the consortium allows authors to retain intellectual property rights to their contributions, however, they must agree to give Stoa non-exclusive rights in perpetuity so that works that eventually build upon a creator's work do not suffer from missing links at some future time. This policy gives creators maximum control over their intellectual property while insuring community access and preservation of the content as it becomes integral to the fabric of scholarly knowledge. This important policy is worthy of longitudinal study to understand the implications of this compromise on scholarly productivity and the growth of knowledge

The Stoa consortium has also developed a number of **tools, guidelines, and templates** that facilitate electronic research and publication.

- Rob Chavez has completed a first phase of work on the Stoa Waypoint Database, which provides freely available geographic coordinates for over 2000 geographic entities associated with the ancient world. This work complements the new atlas for the Perseus DL

- Sebastian Heath has developed a cross-project search interface that allows people to search across general tools (e.g., search engines like Yahoo! and encyclopedias), 10 different bibliographies, ancient and medieval sites, and specialized humanities sites.

- Jacques A. Bailly, is leading work on a complete on-line guide to reading and appreciating Latin letters. The project will help readers of Cicero's letters by providing basic commentaries for each letter, thorough grammatical assistance, and any cultural information (from gladiators to Epicureans) necessary to understand the letter. Ancillary resources (essays, charts, diagrams, guides) on topics relating to the letters will also be included.

- Chris Blackwell early in the project provided a Microsoft Word Style Sheet that uses different colors and fonts to illustrate references, names, and Greek words. A much more ambitious path is now being tread by Anne Mahoney and David Smith who are porting the new Perseus text hopper onto the Stoa server as a publishing environment. This hopper combined with new feature extraction tools and a document conversion tool will allow less technically experienced authors to introduce their simpler html files into the system and still get the advantages of true structured markup. Distinctive interfaces for individual projects will still be possible. This is a great example of how the existence of the Stoa can lead to the generalizing of tools developed for the Perseus DL.

Four sets of guidelines have been developed that stand as important resources for humanities scholars and students who wish to develop electronic resources.

Rob Chavez developed **A Guide to Recording Handheld GPS Waypoints**. This guideline explains basic GPS technology, makes recommendations for acquiring and using the equipment,

and gives procedures for contributing GPS data to the Stoa consortium for publication. These guidelines have taken into account the Archaeology Data Service's GIS Guide to Good Practice http://ads.ahds.ac.uk/project/goodguides/g2gp.html, which promotes standard methodologies for collecting archaeological data, and the Dublin Core metadata standards.

Bruce Hartzler and Maria Daniels have contributed **A Standardized Method for Producing QTVR Panoramas**. This guide gives background on equipment, suggestions for shooting images, and procedures for creating QTVR presentations for use on the WWW.

Maria Daniels has developed **A Guide to Shooting Architecture, Monuments, Sites, and Topography**. This document describes a standardized approach to photographing archaeological or historic places and putting them on line for scholarly research. Included in this approach are the natural landscape and topography, as well as the built environment of sites and architecture, such as monuments or buildings. Though a plan for thorough photographic coverage will be unique to each place, certain standard views are generally useful. The Dublin Core metadata standards were taken into account in developing the guidelines. This document also provides some basic photography advice and instructions for contributing your digital images for web publication on the Stoa or Perseus web sites.

Anne Mahoney developed a two-part guideline titled **An Introduction to Structured Markup**. The first part provides an introduction to markup that includes a discussion of differences between SGML and HTML. The second part is one of the major contributions of the Stoa project as it provides extensive guidelines for marking up documents in SGML using TEI standards. The guidelines are detailed and are intended for Stoa collaborators, Perseus editors, and Perseus programmers. Readers should be familiar with the basic ideas of SGML. The TEI Guidelines for Electronic Text Encoding and Interchange are the basis for the markup schema described in these guidelines. Writers and editors creating a new text in electronic format will not be concerned with some of the more technical information in the document. Programmers dealing with raw output from optical scans or data entry, on the other hand, should read the hints about automatic processing. Editors doing more detailed markup on a text that has already been turned into correct SGML will have requirements intermediate between those of the other groups. Editors with little experience in SGML should experiment with simple files first.

Finally, the Stoa website itself illustrates an electronic medium of publication and communication for the humanities. The website uses typical semi-hierarchical organization for presenting content and tools (Goals; Identities, Forum, Review, Audiences, Technical, Copyright, FAQ, Options, and Projects). The site includes a discussion forum that supports threads, a frequently asked questions service, a full-text search engine, and a site statistics tool. The entire site is developed with open source software (Linux Operating System, Apache web server, Analog site statistic utility, etc).

2.1.3. Projects

Over the three years, a number of projects were proposed and many have advanced to become valuable resources in their own rights. Some of the projects were extant efforts underway by consortium members and Stoa has served as another venue for continued development and dissemination. Others were original projects inspired by the consortium. The projects represent

a diverse set of approaches to information technology in the humanities in several genres: Reference, electronic publications (with three sub genres: E-Texts, Multimedia documents, and E-journals), manifesto/meta-essays, and databases. Most of the projects fit into several genres.

Demos: Classical Athenian Democracy (Christopher Blackwell, Tom Martin, Amy Smith, Michael Arnush, et al.): This is a collaborative project with a variety of elements:
As the foundation, there will be a highly accessible and practical description of how the various institutions of Athenian democracy actually worked, with full hypertextual citation of as many primary sources as possible (many of them available via Perseus). We believe there will be wide public interest in this description alone. Other key components will be the site at Holy Cross on Democracy in the Politics of Aristotle, and the Perseus Overview of Archaic and Classical Greek History, both by Tom Martin. A series of scholarly essays of analysis and interpretation have been initiated. Demos was the focus of a special panel at the 2000 Annual Meeting of the Classical Association of the Middle West and South (April 6-8 in Knoxville TN). In addition, the team is developing an application to the NEH division of Education seeking multi-year grant support for expansion of Demos into Politeia, a three-part modular encyclopedia featuring not only Demos but also SPQR: the Roman Republic, and WeThePeople: the Classical Origins of Early American Democracy (all three interoperable with each other and Perseus and using the same technology).
Articles on Democracy to date:

Art and Iconography (Amy C. Smith)
Images of historical individuals
Images of tribal heroes
Images of personifications of political ideas

Articles Linked to Primary Sources (Christopher W. Blackwell)
Institutions
Assembly
Council
Legislation
Areopagus
Apophasis (impeachment)
Scythian Archers (police force)

Historical Figures (Christopher W. Blackwell)
Cimon
Ephialtes

Inscriptional Evidence (Michael Arnush)
List of Inscriptions to be included.

Diotima. Hypertextual Essays for Diotima: we have identified a limited (though substantial) number of topics along with some accomplished scholars to write about them for Diotima. Our goal is a set of refereed essays that would be about 8-15 pages apiece if printed, but of course we intend to enhance these essays hypertextually to the greatest possible extent with links to further

bibliography, images, texts, maps, etc., so as to make them introductory in the truest sense. Topics: Archaeology and gender, Classics and feminism, Women and ritual, Gynecology, Homer, Hesiod and Semonides, Sappho/Women Writers, Greek art, Roman family and law, Greek family and law, Egyptian women, Jewish women, Early Christian women, Ancient clothing, Greek drama, Prostitution, Amazons, Herodotean women, Women and Inscriptional evidence, Papyrology, Mythology, Late Antiquity, Widows, Roman painting, Byzantine Women.

Today, Diotima contains more than 100 essays, scores of syllabi and course materials, access to hundreds of images at related projects, an extensive bibliography, and an electronic discussion list. As Diotima has evolved its anthology of translated sources and its role as a repository for essays, book reviews, etc. have become more important. Both aspects have continued to grow significantly in recent months. Diotima is in many ways a precursor to Stoa and Diotima and Stoa continue to co-evolve.

The Suda On Line (SOL). The Suda is a massive 10th century Byzantine Greek historical encyclopedia of the ancient Mediterranean world, derived from the scholia to critical editions of canonical works and from compilations by yet earlier authors. The purpose of the Suda On Line is to open up this stronghold of information by means of a freely accessible, keyword-searchable, XML-encoded database with translations, annotations, bibliography, and automatically generated links to a number of other important electronic resources. It has recently passed the 2250-entry mark and has also added a new interface with new help facilities and much-improved searches.

Suda is being used in classics courses and new efforts are underway to extend its support. In the first case, University of Chicago Classics professor Helma Dik had the graduate students in her Greek seminar participate in the SOL throughout the spring semester of 2000. In the second case, a grant proposal to the NEH Division of Preservation and Access for multi-year funding to support continuing improvement and also generalization of the SOL infrastructure was recently submitted.

In her response to a questionnaire mailed to candidates for the presidency of the American Philological Association, Princeton Classics professor Froma Zeitlin singled out the Suda On Line project for special praise:

> "Over these last few years Classics has expanded into a full-fledged interdisciplinary field of study that has gone far beyond the focus on the traditional areas of teaching and research to propose new topics of inquiry and new approaches and methods. Communication and cross-fertilization are essential to continuing vitality. In this respect, Classics has been fortunate in perceiving very early the value of the digital revolution and the potential of the web, and through the foresight of many dedicated individuals and groups, has acquired some of the best and most useful range of resources available on the net. As interest in distance learning increases, Classics stands a good chance of gaining a high profile, as has been demonstrated already in experimental alumni courses in some university settings. But, as it is, with electronic mail and collaborative projects (**like the newly announced translation of the entire Suda on the web**) never has a sense of Classics as a universalist discipline that transcends national boundaries been stronger. The APA should do all it can ... in serving as the clearinghouse for new ideas and projects and encouraging the pooling of resources in publicizing and disseminating our many

resources and opportunities. This broader mission serves two purposes: the enhancement of scholarly engagement and achievement, on the one hand, and outreach, on the other."

Olynthus (Nick Cahill, Neel Smith). Nick Cahill is finishing a book for Yale University Press on household and city organization at Olynthus, a polis in northern Greece destroyed by Philip of Macedon in 348 BC. Olynthus is unique among Greek urban sites in that it was short-lived (most of the site occupied for less than 84 years); violently destroyed, leaving tens of thousands of artifacts on the final floors of the houses; and extensively excavated, with more than 100 houses completely or partially uncovered. The book is based in large part on a study of the architecture and finds from excavations carried out in the 1920's and 30's. Cahill explores both the "norm" and the variety of houses at a Greek city, and in issues such as neighborhoods in the city, the use of space within houses, household industry and the articulation between domestic and urban economies. The Stoa site will complement Cahill's book by giving users access to the full database of artifacts, houses and rooms, linked to a new CAD map of the site. Users will be able to learn what was found in each room, look for associations between types of artifacts, or between room types and artifacts. They will be able to plot the distribution of artifacts or rooms, or query what was found in a room through a map interface. We may be able to provide 3d models of some houses as well. This will be among the most complete electronic publications of any archaeological site. A PostGres database of all artifacts, rooms, houses, graves, installations, and activities at the site is under development. A GIS tool will allow users to plot the distribution of artifacts, room types etc. on a map of Olynthus, or to query a map for tabular information (what objects were found in this room; etc.).

Several **critical editions, translations, and essays** are also published through Stoa.

Ronald Woodley (Honorary Senior Research Fellow, Lancaster University) is producing a new edition and translation of the corpus of Latin treatises by Johannes Tinctoris (c. 1435-c. 1511) on various aspects of music notation, composition and theory. He intends to complete work on the dozen treatises one by one over the next couple of years. At present, an introduction to his life and outline of his work are available along with bibliographic resources.

Craig Gibson (Assistant Professor of Classics, University of Iowa) is preparing new translations of Libanius' hypotheses to Demosthenes. At present, four of the 57 hypotheses are translated and available through Stoa. These translations can be vetted and archived as a separate reusable corpus via the Stoa, but also added to the Perseus digital library.

Augustine's Confessions: James O'Donnell's 1992 OUP critical edition and commentary is now available on-line following TEI-conformant SGML markup by Anne Mahoney. The complete work is available in multiple interface formats (frames and no frames; from table of contents or Prolegomena).

Suetonius's Lives of the Caesars. This integrated electronic edition will contain Latin texts, English translations, and commentaries; together with links to the extensive lexical and geographical reference material available at Perseus. At present, 13 Latin texts and 18 translations (some texts have multiple translations) as well as a variety of essays and encyclopedia entries are available.

Thomas R. Martin, the Jeremiah O'Connor Professor of Classics at the College of the Holy Cross, kicked off a Stoa series on the experience and the process of humanities computing with his essay entitled "The New Rhetoric: Classics on the Web." This address was originally presented on December 28, 1997 in Chicago as part of the Presidential Panel Propagating Classics at the annual meeting of the American Philological Association. This paper has been added to the Stoa web site and was updated on October 1998. It stands as a manifesto for computing in the humanities from a senior leader in the field.

Electronic journal. *Retiarius: Commentarii Periodici Latini* The first three issues of this Latin-only, web-only journal devoted to the study of Latin written from antiquity to the present, and to publishing new texts in Latin, have now been published. The editor (Terry Tunberg) has added an associate editor of the journal, and is actively seeking partners to add to the corpus of digital neo-Latin texts. One partnering example is an alliance with Projekt Camena http://www.bib.uni-mannheim.de/public/camena/beschreib-engl.shtml - the Corpus Automatum Manhemiense Electorum Neolatinitatis Auctorum (Mannheim Digital Corpus of Selected Neo-Latin Authors).

Metis (Bruce Hartzler). This **multimedia** project provides Quick Time Virtual Reality (QTVR) panoramas for the following ancient Greek archaeological site: Acropolis (Athens); Aegina, Temple of Aphaia; Agora (Athens); Amyklai; Delphi; Karphi; Lefkandi; Mallia; Menelaion; Mycenae; Myrtos (Phournou); Myrtos (Pyrgos); Pellana; Phaistos; Sounion; Sparta; Troy; Tylissos; Vaphio; and Vasiliki. This project has direct links to Perseus materials, has been profiled in the *Chronicle of Higher Education* and accounts for large portions of the traffic volume on the Stoa site. Bruce Hartzler, who currently works in Athens for the excavations of the Athenian Agora conducted by the American School of Classical Studies, has many additional QTVR files for more sites in the works and he will be adding them to the collection as time permits.

Trajan's Column. The Stoa Consortium provided editorial support for Trajan's Column, a site for exploring the Column of Trajan as a sculptural monument. The core of the site is a searchable database of over 500 images focusing on various aspects of the design and execution of the column's sculptural decoration. These images (slides and drawings) were generated by and for sculptor Peter Rockwell, over the course of his study of Roman stone-carving practices. The aim of this site is to make these images available to the widest possible public, in a form that can contribute both to ongoing study by specialists and to enjoyment and appreciation of the monument by the general public. This is a recent original contribution to Stoa that was peer reviewed and revised on both art-historical and technical grounds (by different people). One result of this process was the addition of dynamically-generated Dublin Core metadata in the source code for every page.

In sum, the Stoa consortium has made substantial progress in assembling and linking existing humanities content and in attracting original content. It has developed important policies for intellectual property and content management and is providing useful tools to scholars and students in the humanities. The Stoa website is the primary medium for these accomplishments.

2.2. Evolution of Perseus

The Perseus Digital Library (DL) has under active development since 1987 and under conceptualization even longer. At the time of the FIPSE funding, it was ten years old and had already been established as a significant resource in humanities education. See Marchionini (www.ils.unc.edu/~march/LT/perseus_eval.pdf) for a report on the evaluation of Perseus over the 1987-2000 period.

In the three years covered by the present FIPSE funding (1997-2000), Perseus continued to grow and expanded into several new intellectual realms. This expansion took three forms: new content, new tools for access and analysis, and new funding sources. Because the Perseus Digital Library evolution is documented elsewhere and serves as a base upon which the Stoa consortium evolved, only highlights are given here.

2.2.1. New Content

Over the 1997-00 period, the Perseus DL added a substantial number of Latin texts and began expanding into other time periods by cooperating with other projects and adding materials from Shakespeare, Christopher Marlowe, and the Bolles collection of maps of London. Today, the Perseus DL includes more than 225 Gigabytes of texts, images, maps, and indexes. There are almost 300 Greek and Roman texts in Greek, Latin, or English, along with 18 secondary texts and 19 Renaissance texts. There are more than 33,000 images available through the image browser representing more than 500 coins, 1500 vases, 1400 sculptures, 180 sites, and 380 buildings—each object having a catalog card entry point. Additionally, there are three meta collections created that cut across the texts and multimedia: an encyclopedia, a narrative overview, and an atlas. The encyclopedia is accessible via hyperlink or word search from any point in the Perseus DL. The overview is a substantial essay (an electronic book) by Thomas Martin that introduces the ancient Greek world and includes hyperlinks to items in the DL. Other secondary essays focus on vase painting and Greek and Latin syntax. The atlas has gone through many changes as it moved from the CD-ROM version that included LandSat imagery and maps for pre-determined regions to the WWW version that is built upon a full geospatial database. The current WWW atlas provides access to more than one thousand physical places in the ancient world at multiple levels of resolution ranging from a global view that allows user to label bodies of water, populated places, and modern borders, to a zoomed in resolution that allows the user to display contour lines, spot elevations, and rivers.

2.2.2. New Tools

The morphological tools for analyzing Greek texts were always a core technology for Perseus. These tools have continued to evolve and new search and summary tools for language have been added. In the 1997-00 period, substantial efforts were given to creating a platform independent version of Perseus so that Wintel and well as Macintosh platforms can use the CD-ROM version of Perseus. Ongoing improvements in WWW delivery were also achieved so that images and other non-text content loads and displays quickly and efficiently. A major effort was devoted to giving users better control over the display of texts, especially the ability to use and different Greek fonts, automatic hyperlink to places and other texts, and revised navigation tools. Another major development was the implementation of the atlas on the WWW platform. This tool allows

people to zoom in and out of maps and explore a variety of spatial themes across space and time. The tools are all based on Open Source software and generalized to operate across different Perseus content (e.g., the London maps as well as ancient Greek sites) and be adapted to other projects.

2.2.3. New Funding

An important development during this period was a major grant from the Digital Libraries Initiative, Phase Two. This program is sponsored by the National Science Foundation (NSF) Digital Libraries Initiative, the National Endowment for the Humanities (NEH) Digital Library Initiative, the Defense Advanced Research Projects Agency (DARPA) Information Technology Office, the National Library of Medicine (NLM) Extramural Programs, the Library of Congress (LOC) Digital Library Initiatives, the National Aeronautics & Space Administration (NASA), and the Federal Bureau of Investigation (FBI) in partnership with the National Archives and Records Administration (NARA), the Smithsonian Institution (SI), and the Institute of Museum and Library Services (IMLS). This grant will ensure the continued development of the Perseus Digital Library, train young humanities scholars to create and work in digital venues, and extend the expertise and experience of the Perseus project to the scientific and engineering communities who are struggling with multiple languages, temporal challenges, and multimedia collections.

3. Usage and Impact

As evidenced in the section above, the goal of developing a venue for publishing digital scholarship in the humanities and establishing a base of content that can be used in educational settings has been achieved on several fronts. These developments clearly have impact on the individuals involved and the students they serve. In this section, we look beyond the growing Stoa consortium itself to other indicators of impact. The section is organized as follows: first, a summary of how the Stoa community reaches out to the broader humanities and educational communities is given; second, usages of the Stoa and Perseus websites are examined in turn to demonstrate breadth of usage and inferred impact; finally summaries of interviews and surveys of Stoa users are discussed.

3.1. Extending Community

The FIPSE principal investigators and project staff gave many talks at professional meetings and published several papers and reports over the three years of the project. These activities are important to building community as they disseminate information about the project and invite broader participation.

- A New Consortium for Electronic Publication: Adventures in Stoicism," for a panel on "The Electronic Stoa: The Future Potential (and Problems) of On-line Publishing in Classics" jointly sponsored by the American Philological Association's Committee on Computer Activities and the American Institute for Archaeology's Computer Applications and Electronic Publication Committee at the annual meeting in Washington, D.C. December 28, 1999 (HTTP://www.apaclassics.org/scripts/APA/ClTech/panel98.html) At the same session Elizabeth Vandiver of Northwestern gave a paper about the Suda On Line.

- The Suda On Line: Collaborative Web-based Translation," 32nd annual Hawaii International Conference on System Sciences (HICSS), January 5-8 1999 (http://www.stoa.org/sol/HICSS/)
- The Suda On Line: Collaborative Web-based Translation," Center for Computational Sciences Brown Bag Seminar series, January 26, 1999 (http://www.uky.edu/~scaife/suda/sol.ppt)
- The Stoa: A Consortium for Electronic Publication in the Humanities" at the annual meeting of the Classical Association for the Canadian West in Calgary, February 20, 1999 (http://www.uky.edu/~scaife/cacw.ppt)
- Ross Scaife, Raphael Finkel, William Hutton, Elizabeth Vandiver & Patrick Rourke Academic Collaboration On Line: The SOL as a Case Study, delivered at the 2000 joint annual conference of the Association for Computers and the Humanities and the Association for Literary and Linguistic Computing July 23rd at the University of Glasgow in Scotland (presentation available at http://www.stoa.org/sol/ach.ppt).
- The Stoa and Perseus are among the sponsors of a conference called Ancient Studies -- New Technology: The World Wide Web and Scholarly Research, Communication, and Publication in Ancient, Byzantine, and Medieval Studies, which will be held at Salve Regina University on 8-10 December 2000. Many people associated with the Stoa and Perseus will give presentations at this conference (details available at http://www.roman-emperors.org/wwwconf.htm).
- Ross Scaife just returned from a trip to the Center for Hellenic Studies in Washington DC, a privately-endowed residential research institute owned and operated by Harvard University (http://chs.harvard.edu/). The incoming director of the CHS, Gregory Nagy, is eager to develop a three-part program of electronic publications in close partnership with the Stoa Consortium: conversion of existing print work to hypertextual form; development of all-new, made-for-the-web publication projects; and outreach efforts. The CHS is also likely to host regular meetings meant to help foster communication and cooperation among people, groups, and projects. Finally, the CHS grants twelve year-long residential postdoc fellowships each year. In the past these fellowships have supported work on print publications; we expect that some of them in the future should be awarded to promising younger scholars working on quality electronic projects.
- In addition, Greg Crane has presented numerous talks and papers at meetings over the three years of the FIPSE projects. These include:
  - Keynote speaker at the New Tools for Teaching and Research workshop, a weeklong program for graduate students in the humanities from Princeton and Cornell, June 1998.
  - "Digital Libraries and the Humanities," Penn (March 1999)
  - "An Electronic Variorum Shakespeare," Shakespeare Association (April 1999)
  - "Electronic Publication and the Future of Humanities Scholarship" Max Planck Society special conference at Elmau (June 1999).
  - "Classics and Computing, Keynote Address," Conference on Classics and Technology, St. Anne's College, Oxford (July 1999).
  - "The Electronic Bolles Archive," London (September 1999).
  - "Perseus Project Overview," NSF Project Directors Meeting (October 1999).
  - "A Digital Library for the Humanities," the University of Kentucky at Lexington (October 1999).

- "Searching and Analyzing Greek Text," SBL/AAR (Boston November 1999).
- "The Perseus Project," Boston Library Association (Northeastern, December 1999).
- "The New Variorum Shakespeare Series in an Electronic Environment," Modern Language Association (December 1999).
- "Men in the Ancient Greek World," Museum of Fine Arts Boston (January 2000).
- "Libraries, Digital and Print," Furman University (February 2000).
- "Information as Commodity," Mellon Seminar, Furman University (February 2000).
- "Electronic Technology and Shakespearean Scholarship," Penn, (February 2000).
- Keynote speaker at the Coalition for Networked Information, Spring meeting in Washington, DC, March 2000.
- Dartmouth College Library, May 2000
- Library of Congress, May 2000
- DLI2/JISC Join Meeting, Stratford on Avon, June 2000
- CNI/JISC Meeting, Stratford on Avon, June 2000
- Electronic Cultural Atlas Initiative, London, June 2000
- Reflection and Intervention, a workshop at the Max Planck Institute for the History of Science, Berlin, June 2000.
- Joint Korean/US Workshop on the development of Digital Libraries, sponsored by the National Science Foundation, San Diego, August 2000.

3.2. Website Usage. Stoa

The Stoa website has seen continuous usage growth since its inception in the summer of 1998. Table 1 gives data from the transaction logs for the two years of operation. Figures in parentheses give values for the last seven days before these data were drawn (mid July 2000). See the Stoa web site (http://www.stoa.org/stats/outfile.html) for the complete set of site usage statistics from which these summaries were abstracted. Perhaps the most interesting number in the general summary is the 37216 different hostnames. These are unique machines and the value stands as a crude estimate of the number of different individuals that accessed the Stoa site over this period (note that a single machine in a lab may be used by many different students and the same person might use multiple machines). This suggests that Stoa has very broad reach.

Table 1. Stoa Logs Summary

Successful requests: 551,423 (19,260)
Average successful
l requests per day: 745 (2,751)
Successful requests for pages: 265,036 (10,464)
Average successful requests for pages per day: 358 (1,494)
Failed requests: 41,469 (1,456)
Redirected requests: 31,078 (850)
Distinct files requested: 21,845 (1,858)
Distinct hosts served: 37,216 (1,422)
Corrupt logfile lines: 23,283
Unwanted logfile entries: 396,077
Data transferred: 36,980 Mbytes (1,595 Mbytes)
Average data transferred per day: 51,228 kbytes (233,392 kbytes)

Figure 1 depicts the number of HTTP requests received over the July 1998-July 2000 period. Note the upward trend with usage trailing off during the summer months and picking up again as the academic year progresses. Clearly, Stoa is an education-oriented web site.

Table 2 shows access by Internet domain—a gross estimate of coverage across user populations. In the table, only domains with more than 1000 requests are listed except for the .gov and .mil domains, which are included to demonstrate access from government and military establishments. The request column gives the actual number of requests and the percentage column represents the byte percentage of fulfilled requests. More than one-quarter of the accesses come from the .edu domain (educational institutions in the US), but many of the non-US requests as well as many of the .com and .net requests undoubtedly come from faculty or students accessing the WWW through commercial Internet Service Providers. For example, more than 5% of the .com accesses came from America Online accounts. The 16% value for unresolved IP addresses (those machines that do not have a domain name but rather numeric address) include machines on campuses without specific names. Note that about one-fifth of the requests are from international domains. Within the .edu domain, 650different institutions accessed the Stoa site. These institutions range from two-year colleges and small liberal arts colleges to the largest public and private research universities.

Table 3 gives the top referring sites to the Stoa home page. Referrals are another indicator of Stoa impact because it indicated how people find the Stoa web site. The table shows the URLs of sites from which users came to Stoa more than 100 times. Clearly, people are finding the Stoa site from general search engines (e.g., google, yahoo) as well as from university sites where Stoa is used in classes. Note the large number of referrals from the Hartzler VR project, including referrals from the Chronicle of Higher Education site that did an article on his project. Also note the direct links from the Yahoo and Geocities indexes and from the commercial ancient Greece website. It is also interesting to note that Stoa is serving as an example of good digital encoding since more than 450 referrals come from the xmlinfo website.

Figure 1. Stoa Requests July 1998-July 2000.

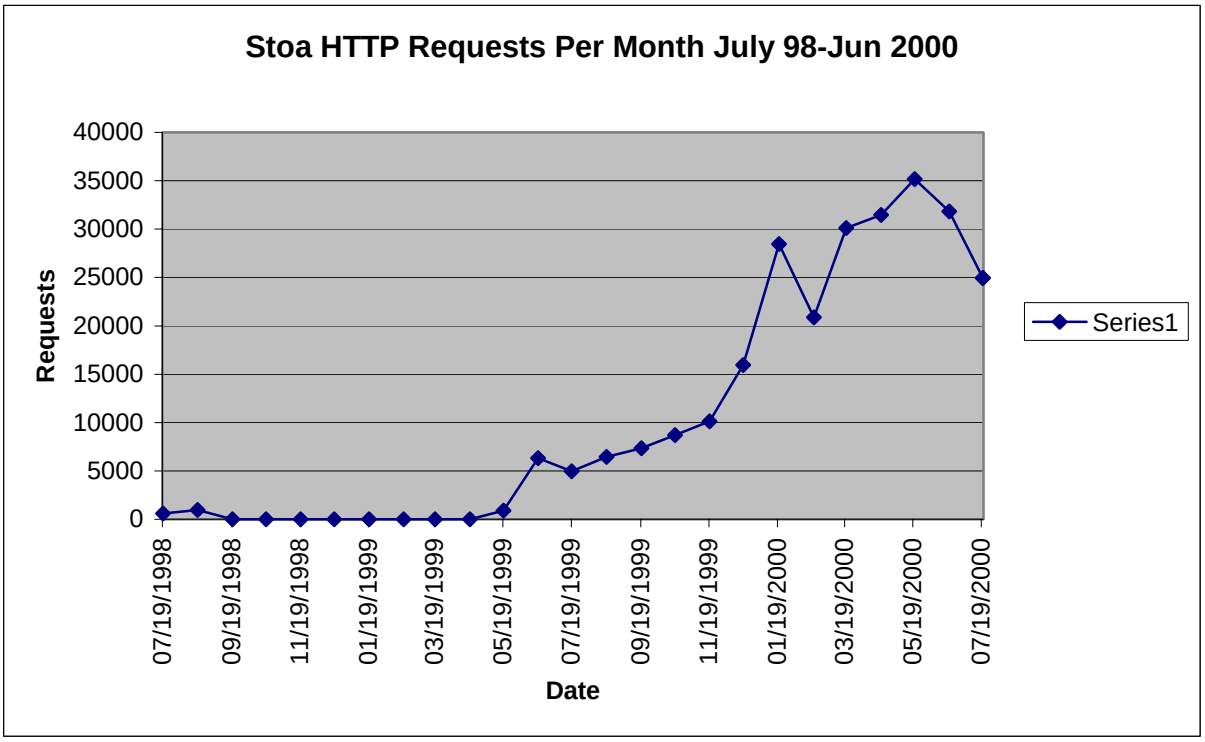

Table 2. Stoa Access by Internet Domain (Greater than 1000)

Requests	Percentage	Domain	
230685	**28.01%**	**.edu**	**(USA** Educational)
169931	11.01%	uky.edu	
1117	0.78%	nyu.edu	
4705	0.48%	tufts.edu	
10517	0.46%	wm.edu	
3950	0.31%	harvard.edu	
5750	0.29%	uchicago.edu	
2161	0.27%	umd.edu	
1315	0.26%	upenn.edu	
1216	0.21%	furman.edu	
1095	0.19%	bu.edu	
1547	0.05%	ukans.edu	
78365	**16.33%**	**.com**	**(Commercial)**
15568	5.41%	aol.com	
4202	2.64%	home.com	
1159	0.84%	rr.com	
4504	0.52%	dec.com	
8263	0.47%	googlebot.com	

4632	0.28%	inktomisearch.com
2183	0.23%	alltheweb.com
1212	0.20%	mindspring.com
1950	0.15%	ip3000.com
3574	0.14%	inktomi.com
1662	0.11%	wizard.com
5104	0.06%	northernlight.com
81968	**15.95%**	**[unresolved numerical addresses]**
70708	**15.60%**	**.net (Network)**
1959	**0.88%**	**.org (Non-Profit Making** Organisations)
4704	2.37%	.au (Australia)
7069	2.18%	.uk (United Kingdom)
9292	2.09%	.ca (Canada)
4526	1.99%	.us (United States)
3264	1.77%	.jp (Japan)
2946	1.34%	.nl (Netherlands)
6630	1.29%	.it (Italy)
5733	1.27%	.de (Germany)
6503	1.21%	.gr (Greece)
11093	1.04%	.fr (France)
4623	1.02%	.es (Spain)
2205	0.74%	.be (Belgium)
1401	0.49%	.nz (New Zealand)
1214	0.30%	.br (Brazil)
1021	0.27%	.fi (Finland)
1419	0.26%	.ch (Switzerland)
1236	0.25%	.at (Austria)
1162	0.23%	.se (Sweden)
1364	0.17%	utoronto.ca
886	0.19%	.gov (USA Government)
482	0.36%	.mil (USA (USA Military)

Table 3. Sites Referring Requests to Stoa (Greater than 100)

Referrals	Referring site
2666	//www.google.com/search
1412	//ccwf.cc.utexas.edu/~bruceh/VR/index.html
1340	//ink.yahoo.com/bin/query
1064	//ccat.sas.upenn.edu/jod/conf/
984	//dir.yahoo.com/Regional/Countries/Greece/Social_Science/Anthropology_and_Archaeology/Archaeology/
969	//ans.openarchaeology.com/cgi-bin/showobj
923	//google.netscape.com/netscape
701	//www.uky.edu/ArtsSciences/Classics/lexindex.html
674	//www.uky.edu/ArtsSciences/Classics/sol.html
670	//search.netscape.com/cgi-bin/search
170	//search.netscape.com/cgi-bin/search?search=japanese+fonts
590	//www.altavista.com/cgi-bin/query

539//web.missouri.edu/~c750802/index.html
523//ccat.sas.upenn.edu/jod/latinconf/latinconf.html
482//search.yahoo.com/bin/search
457//www.xmlinfo.com/examples/
403//search.yahoo.com/search
384//www.uky.edu/ArtsSciences/Classics/
356//www.lycos.com/cgi-bin/pursuit
336//search.aol.com/dirsearch.adp
322//infoseek.go.com/Titles
281//www.uky.edu/ArtsSciences/Classics/gender.html
280//www.ancientgreece.com/art/art.htm
279//search.excite.com/search.gw
266//www.bluffton.edu/~schlabachg/aug.htm
256//ccwf.cc.utexas.edu/~bruceh/VR/
250//www.leeds.ac.uk/classics/heath/sudabits.html
249//hotbot.lycos.com/
242//aolsearch.aol.com/dirsearch.adp
234//www.northernlight.com/nlquery.fcg
230//chronicle.com/free/v46/i39/39b01001.htm
228//search.metacrawler.com/crawler
212//www.uky.edu/ArtsSciences/Classics/retiarius/
207//www.webcrawler.com/cgi-bin/WebQuery
206//google.yahoo.com/bin/query
197//ccwf.cc.utexas.edu/~bruceh/
191//www.webtop.com/
183//www.perseus.tufts.edu/PR/hopper.ann.html
181//www.ussc.alltheweb.com/cgi-bin/search
176//search.dogpile.com/texis/search
175//www.geocities.com/Athens/Acropolis/6200/carto/liens.html
171//anglicansonline.org/
162//julen.net/ancient/Archaeology/
161//search.msn.com/spbasic.htm
149//www.uky.edu/AS/Classics/
149//www.uky.edu/~scaife/
148//www.dogpile.com/texis/search
143//sunsite.berkeley.edu/cgi-bin/searchindex
142//search.msn.com/results.asp
135//aolsearch.aol.com/cat.adp
134//www.cs.engr.uky.edu/~raphael/
131//www.uky.edu/AS/Classics/lexindex.html
129//www.hotbot.com/
128//www.perseus.tufts.edu/PR/1.2/stoa.html
127//www.ukans.edu/history/index/europe/ancient_rome/E/Roman/RomanSites*/Topics/Language_and_Literature
126//www.uky.edu/AS/Classics/artfordio.html
126//www.dartmouth.edu/~cc/about/new.html
126//units.ox.ac.uk/departments/classics/software/software.html
125//www.uky.edu/ArtsSciences/Classics/artfordio.html
124//web.missouri.edu/~c750802/aegina.html
121//classics.holycross.edu/
118//dmoz.org/Science/Social_Sciences/Language_and_Linguistics/Natural_Languages/Classical_Languages/Old

115//www.furman.edu/~cblack01/pages/sidebar.html
110//ancienthistory.about.com/education/ancienthistory/gi/dynamic/offsite.htm
110//ancienthistory.about.com/education/ancienthistory/gi/dynamic/offsite.htm?site=http
109//stoa.rch.uky.edu/sol-cgi-bin/edit_entry.pl
106//www.classics.ox.ac.uk/resources/etexts.html
106//www.univie.ac.at/latein/fachtextetext.htm
106//www.temple.edu/classics/myth_links.html
105//web1.ea.pvt.k12.pa.us/medant/info.htm
104//infoseek.go.com/
102//www.lycos.com/srch/
100//lii.org/search

3.3. Website Logs. Perseus

In the WWW environment, one of the key measures of impact (e.g., upon which advertising pricing is based) is usage statistics. From this point of view, Perseus not only stands as an important part of the humanities infrastructure but also as a significant WWW presence. The site is based at Tufts university but also has mirror sites in Oxford and Berlin to better serve the substantial European user base. Since July 1996, the Tufts site has received more than 100 million requests (110,550,034 July 6, 2000) and transmitted more than 1.2 Trillion bytes of data. The AltaVista portal listed almost 30,000 links to the Perseus home page in mid June 2000 compared to almost 56,000 for the Library of Congress home page. In addition, many commercial sites (e.g., encyclopedias) as well as hundreds of syllabi at universities and K-12 institutions around the globe link to the Perseus site.

The Perseus site received a peak of 300,000 HTTP requests per day in the spring of 2000. Figure 2 depicts the number of HTTP requests per month from July 1996 through June 2000. Note that these numbers represent page requests rather than all transfers on a page (e.g., a page with five GIFs counts as 1 request even though the transaction logs contain six HTTP requests). Note that spikes in usage recur during academic periods, illustrating its heavy use in academic institutions. The complete log summary can be found at http://tantalos.perseus.tufts.edu/Stats/hekate.html.

Table 4 summarizes requests by domain. Only domains that made more than one percent of the requests are included in the table (thus the total percent is les than 91% as the remaining requests are distributed across hundreds of domains (e.g., other countries). Over the four years, approximately 25% of the requests (more than 27 million) came from 187 countries outside the US.

Figure 2. Perseus Requests July 1996-June 2000

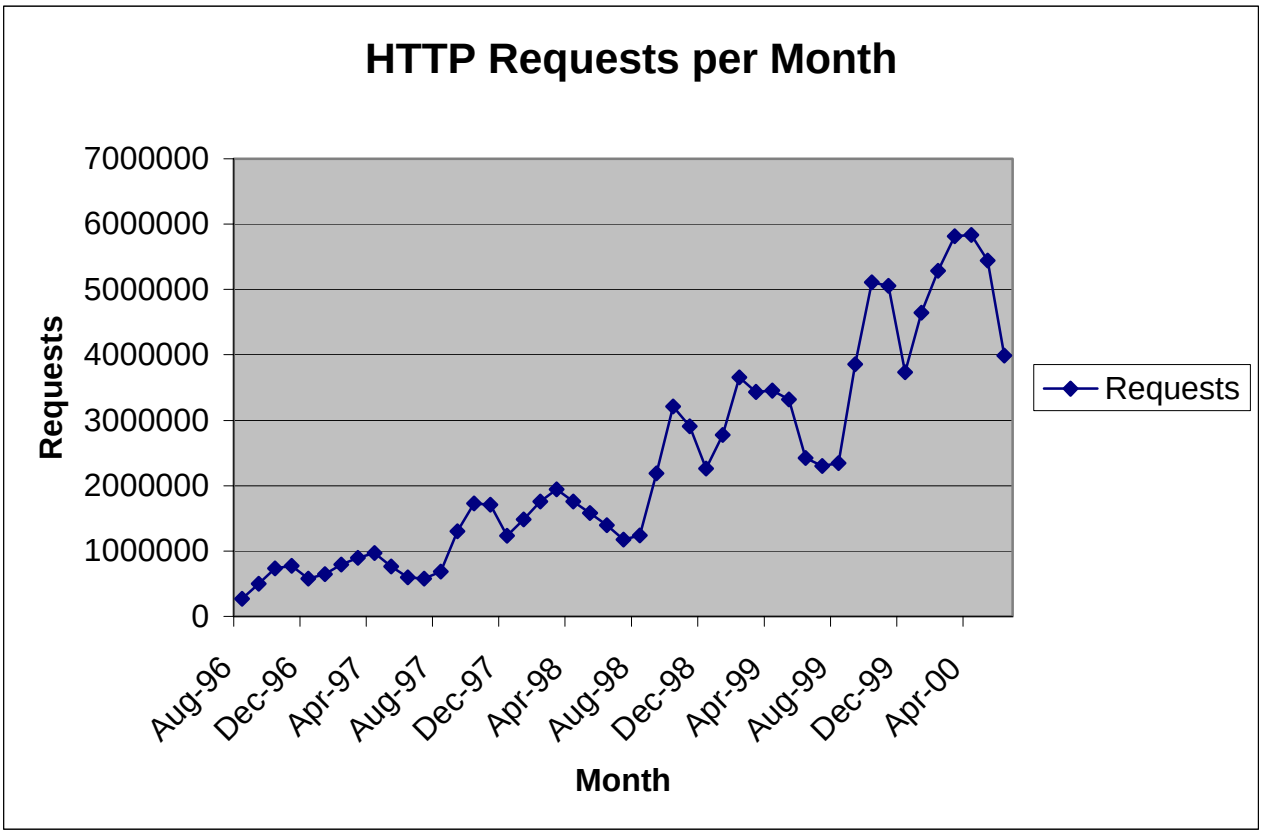

Table 4. Perseus Access by Internet Domain (Greater than 1% of Requests)

% Requests	% Bytes	Bytes	Requests	Domain
21.01	21.28	2.62484E+11	23228118	com
16.74	14.76	1.82019E+11	18501032	edu
17.22	18.28	2.25473E+11	19036427	net
1	1.08	13322981648	1109016	org
18.57	18.94	2.33542E+11	20533232	unresolved
2.06	2.54	31320559178	2273350	us
1.86	1.93	23861757244	2055295	uk
1.1	1.15	14210154835	1218255	nl
1.04	0.82	10055262986	1147296	jp
1.49	1.47	18107166173	1647017	it
1.29	1.26	15588133984	1420754	gr
1.75	1.79	22095133792	1935714	fr
1.5	1.36	16769140992	1654968	de
2.27	2.39	29467328431	2512887	ca
1.84	1.87	23091975404	2036711	au
Total	**90.74**	**90.92**	**1.12141E+12**	**100310072**

3.4. User Interviews and Questionnaires

Several approaches were taken to elicit feedback from people involved in the Stoa community and users of the Stoa and Perseus resources. A focus group interview with five principals involved in March of 1999 focused on how Stoa will affect teaching, learning, and research. This interview is detailed in the 1998-99 report (http://ils.unc.edu/~march/perseus/final_report98-99.pdf). The main themes revolved around the following ideas and issues:

- using Stoa to provide alternative models to instructors for syllabi, assignments, and materials;
- managing the large investments of time necessary to create electronic resources for courses;
- the potential of improving student critical thinking through access to primary materials;
- coping with increasingly technology-savvy students in classes;
- the potential for making the humanities more public-oriented rather than closed to the scholarly community; and
- challenges that involvement in technology applications and creating electronic publications pose to career advancement.

An online survey of Perseus users was conducted in the spring and summer of 1999. The results of the voluntary questionnaire (324 individuals responded) are given and discussed in the 1998-99 report. Beginning April 13, 1999 and continuing through December 20, 1999, the questionnaire was randomly assigned to 10% of the visitors to the Perseus DL[1]. To avoid confusing people upon accessing the home page, the questionnaire was displayed once the user took any action on the home page (e.g., followed a link). Figure 3 shows a screen dump of the questionnaire as presented to users. The user's IP address was captured and added to a file that was checked as part of the questionnaire assignment process so that the same IP address would not receive the questionnaire more than one time. If the user did not want to complete the questionnaire, they could simply skip it by pressing the submit button.

Over this period, 407,118 unique IP addresses used the Perseus DL. Thus, approximately 40,700 visitors were invited to complete the questionnaire. Of this number, 19,144 (47%) completed the questionnaire. In addition, there were 1305 voluntary respondents to the questionnaire. The differences in responses for the randomly assigned and total of random plus voluntary were not statistically significant at the .01 level so all responses are combined in the summary here.

Users were asked to characterize themselves (e.g., student, teacher, researcher), how often they use Perseus, the resources in Perseus they use, where they access Perseus (e.g., home, office, school), why they use it and how they learned about it. The survey results showed that the main audience was tertiary education (24% undergraduates, 11% graduate, and 7% college professor) with a significant portion of K-12 users (about 16%) and continuing education users (5%) also taking advantage of Perseus. One-quarter of the respondents were in the other category. This

[1] David Smith, the Perseus lead programmer implemented the randomization so that each newly seen IP caused a random number between 0 and 1 to be generated. If the number was 0.1 or below, the survey was given.

could be an indicator of a general interest in the humanities among WWW population or be partially due to casual browsing behavior on the part of WWW users. That more than one third of the respondents (37%) said they were using Perseus for personal interest suggests the former inference about non-instructional access may be more likely.

Figure 3. Survey Screen Display

Half the respondents accessed Perseus from home (54% reported using it at home during the session in which they completed the questionnaire and 48% reported using it most often at home), demonstrating a powerful trend in WWW usage and highlighting a large potential of the WWW for instruction—ubiquitous access outside the school. About one in ten (11%) of the respondents reported that they used Perseus more than once a week. This suggests that there is a community of users—a point that can be leveraged in the future through more active discussion and forum features in Perseus. It is interesting to note that texts are the primary basis of usage (40%), although images show significant usage as well (30%). It will be interesting to monitor this balance as bandwidth increases in homes. The full summary of the questionnaire data is provided in Table 5. Overall, the broad-based usage of Perseus illustrates that it is more than an educational resource but becoming a cultural artifact.

Table 5. Perseus Online Questionnaire Results

Question 1: Please identify yourself:

Other	5240	25.31%
Undergraduate	5050	24.39%
K12 Student	3213	15.52%
Graduate	2236	10.80%
[no answer]	1465	7.08%
College Professor	1461	7.06%
Continuing Education	1120	5.41%
K12 Teacher	916	4.42%

Question 2: Are you a professional classicist or classical archaeologist?

Not Professional	17383	83.97%
[no answer]	1744	8.42%
Professional	1574	7.60%

Question 3: How often do you use Perseus:

First Time	13688	66.12%
Less than once a month	1691	8.17%
[no answer]	1605	7.75%
Once a month	1439	6.95%
More than once a week	1181	5.71%
Once a week	1097	5.30%

Question 4: What areas of the Perseus Digital Library do you use (Check all that apply)

Primary Texts	8260	39.90%
Searching	6753	32.62%
Images	6125	29.59%
Encyclopedia	3752	18.12%
Phil Secondary	3698	17.86%
Atlas	3316	16.02%
Morphology	2576	12.44%
A&A Secondary	2454	11.85%
Site Plans	2280	11.01%
Catalogs	2231	10.78%
Shakespeare	1958	9.46%
Olympics	1230	5.94%
Hercules	1169	5.65%
Marlowe	1074	5.19%

Question 5: Are you using Perseus now at:

Home	11214	54.17%
School	3388	16.37%
Office	2882	13.92%
[n/a]	1862	8.99%
Library	721	3.48%
Other	634	3.06%

Question 6: Do you usually use Perseus at:

Home	9977	48.20%
School	3513	16.97%
[n/a]	3303	15.96%
Office	2161	10.44%
Other	1087	5.25%
Library	660	3.19%

Question 7: Are you using Perseus now for:

personal interest	7654	36.97%
research	4854	23.45%
homework	4436	21.43%
class	1918	9.27%
[no answer]	1838	8.88%

Question 8: How did you learn about Perseus:

Search Engine	7417	35.83%
Link	5591	27.01%
Teacher	2725	13.16%
[no answer]	1779	8.59%
Friend	1370	6.62%
Other	1289	6.23%
Publication	530	2.56%

In the 1999-2000 academic year, contributors to the Stoa project were asked to provide feedback on their experiences creating and using Stoa materials. After a number of email requests for phone interviews and a full survey failed to garner responses, a request with four general questions was sent to fourteen Stoa contributors. See Appendix A for the text of this request (Appendix B displays the full protocol created for interviews and any contributors who agreed to follow up with additional information). Six contributors responded to the general questionnaire via email. Responses are summarized below for the four questions.

Why have you decided to contribute/distribute your work to/via Stoa?

One respondent noted that his translations were too short (40 pages) for a book venue and thus appropriate for the Stoa publication model. Another noted that having his project mirrored on a well-maintained site as well as to get feedback and review were both important to his decision to contribute. A third noted that print publication takes too long and that the Stoa distribution reaches a wider audience than scholarly presses. Another respondent noted that free and open distribution as well as the advantages of electronic formats (e.g., search) were important to her decision to contribute. She noted "I am committed to free and open distribution of my academic work, and I am very frustrated by the limitations imposed by traditional book publishing: both in terms of technology (printed indexes are inferior to searchable databases, for example) and in terms of price (I cannot ask my undergraduate students to buy most university-press publications)." Another noted that it helped get others to think about electronic publishing and

the sixth noted quality or work and free access as reasons to contribute. These responses provide an interesting array of reasons ranging from content to medium to audience to economic conditions for participating in the Stoa publication model.

Who are you trying to reach? (What is your target audience?)
One respondent focused on scholars who want to make forays into related work outside their primary area of expertise, another focused on scholars and teachers, another welcomed scholars but wanted to reach all educated people, the fourth addressed the general public and students at all levels, a fifth aimed at authors, and the sixth aimed to reach educated readers and students. Thus, although other scholars and students were the main audience, there was strong support for reaching the general public with classical materials.

What resources, tools, or guidance has the Stoa community provided to help you make your contributions?
Two respondents noted that server access and programming support from the Stoa Project were highly beneficial to their projects. Another noted that importance of getting review feedback from senior scholars in the field. One noted the usefulness of the best practice guidelines and general experience of the project team. Another noted the usefulness of the discussion forum.

Have you used Stoa materials in your classes? If so, how have they influenced student learning and/or your teaching?
Five of the six respondents said that they had not yet used the materials in their classes but planned to in the near future. One respondent was using several of the Stoa projects in classes. He wrote: "I have used Metis in almost all of my classes, as background and to help my students visualize the context of the materials they are studying. I am currently using the Suda On Line project with my advanced Greek Prose seminar. I am looking forward to using Gibson's translations of Libanius the next time I teach the Greek orators, either in Greek or in translation." Although one contributor has fully adopted these electronic resources in classes, it will take some time for even the relatively technology-savvy faculty who are contributing to Stoa to incorporate the materials in their teaching.

3.5. User Support

Digital libraries and other electronic services are quickly finding that responding to questions from users is a significant challenge. Businesses have long known this and e-commerce sites are learning that they must have significant portions of their employees devoted to customer service. Frequently asked questions (FAQ) services and discussion lists and forums are a beginning but it is inevitable that those who post materials on the WWW will receive email from users. The Perseus DL webmaster received more than 6000 email messages in the past year—more than 100 per week. To cope with these messages, Lisa Cerrato, the Perseus webmaster created a database and some tools for managing messages including some automatic responses. Her report on a year's worth of email with descriptions of the tools she uses to mange this information flow is provided in Appendix C. The importance of providing this support is an important lesson to any project that plans to offer electronic publishing and information resources on a large scale.

4. Conclusions and Reflections

4.1. A note on Evaluation.

Over the past decade, a multifaceted approach to evaluation has been taken to understand the development and impact of the Perseus Project. In this approach, data is systematically collected from multiple perspectives and triangulation is used to make inferences and develop arguments about meaning and impact. This approach is based upon the belief that *evaluation* is a research process that aims to understand the meaning of some phenomenon situated in a context and the changes that take place as the phenomenon and the context interact (see Marchionini, in press for an elaboration). This same perspective was taken in assessing the Perseus Publication Model as embodied in the Stoa. The products produced by the consortium and its contributors represent one kind of evidence of progress; server transaction logs and user email stand as surrogates for user impact; and interviews and questionnaires inform understanding of participation in the consortium and impressions about impact on student learning. Taken together, the data demonstrate an emerging community that is pushing the envelope of electronic publishing and teaching in the humanities.

4.2. Summary of Results

Electronic Publishing in the Humanities.
The Stoa community has made substantial progress toward an electronic publication model on three fronts: providing a scholarly venue for electronic publishing, developing technical models and guidelines for electronic publishing, and developing a human support network.

Scholars in the humanities are looking for ways to leverage the electronic medium and the Perseus/Stoa publication model is proving to be a viable option to meet these needs. Contributors are taking advantage of the electronic medium to:

- gain faster outlet for the products of their scholarship;
- save their students, colleagues, and institutions (e.g., libraries) the high costs of paper-based publications; and
- take advantage of active, multiple media electronic venues for scholarly expression.

These are often-cited advantages for electronic publication in scientific and business domains and it is not surprising that humanities scholars are adopting these characteristics for their specialized needs. The Stoa website offers numerous examples in this regard.

In addition to leveraging the medium, contributors also discuss the potential for changing the power and reward culture in the humanities through Stoa participation. The gate keeping process is such that young scholars get rewarded with tenure and promotion and all scholars get rewarded with positive peer reviews only if the work sits within the extant paradigm of scholarship—in the case of the humanities, the gold standard is the scholarly monograph that elaborates existing knowledge and pays homage to existing work and is published by prestigious presses. The Stoa consortium gives scholars the opportunity to ‘publish’ electronic presentations, primary data sets, and innovative simulations that stand as scholarly interpretations. The fact that senior and junior scholars are contributing to Stoa and serving on the editorial board gives evidence for a broader model of reward in the humanities. This change

in the culture of scholarship may be the single most important impact of Stoa and bears watching over the years ahead.

The Stoa consortium has developed a number of standards, templates and guidelines for electronic publishing. This contribution is crucial to advancing the model as these products and tools assist scholars in the technical fundaments of doing electronic publishing and allow them to focus on the content. Given the enormous time investments necessary to develop the skills and tools for creating electronic resources, Stoa is advancing electronic publishing in much the same way that office productivity tools allowed non-programmers to use computers for daily tasks.

Finally, the Stoa consortium stands as a community of expertise that serves to answer questions, provide technical assistance, and give scholarly advice to faculty who are beginning to leverage technology for research and teaching. The principal investigators, editorial board, technical staff, and various pos docs and graduate students offer a substantial core of expertise and experience around which the larger community continues to grow.

Impact on Learning.
Many of the contributors are using their own work in their own classes as they develop their projects and a few members are using the work of others as well. Although we did not seek primary data from students, the most substantial evidence of impact comes from the transaction logs. The huge volume of usage from educational institutions demonstrates the widespread usage from educational settings. What is perhaps even more important in the long run is the substantial access from sites that are not devoted to formal education—offices and homes. It seems clear that the materials in Perseus and the Stoa are being used by people for self-directed learning and that students in formal settings are using the materials away from classrooms and campus. These developments bode well for the vibrancy of the humanities and bear ongoing investigation in the years ahead.

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Appendix A. Stoa Participant Feedback Request

Dear Stoa Project Contributor:

Stoa has been partially funded by the Fund for the Improvement of Post-Secondary Education (FIPSE) and as part of the reporting process; we are assessing how Stoa impacts instructors and their students. We would appreciate you taking some time to give us some reflections on your experience with Stoa. Please email your thoughts to Gary Marchionini (march@ils.unc.edu) and they will be incorporated into this year's report. As the report is due in two months, please send your responses by March 31.

1. Why have you decided to contribute/distribute your work to/via Stoa?

2. Who are you trying to reach? (What is your target audience?)

3. What resources, tools, or guidance has the Stoa community provided to help you make your contributions?

4. Have you used Stoa materials in your classes? If so, how have they influenced student learning and/or your teaching?

Please note: This is an abbreviated set of questions. If you are willing to respond to a more detailed set of questions, please let me know and I'll forward that set immediately.
Thank you for your contributions to Stoa.

Appendix B. Stoa Contributor Protocol

Contributor Protocol (to be used in interviews)

1. Briefly describe the work you have placed at the Stoa web site.

2. Why have you decided to contribute/distribute your work to Stoa?

3. Who are you trying to reach? (What is your target audience?)

4. What Stoa resources have you used in creating your contribution?

5. How much time did you spend creating the contribution? When did you do this? Where did you work? (office/home proportion)? Did you have to change your style of writing? Did you involve others (e.g., students)? How?

For instructional contributions, use 5a
5a. Have you already used these materials in teaching?
If yes,
How were they used? (What did you do? What did students do?)

How did they work from a student learning perspective?

How did they work from a teaching perspective?

Were there things you did NOT teach as a result?

Is your campus supportive of this kind of instruction? Is your department?

Have these materials influenced student learning? How?

Have these materials changed your teaching? How?

For other contributions (e.g., raw data, scholarly papers, etc.) use 5b

5b. Have you yet shared these materials with others?
If yes,
What reactions did you get?
If no,
What reactions do you expect?

6. Are there other contributions you are planning? (Describe)

7. Are there other materials you would like to see at the Stoa site or other activities the Stoa consortium should undertake?

8. What is the one best thing about your involvement with the Stoa consortium?

9. What suggestions do you have for advancing the work of the consortium?

Appendix C. Perseus Webmaster Report

Over the past year, Perseus Project staff members have compiled a database of correspondence to and from the webmaster of the Perseus Digital Library (*webmaster@perseus.tufts.edu*). The webmaster mail database consists of over 6,000 records divided into two related tables: 4,241 incoming e-mail records from visitors to the site and 1,803 responses sent by project members.[2]

All of the incoming mail[3] is logged with the e-mail address of the sender, the date received, the complete message content, an indication of whether or not a response has been sent, and one to three "keyphrases." These short phrases describe the content of the mail message received. There are nine general categories of keyphrases, most with five or more modifications; there are 54 keyphrases in all (see figure 2). For instance, one general category is "translation" with modifiers such as "to Latin," and "to Greek."

The nine general categories of classification are as follows: bug reports for the on-line Perseus Digital Library, mail pertaining to the Perseus CD-ROM publications, help for the Perseus DL, general homework or research questions, miscellanea such as award notices or other suggested sites, praise, requests such as those for permission, suggestions for improvement, and translation queries. Wherever possible, these categories contain modifiers, which point to the area of the DL in question. For instance, "A & A" describes the Perseus art and archaeology database while "texts & tools" describes the texts, lexica, and lexical tools for both Greek and Latin.

A sample entry is shown in figure 3. In this record, the response is marked "auto," meaning that an automatic reply was sent.[4] Other records have response fields marked with "n/a" (when an invalid e-mail address was given making a reply impossible), "no," "forw" (meaning the e-mail was forwarded to one or more staff members), and "yes." Any record with a "yes" in the response field has a corresponding record in the response table. There are four messages marked "n/a," 22 marked "no,"[5] 97 marked "forw," and 2,315 marked "auto." As noted above, there are 1,803 messages with responses: these contain "yes" in the response field. The record shown in figure 3 has been given keyphrases[6] of "hmwk/res: Greek language" and "hmwk/res: G-R mythology." Thus, the subject of this mail is a homework or research question, which crosses into two broad subject areas: Greek word origin, which classifies this as a Greek language homework/research question and mythology, making this a Greco-Roman mythology

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[2] As of June 30, 2000.

[3] Mass marketing e-mail, known as "SPAM," and e-mail without a subject or a text message is not recorded.

[4] The automatic reply was instituted in response to the large volume of incoming mail. It is a detailed message, which reiterates much of the information on the Perseus FAQ (frequently asked questions) page. In general, personal replies are not made when a correspondent writes with a "frequently asked question," most often a translation request.

[5] Of the 22 messages that did not receive a response, all were dated from May, June, and July of 1999, prior to the institution of the automatic reply. A majority of these messages are reports of bugs or typographical errors from regular writers.

[6] These were originally termed "keywords," following the Perseus model for art and archaeology materials, but phrases were necessary for clarity.

homework/research question. Most e-mail messages touch on one subject area: 3,643 of the incoming records have only primary keyphrases.[7]

Replies are made to messages, which pertain to Perseus. The message in figure 4a is a question on Greek word searching in the Perseus DL. Figure 4b illustrates the reply. The author field contains the initials of the staff member who wrote the reply, the content contains the reply, typically with a copy of the original in the body of the message, the date indicates the date the reply was sent, and the original sender field contains the e-mail address of the correspondent and this field is used to link this message to the incoming e-mail table.

Now that over a year's worth of e-mail has been recorded and classified, it is our goal to use the webmaster database to make improvements to the Perseus Digital Library. Statistical analysis of server logs give us numbers; e-mail from our users tells us why they came, what they want to know, and what they expected to find. With the information in the webmaster mail database, we can now make improvements not only to the content of Perseus, but also to the help documentation. It is our plan to continue building this database indefinitely and to begin analysis of the mail classifications later this year.

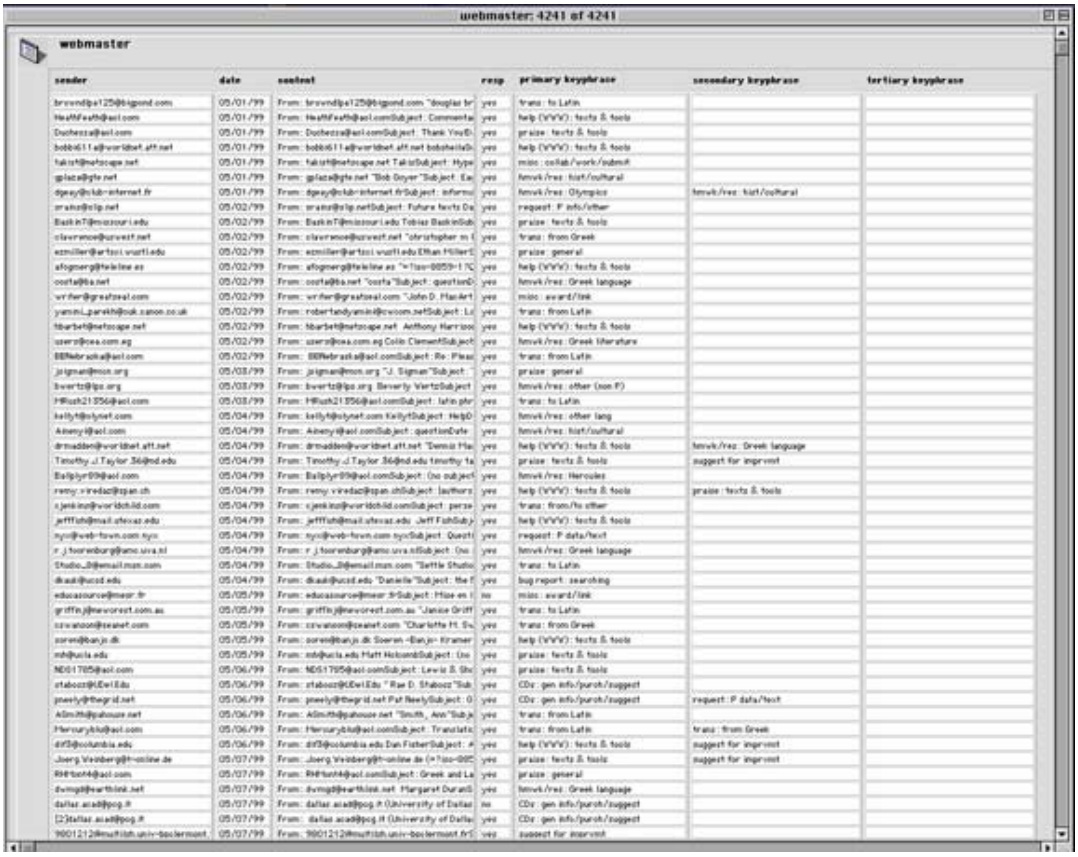

Figure 1: Overview of incoming webmaster mail table.

[7] 561 incoming records have primary and secondary keyphrases only; 38 are marked with three keyphrases.

bug report: A &A
bug report: atlas
bug report: other
bug report: searching
bug report: texts & tools
bug report: typo
CDs: 2.0 help
CDs: 2.0 info/purchase
CDs: gen info/purch/suggest
CDs: PIP help
CDs: PIP info/purchase
help (WWW): A &A
help (WWW): atlas
help (WWW): font display
help (WWW): general
help (WWW): other
help (WWW): Ren, etc.
help (WWW): searching
help (WWW): texts & tools
hmwk/res: G-R mythology
hmwk/res: geographical
hmwk/res: Greek language
hmwk/res: Greek literature
hmwk/res: Hercules
hmwk/res: hist/cultural
hmwk/res: Latin language
hmwk/res: Latin literature
hmwk/res: Olympics
hmwk/res: other (non P)
hmwk/res: other A& A
hmwk/res: other lang
hmwk/res: Ren, etc.
misc: award/link
misc: collab/work/submit
misc: mirror sites
misc: subscript fee
misc: sugg'd site/other res
praise: A & A
praise: atlas
praise: general
praise: Hercules
praise: Olympics
praise: Ren, etc.
praise: texts & tools
request: P data/text
request: P info/other
request: permission
suggest for imprvmt
trans: from Greek
trans: from Latin
trans: from/to other
trans: to Gk or Lat
trans: to Greek
trans: to Latin

Figure 2: Keyphrases for incoming webmaster mail classification.

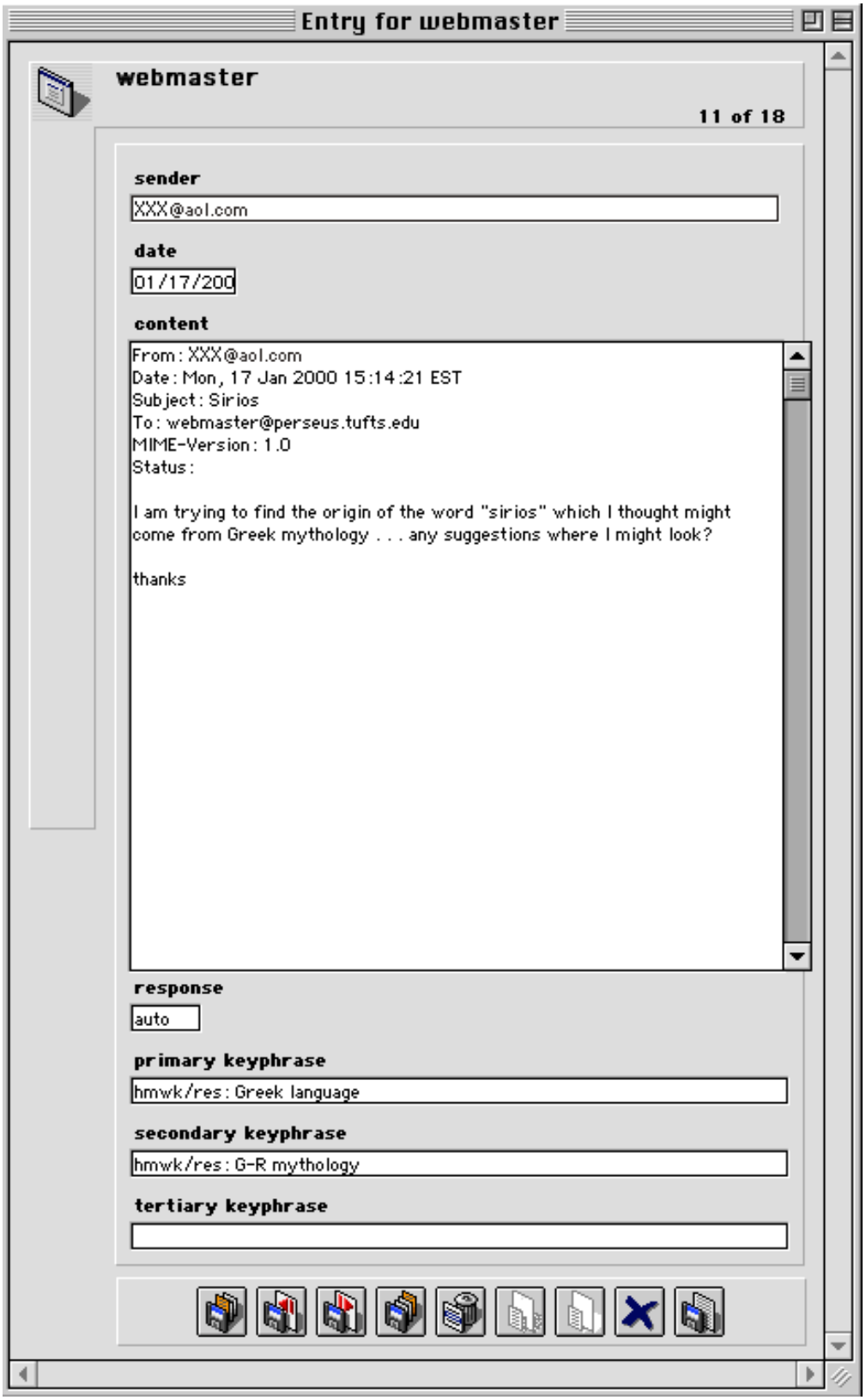

Figure 3: A sample webmaster mail record.

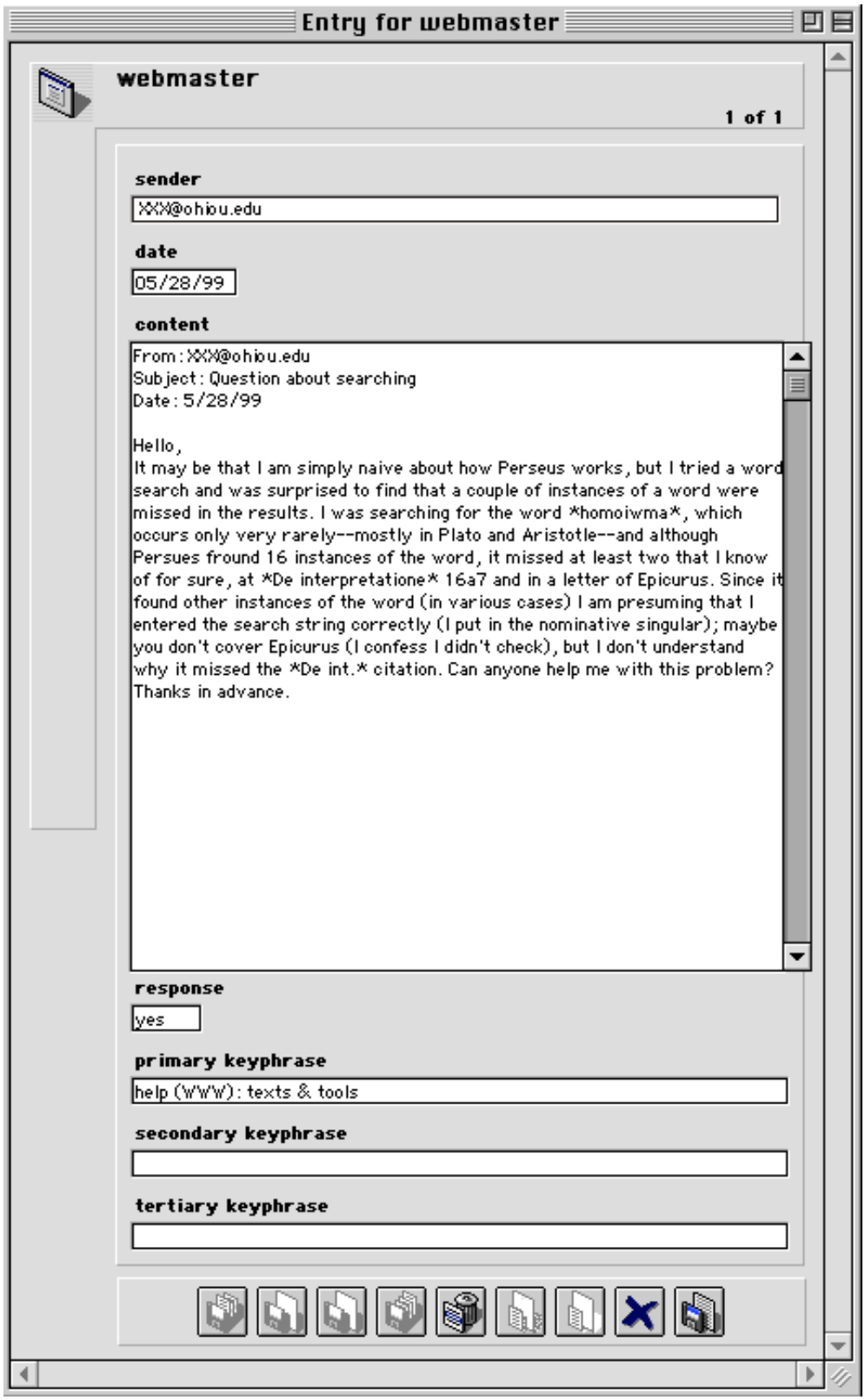

Figure 4a: A sample incoming webmaster mail record.

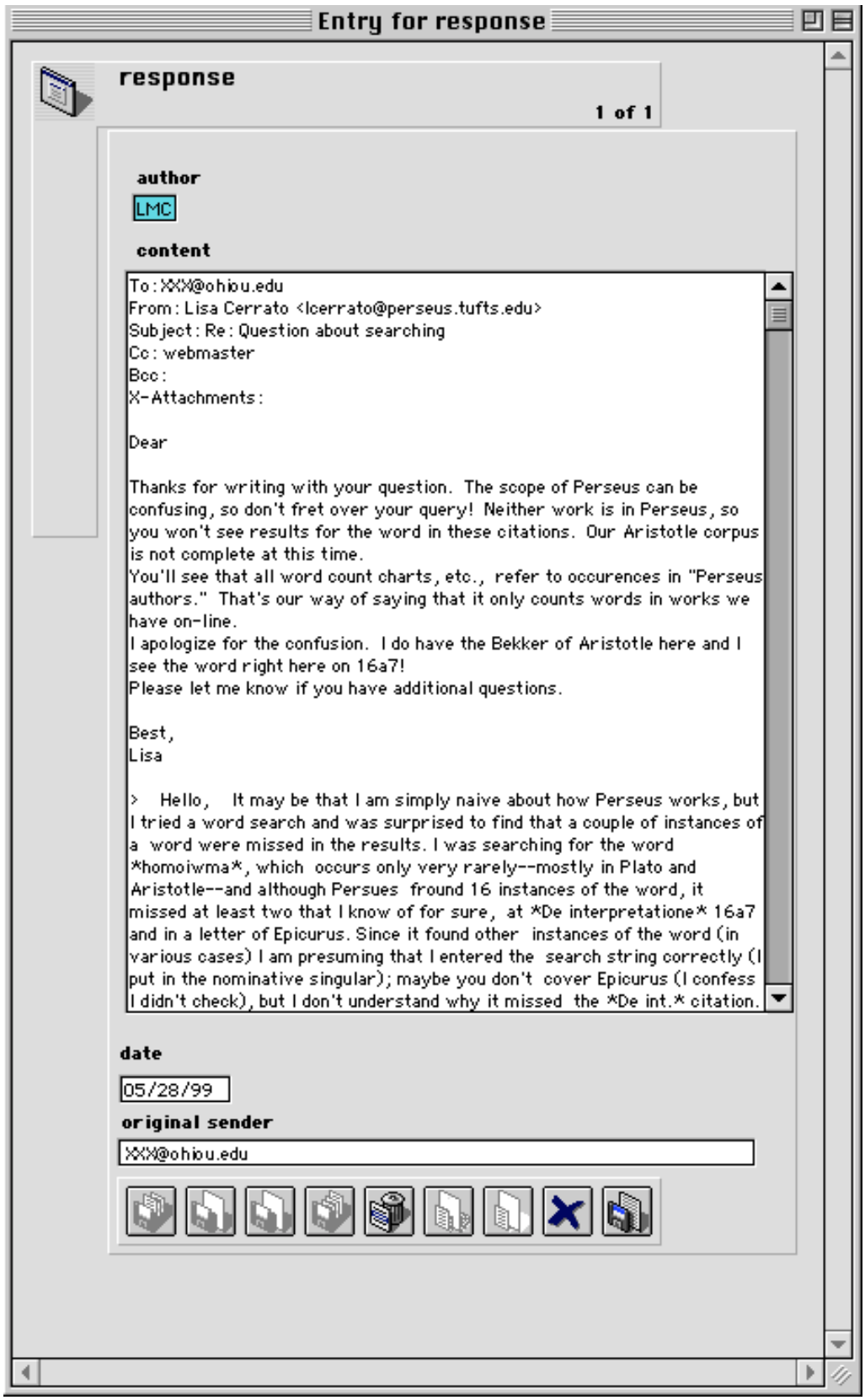

Figure 4b: The reply to the message illustrated in figure 4a.