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'Hypermedia' and scholarly publishing

GREGORY CRANE

The Perseus Project, an electronic database incorporating texts and images of archaic Greece, encourages exploration into the minds, mores, and habitation of a classic civilization

PROBLEMS OF FORM AND CONTENT

Traditional Forms of Scholarly Publication

The 'monograph' and the 'book' are two different mechanisms by which scholars disseminate the results of their work. These two forms reflect two rather different attitudes towards publication, and the contrast between them provides a good introduction into the possibilities and problems of electronic information. The 'monograph' is a specialized document, aimed at experts in a particular field, possibly part of a monograph series, and, as such, really a journal article that has burst its natural boundaries and overrun an entire volume. In a monograph on classical philology, for example, Greek is not translated, footnotes – even in small print – compete very successfully with text for space on the page, and the narrative tone makes few if any compromises to the reader. Whoever does not understand the presuppositions of a particular scholar or controversy will get little help.

The 'book,' in contrast, aims for a wider audience. A book is primarily meant to be read, not studied, and must therefore engage as many readers as it conveniently can. Greek text may be quoted in the original, but it must be present in translation. Complex or technical terms that cannot be translated may be used, but only in transliteration and only if the nature of these terms is a subject for exposition. Footnotes tend to yield to endnotes – properly so. The reader of a monograph may use the text only as a guided tour of the notes, looking up a small section of the monograph to see

precisely what ancient sources we have or what scholars have said about a particular problem. In the 'book,' however, the text dominates and the readers are expected to pay far less attention to the documentation. If abstruse arguments are mentioned, then they are situated, if only briefly, in their intellectual and historical framework. Clarity and continuity are especially important: authors cannot expect that their readers will struggle their way through the text like the weary scholar, pressing ever forward in order to keep current in his or her specialty.

Of course, the two kinds of publication do not always reflect such distinctions. Plenty of tedious books with their elegantly translated quotes are incomprehensible to specialist and general reader alike, while some monographs, trailing their footnotes like the numbing tentacles of Portuguese men-of-war, attain to grace and clarity. In technical subjects such as classics the distinction is even less clear. The book does not occupy the same privileged position, for much of the classicists work cannot be squeezed into the formal parameters of a book. The commentary and the scholarly edition, for example, play a prominent role, and thus undermine the respect that normally accrues to the more popular form. Furthermore, monographs and journal articles allowed Milman Parry and Elroy Bundy to revolutionize the studies of Homer and of Pindar respectively. Neither published very much, but few scholars in the past century have exerted such pronounced and decisive influence on any subject in the classics. The general reader would find such influence hard to evaluate if he or she read their works, for neither man translated any Greek and their best work looks, to the untrained eye, like a combined algebra text and phone book.

Nevertheless, the book is the preferred means of publication even within the introverted and technical world of classical philology. Cynics might point to purely logistical advantages. Books are not so hungry for publishing subventions and they are more widely distributed than monographs, nor are readers the only ones who find their paths smoothed when smaller points cannot be argued at length and the number of footnotes must be kept to a minimum.

But such interested motives aside, the book as a genre has its own distinct character, and represents an attitude towards ideas that raises it above the monograph. For the book, in its finest flowering, unites the needs of scholar and layman. The more these needs struggle to break loose in opposite directions, the more energy the book can, by harnessing these forces, muster in its own service. The book is an idealistic creation, for it testifies to the belief that a single document can be so contrived that it will appeal to

the restless general reader and to the predatory specialist. The book, by its existence, proclaims that clarity need not degenerate into platitudes, and that the excitement and beauty of highly trained discourse can capture the imagination of any intelligent reader. To the extent that a book stands up to the professionals and engages the general reader it reinforces a vision of intellectual activity from which liberal education (and much of democratic society as well) is constructed.

Opposed to the book as we have defined it stands the 'textbook.' The textbook is a repository of received wisdom, with 'facts' and 'controversies' carefully divided into small bites that do not trouble the digestion and that the consumer will often discretely hand to the dog beneath the table or drop in a convenient potted plant. The textbook occupies a distinctly lower position in the eyes of the specialist. Unlike monographs or books, textbooks often do not earn their authors promotion within their departments or much respect within the field. 'Pedagogical' publications are at best viewed as acts of selfless altruism, at worst as venal attempts for royalties. Most commonly they are simply ignored.

Few specialists, even those perched on the loftiest ivory towers, would agree that their disdain for the textbook is healthy – every field needs to put on its best face for the introductory student, for from these unwashed masses will one day come the next inhabitants of the ivory tower. The finest minds should be engaged here at the front line. Even as the students stuff their heads with basic facts and information (as indeed they must), they must also catch glimpses of the intellectual excitements and pleasures that lie ahead. Human beings will undergo enormously disciplined training – be it countless finger exercises or miles of running – if they have before them the vision of what they will become, whether that be a pianist or middle-distance runner. The isolation of the ivory tower does not only damage the specialist but also the beginner, for it reveals to the beginner all the tedious labour while concealing the real benefits which that labour can bestow. The composer dreams of Mozart or Beethoven, the pianist of Horowitz or the late Glenn Gould. Good college students do not work so that they may become another Kant or even another Milman Parry, but so that they can receive high grades.

Yet even as specialists might concede such arguments, they might point out that the form of the textbook offers few attractions. Courses must move quickly through the material, and such rapidity prevents scholars from dwelling upon just those details or subtleties in which they delight. A textbook is not an exciting medium for publication and its very form thus

discourages many of our best scholars. As a result, the textbook has drifted into an entirely separate track from the book and the monograph. Those few scholars who have the energy and courage to cross over to the textbook world find themselves on the defensive with their colleagues. The habits and prejudices of intellectual life thus conspire to weaken that arena that most requires energy, talent, and dedication. Such a system of incentives is very hard to break: scholars who devote their energy to textbooks or related endeavours necessarily have less time to devote to books and monographs, and are thus not as highly rewarded. Younger scholars, carefully scrutinizing what will and will not advance their careers, steer away from such selfless activities and, in turn, encourage their students to do so as well.

The results of this system are not encouraging. Students leave their courses with no comprehension of why anyone would study anything except for purely utilitarian purposes. Scholars have fewer people with whom to exchange ideas outside their own narrow specialties. Unappreciated, they nurse their resentments and, in response, view with suspicion those who do not share their own knowledge and skills. The situation is, of course, not nearly so simple as this, and many causes interact to create our present situation. Nevertheless, the purely formal characters that we assign to different kinds of publication play a key role. One can only put so much between the covers of a book and, once printed, a book is meant to be read from beginning to end: such physical limitations have far-reaching consequences on what we do with information and, more important, with the ideas that breathe life into mere data.

A Question of Content: Poetry and its Context

Having now touched on several forms of publication and the impact that they currently have on intellectual life, consider some of the things on which one might want to focus in studying a particular subject – the Greek poet Pindar, for example. Pindar lived from roughly 520 to 438 BCE and is the only Greek lyric poet of whom any sizeable works have survived in the regular manuscript tradition. He composed many different kinds of works – songs for religious processions, dirges, songs to honour Apollo or to be sung by young girls – but only one class of poems has come down to us intact, his 'epinicians.' The term *epinicia* literally means 'things for a victory,' and these poems were composed in honour of men who won athletic contests at the four great 'panhellenic' festivals, which were held at Olympia (hence our Olympic games), Delphi, Isthmia, and Nemea. Boxers, runners, wrestlers, rich men who had entered chariot teams – all could

compete and, if successful, could ask Pindar (for a fee) to compose a poem in their honour.

Poetry of this type is extremely foreign to modern tastes. Poets are supposed to express their innermost feelings freely: the idea of court poets writing under contract to praise the highest bidder does not sound much like either Shakespeare or Keats. Thus Ezra Pound, when asked in 1937 to participate in a translation of Pindar, wrote back, 'No, I will *not* help you reinflate Pindar... Call me bldy. barbarian, I don't believe Pindar was the 67th part of Homer' and elsewhere 'the prize wind-bag of all ages.'[1]

Nevertheless, Pindar was an enormously successful poet who captured the imaginations of many cultivated and intelligent individuals. Many of those who have studied him and who have penetrated beyond the forbidding exterior find in his work an intellectual vitality that constantly renews itself, suggesting new questions or insights. If modern readers find him unappealing, then in this particular case they perceive less, not more, than their fellows. One can only acquire a sympathy for this poet through effort, but the effort is worthwhile and reminds us that there are many kinds of excellence and subtlety. Pindar's very difficulty makes him valuable, for his poetry forces modern readers to expand their views of poetic creation and ultimately rewards this effort richly. Such intellectual growth is a major reason for studying literature.

Furthermore, the aristocratic world of Pindar addresses some of the same problems that we too now face, and its solutions deserve attention. Although Pindar addressed free Greek men who had attained to a certain level of education, he did not focus on the free Greek men of any particular city state. Each free Greek man was a citizen in one of more than seven hundred independent political units called *poleis*. For him, the world normally divided into those who lived on his island or in his valley or plain, and those who lived a few miles away over a hill or across a small strip of water. The people who lived over the next hill spoke with a slightly different dialect, were treacherous and predatory, could never be trusted, and occasionally needed a punitive raid if they were to keep their place.

The Pindaric world transcends this parochial view. Those who won at Olympia or one of the other 'panhellenic' games had competed in a contest open to all Greeks. Pindar's odes were likewise written for people in every Greek polis. Because the victor craved fame and the poet wanted a large audience one can see that Pindar's poetry might not have been as exclusive as might at first appear. Exclusivity becomes a stance that makes such poetry especially appealing to those on the lower end of the middle class. Thus we

see that the hero of Aristophanes' *Clouds*, an ostentatiously unaristocratic and bourgeois figure, likes his son to entertain him with epinician poems after dinner. The selfish interests of Pindar and his clients transmuted the epinician poem into powerfully unifying force, one that compelled the audience to lower, if only momentarily, their parochial prejudices, which invited participation by the widest public possible.

The archaic Greek world was a diverse and vibrant environment in which many different groups competed for prestige and esteem. All Greeks yielded something of their own cultural independence to form a greater society that in turn gave to each polis and each citizen a share in something greater. The citizens of two embittered rival states, despite their common appearance and language, perceived their differences as keenly as any two ethnic groups do today. The problems and solutions that emerged are not so foreign, particularly to those of us who live in the great immigrant societies of North America, who must transmute ethnic diversity into a dynamic and positive force. Yet, interesting as this topic may be, it makes considerable demands upon the author. How can one communicate the diverse and complex nature of the archaic Greek world?

POSSIBILITIES OF THE ELECTRONIC MEDIUM

Format as Language: Problems of Expression

So much, then, for one particular approach to one particular poet. How do the current publication media – such as monographs, books, and textbooks – allow us to pursue this subject. Relatively few people study Pindar and fewer still would adopt the same stance that I have outlined above, but pursuing this set of questions reveals many barriers and problems shared by a wide group.

First and foremost, the poetry of Pindar, like that of all poets, should be studied in its full cultural context. Pindar assumed that his audience was immersed in the details of the late archaic world. He could assume that his audience knew the topography of the great panhellenic sites such as Olympia and Delphi. He could assume that his audience understood the different athletic events – not just the chariot race or the sprint, but the particulars of more specialized activities such as the pankration (a kind of all-out combat with few holds barred) or the hoplite race (in which men raced while wearing heavy armour). He could assume that his audience was familiar with a wide range of poets and especially with Homer. Above all, he could

assume that his audience shared a certain number of values and ideas that could be used to interpret allusions to myths or places.

Furthermore, Pindar could count not only on background knowledge but on an attitude towards that knowledge. Although any one member of his audience may not have been to all the major panhellenic sites or might not have memorized every poet in the traditional canon, few listeners would be proud of such gaps in their knowledge. Conversely, the more familiar members of Pindar's audience were with specific allusions, the more satisfying they would find his poetry, for each recognized allusion reinforced his audience's sense that they belonged to the general archaic world.

Pindar differs from Greek tragedians such as Aeschylus or Euripides only in the degree to which such expectations are explicit. Aeschylus and Euripides were just as firmly rooted in their particular social context. Their plays, however, contain dramatically powerful narratives that can communicate more directly to audiences from a different cultural setting, but the immediacy of this appeal can, in fact, distort our perceptions and deceive us into thinking that we understand the plays better than we actually do. The Pindaric poetry, with its insistent demands upon our background knowledge, is more explicit and provides a good environment within which to study the general problem of cultural context. Familiarity with Pindar thus can make us more sensitive to aspects of Greek tragedy that we might otherwise have missed.

But how can anyone, whether scholar or instructor, provide the background necessary to interpret a poem of Pindar? Some examples:

1 / *Basic geographical and topographical information* If a poem refers to the river Alpheus or the hill of Cronus, a commentator can explain that these are parts of the terrain at Olympia, but that means little. The reader should react almost physically to these allusions, because the names Alpheus and Cronus should be part of a larger set of knowledge about the site of Olympia.

2 / *Parallel or source texts* No commentator can quote all the texts that are relevant to a particular poem.

3 / *Culturally defined categories* Pindar clearly aims his poetry at an audience that belongs to (or would like to belong to) a high social standing. How does a modern scholar convey what it means to be 'upper class.' Terms such as 'noble' and 'aristocratic' are, in fact, loaded with extremely complex associations that derive from European history. Applying such categories gives the modern reader a

general framework within which to situate Pindar, but it distorts as much as it clarifies.

4 / *General context* Generally speaking, epinician poems are a late phenomenon, invented in the sixth century BCE, it seems, by the poet Simonides. Those who were victorious at the great Panhellenic Games had already commemorated their successes with physical monuments such as statues or inscriptions. The epinician poem became a new medium within which the victor could memorialize his achievements. The reader of Pindar should already know that a poem is only one of many options, for the possibilities of poetry differ from those of statues or coins or inscriptions, and the poet frequently contrasts what he can do. These other media that precede and coexist with poetry shape the expectations of the poet's patron and audience.

Each of these categories offers its own challenges, and scholars have used printed information to solve them. Nothing can compensate for the enormous knowledge that Pindar's original audience held in their heads, and no amount of work can thus fully restore the immediacy with which readers could once react. Even the most sensitive critics can only go so far, because much of what the fifth-century audience knew as a matter of course has been forgotten. Electronic media, however, change the possibilities open to the author and make new techniques of presentation possible. We can enhance the way in which we describe these texts by, first, giving readers access to more information and, second, making that information more accessible than it ever otherwise could have been.

The Perseus Project

The Perseus Project is one attempt to exploit the capabilities of electronic media. Perseus is a collaborative project, centred at Harvard University, but with major work taking place at a variety of institutions, including Bowdoin College, Boston University, Pomona College, St Olaf College, and the University of Chicago. It is creating an environment in which source texts, dictionaries, maps, site plans, museum objects, and essays are linked together. Over the course of the project we hope to collect between forty and one hundred megabytes of textual information (the equivalent of between forty and one hundred printed books) and about 10,000 images. Perseus is a *hypermedia* database, in that it links many different kinds of information together into a fluid graphical interface. In early 1990, Perseus 1.0, a beta version of the database will be released for testing and evaluation. At the end of each calendar year, a new version of the database will be released,

starting with Perseus 2.0 in December 1990 and continuing at least through Perseus 5.0 in December 1993. At this point, Perseus will evolve into an electronic journal, in which new source materials and studies about the ancient Greek world will be incorporated as they are submitted.

Technology for creating and using a large 'hypermedia' database such as Perseus is evolving rapidly, and no one knows for sure what software or delivery media will be available in 1993. Perseus 1.0 will be produced on a combination compact disk and videodisc. The compact disk is, from the computer's perspective, simply a read-only disk that can store more than 500 megabytes of information. A single compact disk thus provides us with the storage that we need for texts and graphic information (such as maps, plans, or drawings). High-definition images, particularly colour images, however, consume enormous amounts of space – the 3000 still images that will appear as part of Perseus 1.0 would alone fill a compact disk. Videodisc remains the most efficient medium for disseminating pictures: one side of a videodisc can store 54,000 full-colour images. The combination of videodisc and compact disk thus provides us with the greatest possible flexibility.

Consider some of the ways in which a database like Perseus can address the general goals and problems outlined above. Simply informing the reader that the river Alpheus or the hill of Kronus are near Olympia conveys little. An author would certainly like to include photographs illustrating both the hill and the river, if only to make these abstract phenomena more concrete. One would also like to have plans illustrating the layouts of the panhellenic sanctuaries – and, ideally, of the cities of the victors, because Pindar will also allude to specific places there as well. Unfortunately, Pindar alludes to many different places at the panhellenic sanctuaries and a book devoted to Pindar cannot also include all the images that would be needed. Economic considerations limit the size of the book and authors can rarely include all the textual descriptions that they would like; illustrations, being particularly expensive to produce, are either limited or eliminated altogether.

In an electronic publication that combines a compact disk and videodisc, however, space is not nearly such a constraint. A publication that can include more than 50,000 colour pictures can provide extensive pictorial coverage of many places in Greece. At the same time, site plans and maps of Greece on the compact disk can reinforce the individual pictures on the videodisc. An electronic database thus allows the author to deliver many more 'visuals' than a traditional printed publication.

The flexibility of an electronic publication is even more exciting than its storage capacity, for authors not only can include more information but

also can use that information in new ways. Thus, in an electronic publication such as Perseus, each ode by Pindar that is dedicated to a patron from a particular city in Greece can be accompanied by the general map on which the home city of the victor is marked. Although there are several dozen victory odes, one needs only a single map and a single database of places. Moreover, in a printed text, the layout of the information must be determined in advance and illustrations, which take up valuable space, must be minimized: few authors would even imagine printing several copies of the same map in one book. In the electronic environment, readers can have much more control over the information they want to see. Once the system can plot cities on a map, readers can interactively create maps suited to many different needs: e.g., a single map illustrating all the cities of Pindaric victors, or only cities that produced victors at Olympia (as opposed to Delphi, Nemea, or Isthmia).

A rich electronic medium opens many avenues for the reader. Those working with Perseus 1.0 who want to familiarize themselves with the topography of Olympia can call up a site plan. They can call up information about individual places (such as the Temple of Zeus or the shrine to the hero Pelops) by clicking on areas on the plan (see fig. 1). Most exciting is that if they click on arrows on the plan, the system uses the videodisc to display an image of the site as it appears to someone standing in that place and looking in the general direction of the arrow. Choosing such vantage points, readers can move around the site, going backwards and forwards, viewing buildings, for example, from several angles or from different distances. Such virtual travel is a very powerful tool. When human beings can select different views of the same building, the brain creates a three dimensional model of that object. People can develop an almost unnerving sense of what it would be like to move around that building if they were actually there. Thus, when an electronic environment allows a map and a series of ground-level views to interact, readers are able to tap powerful intellectual forces that separate maps and images do not as readily arouse.

Consider now the second problem outlined above. Every critic or commentator on ancient Greek literature knows that a Pindaric ode (like a play by Sophocles or a story in Herodotus) must be read in the light of many other texts. In some cases, Pindar may have a particular poem in mind; elsewhere, he may be using a general idea that appears a number of times elsewhere.

When Pindar wrote an ode for an Olympic victor from the island of Rhodes, he included the myth of Tlepolemus – a story that appears also in

the *Iliad*. Every educated Rhodian knew that seventeen-line section of the *Iliad* by heart, because the *Iliad* was the single most important poem in Greek and each city-state treasured any appearance that it made in that poem. Even a brief reference to a hero who plays no major role in the poem stirred Athenian national pride, and the story of Tlepolemus is far more developed. Each listener would have noted the ways in which Pindar shaped this story, adhering to the basic Homeric data, but subtly reinterpreting events for the purposes of this poem. The modern commentator can allude to the Homeric model and can even discuss the way in which Pindar treats the story, but this exegesis cannot replace the spontaneous sense of recognition and then scrutiny that the Greek audience felt.

Within an electronic environment, source references can lead directly into source texts themselves. Suppose a reader happens upon a comment such as 'the description of Tlepolemus that appears at Homer *Il.* 2.653–670 is very much in Pindar's mind.' The author may or may not explain what relevance the Homeric passage has for Pindar; in either case, those studying this ode should check the text of Homer for themselves. In an electronic environment such as that offered by Perseus, the reader can select 'Homer *Il.* 2.653,' display a set of instructions and choose '*go to selected source passage*,' and then view the appropriate text side by side with the Pindaric reference.

Of course, any classicist should have a text of Homer at his or her elbow, but many references will be far more obscure. A database such as Perseus will contain most of the references that will appear and will often allow even professional scholars to scrutinize a text that is not in their office. If a text is not in Perseus, however, it will probably be in the 300 or so megabytes of Greek text available on a compact disk from the *Thesaurus Linguae Graecae* (TLG) at the University of California. Few among us have in our offices all the texts included in the TLG. Existing electronic databases not only allow scholars to find texts more quickly than they could before, but allow them to pursue references that they would otherwise have ignored.

Immediate access to source material can have an obvious impact on the non-specialist, who probably does not have all the basic Greek authors. The non-specialist in this case may well be a freshman in a general course on Greek civilization, but could easily be an English professor conducting research on lyric poetry as a genre.

Access is easy to measure, but its impact is far more subtle. One can measure the time it takes (1) to select 'Homer *Il.* 653' and call up the text, (2) to get up from one's chair, cross the room, pick up a text of Homer and

turn to the passage, (3) to leave one's office and go to a library across campus to find the book, or (4) to stop at the public library on the way home from one's non-academic job and look for a copy of Homer. Obviously, the gap between (1) and (4) is enormous: few people would consider option (4) to pursue a casual reference. Options (1) and (2) may both be quick, but if (1) is five and (2) is thirty seconds, even this difference can make browsing substantially less disruptive and thus more attractive. The 'marginal utility' of an action is, as economists emphasize, extremely hard to measure.

If source texts are always available, does this change the way in which we conceive of documents? Consider again the example of Tlepolemus in Homer and Pindar. A critic assumes that someone reading Pindar's ode will probably not turn to the Tlepolemus passage in the *Iliad* until after starting the Pindaric poem and seeing the reference in a note. We assume as authors that the readers have Pindar in their hands and we organize our discussion so that the reader can do as much with that one book as possible.

If, however, our discussion of Olympian 7 (a poem that celebrates a victory won at Olympia by Diagoras of Rhodes) is part of a larger network of documents, then our narrative will still focus on Olympian 7, but we can draw upon any text within the database. We might then precede our discussion of Olympian 7 with a reference to Homer. Our comments might automatically open up a window into the *Iliad* before they lead to the Pindar. Readers might well skip past the Homeric passage, but the form of the new document would urge them first to read and ponder the story of Tlepolemus as it appears in the *Iliad*. If they do, then their initial impressions of the Pindaric ode would be formed by their awareness of what had been in the Homeric narrative. They could then watch Pindar follow Homer on one point, subtly change another, or add an entirely new detail. In actively following the interaction of Homer and Pindar, they could feel much more closely the experience that Pindar expected in his audience. Now, when we read the Pindar and then go back to the Homer, we have already formed a number of conclusions about the Pindar that may well distract us from important questions about how Homer and Pindar relate to one another. In this we see the connection between scholarly and critical reading, for the scholarly background ideally allows the critic to understand the text with an equal measure of immediacy and detachment. Like jokes, allusive utterances can never fully be appreciated if they are decoded after the fact. Electronic media can allow authors to rethink the fundamental way in which they lead readers through a text.

At this point, let us take up the problem of culturally defined categories mentioned earlier. We take with us many preconceptions when we study a problem, and we must evaluate new evidence in the light of our own experience. Without preconceived notions we could not make any sense of the world in which we live, but we must be as conscious as possible about what intellectual frames we use to shape our experiences. Not even the most careful readers can detach themselves from their expectations, and careful readers must constantly scrutinize the way in which they view the world. Such a task is difficult, and we need all the help that we can get.

Consider then the specific problem of terms such as 'nobility' and 'aristocracy' as they are applied to archaic Greece. Clearly, these are culturally loaded terms, shaped by centuries of European history. Surely they cannot be applied directly to Greek society without doing violence to the subject, but if we do not use such terms then how are we to describe Pindar's world? What categories did Pindar and his fellows use, and what do these categories tell us about that world?

There are many ways to approach such a critical problem. An electronic environment offers at least one technique that is quite simple, but surprisingly powerful. First, we entered in Perseus a Greek-English lexicon, a document designed to give English definitions for Greek words. Once we had this document online, however, we were able to index the definitions and to convert it into a rough, but very effective, English-Greek lexicon. Second, we also developed a fairly powerful system that could analyse Greek words. For any form in Pindar, we have a database entry giving the dictionary words to which this form could belong. Since Greek morphology is extremely precise, more than 90 per cent of all Greek forms belong to one or two dictionary entries (see fig. 2).

These resources allow us to pose the following two questions. First, what Greek words have the English term 'noble' in their definition? Second, which of these words actually occurs in Pindar? The results of this query are suggestive: the term 'noble' appears in the definitions of *gennaios* ('of good birth') and *gnesios* ('legitimate,' 'of proper birth'), each of which appears once in Pindar's epinician odes. The query elicits fifteen other words, however, none of which have any linguistic connection with birth or family.

The results of this search are, of course, only a starting point for further thought. Anyone studying the English term 'nobility' in Pindar would have to look at all the places in which the retrieved words actually appear. Nevertheless, this process provides us with a tool to disentangle our own catego-

ries from those of the Greek. Further study can help us isolate the English term 'noble' from various Greek categories glossed with the same word but with different meanings. Many terms glossed as 'noble' have nothing to do with good birth but describe such qualities as 'fame' or an impressive demeanour. Ultimately we may better understand how, in choosing a particular term (in this case, 'noble') to gloss many Greek words, we are unconsciously emphasizing and denigrating values according to our own background.

The Greek-English dictionary is not the only source for such work. Every online translation of a Greek text can similarly offer a kind of scholarly Rorschach test, allowing us to see what English and Greek terms are associated. At a more basic level, every English definition or translation offers the reader a new entry point into the Greek. The reader of Greek can now search not only for examples of *naus*, the standard Greek word for boat, but for the English term 'boat' and locate passages in which other Greek words for boat (such as *akation, baris, epholkion*) appear.

English translations, which heretofore have played only a marginal role in scholarly activity, can thus become in the electronic publication medium a major new tool in the day-to-day work of the professional. This new use for standard translations illustrates a general phenomenon. Texts (or any other kind of information) stored online can be manipulated in ways that are not otherwise practical. Although individual changes can be viewed as simple quantitative advances in speed, their cumulative effect qualitatively changes the way in which we view the information before us. Not only can we do new things with each document type – dictionary, scholarly text, English translation – but each document type is able to interact with the other. Ultimately, translation, text, and dictionary – together with atlas, site plans, ground-level views, museum-object catalogue entries, etc. – become segments of a greater whole. Many individual segments of this electronic network resemble their printed antecedents, but none of them are quite the same.

BOOK, MONOGRAPH, AND TEXTBOOK: DIFFERENT WINDOWS ON THE SAME DOCUMENT

Consider now the theme that opened this paper – the contrast between book, monograph, and textbook. A 'hypermedia' database has the inherent power and flexibility to reassemble these fragmented visions of knowledge, for the same database can, if properly organized, fill the differing functions of book, monograph, and textbook.

First, primary and secondary source materials must be as clearly distinguished as possible. Discussions of the Parthenon aimed at professional scholars, college undergraduates, and even elementary school students can coexist and share many plans, photographs, and texts. A document for scholars might discuss at length the Greek text of Pericles' funeral oration to show how the Athenians who built the Parthenon viewed themselves, while an essay for the general reader might cover this topic in general terms and with reference to the English translation. A discussion aimed at elementary school children might omit the Thucydides, but make the same general points by showing the way in which Athena, patron goddess of Athens, is pictured in Greek art. The precocious twelve-year-old could, however, move from the grade-school introduction to the college-level essay and even on to the more formidable scholarly discussion.

Second, primary materials must be stored in the most general format possible. Texts or images should not be included simply to illustrate a particular point. Wherever possible, quotes should be links into scholarly editions. The reader may see only a six-line passage, but the system should insert that six-line quote dynamically by looking up the source text. If a new essay cites a text, then both the Greek and English text should be entered – whether the essay that requires that text happens to be aimed at professional scholars or at a general audience. If an art historian quotes a passage of Pausanias, or a textbook discussion of Western civilization cites the beginning of Herodotus, the reader should be able to go directly to the full source text, call up the Greek, look up words in the Greek-English lexicon, examine parallels, etc. Likewise, if an essay on Greek tragedy uses a painted Greek vase to illustrate a particular myth, a low-resolution black and white image would suffice (see fig. 3). But if the vase is entered in the database, readers should be able to choose that vase as their focus. They should be able to call up a catalogue entry for that object with full description, multiple views of the piece, and pointers to pieces by the same artist or with the same general iconographical scheme. In short, the computer can select subsets of information – e.g., a single view of a vase or just six lines of English translation – while retaining in reserve many layers of knowledge. The reader should be able to shift dynamically from one perspective and level of expertise to another.

Within such an environment, any particular discussion becomes a narrative tour through the evidence. The same basic database can serve an open-ended number of purposes and perspectives. The anthropologist and the art historian should find that the data can serve each of their needs; the

author of a general textbook can tailor the texts and images that he uses to his audience but can also include links to more detailed and sophisticated discussion. The reader should be able to shift from general to specific, and from the perspective of one discipline to another.

Consider now the fourth problem outlined above: How can an individual use an integrated hypermedia database to illustrate the general context of literature? An instructor teaching a high-school class and a research professor writing a scholarly book are (or should both be) doing much the same thing, struggling to organize the information before them in such a way that their audience will understand what they are saying. Neither should be conveying 'inert' information. The ideas that are expressed must in turn generate new questions and suggest new ideas. Otherwise, the scholarly book will soon gather dust on the shelf, forgotten and unread, while the students will turn from their academic work in sensible disgust.

At this point let us return to Pindar and archaic Greece. Pindar's world is a mixture of narrow-minded parochialism and broad-minded international ('panhellenic') sentiment. His poetry springs from a particular social context. The great panhellenic sanctuaries such as Delphi and Olympia provided a few central points at which Greeks in their hundreds of scattered city states could gather. They also provided a stage on which states and exceptional individuals could dramatize their own successes and win prestige from their fellows. Victory in the athletic contests – especially in the horse races, which were extremely expensive and open only to the rich – dramatized one's position in the Greek world or could even lay a foundation for political power at home. Victors did everything they could to dramatize their accomplishments, putting up inscriptions, erecting statues at Olympia or at home, minting coins (if they were political leaders) that included a chariot or a victory wreath.

The victory poem arose from this background, and it offered certain advantages. A poem, unlike a statue, could be in many places at once and could survive much longer than anything made out of stone or metal. At the same time, these poems exhibited the same tension that we see in archaic society as a whole. Each individual (or state) sought to promote his own achievements, but that individual person (or state) also had to admit that it was a part of a greater society that transcended him and his home, and that enhanced the meaning of his achievements. The purpose in stressing such topics has, in turn, a more general purpose. The tension between local and general, between individual and community interests is universal.

Studying this phenomenon in the archaic Greek world can help us recognize general phenomena that are at work in our society.

In a traditional environment, one would express these ideas as a narrative, choosing examples that illustrated various points and serving the reader predigested conclusions. There are several problems that an environment such as Perseus can help alleviate. First, the expert on literature will generally focus on literary evidence, while the archaeologist will use little if any literary evidence. Each has a different emphasis and starting point: the literary critic makes Pindar's poems his centre, while the archaeologist may use physical remains of various sites to structure his work, but both are describing the same phenomenon, the workings of the archaic Greek world. Site plans of Olympia and the poems of Pindar will receive different emphasis depending on the context, but they must play a role in both. When we separate archaeological and literary information into physically separate publications, we not only make it harder to integrate both kinds of information, but we subtly imply that both kinds of information are independent of one another and thus *can* be separated. A more heterogeneous medium allows us to bring both kinds of information back under a single roof.

Second, conventional publications are (or should be) designed for easy comprehension. The less a reader has to do to understand the points being made, the better. Professionals find compressed and allusive writing useful, because they are busy and they will, in any event, attack whatever they read before believing it. Nevertheless, predigested conclusions are easily forgotten, and even the professional may prefer to test hypotheses rather than scan the conclusions. An electronic environment allows the author to mix statements with instructions to perform a particular task. In fact, every reference in a printed text is an invitation to test the evidence on which a statement is based. The electronic environment allows an author to create new kinds of suggestions.

Turning back now to concrete example, consider how one might use a relatively small database such as Perseus 1.0 to explore some of the possibilities raised above. Consider the following operations:

1 / Plot on a map of the Greek world those states in which Pindar's patrons live.

2 / Use a site plan and videodisc to explore the setting of Olympia. What are the major buildings? What kinds of buildings do individual Greek states build and who builds them? What do victors do to commemorate their achievements?

3 / Read the debate between Gelon, political leader of Syracuse, and ambassadors from Sparta and Athens.

4 / Read Pindar's first Olympic ode, composed for Hieron, younger brother of Gelon, who succeeded him as leader of Syracuse.

Each of these four operations is feasible in a library, but Perseus, because it includes all these categories of information, makes such wide-ranging exploration a more efficient task, and thus a more attractive option for the reader. This path through the data is calculated to suggest several things. Task (1) should reveal that many of Pindar's patrons come from the periphery of the Greek world such as Sicily or North Africa. Task (2) should perform three functions. First, it should help readers internalize the physical setting of Olympia. When they then encounter references to the hill of Kronus or the river Alpheus or the grove of Zeus, these allusions will not irritate or confuse them, but will elicit silent nods of recognition – just as they might have affected Pindar's audience. The specificity of the poems will not alienate the readers but will awaken their interest, as it puts to new use information that they will have already assimilated. Second, task (2) should draw to their attention the fact that individual cities built 'treasuries,' small buildings that contained things that each polis had dedicated to Olympia and that thus dramatized the wealth and power of these states. In particular, many of these treasuries are built by Greek states from the outer reaches of the Greek world. At this point, an attentive reader may connect this with task (1) and begin to wonder why Greeks from outside the mainland played such a disproportionate role at Olympia. Third, the reader will see that Olympia was soon filled with statues and that victors were very anxious to make their achievement tangible and permanent.

In task (3), the reader will see how the mainland Greeks, when threatened by an invasion from Persia, appealed to Hieron for help. Hieron agreed to send enormous support, first, if he was given overall command over the defence of Greece and, second, if he was given command of either the land or the sea forces. The Spartans rejected the first offer, and the Athenians, particularly annoyed that Hieron would seek command of the sea and thus interfere with their prerogatives, rebuked his second suggestion.

The real issue was not, of course, command of the war by primacy within the Greek world. Hieron had become the richest and most powerful leader in Greece, and he wanted to convert his material strength into prestige and authority. The older Greek states bitterly resisted his pretentions and would have preferred to be enslaved than to yield their positions to such an upstart. The Athenians, in particular, cited a brief section of the *Iliad* in

which an Athenian is praised for his ability to command troops. Homer was the most prestigious figure in the Greek poetic canon, but he was not the only one, and one can see from this the kind of practical importance that Greek poetry had. Syracuse was founded too late to appear in Homer, but it could play a major role in the poetry of Pindar, one of the two or three leading poets of the day. The Herodotus passage thus illustrates how the states on the periphery of the Greek world craved prestige and recognition, and generally received scorn and prejudice. It also illustrates the power that poetry could wield.

By the time readers come to task (4), and actually examine Olympian 1 (composed for Hieron, tyrant of Syracuse when his horse was victorious at Olympia), they will have been exposed to enough information to enable them to see some of the things that Pindar is trying to accomplish. Few readers will, of course, get each of the points that I have outlined above just by performing these tasks, but, if they perform these tasks, they will be much better prepared to evaluate the conclusions outlined above. In a course, good instructors can convert these tasks into a puzzle, arouse curiosity and some suspense. If such assignments are repeated two or three times, students can become quite comfortable with this kind of inquiry and can, more generally, begin to derive greater satisfaction from reflective reading and study.

The exercise outlined above is, of course, geared towards the poetry of Pindar, but only half of the preparatory material is literary. The first two tasks explore geographical and archaeological evidence, and then go on to other literary evidence. Another sequence might prepare the reader to study the sculptures of the Temple of Zeus at Olympia, which depict the foundation of the Olympic Games. This sequence might, however, begin with views of similar temples, with literary sources about Olympia (such as the description of Olympia in the Greek author Pausanias), with a map showing where temples like the Temple of Zeus were built, and with Pindar's Olympian 1, which tells one myth about the foundation of Olympia and which may have inspired the sculptures that adorned the Temple of Zeus. The emphasis of this assignment would probably differ from its literary counterpart. Because this problem takes the Temple of Zeus as its focus, it would subordinate literary and historical evidence to problems of architecture and sculpture.

Nevertheless, any discussion of Greek literature, art, or history must draw upon the same interconnected sets of knowledge. The archaeologist, art historian, literary critic, and social historian all draw upon the same

database of pictures, texts, maps, and other sources. Proper study of literature or history does not draw so much upon discrete sources of information, but provides a different organization and emphasis to the same pieces of evidence. An electronic environment such as we are designing in Perseus should allow individuals to use more varied kinds of evidence than they normally would. Perseus might at once contain book-length discussions of, and course material on, Pindar and the archaeological remains of Olympia. The 'tables of contents' or 'syllabi' for these subjects in Perseus can, however, more easily incorporate a broader range of material and can correspondingly convey a more comprehensive view.

The active inquiry outlined above is, of course, difficult and cannot wholly replace passive lectures or reading. Nevertheless, such inquiry must play a critical role, not just because it is a more efficient way of conveying information, but because such active study mimics the exploratory and tentative character of research and intellectual activity in its finest form. The goal is not to burden students with information, but to show them that ideas feed upon knowledge, that ideas help them to understand their world better, and that a reflective, inquiring life is infinitely satisfying. No technological resource can, of course, alone convey a love for learning, but a rich electronic environment can allow individuals to ask more questions and pursue problems to a deeper level than would otherwise be possible. Each medium – be it oral tradition, manuscript transmission, movable print, or hypermedia databases – has its own strengths and weaknesses. Doubtless, the new electronic tools that are beginning to emerge will raise their own problems. Nevertheless, categories such as 'book,' 'monograph,' and 'textbook' need not isolate ideas from each other but can serve as different vantage points within a single environment.

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1 / For these and other quotes, see M.I. Finley's essay, 'Silver tongue,' in *Aspects of Antiquity* (New York: Viking Press, 1968)

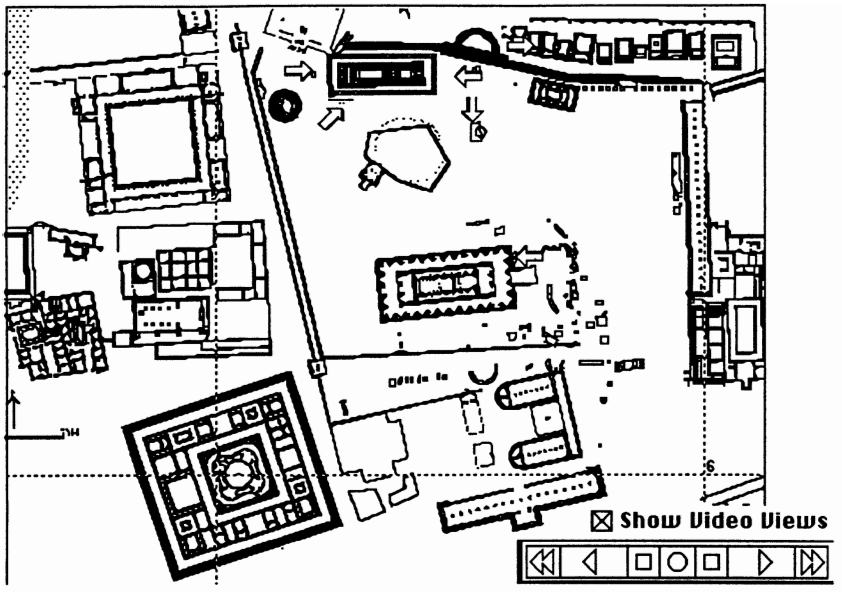


Figure 1 Plan of the site of Olympia. A reader can use a mouse to zoom in and view more detailed plans of individual building. The arrows represent different 'vantage points' from which the site may be viewed. If the reader chooses a vantage point, he or she will see a colour image of the site as it appears to someone standing at that point and looking in that general direction.

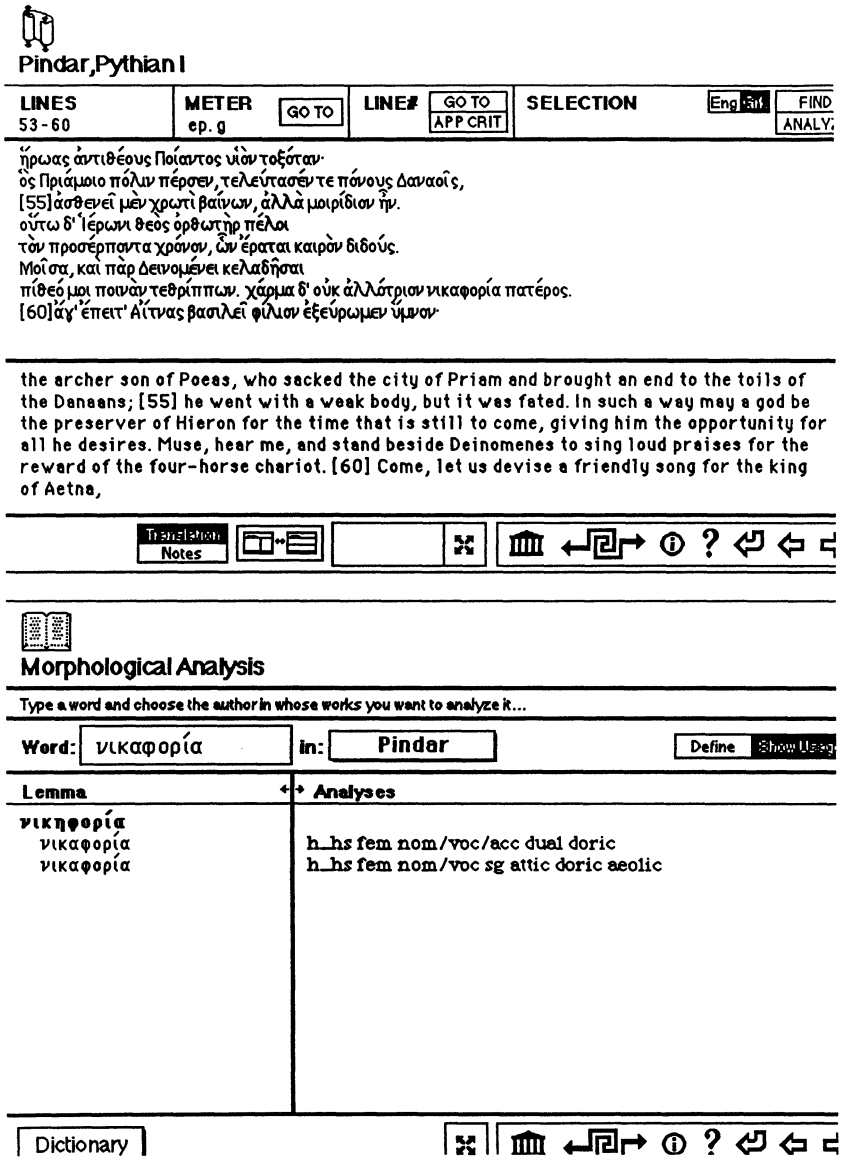
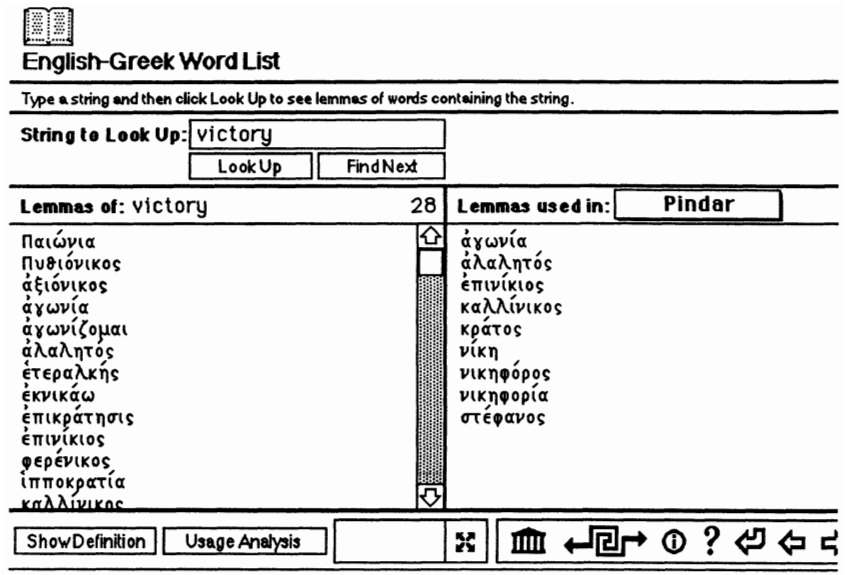
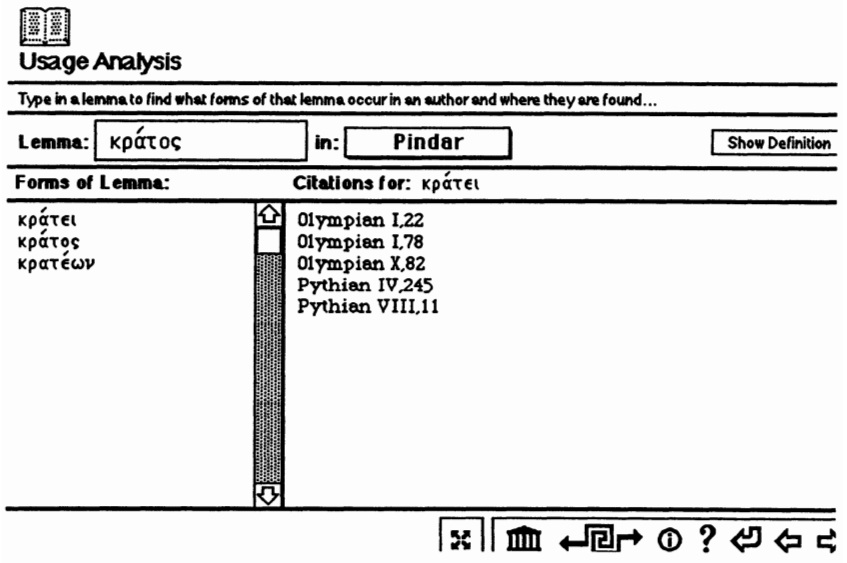


Figure 2 Four views of Greek text and dictionary: Texts in Perseus can lead in a variety of directions. Someone might select a Greek word and call up its morphological analysis (as with the case of νικαφορία). If one clicks on the bold term **νικηφορία** in screen 2, then a window with the definition for this term ('conquering, victory') will appear. The reader could then ask what other words in the dictionary





contained 'victory' in their definition and, second, which of these appears in Pindar (screen 3). The reader might then decide to examine examples of κράτος. Screen 4 shows which forms of κράτος may appear in Pindar and where in Pindar examples of the particular form κράτει appear.

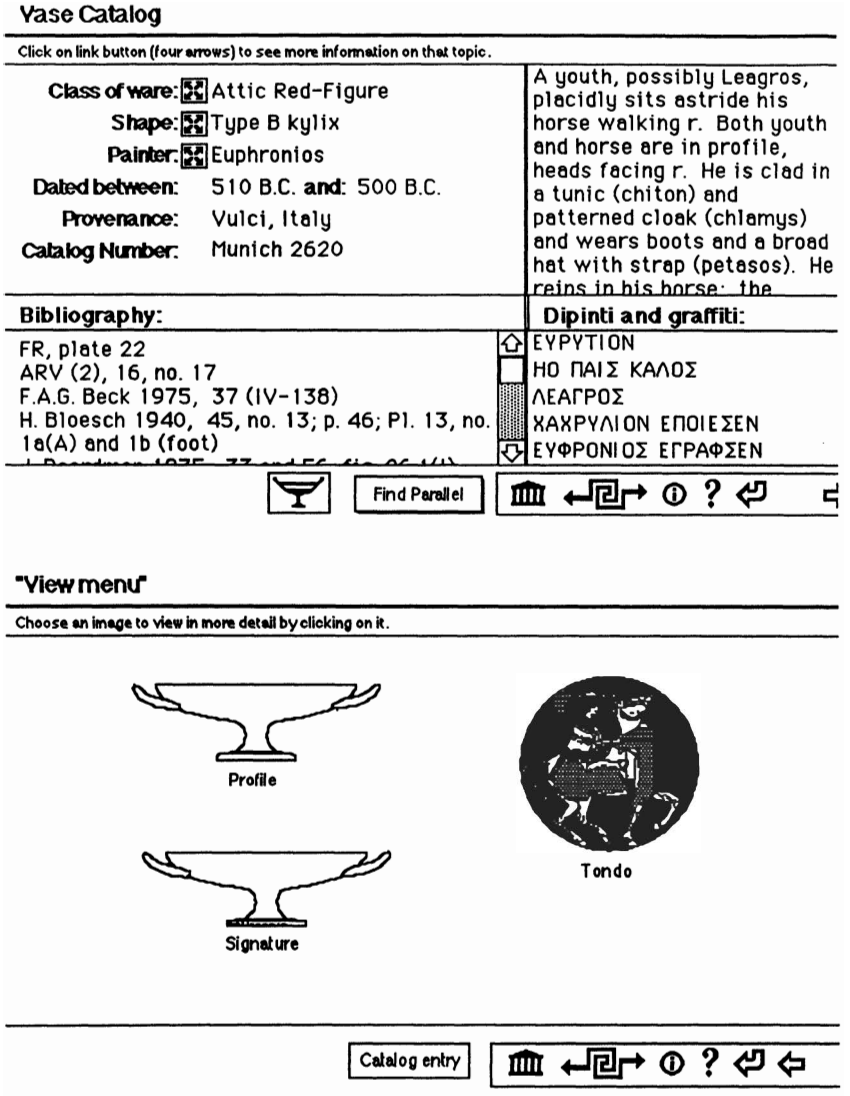
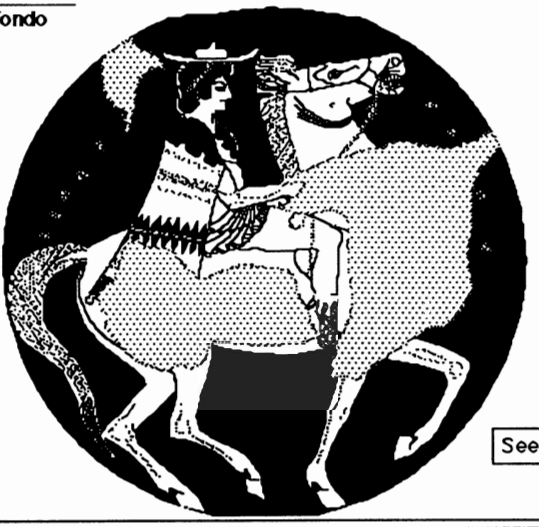


Figure 3 Sample vase as it might appear in Perseus. A catalogue card (Vase Catalog) allows the reader to branch out into different directions: clicking on the various icons will call up discussions of 'Attic Red-Figure' vase painting, 'Type B Kylix' or 'Euphronios.' Different views of the vase are available: in this case, the illustration is a drawing that can be seen at different levels of resolution, but Perseus also contains many colour images of art objects.

Munich 2620,Tondo



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