Proposal to Develop Demonstration Perseus Program

I. Background and Objectives

The Computer Museum has selected Perseus for inclusion in its Tools & Toys exhibit opening in June 1992. Perseus is a database on classical Greek civilization containing primary texts, maps, still images, archaeological catalogs, secondary references, and custom database tools.

As a database, Perseus offers a large amount of information and powerful tools. To be suitable for display at the Computer Museum, a new front-end must be developed, and the program must be made robust enough for public use. Several challenges exist.

When novices use a powerful information tool such as Perseus, they may not have enough existing knowledge to pose interesting questions. This is certainly the case with Perseus—most Museum visitors will not know much about ancient Greek civilization. The solution to this problem is to construct interesting questions for visitors. The questions will establish a goal and provide a framework for leading visitors through Perseus.

A second challenge is the skill level of visitors. In full-fledged operation, Perseus uses pull-down menus, a navigator, and point-and-click features, among others. Regular Perseus users must invest some time in learning, exploring, and reading instructions. Museum visitors, on the other hand, will not be able to invest much time in learning operating conventions. The solution to this problem is to scale down the Perseus features, eliminate some user options, and constrain the path of the visitor through the database to help the visitor maintain a sense of navigation.

The remainder of this document offers a brief summary of the proposed demonstration program. A moderate familiarity with Perseus is assumed. Figure 1 shows the existing Perseus Gateway and navigator.

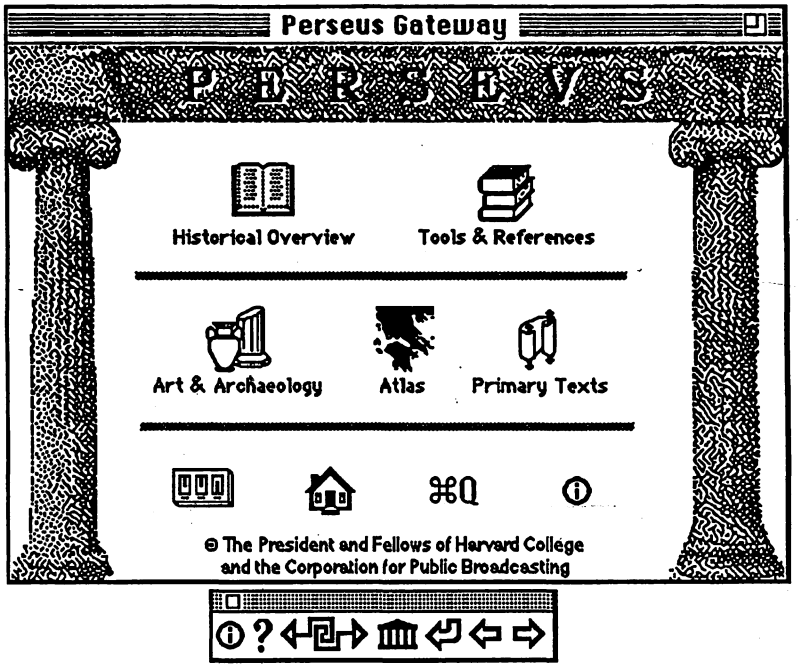


Figure 1. Existing Perseus Gateway and navigator

II. Approach

Overall design—Use the existing elements and metaphors of Perseus rather than constructing new ones. Specifically, use a modified navigator that offers fewer choices, annotated icons, and a larger format. (See Figure 2.) Use the Gateway as the entrance to the examples. Use the path feature as the navigation mechanism for the two examples. Use a floating note window to offer information and instructions.

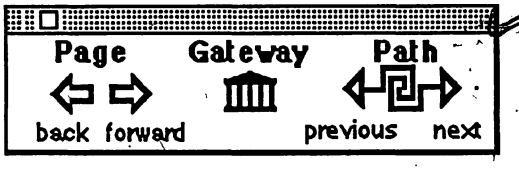


Figure 2. Prototype of modified navigator

Design of examples—Develop each example so that it correlates several elements of Perseus in support of the main theme. Set up the problem, lead user through at least three elements related to the problem, and make the last element one from which the user can explore a number of items. (See Figures 3 and 4.)

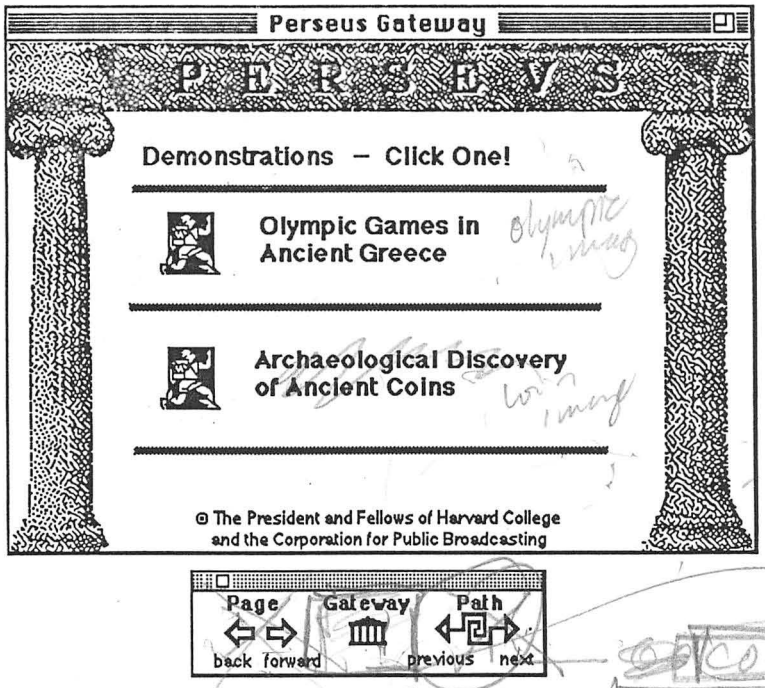


Figure 3. Modified Gateway for demonstrations

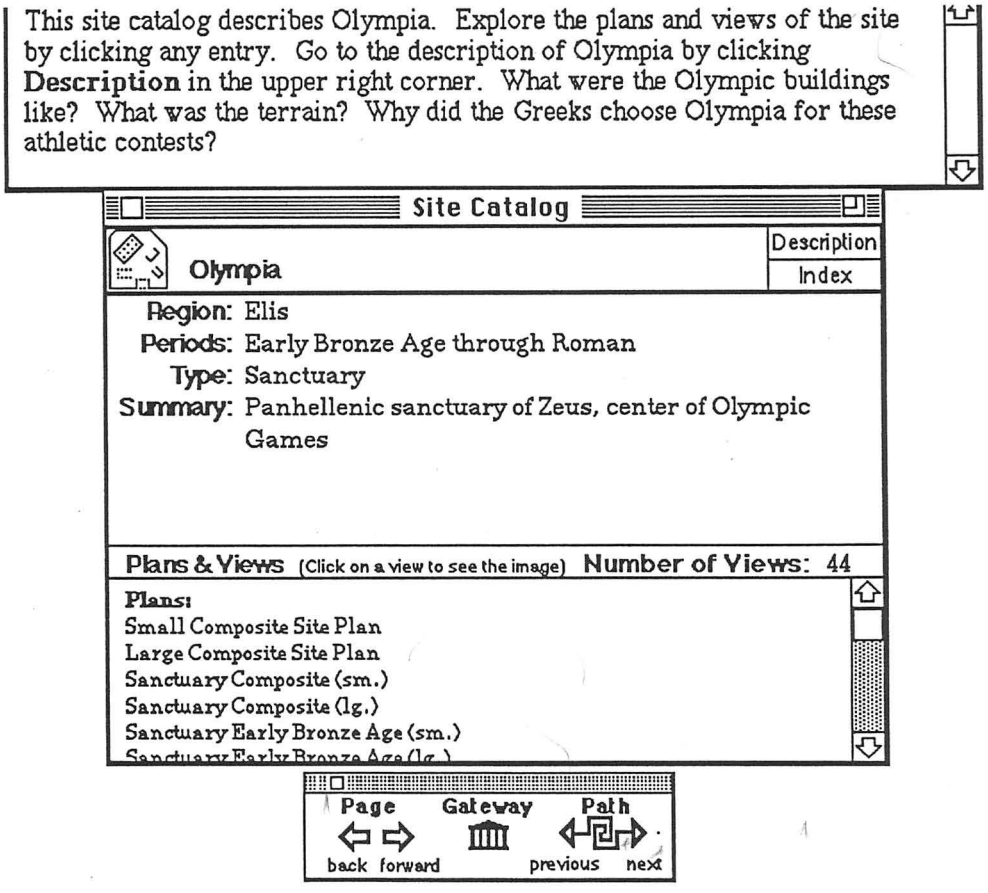


Figure 4. Prototype of screen within one of the examples

Enter the examples from the Gateway. Navigate through the examples, from major stop to major stop[1], by using the Path icon on the navigator.

Example #1: Exploring the Olympics of Ancient Greece
The user's goal is to explore Olympia as the site of athletic contests. The path consists of stops at the Atlas, the Vase catalog, two texts, and the Site catalog. The user will learn to use visual evidence and text descriptions to gain a sense of Olympia.

1. Start at a map of the Greek world, with sites of major athletic contests plotted.
2. Go to text by Pausanias describing the Olympics.
3. Go to a vase portraying an athletic contest and see picture of vase.
4. Go to Pindar's Odes to Olympians and read as much as desired.
5. Go to site catalog card for Olympia (see Figure 4, above). From this central location, the user can click on 40 items to see large and small site plans, building plans, and digitized photographs of the area. The user can also read a detailed description of Olympia and its role in the growth of the Olympic games.

Example #2: Investigating an Archaeological Discovery
The user's goal is to identify the figures on a coin. The path consists of stops at the Encyclopedia, a text, and the Coin index and catalogs. The user will learn to conduct a narrowed search and combine clues from Perseus elements to identify the figure.

1. Start at an image of a coin and provide some known facts about it: the coin is silver, was minted in Athens, and has an owl on one side.
2. See Encyclopedia,Attica article for short description of owl coins.
3. See Plutarch,Lys,16.2: "For most of the coinage of the time, as it seems, bore the effigy of an owl, owing to the supremacy of Athens."
4. Go to Coin Index and use pop-up menu to select index type. From the index by mint, choose Athens and go to various coin catalog cards to confirm that figure on the obverse of coin is Athena.

What happens next?

[1]"Major stop" refers to a location in Perseus recorded in the path. For example, a user will be at a major stop in a path upon arriving at a reference in Pindar's Olympian Odes. From this location, the user can scroll up or down and can page forward or back. This lateral movement will occur through use of the card's scroll bar and the navigator. The user will not proceed to another major stop until choosing to Go Next on the path.

Performance issues—Access to data stored on CD-ROM can seem slow, at times. In the event that direct access from the CD-ROM inhibits the performance of the examples, the relevant Perseus elements will be moved to the hard disk. Images will remain on the CD-ROM.

Constrained vs. open-ended exploration—The proposed demonstration tends toward a constrained use of Perseus and excludes access to many Perseus elements, particularly the tools. The tools are perhaps the most complex Perseus features and difficult to integrate in a public demonstration program. The balance of constraint vs. open-endedness will be adjusted during development in consultation with David Greschler from the Computer Museum.

III. Equipment and Software Requirements

The entire Perseus database exists on a CD-ROM and an accompanying videodisc. The database uses no motion video, only still images. The videodisc is considered optional, because all images on the videodisc are available as digitized images on the CD-ROM. The proposed design relies on the CD-ROM images and does not require the videodisc.

The desired hardware configuration is listed below:

- Macintosh with color monitor, 4MB RAM
  (Mac II model is preferable, Mac LC is minimum)
- Mouse and keyboard
- CD-ROM drive and appropriate SCSI cable

The software requirements are listed below:

- HyperCard 2.1 or later
- 32-bit QuickDraw

Omitted intentionally from this list are the videodisc hardware and SMK GreekKeys software. SMK GreekKeys is a keyboard program that enables users to type accented Greek.

IV. Milestones, Deliverables, and Allocation of Time

The milestones and deliverables are itemized in the contract between the Computer Museum and Maria Flanagan. They are summarized briefly below:

1/24/92 Delivery of draft proposal for comments

1/31/92 Receipt of comments on proposal

2/92 Development and programming, and consultation with Perseus Project staff to review accuracy and emphasis of subject matter

3/16/92 Delivery of first draft of program

4/6/92 Commencement of revisions based on evaluation exhibit

Shown below is an estimated allocation of time to each major task.

10%	Identify a framework for the front-end
15%	Develop content of examples, with input from Perseus staff
50%	Design user interface and program the front-end, disabling where needed
25%	Evaluate and revise

- Script breaks.
- Remove Keyboard.

- How is this more advantages than using books. : Database vs. Books.

- Mention CD-ROM - but speed is too slow.

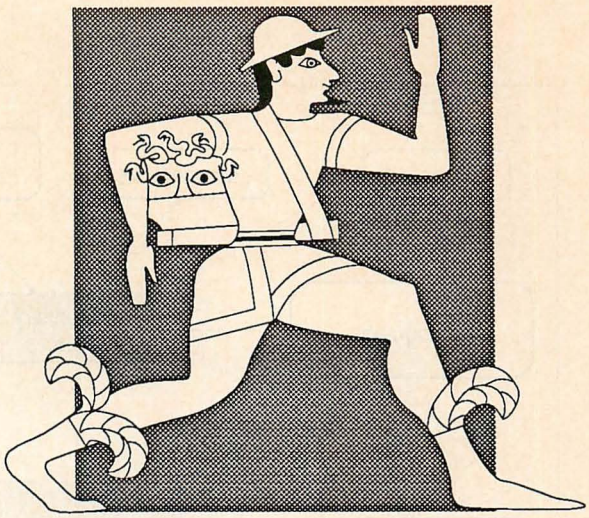
- Bring up all the pictures at once.

- Captioning - selected pict gets caption.

Database vs. Books

Important thing is to ask a question.

- Variety, speed, comparison of books
- Images.



Hypermedia and the Study of Ancient Culture

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Allowing fluid movement among disparate data, hypermedia databases ideally suit the study of ancient cultures, where evidence ranges from literary texts to archaeological sites to individual objects.

Students of ancient Greek culture share with others an intense interest in tools allowing them to make new connections between the scattered aspects of their subject. Hypermedia databases allow them to cover a wider variety of evidence more thoroughly and make it less likely they will pursue the same text-limited questions as before. The long-term consequence will not simply be new answers, but new questions and research programs.

Students of ancient Greece have, as a body, integrated electronic databases as deeply into their basic research as any comparable group in the humanities. Classics have come to occupy an unusually prominent position in humanities computing generally, thanks to two complementary and far-sighted efforts. In 1972 planning began on the Thesaurus Linguae Graecae (TLG), a database project based at the University of California at Irvine and designed to place all ancient Greek literary texts on line. Then, during the mid-1970s, David Packard began developing computer systems to support this database and multilingual research (with an emphasis on Greek).

Classics departments began using minicomputer-based systems more than a decade ago and, since the mid-1980s, have had access to a personal computer specifically designed for their needs. Additional software made the massive TLG database accessible on general platforms such as the Macintosh and the PC. As of this writing, more than 500 departments and individuals use the TLG CD-ROM with its 300 Mbytes of Greek literature. Perhaps half of those actively engaged in research on ancient Greece have access to this resource, and that percentage is rising steadily.

Yet the very success of the TLG database poses problems for those inter-

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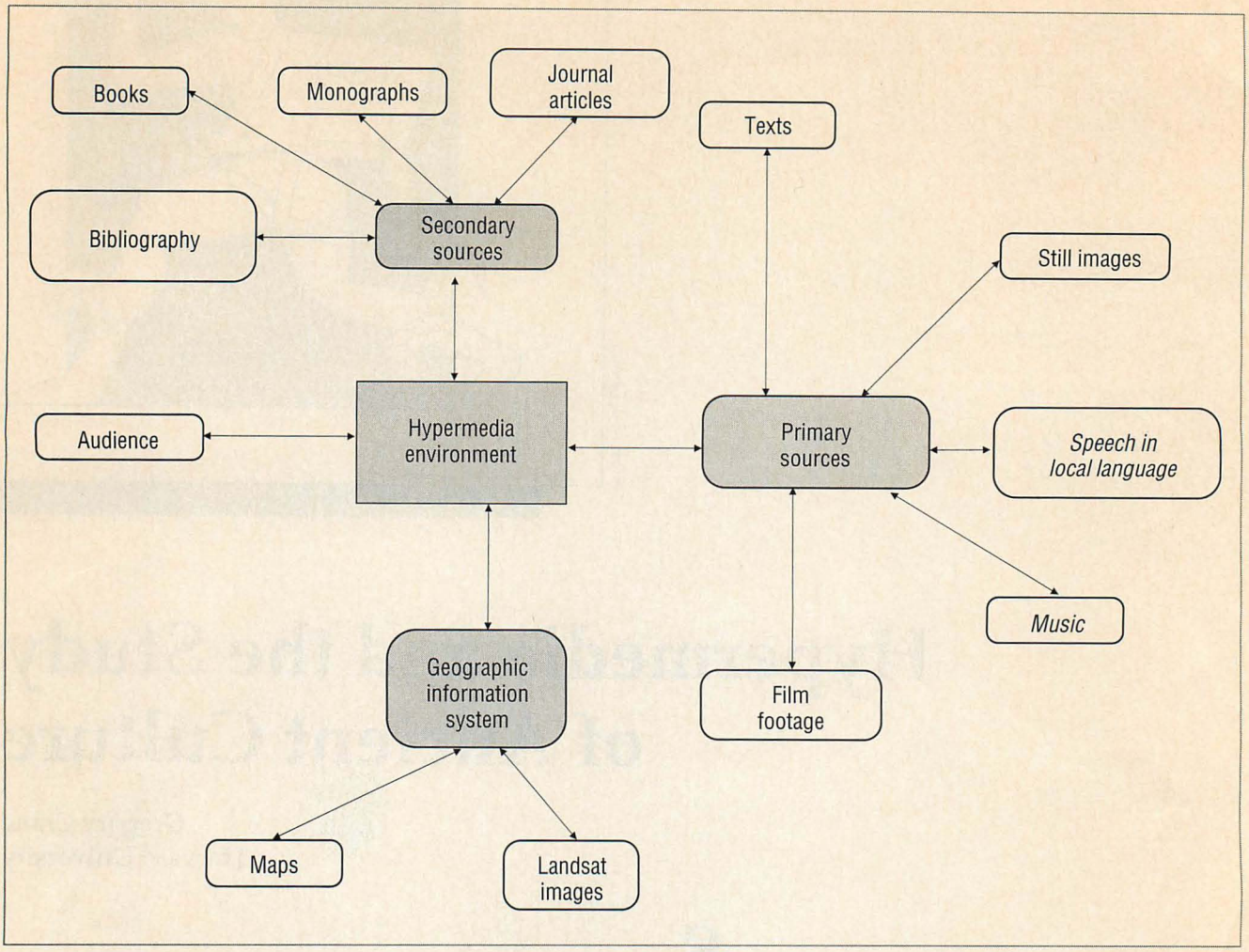
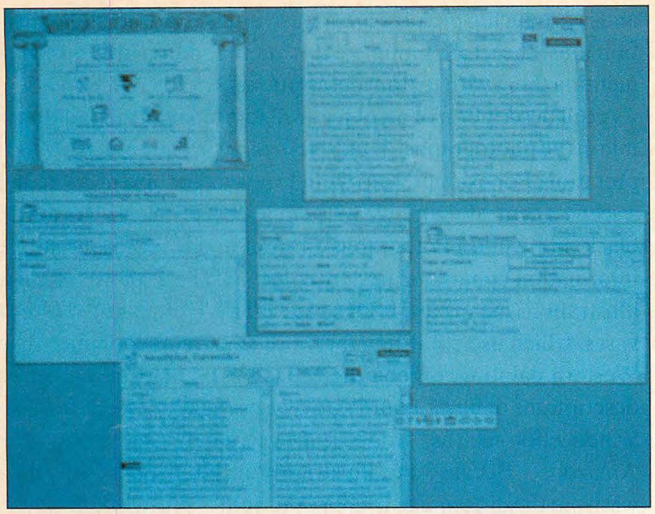


Figure 1. Simplified diagram of a hypermedia environment. Data types in italics are not included in the Perseus database. A second-order hierarchy such as that pictured is one way to organize our information.

ested in developing broadly associative hypermedia databases. (I use "hypermedia" rather than "multimedia" because it emphasizes associative browsing. Putting texts, images, sound, and motion video on line forces us to explore ways in which to link these different media. See Figure 1.) Scholars have enthusiastically embraced text retrieval, but the textual database mirrors the "monomedia" focus that has developed in many disciplines. Students of classical Greek literature, in particular, tend to work intensively with texts and pay comparatively little attention to other archaeological evidence.

In the past few years, for example, classicists have engaged in a debate as to the manner in which one kind of poetry was performed. Hundreds of painted Greek vases illustrate the performance of poetry and of music, and they provide one of our best sources of information on this topic. However, in the published articles the authors based their analyses entirely on the poetic text, citing an average of 10 separate passages per page to build their arguments. Of five recent articles, only one even alludes to the visual evidence—and that in a single footnote buttressing a secondary argument. Conversely, literary critics considering archaeological material frequently restate standard opinions from published sources rather than reevaluating the evidence and building a new synthesis (as they would if working on texts).

The excessive emphasis on textual materials highlights both the short-term challenges and the long-term promise of hypermedia databases. The challenge will be for those who study ancient Greece to make good use of such databases. Literary criticism has spent more than 2,000 years developing topics best studied with textual evidence. In addition, despite the development of photography, printed images remain expensive and often of poor quality. Even specialists in classical art and archaeology find it unnecessarily time consuming to collect images illustrating a theme or topic. Those who can will often avoid the visual record altogether, selecting topics for which the visual record is not especially relevant or (as in the case of the poetry articles cited above) defining the problems in such a way as to dismiss the artistic and archaeological materials. Many consequently do not yet have the training or the background to use these materials.



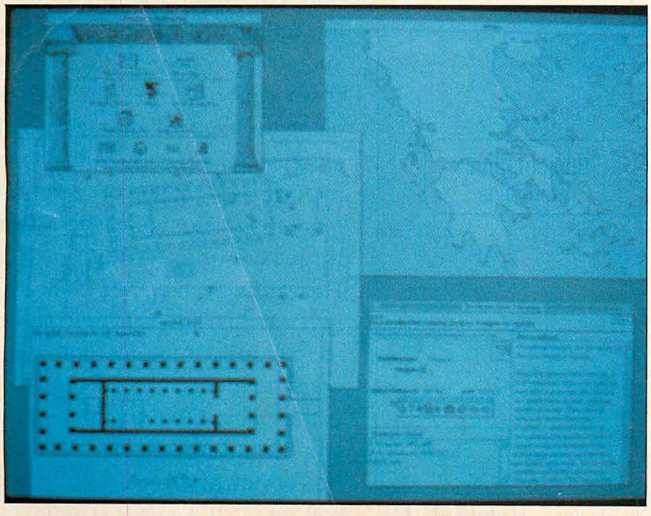
Courtesy of Maria Daniels

Figure 2. A screen from the Perseus hypermedia database showing a Greek and English text.

Nonetheless, few of the literary critics who focus so heavily on the text do so happily. Even the most quarrelsome factions in classics (and the humanities in general) would largely concur that literature must be studied in the context of the culture that produced it. The same forces that affected the form of a poem might have shaped the design of a temple or the scene painted on a Greek vase.

An experiment in hypermedia

The Perseus Project was conceived in the mid-1980s as both an experiment and a complement to the TLG. Where the TLG sought to collect all literary texts surviving from ancient Greece, the Perseus Project emphasized the earliest period of Greek civilization, roughly from the eighth century B.C. to the death of Alexander the Great in the late fourth century B.C.



Courtesy of Maria Daniels

Figure 3. A screen from the Perseus hypermedia database showing an archaeological site.

However, the Perseus Project set out to collect as many kinds of data as possible from this 400 year period. We wanted to see what would happen to the study of antiquity if we could make not only more information, but more kinds of information, more readily accessible. We chose a hypermedia environment as the most flexible vehicle.

The Perseus hypermedia database includes source texts in Greek, English translations, essays, maps, drawings, and motion video and color still images representing Greek art and other archaeological materials[1-3] (see Figures 2-4). The database must support a wide variety of materials and, more importantly, serve a wide range of individuals, from the general reader to the advanced scholar. It must also stimulate inquiry into many different (and at times antagonistic) approaches.

A civilization—even one that, like classical Greece, has long vanished—poses questions for faculty in departments such as comparative literature, art history, archaeology, social anthropology, philosophy, political science, religion, and linguistics. Each of these disciplines requires a slightly different set of data.

Courtesy of Maria Daniels

Figure 4. A screen from the Perseus hypermedia database showing a Greek vase.

For example, an art historian might study a painted Greek vase to determine which particular Athenian vase painter produced it and to further understand that painter's methods. In contrast, an archaeologist might have little or no interest in who painted the object, but rather in its discovery in a particular tomb in central Italy along with six other vases of the same shape.

The Perseus Project is equally a wholehearted exploration of one culture and a case study in how to represent culture in a hypermedia environment. It also probes the strengths and weaknesses of the new medium. Although the study of ancient Greece incorporates many different methodologies, our primary subject materials are easier to control than in many other fields. A textual database of 60 or 70 Mbytes allows us to include the majority of surviving literary texts, in both Greek original and English translation, as well as relevant later sources (such as sections of Plutarch).

Of course, enormous quantities of material remains exist. In just one category—painted Greek vases with scenes from mythology or daily life—we have roughly 80,000 whole or fragmentary vases. The *Princeton Encyclopedia of Classical Sites*, published in 1971, includes roughly 300 sites from the Greek mainland, many of which have produced vast amounts of information. Hundreds of thousands of coins and millions of artifacts have been recovered. Although we cannot expect to be comprehensive in this sphere, we have already collected roughly 18,000 images, including 1,000 drawings, plans, and maps, which will provide the most extensive collection of materials yet published.

We expect to distribute texts, drawings, database information, and other naturally digital forms of data on CD-ROM. We plan to make color images available on videodisc or on CD-ROM. In addition to providing broad coverage, we will select a few topics for intensive work. These will show the general audience what archaeological work entails and will illustrate to professional archaeologists what they can do in this new medium.

Representing Greek art

One particular experiment under way within the Perseus Project illustrates how a large hypermedia database can open up a subject to new audiences. Consider, for example, the way print publications represent and define our access to museum objects. Photography made possible the study of art as currently conceived, since few indeed can spend their lives in the agreeable practice of moving from one major museum to another. Nevertheless, even the modern catalog must compromise between logistical and economic factors. Books are bulky, and reproducing pictures is expensive. The traditional publication must therefore minimize the number of illustrations, augmenting them with textual descriptions.

A full description of an object will refer to many details invisible in the photographs, details that might prove crucial to interpretation. For example, an overall view might obscure whether a scene's central figure wears a smile or a grimace. Moreover, black and white photographs simply cannot represent all the information communicated by color, but the expense of color illustrations means few books have many. Even painted Greek vases, which use color in a far more constrained manner than Western painting, exceed the capacities of halftones. Textual descriptions of black figure Attic vases regularly include a separate section such as "Added red: eyes, cloaks, shield rims of all Amazons." Because the illustration in the catalog will often wash out the differences in color, the author must describe them in text.

The possibilities and constraints of a large hypermedia database have led us to rethink the way we visually document objects. Whether we work with videodisc (and thus have access to 54,000 NTSC video images) or a CD-ROM filled with (for example) 10,000 compressed 640 × 480 24-bit color images, the new medium changes the quantity and quality of visual documentation that we can offer.

In photographing objects specifically for a hypermedia environment, we found that our standards for photographic coverage changed. The views we had previously selected were not the best possible views to illustrate the object in question, but represented the best we could do with four or five pictures. We now as a matter of course photograph each three-dimensional object from all sides, provide overviews of each major scene, and show details of all major figures. In gross terms, we regularly provide more images, such as shooting an average of 22 pictures for a Greek vase.

More subtly, we can better adapt our coverage to the object in question. For example, a printed catalog might provide between two and 10 views of the different objects that it contains. In the database, a small, lightly decorated piece might get only four or five overviews. On the other hand, more than 110 pictures illustrate a large, complex Greek vase in Harvard's Sackler Museum. The hypermedia environment allows us to tailor our photographic coverage far more closely to the needs of the object. Of course, our photographic coverage is itself a selection of views, and no careful viewer will find that we have covered everything of interest on every ob-

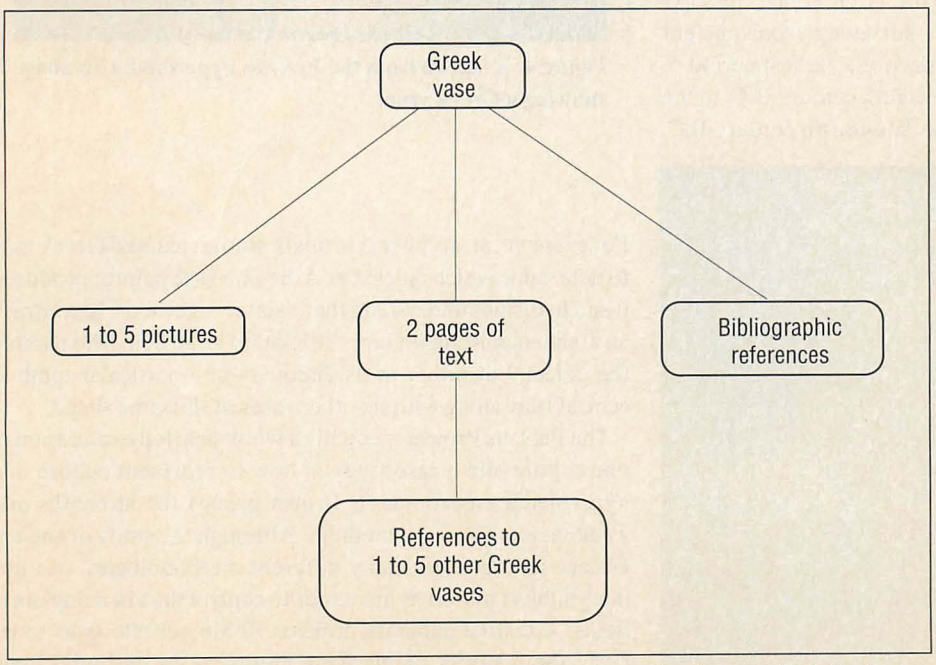


Figure 5. Diagram for a standard printed catalog entry for a Greek vase. Relatively few readers will have access to images of the other vases cited.

ject. Nevertheless, our audience will be able to see the objects in our database far more clearly than in print.

A hypermedia database does not simply affect the way we photograph an object. The problem for most viewers is context: Why do we think this vase was painted by a particular painter? What is the significance of the picture on the vase? Is it conventional or perhaps an odd variation on a particular theme? Such questions lend significance to an object, but are extremely hard to communicate in a printed publication. The only way to understand that a vase illustrates a conventional portrayal of Heracles fighting the Nemean lion is to see several other vases with the same scene, with each figure standing in the same relative position to the other. Conversely, stating that a vase illustrates a new approach to a particular scene will not suffice—readers need to see enough other conventional representations to properly appreciate the difference. Textual descriptions of visual information can lead the eye and point out significant features, but they cannot substitute for images of the objects to which they refer.

In the spring of 1990 Sarah Cormack and Mark Stansbury-O'Donnell, two graduate students in fine arts working for Perseus under the supervision of Susan Matheson (curator of the Yale Collection), created six catalog entries on Greek vases in the Yale Art Gallery. Composed from the start for distribution as part of the Perseus database, these entries came to assume a nontraditional form. Wherever possible, each statement about the object at Yale was documented by reference to an illustration of objects in other museums. Rather than presenting written judgments, we tried to create verbal links calling attention to the similarities between objects and directing readers to view the evidence for themselves. Each catalog entry included links to an average of 30 other objects.

Now if we contrast the electronic version with the printed catalog, we can begin to see the difference in form. A printed catalog entry for one art object might contain four or five pictures, a page or two of text, and a half dozen items of bibliography (see Figure 5). Its hypermedia counterpart would include a bit more text (perhaps three or four pages), because the 20 or so pictures of the main object would connect to an additional 30 objects, each (in theory) represented by its own 20 or so pictures. In the immediate future, anyone developing a hypermedia database will have to use black-and-white prints or color transparencies—the normal tools for print publication—to document most of the comparanda. A single CD-ROM will allow us to document roughly 90 objects, a figure comparable to many printed catalogs (see Figure 6) if we make the following assumptions:

- We work exclusively with 640 × 480 24-bit color images compressed to roughly 50 Kbytes.
- We use a CD-ROM for storage.
- 22 images illustrate each primary object.
- Each object will have links to 30 additional objects for comparison.
- Each object chosen for comparison will be illustrated by three images (as opposed to the 20 views for primary objects).

The precise figures will, of course, vary. We might not choose to work exclusively with full-frame images, and we might not always use 30 comparanda for each object. Nevertheless, the general idea should be clear enough. If we conceive of a CD-ROM rather than a printed book as a means of publication, then we can treat the same problem (the documentation of interesting works of art) in a far more detailed manner. The hypermedia audience will see the individual objects far more clearly and will be much better prepared to understand the artistic context in which they were created.

The quantitative and qualitative change affects the range of questions hypermedia can stimulate. Readers cannot ask questions about evidence to which they do not have access, and access to primary material directly constrains the questions we choose to pursue. A richly documented publication such as the hypermedia museum catalog described above will, superficially at any rate, undermine the author's authority. Readers can see at least some of the evidence underlying the author's conclu-

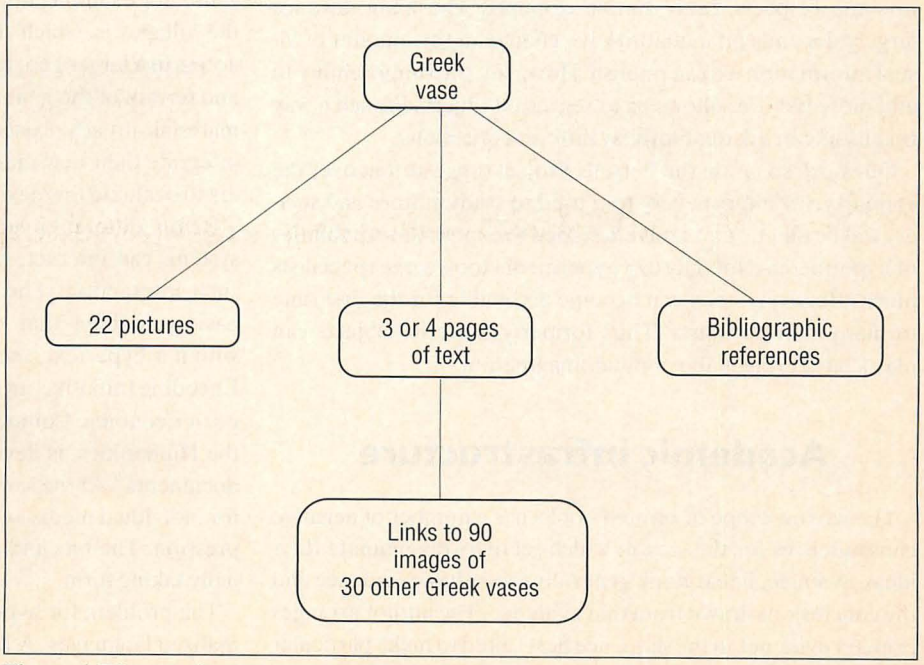


Figure 6. Diagram for a catalog entry for a Greek vase as created for the Perseus Project's hypermedia database. Note that the links in the hypermedia database are to images also accessible.

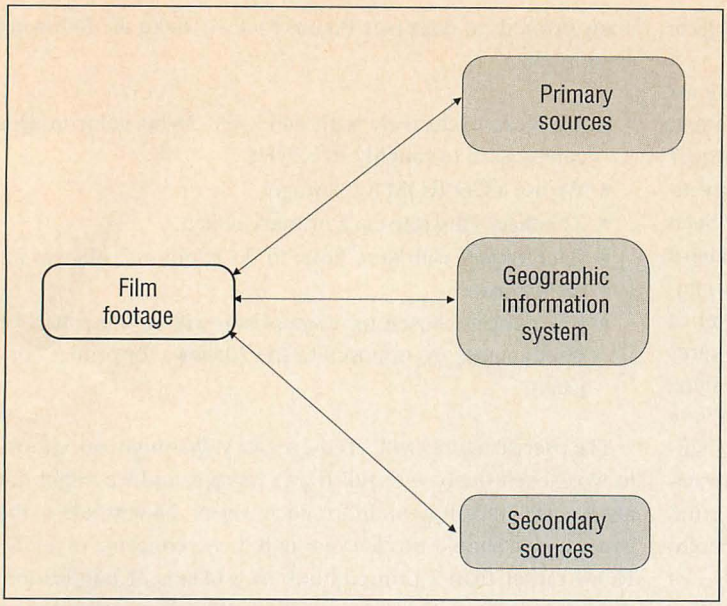


Figure 7. Video as part of a hypermedia environment. An electronic video stored as part of a hypermedia database can contain links to other kinds of materials. Moreover, other documents, such as more traditional textual discussions, can contain links to it.

sions, and a greater number of readers will be able to challenge those opinions.[4] Nevertheless, art historians will be able to engage a far wider audience, and a greater number of researchers will be able to integrate artistic evidence into their work.

This hypermedia representation of art provides a single and, in some respects, fairly simple example. The main advance largely depends on a quantitative change in the amount of visual information we can publish. However, the simple ability to add more pictures allows us to represent objects in such a way that users can ask qualitatively different questions.

Our work so far on the Perseus Project suggests that over the coming years almost every tool used to study culture and society will be taken apart and redesigned to exploit the capabilities of hypermedia. Not only can hypermedia tools serve specialists more effectively, they can become accessible for the first time to many nonspecialists. Thus formerly esoteric subjects can play a larger role in the popular imagination.

Academic infrastructure

The narrow scope of printed books has a number of negative consequences for the way in which scholars disseminate their ideas. A single, linear book generally mixes basic evidence and the conclusions drawn from that evidence. The author arranges primary evidence in the sequence best suited to make particular points, choosing what to leave in and what to leave out.

The hierarchical, narrative form of a well-organized book leads the reader to scan a text in a particular order, giving the author's conclusions more weight than is proper and making it more difficult for subsequent researchers to extend what has been done. Now, researchers returning from extensive fieldwork or archival study can, in a hypermedia database, publish thousands of pages of primary source material while more successfully keeping this material separate from their own conclusions. In addition, the author can include many images and even some limited motion video and sound to illustrate key points (see Figure 7). The reader in this environment is in a far better position to critique or to extend the author's conclusions.

Once authors can publish their ideas as a hypermedia database, they must alter their entire research process to take advantage of the new medium. They must more systematically collect audiovisual materials such as slides, recordings, and video. If the final publication is a CD-ROM-based database capable of holding 5,000 images, then taking 500 slides will not exploit the medium fully. Unfortunately, we do not yet train graduate students in the skills needed to make reasoned and intelligent decisions on collecting video footage that conveys a reasonable amount of information.

Benefits to come

The real benefits of hypermedia databases will come when they begin to proliferate and interact with one another. Authors cannot create every tool needed to describe a culture. Experts who concentrate on particular areas of New Guinea or Zaire, for example, might create detailed topographic maps of the villages in which they worked, but they will surely want access to a larger geographical database illustrating the climate and terrain of the general region. If more existing background material already exists, then it will be easier for authors to integrate their new material into a wider context and for readers to evaluate this new contribution.

Before different hypermedia documents created in different systems can interact, we need to establish basic standards of such interaction. The hypertext community has developed basic guidelines that might lead to a standard for the links within a hypertext, the so-called "Dexter" model.[5] The Text Encoding Initiative, an international effort funded by the European Economic Community and the National Endowment for the Humanities, is developing standards for encoding textual documents.[6] At the same time, we have begun to see standards for individual media such as still image and motion video compression. The bits and pieces of a complex standard are gradually taking form.

The problem for hypermedia databases extends beyond formalized languages. A hypermedia database that runs on many different systems must allow its audience to perform some useful task. If we simply replicate the tasks already performed using printed documents, we might well produce crippled and

poorly designed data that five or 10 years from now will not serve our needs or meet our intellectual demands.

The challenge is twofold. First, we must imagine how the technology can allow us to meet our existing goals at least as effectively as conventional printed tools. Second, we must determine what questions or tasks we have never before considered asking or performing that now become possible. While the first task provides a necessary point of departure, the second task creates an environment in which hypermedia will achieve its fullest impact. ❑

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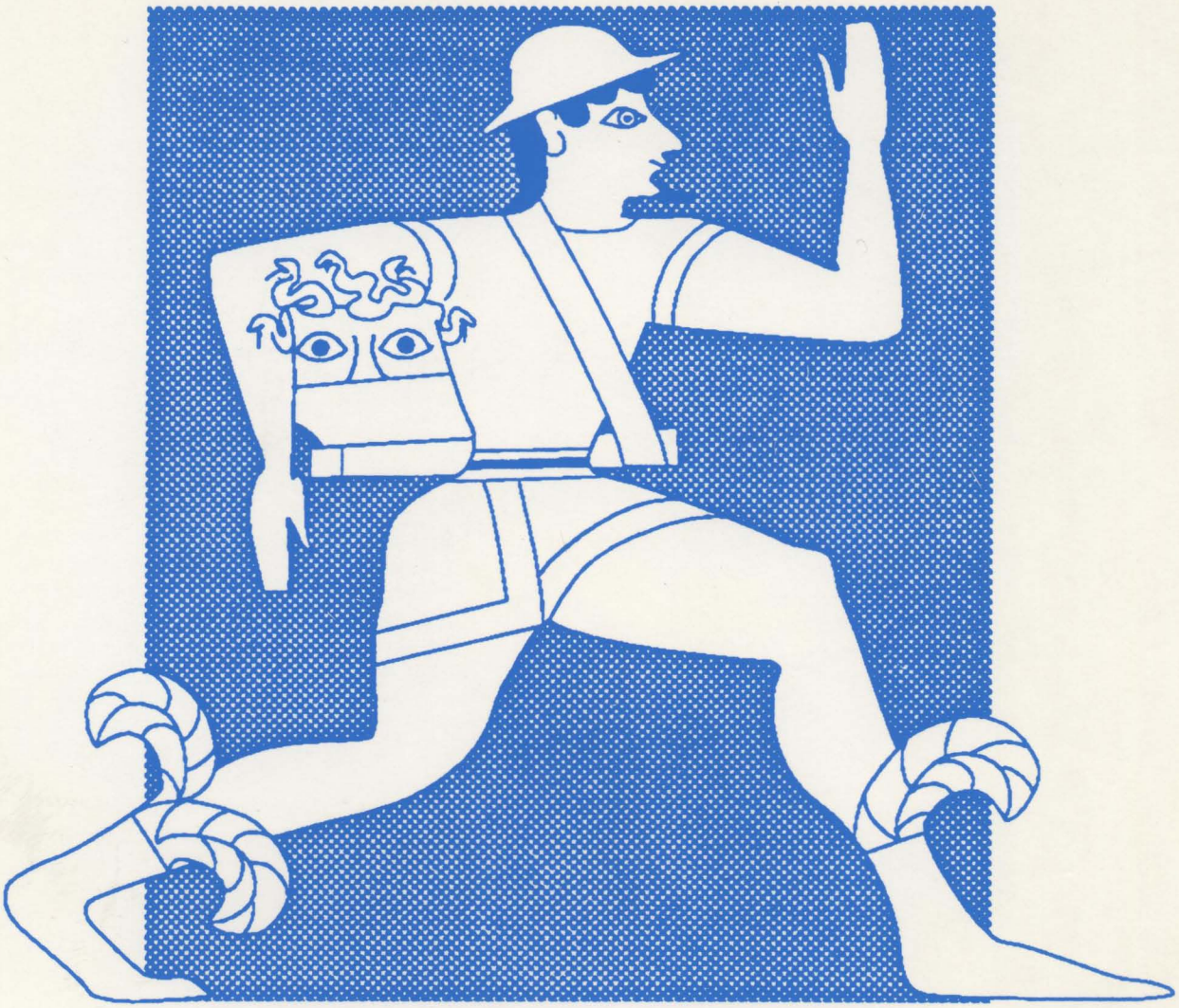
PERSEUS



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"Perseus is alive and well in the form of an adventurous computer database that, with the click of a button, helps students navigate through the complex and often intimidating morass of ancient Greek linguistics, history, and art."

—Laura Van Tuyl, *The Christian Science Monitor*

Yale
University
Press

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New Haven, Connecticut 06520
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Telex: 963531 Cables: Yalepress

4/6/92

Dear David -

Here it is ... Perseus 1.0.

I understand Elli and Maria are still working on the front end, but thought I'd forward a copy to you to look at.

I wasn't sure if you'd be using videodisc as well. Let me know if you are. I'd be happy to send you one.

Thanks.

Mary Coleman

Yale Book News

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For immediate release

April 3, 1992

YALE UNIVERSITY PRESS PUBLISHES THE FIRST INTERACTIVE MULTIMEDIA DATABASE ON ANCIENT GREECE

Initial release of the Perseus Project's CD-ROM series will advance study in the field

"**Perseus** is an outstanding resource for all courses on ancient Greek language, history, culture, and art. Its ability to link different types of information is amazing, allowing instant access to texts, maps, site plans, and photographs of places, buildings, vase paintings, and coins. **Ancient Greece has never been more accessible.**"

--Walter Englert, associate professor of classics, Reed College

Since 1987, the Perseus Project--a team of classicists and archaeologists based at Harvard University and contributors from many other institutions--has been collecting and developing an enormous store of materials in order to transform it into the remarkable and innovative product known as **Perseus.** Named after the mythological hero who explored the limits of the known world, **Perseus 1.0**, the first edition in the series, will be released by Yale University Press in April.

Published on CD-ROM and videodisc and accompanied by a user's guide, **Perseus 1.0** contains the equivalent of 25 volumes of ancient Greek literature by ten authors (1 million Greek words), roughly 4,000 glosses in the on-line classical encyclopedia, and a 35,000-word on-line Greek lexicon. It also contains the largest photographic database of mainland Greece ever published electronically, with nearly 6,000 photographic images, 15 minutes of video with narration, and hundreds of descriptions and drawings of art and archaeological objects. This unparalleled library of texts and images will support teaching and study in literature, art, language, and history, and will be an invaluable reference tool for anyone interested in the study of ancient Greece.

Perseus was developed using the program Hypercard™. Because of this, information in

Perseus is cross-linked, allowing users to move quickly across traditionally separate types of information in a non-linear, non-sequential way. This interplay of diverse and interactive source materials allows students and scholars to delve deeper and more easily than ever before into the world of ancient Greece. While touring a site plan of Delphi with its many corresponding images, for example, users can simultaneously access references to Delphi and the oracle in Herodotus, the classical encyclopedia, and the historical overview, as well as in descriptions of vase paintings and coins.

Major funding for **Perseus** is provided by the Annenberg/CPB Project. Additional funding was provided by Apple Computer, the National Endowment for the Arts, the Packard Humanities Institute, Xerox Corporation, Boston University, Bowdoin College, and Harvard University.

Exciting, flexible, authoritative, and easy to use, **Perseus** will transform the way classics is both taught and learned. Above all, it will set a new standard for multimedia, not only in the study of the classics but in all disciplines.

Gregory Crane, editor in chief, is associate professor of the classics at Harvard University. He has directed the Perseus Project since its founding in 1987. He has worked on computer-based applications for the humanities since 1982, when he developed an early retrieval system for the *Thesaurus Linguae Graecae*, and has published widely about the impact of electronic tools on learning. He is the author of *Calypso: Backgrounds and Conventions of the Odyssey* and a variety of articles on Hellenistic poetry and fifth-century B.C. literature.

Elli Mylonas, managing editor, is research associate in the department of the classics at Harvard University. She has overseen the structure of the project from its beginnings. With several programmers, she has developed *Pandora*, a program for searching texts on the *Thesaurus Linguae Graecae* and *Packard Humanities Institute* discs. She has spoken and published on text encoding (SGML), hypertext, and related issues.

For more information on **Perseus** or to receive review copies, please contact:

Mary Coleman
Yale University Press
92A Yale Station
New Haven, CT 06520
(203) 432-0912
E-mail: COLEMAN@YALE.VM.BITNET

Yale Book News

Yale University Press
92A Yale Station
New Haven, CT 06520

For more information, please contact
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203-432-0972
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Fax: 203-432-0948

A Partial listing of **Perseus** events, lectures, and workshops - 1992

1/10/92 - Notre Dame, IN - Greg Crane, editor in chief, is the keynote speaker at the opening of Notre Dame's new computer center.

2/1/92 - Cambridge, MA - The Fogg Museum opens "The Social Context of Greek Art," a teaching exhibit organized by the Perseus Project that gives visitors access to **Perseus.**

2/19/92 - Cupertino, CA - Apple-TV airs a segment on **Perseus** as part of their educational series, Imagine.

3/6/92 - Groton, MA - **Perseus** is introduced at the Classical Association of New England.

3/18/92 - Medford, MA - Greg Crane addresses the Massachusetts Classical League at Tufts University.

4/1/92 - Austin, TX - **Perseus** is introduced at the Classical Association of the Middle West and South. A series of hands-on workshops is held.

4/5/92 - Oxford, England - **Perseus** is introduced at the Association for Computing in the Humanities.

4/12/92 - Salt Lake City, UT - **Perseus** is introduced at the Association for College & Research Libraries.

4/24/92 - Villanova, PA - **Perseus** is introduced at the Classical Association of the Atlantic States.

5/21/92 - Chicago, IL - **Perseus** is introduced at the Association of Ancient Historians.

6/11/92 - Boston, MA - The Computer Museum opens its exhibit, "Tools and Tools," featuring **Perseus.**

6/24/92 - Athens, GA - **Perseus** is introduced at the American Classical League.

10/28/92 - Baltimore, MD - **Perseus** is introduced at EDUCOM.

TALK OF THE TRADE

BY LEONORE FLEISCHER

How Many Copies Is Too Many? In the wake of last November's settlement of the two-year-long copyright infringement suit brought by the AAP against Kinko's photocopy chain, which was resolved by Kinko's agreeing to pay $1.9 million in damages to eight publishers, an odd thing has been happening. As you may remember, Kinko's was charged with violation of copyright when its chain of 200 copy shops copied excerpts from books—without permissions and without payment—and bound them into anthologies that it then marketed to college students. Now, it seems, the pendulum has swung in the other direction, and a growing number of small, independent mom-and-pop copy shops are refusing to copy almost anything from a book without first getting publisher permission.

I spoke to a rights person at a major New York trade publishing house—by request, both person and house are to remain anonymous—and was told that the number of copy shops calling for permissions for minor copying is getting to be time-consuming and very annoying, "a little like gnats on a windshield; if enough of them pile up on the glass, you can't see out. Sometimes it takes two hours to resolve a 45-second request. And on the part of the copy shop, it often involves a lot of long-distance phone calling, running costs up 2000%–3000% higher." This rights person thinks that making up to 10 copies of up to 10 pages is probably okay without bothering the publisher for permissions; above that, permissions should be sought. Any legal opinions out there?

The Killer Next Door One of the more bizarre of recent American murders is the so-called "Mensa murder," in which George James Trepal, a computer whiz and a member of the high-I.Q. club Mensa, was arrested, found guilty and sentenced to death for the murder of his next-door neighbor Peggy Carr, who died after drinking a poisoned bottle of Coca-Cola. A number of elements set this killing apart: first, that the killer would actually resort to murdering a neighbor instead of merely turning over her garbage cans; second, that this was a long-premeditated killing, instead of a flare-up that ended with somebody fetching the shotgun; third, that although the police believed he left no clues, Trepal's house was actually filled with them. The fourth and possibly most bizarre aspect is that after the murder the killer hosted a series of Mensa "mystery weekends," during which other Mensa members were invited to the Trepal home and challenged to solve poison-related murders for fun. Although none of the Mensa members caught on, they were witnessing Trepal's own compulsion—part guilt and part arrogance—to reveal bits of the truth.

The case was cracked by special agent Susan Goreck, a police officer who went undercover for seven months, posing as a Mensa member and getting so close to Trepal and his wife that she eventually rented their home and moved into it when they moved out. It was in this home that Goreck found the clues that tied Trepal to the murder: a poisoning guide written in Trepal's own hand, a soundproof basement with torture equipment and, most incriminating of all, a jar containing the very poison that had killed Carr.

The Mensa case arrest made headlines, and Will Schwalbe, director of special projects for William Morrow, immediately thought "book." He located Jeffrey A. Good, staff writer for the *St. Petersburg Times*, who had covered the Mensa murder, which took place in a small Florida town. Good's agent Arnold Goodman of Goodman Associates pulled together the project, teaming Jeff Good with Goreck for *The Mensa Murder*, which Morrow expects to publish in 1993.

Earth, Air, Fire, Water, & the Macintosh One of the most exciting publishing projects to leap out of the spring catalogues is not a book at all but a "multimedia interactive database" titled *Perseus I.O.* and edited by Gregory Crane. Since the Perseus Project itself is centered at Harvard University and Crane is associate professor of classics there, one would expect that *Perseus I.O.* would be published by Harvard University Press, but no. It's coming out of Yale University Press in April. What happened was this:

Harvard sent out a written proposal to publishers outlining the project, which consists of a complete overview of ancient Greek civilization—literature, art, history, archeology—to be published on CD-ROM, distributed on Hypercard for the Macintosh computer, with a full-color videodisc to be played on an Apple-compatible CD player. It includes a review of Greek history, works in Greek and in translation, an on-line version of *Liddell & Scott's Intermediate Greek Lexicon* and a classical encyclopedia; there are thousands of illustrations, including topographical maps of Greece annotated with place names, views of sites and scenes throughout Greece and a catalogue of several hundred Greek art objects. The CD-ROM will sell for $125, the videodisc for $200 and an accompanying manual for $25.

To Harvard, the advance was not as important as the presentation of *Perseus I.O.* and the marketing plans of the acquiring publisher. Tina Weiner, associate director of Yale University Press, and Charles Gresch, Yale's executive editor, went to take a look and were instantly enthusiastic about *Perseus I.O.*'s possibilities. They submitted a publishing and marketing plan to Harvard, and the project was theirs.

"It was a sort of leap of the imagination. In the short run, it's not going to make gazillions of dollars," admits Weiner. "At this point nobody but a university press would do something like this, but every now and then it's fun to do something different. We have become excited about the possibilities of other projects in electronic media. We have a bird anatomy project going now, somewhat smaller in scope than *Perseus I.O.*, and we're much more receptive to electronic media as a supplement to book publishing." □

Perseus 1.0

Interactive Sources and Studies on Ancient Greece

Gregory Crane, editor in chief

Named after the mythological hero who explored the limits of the known world, *Perseus* is a multimedia interactive library that will advance the ways in which ancient Greek literature, history, art, and archaeology can be examined. This database of text and images, published on CD-ROM and videodisc, provides a solid introduction to Greek antiquity for beginning students in many fields as well as advanced tools and resources for specialists. The initial edition of *Perseus* includes an overview of fifth-century B.C. Greek history, works in Greek and in translation by ten authors from the archaic and classical periods, an on-line version of the Liddell-Scott *Intermediate Greek-English Lexicon,* and a collection of short articles and glossary entries on topics in *Perseus* including geographic regions, architectural terms, vase shapes, and biographies of ancient authors. Among its thousands of illustrations are interactive maps of Greece annotated with place names, views—both still shots and motion pictures—of sites and scenes throughout Greece, and a catalog of several hundred objects of Greek art, illustrated with color images and drawings.

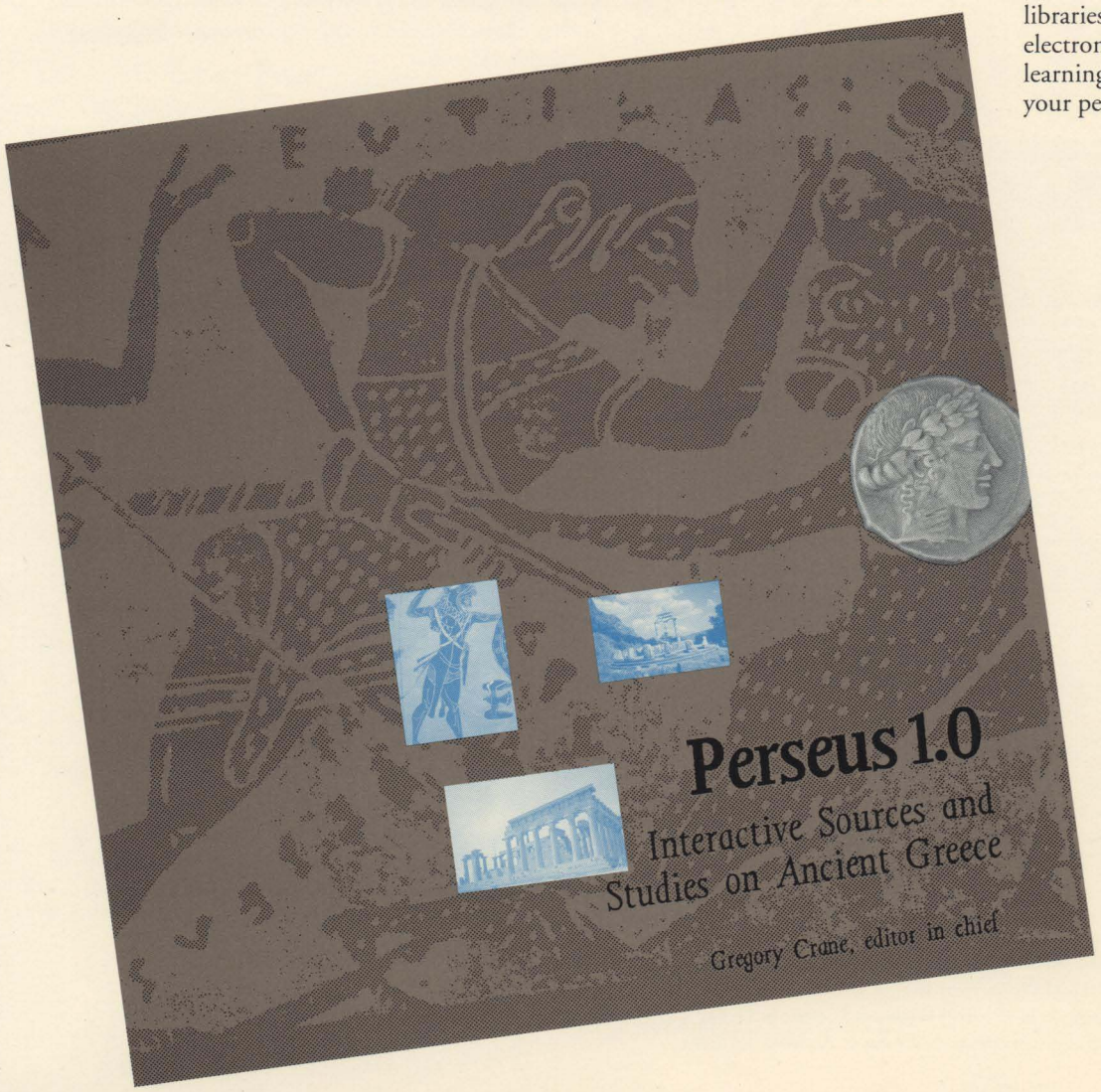
Comprehensive, authoritative, flexible, exciting, and easy to use, *Perseus* is:

a **powerful research** tool for
- archaeologists
- cultural anthropologists
- historians
- philologists

an **essential reference** tool for
- undergraduates
- graduates
- anyone interested in the study of ancient Greece

an **important teaching** tool for all courses in
- classics
- art history
- history
- western civilization
- anthropology
- comparative literature

Perseus can be used in
- academic departments
- libraries
- electronic classrooms
- learning laboratories
- your personal workstation



"*Perseus* is an outstanding resource for all courses on ancient Greek language, history, culture, and art. Its ability to link different types of materials is amazing, allowing instant access to texts, maps, site plans, and photographs of places, buildings, vase paintings, and coins. Ancient Greece has never been more accessible."

—Walter Englert, associate professor of classics, Reed College

The *Perseus* Multimedia Library

Information in *Perseus,* unlike that in a conventional library, is cross-linked so the user can move quickly across traditionally separate types of information in a non-linear, non-sequential way. Students of ancient Greek civilization will benefit from the interplay of the diverse and interactive source materials, which have never before been integrated into one comprehensive database.

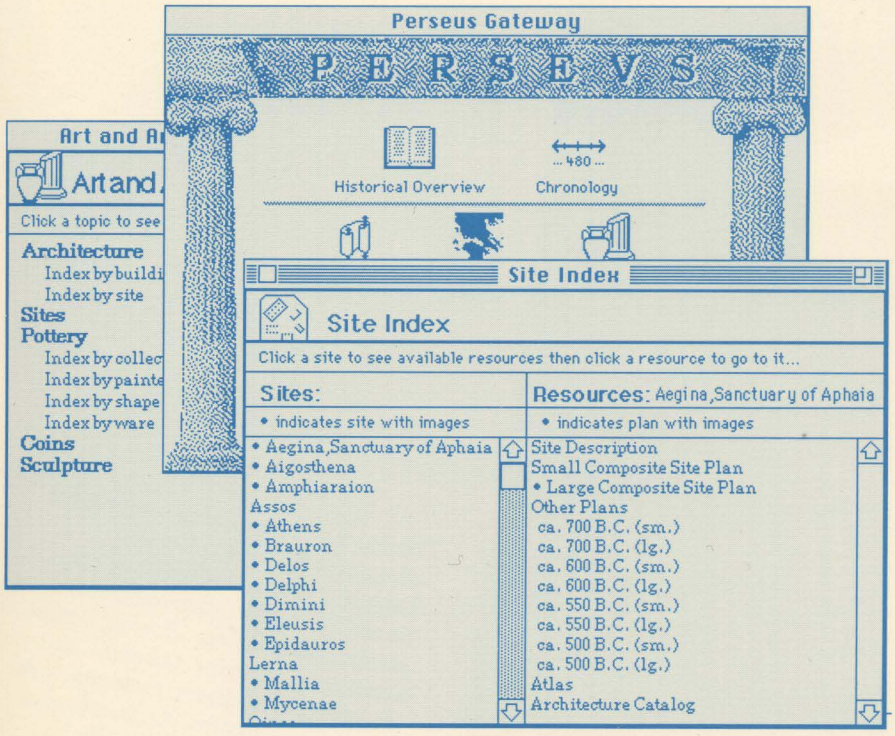
Perseus also gives its readers the power to annotate and reorganize information according to their needs and interests. The "Paths" feature can be used as a note-taking device for individual research and as an expository tool. In addition to the paths and links already found in the database, users can create and save their own "electronic essays" to navigate through the data.

Perseus 1.0 will support teaching and study in:

Literature

—*Perseus* includes the complete works of the following authors:

- Homer
- Aeschylus
- Sophocles
- Herodotus
- Thucydides



The Perseus Gateway is the point of entry into *Perseus.* The Gateway contains buttons that link you to *Perseus* resources and utilities. The Art and Architecture Index Card which lists all archaeological objects in *Perseus* is behind it. In front is the site index which has been selected from the Art & Architecture index.

and also includes:

- Hesiod (*Works and Days, Theogony, Shield of Herakles)*
- Pindar *(Odes)*
- Pausanias *(Description of Greece)*
- The handbook of mythology attributed to Apollodorus (with notes and index by J. G. Frazer)
- a selection of the Greek lives of Plutarch

Many of these Greek texts and translations are from the Loeb Classical Library. Some are accompanied by notes.

Art, Archaeology, and Architecture

—The *Perseus* image database is the largest corpus of Greek art ever published electronically and the widest photographic database of mainland Greece ever distributed. It features:

- a catalog of several hundred objects of Greek art
- 2,400 views of 137 vases, some with fifty or more individual views
- a key word index for all art objects
- an extensive archaeological catalog with thousands of accompanying illustrations
- 2,300 images illustrating about 800 sites, some with textual descriptions
- 150 site plans, many with interactive video buttons that allow the user to call up corresponding views on the videodisc
- 1,060 views of 527 coins
- descriptions of 310 buildings with illustrations, plans, and text
- extensive coverage of the Parthenon sculptures and several hundred details illustrating the pediments from the temple of Aphaia on Aegina

Language

—An on-line version of the Liddell-Scott *Intermediate Greek-English Lexicon* and an index of all English definitions, together with complete morphological databases for all Greek texts in *Perseus.*

History

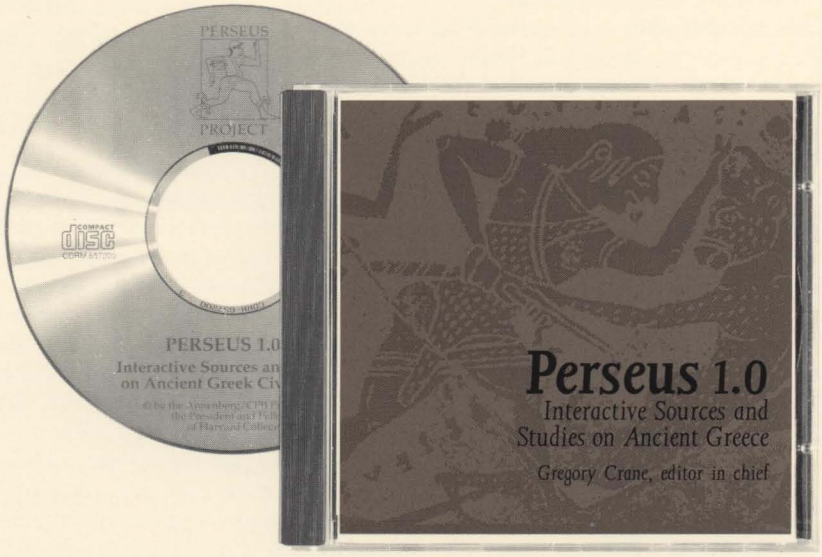
—A historical overview which gives a brief survey of major historical and cultural events in the fifth century B.C., written by Thomas Martin. This chronological narrative has links into the primary material.

Reference

—Some additional reference materials that will enhance your study of ancient Greece:

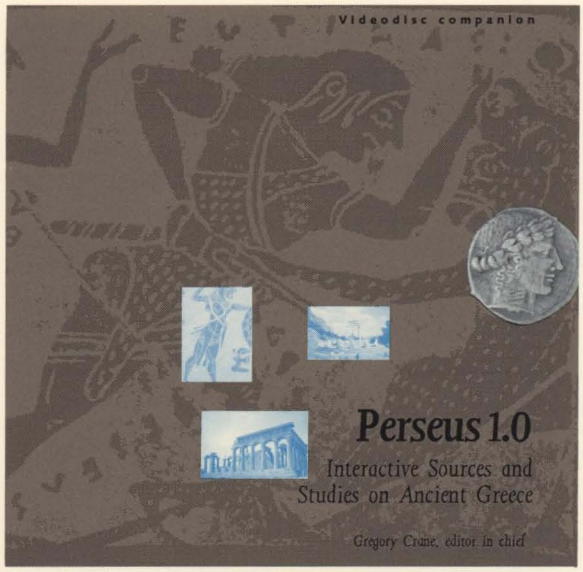
- an atlas with general and regional maps. About 800 sites in all may be plotted on these maps.
- a classical encyclopedia that is a collection of short articles and glossary entries on topics mentioned in *Perseus.* This includes vase shapes, architectural terms, geographic regions, and biographies of ancient authors.

The *Perseus* Package



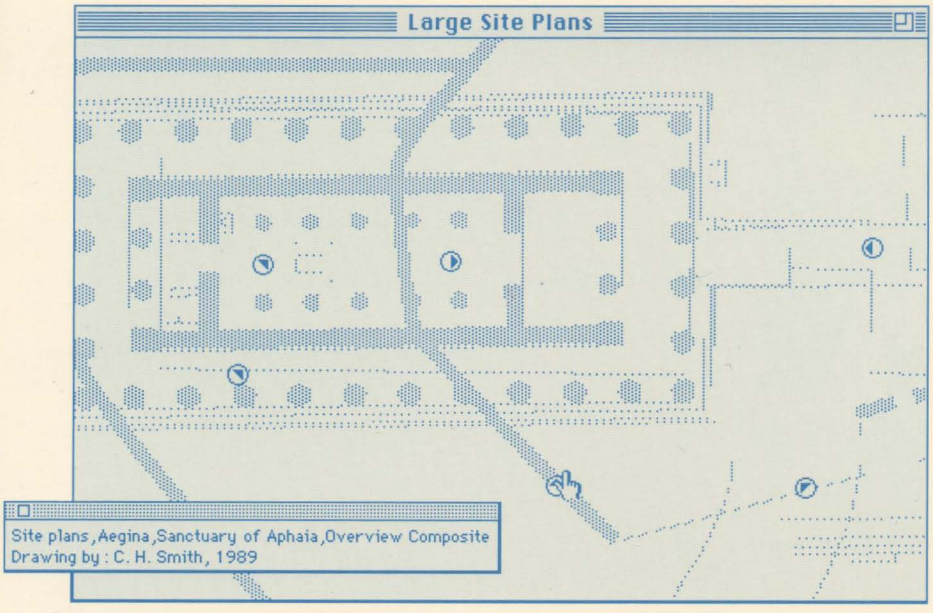
CD-ROM (Compact disc—read only memory)
CD-ROM's large and flexible storage capacity makes it the ideal medium for the *Perseus* database. The *Perseus* CD-ROM turns your Macintosh into a multimedia library complete with interactive text, illustrations, color images, maps, and on-line reference materials.

ISBN 0-300-05087-9



Videodisc
The videodisc companion to the *Perseus* database contains nearly 6,000 still images and fifteen minutes of motion video and narration of scenes and sites throughout Greece. It is the largest photographic collection of Greek art and views of Greece ever published electronically. The videodisc is fully interactive with the rest of the database so users can simultaneously integrate text and images in their study. It is also accompanied by a 70-page booklet that indexes the images with brief descriptions and frame sequences so that users can access the images directly with their videodisc remote control.

ISBN 0-300-05086-0



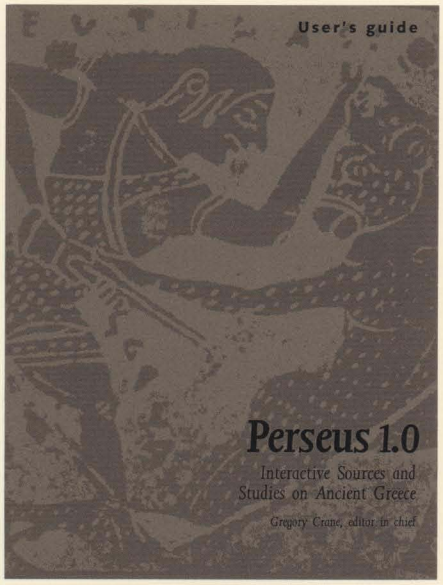
Perseus allows for easy interaction between the site plans and the color views that are available on videodisc or as digitized 8 bit images. You can selectively access buildings and perspectives on the plans and call up the corresponding view on the video monitor to "walk" around the site.

"Through hypermedia links within a vast library of materials—textual, linguistic, historical, artistic, and architectural—*Perseus* gives students and faculty an unparalleled environment for both comprehensive and intensive studies of ancient Greek culture."

—Charles Ess, associate professor of religion and philosophy, Drury College

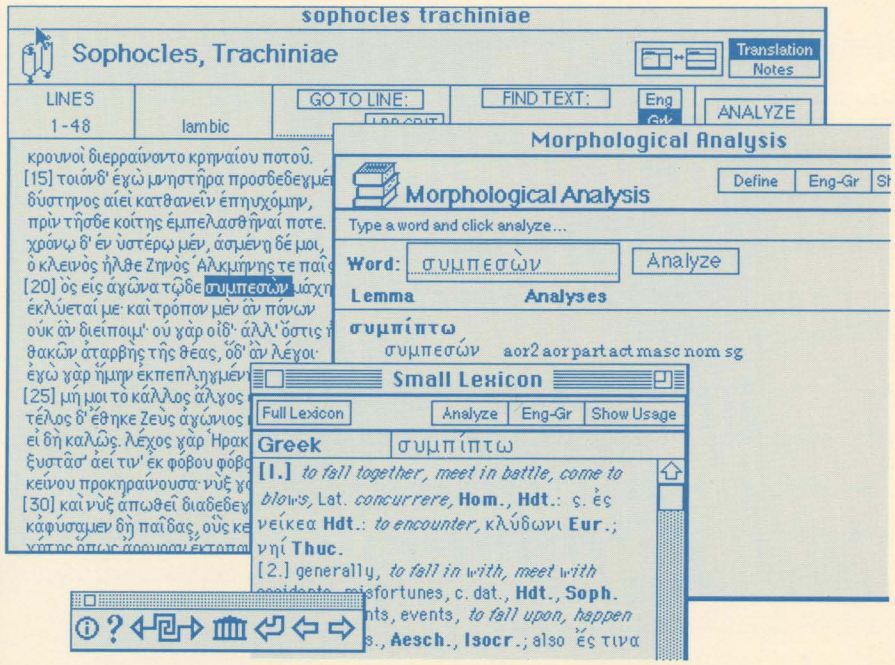
"By making research more efficient, *Perseus* can lead to greater intellectual curiosity. You can ask more sophisticated questions because it won't take forever and a day to come up with the answers. It will be done in minutes."

—William Ziobro, associate professor of classics, College of the Holy Cross, and secretary and treasurer, American Philological Association



User's Guide
The User's Guide provides an introduction to the project and clear, concise instructions for using *Perseus*. It is an excellent reference for users and offers suggestions on how to enhance and expand your use of the database.

ISBN 0-300-05088-7



Four Philological Tools are available to explore the usage, vocabulary, grammar, and syntax of ancient Greek. They are the Morphological Analysis tool, Greek-English Lexicon, English-Greek Word List, and Compound Verb List.

The Builders of *Perseus*

Perseus was developed by a large team of classicists, including philologists, historians, and archaeologists. Major funding is provided by the Annenberg/CPB Project, with additional support from Apple Computer, the National Endowment for the Arts, as well as the Packard Humanities Institute, Xerox Corporation, Boston University, Bowdoin College, and Harvard University. The Perseus Project is a non-profit enterprise located at the department of the classics, Harvard University.

Editor in Chief
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Major Funding from
The Annenberg/CPB Project

The Perseus Demonstration Video
A 22-minute preview and demonstration video (VHS format) is now available. In the video, Professor Crane illustrates some of the many applications of *Perseus.* This $10 video is an excellent way to preview *Perseus,* and it can also be used to further explore the database after your purchase.

Technical Specifications:
Perseus is distributed in Hypercard™ 2.1 and runs on Macintosh computers. The minimal configuration is a Mac Classic with a hard disk, 2Mb of RAM, and an Apple-compatible CD-ROM player. The optimal, which allows the use of digital images, is a Macintosh LC or better with a hard disk, at least 4 Mb of RAM, a color monitor and 8-bit graphics board, and an Apple-compatible CD-ROM player. A videodisc player and video monitor can be used with either of these configurations to take advantage of the full-color still and motion images on the videodisc.

Address orders to:
Yale University Press
92A Yale Station
New Haven, CT 06520

On-approval ordering policy (30-day review for institutional orders only):
Perseus is available for a 30-day review period. We will send an approval copy with an invoice. If you decide to keep it, simply pay the invoice. If you find it does not meet your needs, mark "cancel" on the invoice and return it along with the product in saleable condition for full refund.

Prices are subject to change without notice. Please allow 4–6 weeks for shipping.

Perseus Order Form F2391 2 3 4 5 6 7 8 9

Perseus will be shipped beginning March 1992. Site licenses for network use are available. Please contact Yale University Press at (203) 432-0912 or FAX (203) 432-2394 for more information about site licenses. To order *Perseus* for use on a single computer, please fill out this form completely, including subtotal, tax (if applicable), postage and handling, total enclosed, and signature (if paying by credit card). Individuals are asked to pay in advance; MasterCard, VISA, and checks are accepted. Please make checks payable to Yale University Press. Checks drawn on Canadian banks should be marked "Pay in U.S. dollars." Provide shipping information in the designated area below. **Sorry, no phone orders.**

We offer three separate packages (listed below). All packages include a copy of the User's Guide. All items (CD-ROM, videodisc, and User's Guide) may also be purchased separately.

Please send me the following (be sure to indicate quantity):

Qty.	Item	Price	Amt.
____	The complete *Perseus* package (includes CD-ROM, videodisc, and User's Guide). (ISBN 05087-9, 05086-0, 05088-7)	$350.00	_____
____	The CD-ROM package (includes CD-ROM and User's Guide). (ISBN 05087-9, 05088-7)	$150.00	_____
____	The videodisc package (includes videodisc and User's Guide). (ISBN 05086-0, 05088-7)	$225.00	_____
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____	Additional videodisc(s) (ISBN 05086-0)	$200.00	_____
____	Additional User's Guide(s) (ISBN 05088-7)	$ 25.00	_____
____	Demonstration video (ISBN 05246-4)	$ 10.00	_____
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		7% G.S.T. (Canadian residents)	_____
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Praise for *Perseus:*

"*Perseus* is being hailed by many classicists as an exciting new tool for the study of ancient Greece."

—Katherine S. Mangan, *Chronicle of Higher Education*

"*Perseus* is extremely easy to use and the materials are very accessible, even to a computer novice. Because it is interactive and cross-disciplinary, *Perseus* will benefit students from every department—from classics to computer science."

—Paul Burke, associate professor of classics, Clark University

"Perseus is alive and well in the form of an adventurous computer database that, with the click of a button, helps students navigate through the complex and often intimidating morass of ancient Greek linguistics, history, and art."

—Laura Van Tuyl, *Christian Science Monitor*

Perseus was distributed for testing to these sixteen sites in 1990 and has been widely praised:

Ball State University
Baylor University
Catholic University
Central Washington University
Clark University
Colorado College
Columbia Bible College and Seminary
Cornell College
Davidson College
Drury College
Michigan State University
Miss Porter's School
Oberlin College
Phillips Academy
University of Illinois at Chicago
University of Texas at Austin

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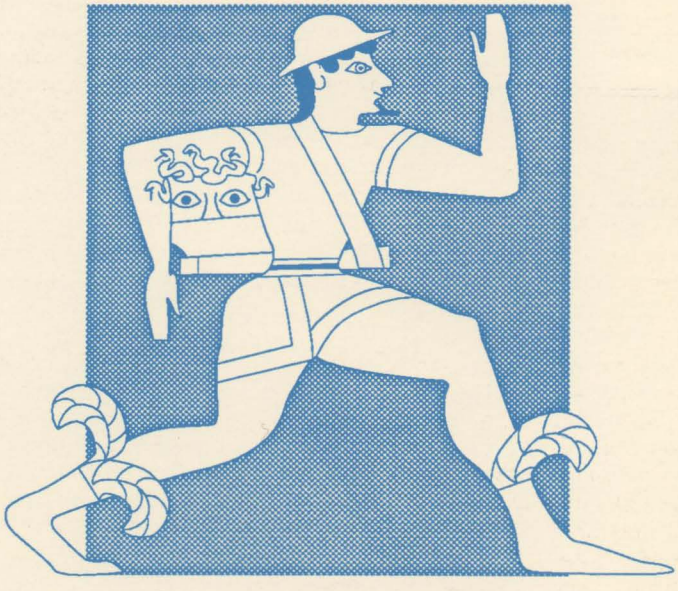
PERSEUS



"Ancient Greece has never been more accessible."

—Walter Englert, Reed College

THE CHRISTIAN SCIENCE MONITOR
AN INTERNATIONAL DAILY NEWSPAPER
MONDAY, APRIL 29, 1991 50¢ ($1.00 CANADIAN)
VOL 83, NO. 107

'HYPERMEDIA' LEARNING

To Ancient Greece Via Computer

By Laura Van Tuyl
Staff writer of The Christian Science Monitor

CAMBRIDGE, MASS.

GREEK mythology has it that Perseus slew the fearsome snake-haired Medusa and saved princess Andromeda from a sea monster.

Today, Perseus is alive and well in the form of an adventurous computer database that with a click of a button helps students navigate through the complex and often intimidating morass of ancient Greek literature, linguistics, history, and art.

Perseus is an "electronic library" that in its initial version includes all major Greek texts and translations, over 5,000 landscape and architectural images, photographs of 500 artifacts, site plans for numerous Greek sites, and color videos. A catalog of 140 Greek vases offers at least 30 different views of each piece.

"All of sudden you've really broken through some barriers that constrain what you can do with printed publications," says Gregory Crane, associate professor of classics at Harvard University here in Cambridge and editor in chief of Perseus.

Using a Macintosh II, a compact-disc player, and a videodisc player, Perseus democratizes learning, Dr. Crane says, through its interactive "hypermedia" environment, which puts mountains of information at anyone's fingertips.

Perseus testifies to growing interest in hypermedia technology among higher education faculties. As a teaching and research tool, hypermedia "is a very powerful instrument for cutting across disciplinary boundaries," says Robert Jones, professor of sociology and director of the Hypermedia Laboratory at the University of Illinois in Urbana-Champaign.

Perseus is "exceptional," says Dr. Jones, because of "the ease with which a novice student of ancient Greece can get answers to his or her questions simply by browsing around in hundreds of megabytes of information."

Institutional skepticism of the technology abounds, adds Jones, and even Crane says, "It's communicated to you in no uncertain terms that this rocks the boat."

But officials connected with the project say they are hopeful Perseus will become popular, because it rides on the availability of easy-to-use, inexpensive technology.

"The number of resources available on optical disc has been growing fairly rapidly, as has the use of video in classrooms," comments Stephen Ehrmann, program officer for interactive technologies at the Annenberg Project of the Corporation for Public Broadcasting. The corporation is pumping more than $2 million into Perseus.

"It pulls together resources which have never been collected together before – let alone accessible to undergraduates," Dr. Ehrmann adds. He estimates that Perseus software (one CD ROM and one 12-inch videodisc) will be sold for less than $200. Yale University Press is scheduled to publish the first edition of Perseus in December.

In his office, Crane demonstrated how Perseus could be used. If students are studying the Greek poem "Olympian I," by Pindar, they can read the Greek text and its translation, side by side, on the computer. Using a built-in 35,000-word lexicon and small encyclopedia, says Crane, they can quickly analyze Greek words and their meanings, even if they don't know the language.

Crane pointed out one reference Pindar makes to Olympia, where the Olympic games took place. Using Perseus's atlas, students can zoom in on the region and view color Landsat photos. Drawings of the archeological site plan are available at the click of a button, as are photographic views from various vantage points, creating "an uncanny sense of having walked there," Crane says. Students can also watch a short video about the site.

WITH numerous clicks of a hand-held "mouse," Crane called up a Greek vase and created a montage of rotated views and enlarged details of the piece. "Usually, [print] publications can't afford to have enough pictures, and they're not very detailed," says Crane. "You can really start to ask questions of these objects, which before, you could do only in the museums themselves."

An obvious advantage of Perseus is the efficiency of working in an all-electronic environment. Students can move smoothly between media, drawing connections between them.

"A lot of logistical 'garbage' which makes it hard for students to ask questions and pursue problems gets eliminated or vastly reduced," Crane says. "In the same hour of time, instead of asking 10 questions, they can ask 30."

Hypermedia technology also takes the "grunt work" out of teaching – "the repetitive, boring stuff that has to be done, but which chews into a teacher's time," he says. If students use the computer, "it changes the nature of class, because when I talk, it's at a higher level."

But what does Perseus do for learning?

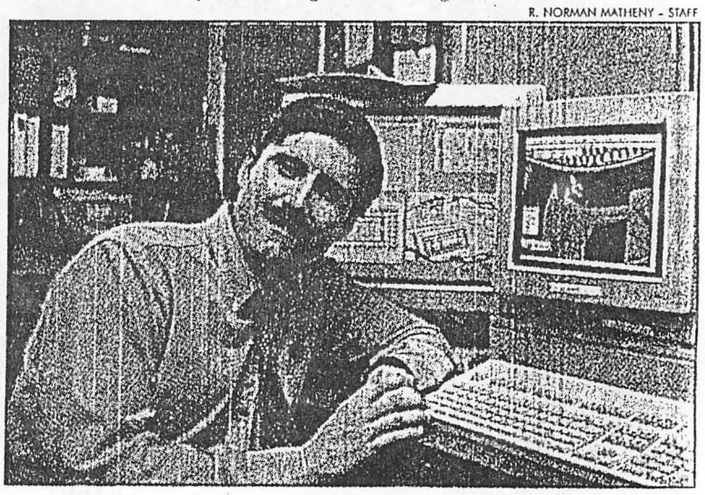
"That's what we're struggling with right now," admits Crane. "We're trying to get a handle on how this affects what goes on in the student's head." One thing is certain, he says: It is now possible for people with minimal training to get further into a subject than was physically possible before.

A group of sophomores were asked to look up everything Pindar wrote about wealth, see how he defined it, and write papers on their findings. "What they came up with, in many ways, looked like publishable articles in journals," Crane says.

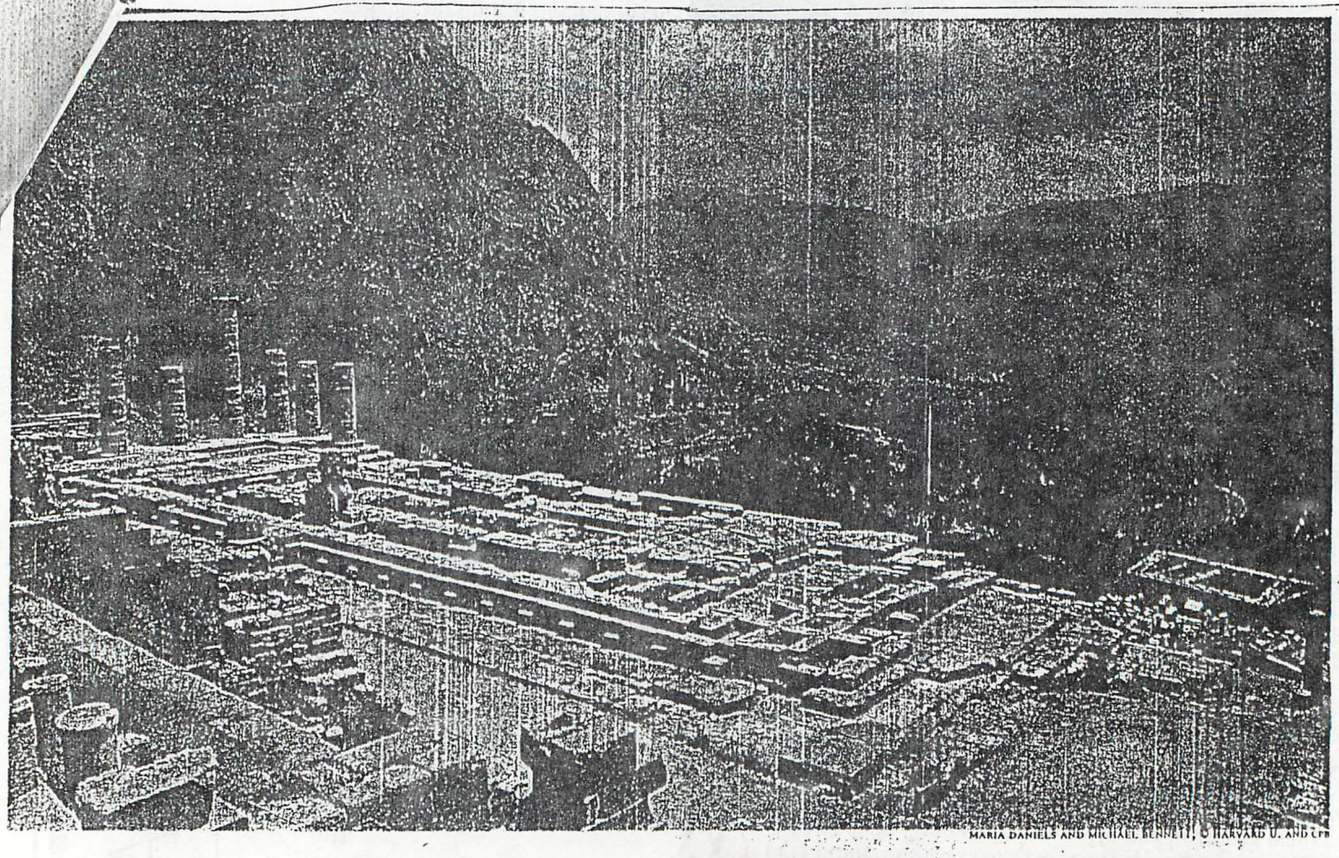
Perseus "is a tremendously rich resource," says Charles Ess, an associate professor of philosophy and religion at Drury College in Springfield, Mo., who is currently testing the Perseus software. He says he thinks many educators will want to use this database on ancient Greece, "because you can use it in the context of so many liberal arts courses."

Dr. Ess says he is not convinced that hypermedia presents a problem-free road to better learning. Still, "it's exciting stuff," he says. "It forces you to rethink how you teach. That can be bothersome for some, but I've found it very liberating and very refreshing."

R. NORMAN MATHENY - STAFF



POINT MAN: *Harvard's Gregory Crane is editor in chief of the Perseus database, an 'electronic library' designed to help students explore ancient Greek culture.*



MARIA DANIELS AND MICHAEL BENNETT, © HARVARD U. AND CFB

'Perseus' Helps Students See Links Between Aspects of Ancient Greece

By KATHERINE S. MANGAN

AUSTIN, TEX.

A student sits at a computer terminal, reading the first Olympian ode by the Greek poet Pindar. Curious about the poem's setting, she clicks a few buttons and a color photograph of the ruins of ancient Olympia appears on an adjacent video screen.

The student pushes another button to zero in on a sculpture depicting Pelops preparing for a chariot race, which she views from several angles. With detailed images of the site etched in her mind, she returns to the text, which is displayed on the screen in Greek and English.

The project that makes it possible to call up a Greek text on a computer and readily gain access to maps, diagrams, photographs, and reference materials is called "Perseus." Based at Harvard University, Perseus is being tested in classes for undergraduates at 20 colleges and universities around the country, including the University of Texas here.

Named after the mythological hero who explored the boundaries of the then-known world, Perseus is being hailed by many classicists as an exciting new tool for the study of ancient Greece.

2,000 Images

Rather than searching through stacks of books for information related to their reading, students simply punch a few commands into their computers.

Here at the University of Texas, scholars use an Apple Macintosh to coordinate information from a CD-ROM—a compact disk that stores information in digital form—and a laser videodisk. The videodisk contains about 2,000 images, including still pictures, diagrams, maps, and motion videos. The CD-ROM includes about a million words of poetry, plays, scholarly articles, historical material, and a classical Greek dictionary. The readings cover the period from earliest times through the fourth century B.C. Apple's "HyperCard" software links the text and images, so students can jump back and forth between readings and illustrations.

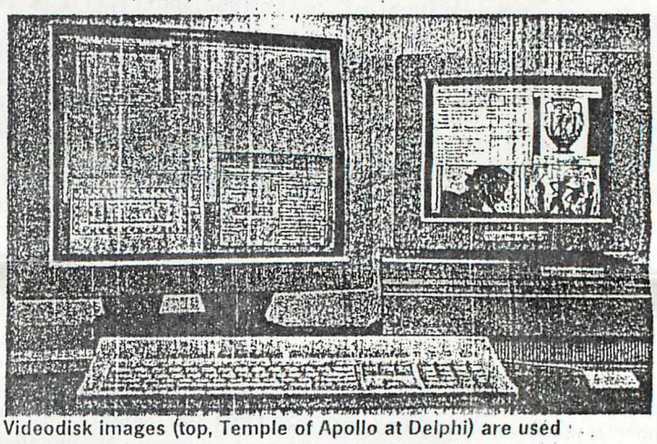
"The system has a wealth of information," says Scott Gordon, a junior at the university. "You don't have to go to the library and find 10 books for the information you need. It's right here."

Michael Gagarin, a professor of classics and chairman of his department on the Austin campus, used Perseus in a course he taught last spring on the intellectual history of Greece. One of its biggest advantages, he says, is that it allows students to cross-reference information quickly.

"All of the material in Perseus is loosely linked together, so that the reader of a play who sees a reference to Heracles can easily find references in other texts, see visual representations and relevant place names on a map, look up the Greek words in a dictionary, and read the encyclopedia entry on Heracles," Mr. Gagarin says.

Gregory Crane, an associate professor of classics at Harvard who heads Perseus, says it has limitations because it is so new. The test programs were released to campuses during the last academic year with just a fraction of the material that will ultimately be accessible. A team of classicists and classical archaeologists around the country has been working to update the data base.

A new version of the Perseus software is scheduled for general release in December by Yale University Press, and further updates are expected each year.



Videodisk images (top, Temple of Apollo at Delphi) are used with information from a computer and a CD-ROM player.

Mr. Crane says he hopes the project will benefit not only classicists, but scholars in other disciplines as well. "Perseus will let people cross disciplinary boundaries within classics and wrestle with primary material outside their areas of expertise."

But, he says, "perhaps its greatest value is that it will make it possible for people who aren't classicists to integrate this material into their work. We want classics to play a greater role in the intellectual discourse of the day, and we think it can."

A Boon for Small Colleges

Major support for Perseus came from a $2.5-million grant from the Annenberg/CPB Project and $200,000—mostly in equipment—from Apple Computer Inc.

While Perseus is a welcome addition to the University of Texas, it could be a real boon to small colleges with limited library resources, Mr. Crane notes.

Although the material cannot be checked out of the library the way a book can, it has its own advantages. Because so much information can be packed onto a single disk, the project lets a student explore architectural sites and artifacts in greater detail than most textbooks allow. For instance, there are at least 15 photographs of each vase depicted in Perseus, taken from different angles.

In addition, the first version of Perseus includes the plans of 30 Greek sites, with detailed views of their buildings. A student can "walk through" a site such as the Acropolis by moving an arrow to a specific point on the plan and pressing a key. Students can view the site from different perspectives by moving the arrow. For four sites—Delphi, Eleusis, Isthmia, and Olympia—students can watch 18 minutes of motion videos.

William Ziobro, an associate professor of classics at College of the Holy Cross, which is also testing the Perseus materials, says Perseus helps students make connections between the literature, language, art, and architecture of ancient Greece.

Mr. Ziobro, who is secretary and treasurer of the American Philological Association, adds that by making research more efficient, Perseus "can lead to greater intellectual curiosity."

"You can ask more sophisticated philological questions because it will not take forever and a day to come up with answers," he says. "It will be done in minutes." ■

HIGHER EDUCATION
WITHIN REACH
THE ANNENBERG/CPB PROJECT
TECHNOLOGY FOR LEARNING

PERSEUS: A History

By Steve Ehrmann

The Annenberg/CPB Project was created over a decade ago with a commitment to insuring that all students get access to a college education. Capitalizing on existing and developing technologies, the Project, in effect, has sought to tear down the walls of the traditional classroom and bring innovative, state-of-the-art educational resources directly to the student.

PERSEUS is a cornerstone of that commitment. The brainchild of Gregory R. Crane, Associate Professor of the Classics at Harvard, PERSEUS gives the student the power, in one sitting, to delve deeply into Greek civilization -- its art, history, architecture and political figures. With Greg's foresight and imagination, PERSEUS has become a reality and its effect on the teaching of the classics promises to be revolutionary. It is a model for similar libraries of text and images in other disciplines and, in fact, the Annenberg/CPB Project has funded a comparable library of physics materials and tools that was directly inspired by PERSEUS.

What makes PERSEUS so breathtaking is its ability to allow the student to explore thousands of slides of ancient architecture and works of art that have been compiled, for the first time ever, on one software program. The added advantage of optical discs and an interactive software package allows the student to see works such as the Parthenon from different angles. To examine, side by side, works of art from that era that today are scattered throughout the world is very exciting. Imagine having all the volumes of an encyclopedia at your fingertips and being able to cross-reference and simultaneously conduct research at the touch of a keyboard, and you would only scratch the surface of PERSEUS' potential.

PERSEUS gives students of the classics a resource that even scholars have never had. And that is precisely why the Annenberg/CPB Project found it so appealing. It will give students from colleges throughout the country, unparalleled access to a discipline that was previously, to say the least, problematic. Any college regardless of size or endowment can offer its students a unique opportunity to study a subject and culture so crucial to the foundations of today's civilization.

Ultimately, PERSEUS blazes a trail for students and educators alike by making technology accessible, relevant and invaluable for those who study past civilizations. For the Annenberg/CPB Project, it has been truly rewarding to be associated with Dr. Crane and other educators who have brought PERSEUS to life. They are truly pioneers in a methodology that will forever change the way teachers teach and students learn.

HIGHER EDUCATION WITHIN REACH

THE ANNENBERG/CPB PROJECT
TECHNOLOGY FOR LEARNING

TECHNOLOGY DEMONSTRATION PROJECTS

FACT SHEET

The Annenberg/CPB Project is the nation's leader in helping colleges and universities use telecommunications technologies to reach the growing number of older and part-time students -- the "new majority" in higher education. The Project's "technology demonstration projects" are innovative experiments with technology that expand students' access to higher education and educational resources and improve the way students learn and faculty teach.

Why are these experiments with technology so important to the future of higher education? For several reasons:

- They provide access to college for students who cannot come to the college campus because of career or family commitments, distance or physical disability. Because these "distance" learners will comprise 60 percent of students in higher education by the year 2000, finding effective ways to serve them has become an important priority for institutions nationwide.

- They allow students -- both on and off-campus -- to interact with one another and their instructors in new and often better ways.

- They bring outstanding educational resources from around the world into the classrooms and lecture halls of even the smallest colleges and universities, greatly expanding the amount and quality of information any one institution can offer.

- They use the power of computers and telecommunications to organize and format information in new and more efficient ways, facilitating more effective teaching and learning.

- They are affordable not only for individual institutions but for individual students as well. As colleges and universities look to cut costs in an increasingly competitive academic environment, developments in technology will continue to provide one attractive alternative.

The technology demonstration projects described below are divided into two categories: hypermedia and telecommunications. The hypermedia projects are sophisticated applications of computer technology that organize and link vast amounts of textual, graphic and video information into comprehensive systems, allowing users to move easily and coherently from one medium to another. The telecommunications projects use various technologies to facilitate communication at or over a distance.

HYPERMEDIA PROJECTS

PERSEUS: A Computer Database on Greek Civilization

The PERSEUS project at Harvard University is a perfect example of the computer's ability to organize and make easily accessible multitudes of resources in a given subject area -- making even the smallest college a storehouse of scholarly material. Designed to help colleges take advantage of resources outside of their walls, PERSEUS is an interconnected textual and visual database on Greek civilization, the first "personal computer library" of its kind in any discipline. Tens of thousands of pages of text and visual images have been stored on CD-ROM and videodisc including a corpus of literature in Greek and English, an on-line dictionary of ancient Greek, an atlas, measured drawings, and visual images of artifacts and topography from the classical world. With such an easy-to-use and affordable library, students study more like scholars.

INTERMEDIA: Network of Scholars' Workstations

Brown University's Institute for Research in Information and Scholarship (IRIS) developed INTERMEDIA, a remarkable software system that enables students to locate widely scattered bits of related information and link them in various configurations on the computer screen. (In essence, the software automates the "see also" function of an encyclopedia by enabling the user to see related text and images instantly.) INTERMEDIA has been used for teaching subjects as diverse as English literature and plant cell biology. The software has been released in conjunction with Apple Computers, Inc. for use on the Macintosh II.

CUPLE Mechanics Disk: Computer Software to Teach Physics

The American Association of Physics Teachers, in collaboration with physicists and the Universities of Maryland and Michigan State, is developing the Comprehensive Unified Physics Learning Environment (CUPLE) Mechanics Disk, an innovative approach to teaching introductory physics. The disk contains computer software to support an undergraduate physics course, enabling students to create simulated physics experiments and compare the results with real life data. Students can also carry out a variety of scientific calculations and access instructional materials -- including explanations of concepts, reference materials for problem solving and guides to library research.

Project Athena: The Language Lab of the Future

Working to improve the way students learn foreign languages, the Massachusetts Institute of Technology has developed Project ATHENA, a new type of language learning laboratory that combines computer and video technologies. One component of the project, a French

language videodisc entitled "A la rencontre de Philippe," enables the computer to respond in the language as a person would do. As students watch specially produced video programs, they are able -- through their computer keyboards -- to respond to questions and situations and direct how the video story unfolds. The French videodisc is currently being tested with students nationwide, and work is underway on a similar disc in Spanish.

TELECOMMUNICATIONS PROJECTS

Audiographic Conferencing: Linking Students Through Computers and Phones Lines

One major obstacle to students learning at a distance is their inability to participate in classroom discussions. The University Tech-Tel Corporation, with the Harvard University Extension School and the Cambridge Tele-Teaching Group, developed a system for teaching "distant" learners using audiographic conferencing technology. This technology allows faculty and students at remote sites to hear each other through telephone lines and to see common images on their computer screens. Participants can communicate verbally as well as visually, by using a pointer, drawing or typing on the screen. Calculus is one subject now being taught with this method.

ENFI: Teaching Writing Skills Through Computer Networks

A consortium of higher education institutions led by Gallaudet University has developed a computer network -- called Electronic Networks for Interaction (ENFI) -- to teach writing composition skills. Originally designed to facilitate communication among deaf students, this system of "conversing by computer" has become a breakthrough in the teaching of formal writing skills to all students at all levels of ability. ENFI has been so successful because it replicates the natural writing process, allowing students to immerse themselves in different writing styles and promoting interaction and feedback from other individuals, whether on a single campus or between campuses. ENFI is currently being tested with faculty and students at Carnegie Mellon University, the University of Minnesota and the Northern Virginia Community College.

PICS Network: Foreign Television Programming on Videodisc

Recognizing a need to make the study of languages more interesting and to improve students' comprehension skills, a consortium of universities led by the University of Iowa has created the Project for International Communications Students (PICS) Network. The project serves as a distribution center for authentic video footage, news clips, public affairs programming, documentaries and children's programs from foreign countries. Compiled on videodiscs (a combination of video and computer software) and supplemented by study guides and transcripts, PICS material is being used at both the high school and college level as an enhancement to the traditional language lab. Materials are currently available in German, French, and Spanish, and are planned for Italian, Russian, Japanese, and Korean.

The Virtual Classroom: Computer Conferencing

Developed by the New Jersey Institute of Technology, the "virtual classroom" computer conferencing system enables students and teachers to interact and work together by computer even though they are not in the same place or on-line at the same time of day. A number of colleges across the country are now using the system to offer courses to students both on and off campus. Serving as a transcript of all information ever discussed over the network, the system features electronic mail capabilities and can work with graphics and other computer packages.

BioQUEST: Computer-Generated Laboratory Experiments

A consortium of colleges and universities led by Beloit College has created high-level computer software to support an entire undergraduate biology curriculum -- the first comprehensive software of its kind in any subject area. Spanning four areas of study -- genetics, physiology, ecology and molecular biology -- and offering more than 18 different computer programs, BioQUEST is truly bringing biology education to a new level. The software simulates actual biology experiments, enhancing students' understanding and appreciation of the wet lab and allowing them to build a case for their hypotheses and lab results through statistical data. The software can do anything from fruit fly mating experiments to sophisticated processes for assisting in environmental decision-making. Affordable for both institutions and individuals, the software is currently being tested with faculty and students at approximately 100 colleges and universities nationwide and will be formally available in 1992.

The Annenberg/CPB technology demonstration projects take one or two approaches: they exploit technology to present information that is uniquely suited to some type of electronic medium -- television, telecommunications or computers. Or they utilize technology to close the gap -- caused by either distance, socio-economic status or disability -- between learners and educational institutions.