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## ArchWEB: a web site for Dutch archaeologists

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### 10.1 Introduction

At the end of 1994, a group of Dutch archaeologists formulated a plan to stimulate the use of the Internet.<sup>1</sup> They believed that the Internet could become a useful additional means for communication among archaeologists. The main aim was to stimulate communication among colleagues and between the archaeological world and the public. This resulted in the idea to develop a World Wide Web (WWW) information service in which all Dutch archaeological organisations could participate, both by offering information and by using the service. This service was not meant just as a web-site. It should also stimulate the use of other Internet facilities, such as e-mail, remote access to databases, file transfer and participation in electronic discussions, by making them easily accessible and by providing user support.

Subsequently the project team made a list of the desired functions of such a service, of the necessary technical and personnel facilities, and of the possibilities of getting such a project financed. This resulted in a grant application to the Internet provider for Dutch universities, Surfnet B.V.

This organisation was willing to finance the project and at the start of 1995 the ArchWEB<sup>2</sup> project was launched. The project is supervised by the Dutch national archaeological association SNA (*Stichting voor de Nederlandse Archeologie*). Other participants are the Dutch Archaeological School for Research (ARCHON), the Faculty for Pre- and Protohistory of Leiden University, the State Service for Archaeology (*Rijksdienst voor het Oudheidkundig Bodemonderzoek*), the Archaeological Information Centre (AIC), the National Museum for Antiquities (*Rijksmuseum van Oudheden*), and the Regional Archaeological Archive Project (RAAP foundation). Additional finances are supplied by ARCHON and the SNA. Technical support is offered by the State Service for Archaeology (ROB) and the Leiden Faculty for Pre- and Protohistory.

The project resulted in a WWW site, called ArchWEB, which serves as a front door to electronic information on archaeology in the Netherlands (Fig. 10.1). In this paper the first year of the project will be evaluated. We shall discuss some of the problems encountered and solutions found during the re-

alisation of the goals, as they may be helpful for the successful development of web services in other countries.

### 10.2 Aims of the project

The main goal of the project was to improve electronic communication within the Dutch archaeological world and between archaeologists and the public. We had four practical aims. The first was to make the information which individual Dutch archaeological organisations present on the Internet more easily accessible by creating a central entrance — a 'front door' — thus reducing the time consuming task of finding the information you need. Although the possibilities of creating and consulting search indexes are rapidly improving, it was still thought useful to have a central archaeological information service. In practice it meant that we tried to compile all available archaeological information in the Netherlands and to make it accessible from one starting-point, no matter where it would be physically located. We call this concept the *One Virtual Server*.

The second aim was to offer all Dutch archaeologists the opportunity to participate, allowing them to present their information through the use of the ArchWEB servers. Not every organisation is able or willing to maintain its own server. Offering disc space on two ArchWEB servers would enable every organisation to participate. For the duration of the project participation was free. We believe that only in this way can an information service be exploited to its full potential.

The third aim of the ArchWEB project was to offer and maintain a number of *central services*, such as an address index, links to on-line libraries, announcements and programmes of conferences and lectures, distribution lists and discussion groups. By offering central services, ArchWEB could gain added value in comparison with web sites which can offer links only. The maintenance of these services would be time consuming, but doubtless this would be compensated for by greater ease of use for our visitors.

As surfing the web is still an 'acquired taste', the fourth aim of the project was to offer user support,





Figure 10.1: The top of the home page of the ArchWEB information service on the WWW.

not only for those who want to consult the service, but also for those who want to present information. For eighteen months the project had a coordinator at its disposal who maintained the site, and took care of educational and promotional tasks.

### 10.3 Evaluation of the first year

The WWW is still a new medium which is developing so rapidly it is difficult to keep up. As a result, the project wished to evaluate the service. The main question was whether an archaeological information service on the web would really be used and, if so, to what extent. Secondly, what types of information are suitable for cyberspace and how best to present these. Thirdly it was wondered whether the Dutch archaeological world would swiftly start to use the facilities of the Internet, adopt it as an additional means of institutional communication and eventually discard the conventional means of communication.

#### 10.3.1 How visitors use ArchWEB

One of the main points of interest for the ArchWEB team was to learn how visitors navigate through the information that is offered by the service. As the Internet is still a new medium it is not known if it is used primarily for entertainment, like TV, or more like a magazine or a book for gathering background information, or in another manner. We were interested in this because the way it is used should determine the way the information is presented.

One method of gathering information about the behaviour of web site visitors is the analysis of logfiles. Most server software enables logfiles to be compiled. Logfiles register which documents on the server are

consulted by which computer (host), and when. These data provide the only immediate feedback a web service receives. They make it possible to get a monthly view on the number of consultations of a service. Organisations that present information are often highly interested in this feedback. They are curious to learn about the frequency with which their pages are being visited because they can use this information to calculate the cost versus the profit of their contribution, and to tune their supply to visitor demand.

The logfiles of the first six months of the main project server have been analysed in detail. Most of these server statistics are based on *hits*: a hit being every request to a server, irrespective of whether it is an HTML, a graphic (largely .gif or .jpg format) or a text file. This means that a page which consists of a couple of illustrations scores several hits. The ArchWEB home page, for instance, yields eight hits at each visit. As this does not give an accurate impression of the use of a web site, the ArchWEB team has decided to incorporate only requests for HTML documents in the statistics. Furthermore the team defined a *visit* as a request for several documents by one visitor in a single session.

One of the difficulties of registering a visit, however, is that if there is more than one simultaneous visitor, the log of the files they request is interleaved, and the number of 'visits' will be erroneously inflated. As it is too time consuming to check and correct the logfiles manually this was not done. Consequently, the number of visits recorded may be too high and the average number of requested pages per individual too low. A spot check has shown that this does not occur very frequently. We assume therefore that its effect on the analysis of visitor behaviour is minimal.



**Table 10.1:** Monthly registered number of visits, and of the requested pages, the average number of pages requested at each visit and the number of documents offered. These data are derived from the logfiles on only one of the Arch *WEB* servers.

month	calls	visits	calls/visit	documents
January	1,158	535	2.16	25
February	2,380	929	2.56	58
March	3,106	1,049	2.96	92
April	2,061	850	2.42	103
May	3,034	1,711	1.77	113
June	2,787	1,502	1.86	149
July	2,662	1,415	1.88	162
August	2,419	1,229	1.97	162
September	3,210	1,736	1.85	177
October	3,560	1,961	1.82	185
November	4,710	2,559	1.84	198
December	3,863	2,186	1.77	215
1995	34,950	17,662	2.07	

### 10.3.2 Number of visitors

The number of HTML pages (calls) that were requested monthly has been growing since the start of the project (Table 10.1). In February 1996, the last log date prior to the CAA conference in Iași, 6700 calls were registered. In comparison with large Internet servers<sup>3</sup> this may be small, but for a specialist area of interest such as Dutch archaeology this is not insignificant. The number of calls is, however, of less interest than the number of visits.

Table 10.1 also shows that the number of visits has increased considerably during the first year of the project, *i.e.*, from 535 to *c.* 2,186. The dips are related to holidays.

Surprisingly, the average number of pages requested by each visitor turned out to be only 2.1 in the first six months and even less (1.8) in the second six months, at which it stabilized. Ninety percent of the visitors look at only 4 pages or less (Fig. 10.2). There are, however, visitors who look at up to thirty pages during one visit. From these figures it can be suggested that after six months, regular visitors to Arch *WEB* knew the information presented and went directly to see if there was anything new on their favourite pages. This suggests that returning visitors use their own bookmarks in their World Wide Web browser, rather than the menu structure of Arch *WEB*.

### 10.3.3 Reading time

Another point of interest was the amount of time that visitors spent reading a page. This is a more difficult question to answer using the data from the logfiles. We deduced the 'reading time' by measuring the time one visitor needed to travel from one document to another. These data may not always be very accurate. It is of course impossible to check whether visitors are actually reading a page while it is on their screen. For example one visitor (usually nightly) may take hours to travel from one page to another; we call these users 'tea drinkers' rather than 'readers'. Since it is unlikely that one page is read for hours, a reading time limit

of ten minutes has been applied. Every page that is 'read' longer is left out of the statistics. Even then pages containing relatively little information may be read longer than necessary.

Another problem is that one user may interfere with the actions of another user. It is therefore hard to distinguish the reading time on the basis of the logfiles. It nonetheless may give some indication of visitor behaviour.

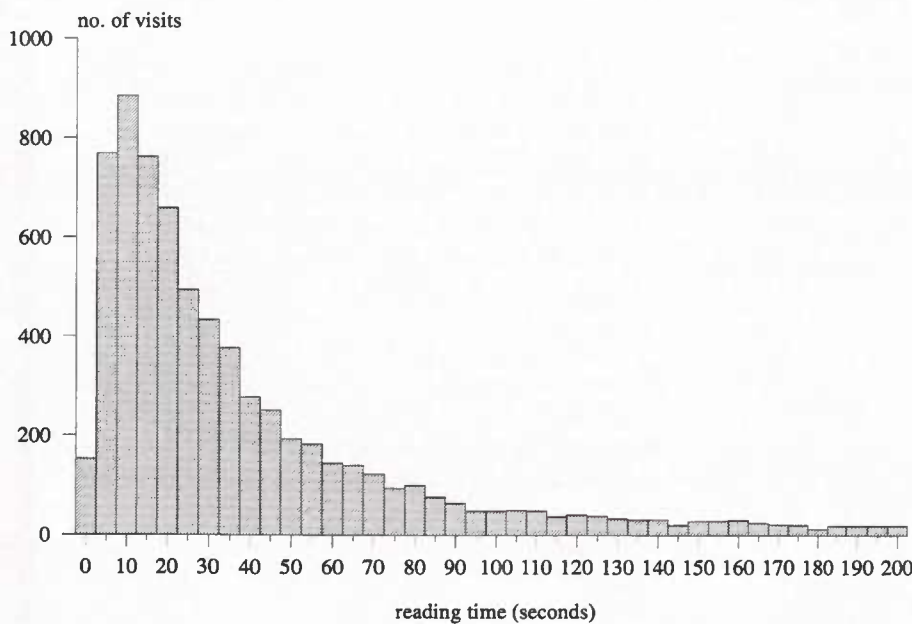
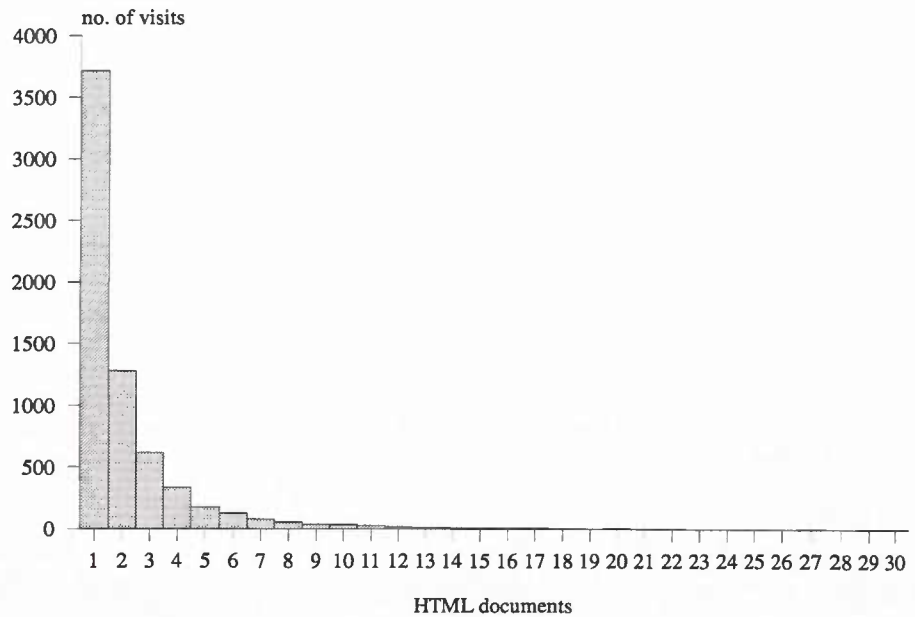
The analyses show that in the first half of 1995 most visitors read a page only momentarily, *i.e.*, for around 10 seconds. The variance is however very large (Fig. 10.3); although the mean reading time is 54 seconds, the majority of the pages are read between 5 and 40 seconds. This implies that the use of the web has an extremely superficial character. Two factors may influence this impression. One is that search engines regularly visit our pages in order to make indices. These visits are extremely short, *i.e.*, a few seconds. If many engines visit our site frequently, then this may diminish our mean reading time considerably. Secondly, visitors may save pages of interest to their hard disc, in order to read them later at their own pace; by saving the information, rather than reading it on-line, telephone bills are reduced.

These two factors do not explain everything. It seems that the Internet is indeed a volatile medium. Many people are primarily headline hunting or picture grabbing, without really reading what they encounter. World Wide Web visitors seem to appreciate documents best if they look like articles from a glossy magazine.

### 10.3.4 Choice of main language

From the response analysis it has also become clear that the English version pages are read more often than pages in Dutch. Even though fifty percent of the visitors are Dutch, six out of ten of the requested pages are in English. It is obvious that the advantage of the documents written in English is that they are accessible to a much larger group. The Internet is

**Figure 10.2:** The number of documents read during a visit, as registered during the first six months of 1995 on the ArchWEB server in Leiden (3,500 visits consulted one page only).



**Figure 10.3:** The time visitors spent, presumably reading a document, as registered during the first six months of 1995 on the ArchWEB server in Leiden (almost 900 times a document was read for only 10 seconds).

universal and the English language remains the *lingua franca*.

The ArchWEB team has, nonetheless, decided to be primarily Dutch oriented and to use the Dutch language. The main reason for this is that most of the documents offered are solely of interest to the Dutch public. Very few colleagues from abroad will, for example, be interested in attending a lecture in a small village in the Netherlands, while on the other hand a large part of the Dutch public will miss this information when offered in English.

The second reason for choosing Dutch is that the information which is at present being offered, like conference programmes, newsletters, job vacancies *etc.* is predominantly derived from already existing paper documents which are written in Dutch and are simply transformed into an Internet suitable format; few

documents are created specifically for electronic use. In other words, the volume of already existing information determines the volume of information that is available for our service.

This meant that we could either choose between offering a service with a wide variety of information in Dutch, or a service with very little information in English. It is obvious which choice was the best for us, although we are of course aware that this approach excludes a number of international WWW users, and that the investment in writing HTML documents is less cost effective when the end user group is relatively small.

Our preference for documents in Dutch does not mean that we do not offer information in English. All relevant information that is available in English will be presented, and occasional texts will be translated.

It is clear that in order to reach a larger audience, the information should not be exclusively in Dutch. Our preference for a Dutch oriented service may even be temporary. Due to European integration, many Dutch organisations are starting to become more internationally oriented. Universities regularly exchange students, which makes it worthwhile presenting lecture programmes on the Internet in order to recruit more students from abroad. Other organisations, such as field units, are increasingly operating in the European market. They may enlarge their activity area by using the Internet as a public relations tool. To distribute a paper document on a Europe wide scale is too costly, but to distribute a document electronically is cheap in comparison.

### 10.3.5 Accessibility of the information

Apart from visitor behaviour, some other things became clear to the ArchWEB team. The ArchWEB home page had been built up as a series of links to home pages of participating organisations. As each archaeological organisation knew where to look for particular information, this concept worked. After a while, however, the wish developed both to serve the international archaeological community and to become a public service. Subsequently the home pages had to be reconstructed as neither of these two groups would know Dutch organisations, and therefore would not be able to find information of interest to them. As a result we changed to a thematically structured home page. Another argument for this approach was that information resulting from joint projects could not be placed on the pages of a single organisation, but could be incorporated into a thematic approach.

Another advantage of a thematic approach is that related information, offered by various organisations at different sites, could be brought together under one topic. For the user the information is better structured, and it diminishes the number of pages the visitor has to consult in order to arrive at a particular point.

A major disadvantage of a thematic home page, however, is the increased maintenance required. If the number of participating organisations, the number of incorporated servers and the number of documents increase, the burden of the maintenance of the links grows as well. At first, ArchWEB consisted of 30 links; we only referred to the home pages of the participating organisations and these required few alterations. The number of links has grown steadily to over 130 and is still increasing. Moreover, these are links that change regularly and therefore require maintenance.

In order to reduce maintenance we only made links to those items to which the organisations have put links on their own home pages. This means that we did not include all documents of all organisations in the thematic links. In this way an acceptable com-

promise between maintenance and accessibility was found. In order to further facilitate maintenance, the means may be developed to check the validity of links automatically.

In order to improve access to less visible documents, *i.e.*, those to which there are no links on the home pages of the organisations, ArchWEB offers its own search engine. At first this engine only made an index of the files on the main server, but now all documents of all participating organisations dispersed over several servers are included. ArchWEB uses a search program (Harvest) that allows all kinds of queries on free text, as well as on structured elements like document titles.

The extra time invested in both the structured and the unstructured means of making information accessible was considered worthwhile. It has improved accessibility enormously; even regular visitors thought the service had gained many new documents, although we had in fact added none.

### 10.3.6 Supply of information

Probably one of the most remarkable problems the ArchWEB team has encountered is the reluctance of many Dutch archaeological organisations to put information on the Internet. At the start of the project the team thought that it would be easy to persuade others of the usefulness of electronic communication via the World Wide Web. The idea was that the low costs and the potentially large group of users would provide effective stimuli for organisations to actively participate.

This was not the case. The willingness to put information on the Internet is less than expected. In 1995 the number of WWW pages on the server in Leiden has grown from 25 (in January) to 215 (in December), but the number of participating organisations has remained limited to *c.* 25. This means that the average number of pages per organisation is only eight. Sometimes the project developer almost had to plead for new documents. Even important public information was not always handed to the team, despite the fact that it already existed in a digital format. As we did not want to withhold it from our archaeological colleagues, we ended up rewriting this information.

The reason for this reluctance is not clear. First of all, the lack of familiarity with the Internet, and the WWW in particular, seems to play an important rôle. Many archaeological organisation have limited access to the WWW. Still this does not explain everything. Even organisations which do have Internet connections on all desks seem little disposed to contribute structurally. Several organisations offered documents, but neglected to invest in keeping their information up to date. It seems that the frequency by which an organisation communicates through electronic means depends on the amount of available 'spare' time. In many cases this is the 'spare time' of a few employ-



ees who are personally interested. It is clear that the development of WWW documents is not yet an institutional activity that is an intrinsic part of corporate communication policy.

Another reason for the low level of active participation may be that communication through the Internet is not considered cost effective. It takes a considerable amount of time to convert existing documents into HTML format, even if the text and illustrations are already in digital format. The fact that WWW visitors expect documents to look like articles of a glossy magazine demands adaptations to the lay-out of existing paper documents. To simply translate a press release, a newsletter or a small article does not lead to a good WWW document. Moreover, the lay-out abilities of WWW browsers are inferior to those of word-processors. In order to adapt a message to the new medium, its lay-out, contents and length must be revised, and medium specific gadgets like hyperlinks and illustrations must be added. Whether organisations are willing to invest this time depends on the priority of this activity. Dutch archaeological organisations do not pay much attention to public relations in general, which also holds for public relations via the WWW.

It is clear that there are costs involved; the benefits, however, are far less clear, as they are more difficult to measure. Moreover, different organisations expect different returns, financially or otherwise. Universities, for example, may be more interested in sharing their latest research results with colleagues, while other organisations may be more interested in communicating with the general public.

Although it is almost impossible to measure the indirect effects of communication through the Internet, it has been observed that there is hardly any direct feedback from any group of visitors to an archaeological WWW site. It seems that most visitors prefer to 'browse' anonymously. Once people are used to the new possibilities interaction may eventually develop; or our expectations may be too high, the fact that communication is possible does not mean that it will be used.

### 10.3.7 Conclusion

During the first year of the ArchWEB project understanding was gained on some aspects of communication on the WWW. The analysis of the logfiles of the ArchWEB server has been very helpful.

In general it can be said that expectations concerning the interest in the service have been met. Since ArchWEB attracted 17,000 visitors in the first year, it is our belief that such an information service is worthwhile.

Secondly, WWW visitors generally behave in a specific way. They tend to glance through the pages quickly without really reading them on-line. One could conclude from this that they expect WWW doc-

uments to look like articles in a 'glossy' magazine with short, entertaining items (Fig. 10.4), rather than like a 'heavy' scientific book. Information providers should take this into account when constructing pages. They should use illustrations and headings that can serve as 'eye-catchers'. In order to allow users to get more background information, one would offer 'entrances for further reading'. In the case of a scientific article, one could start with an attractive looking summary, and include a link to the full text.

It was somewhat disappointing that the elicitation of information for the service needed much more work than was foreseen. Not only did we have to prompt participants repeatedly to up-date their information, we were also forced to actively seek new documents. Many archaeological organisations are not currently participating.

To conclude, the many unexpected aspects of information acquisition, web translation and site maintenance make it a rather time consuming task to offer an information service on the WWW.

## 10.4 The future of ArchWEB

### 10.4.1 A nationally oriented service

During the last phase of the project the aspects of maintenance and improvement have received most of the attention of the ArchWEB team. We have invested a large amount of time in improving and maintaining the information presently provided, instead of trying to expand the service. Management is our main interest, as we consider a small but qualitatively good service more effective than a large but sloppy one.

The direction in which ArchWEB has been developing surely leads to a small nationally oriented service with high quality information. Despite the fact that the Internet is, by definition, internationally oriented, we believe that it should offer our visitors information mainly on Dutch archaeology, as this is our prime knowledge domain. Moreover, our main group of visitors are either Dutch archaeologists or Dutch members of the public who are interested in Dutch archaeology.

We expect a gradual growth of such nationally (or even locally) oriented network communities in Europe. In the near future, other European countries may start national information services as well. In Scandinavia an example of such a service already exists<sup>4</sup> and there are plans to develop an Italian service. The reason for the growth of these locally oriented services is that the number of servers is growing and therefore the available information tends to be widely dispersed; search engines are not always an adequate solution, whereas national thematic information services could be.

This implies that we expect that the rôle of initiatives like the Archaeological Resource Guide for Europe (ARGE) will eventually lose their importance. These large sites, which consist of collections of links,

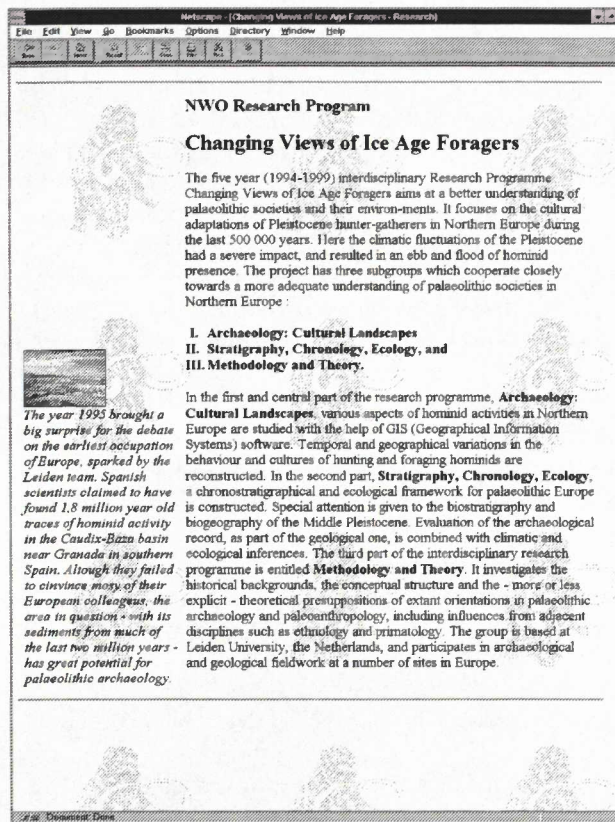


Figure 10.4: A WWW document with an attractive magazine-like lay-out.

have played an important role in the development of the WWW. There comes a moment, however, when they can no longer compete with local services. Local web masters are much better informed about the information available in their country and they are better able to select documents of interest to the public. Moreover, they are better able to keep documents up-to-date. The pages on Dutch sources in the English ARGE illustrate this point. As they predominantly consist of a copy of the Dutch home pages of ArchWEB the references to the underlying documents are maintained at two different locations, on the local and the remote servers; the remote server is by definition less up-to-date.

Probably the best way forward for sites like ARGE is to evolve towards a European meta service; links can be made to national services and European archaeological indexes, and other central services which are of international interest could be offered.

### 10.4.2 Electronic journals

One of the WWW facilities that the ArchWEB team would like to investigate in the near future is the feasibility of a Dutch electronic magazine. There is a growing demand for the publication of excavation reports, dissertations *etc.* Because of their size, however, it is often difficult to have them accepted by reputable publishers. An electronic magazine or journal may provide a solution to this problem. Their production costs may be less expensive than paper publications.

With electronically published articles the final phase of the production, the actual printing, and the distribution can be omitted. Moreover, electronic publishing allows all kinds of facilities to make basic data (like excavation and find drawings, and data records) easily accessible, and to allow for on-line analysis and interpretation. A major advantage of electronic articles, when offered free, is their availability to anybody with access to the internet.

In 1996 a project was started by a group of British academic organisations to create an archaeological electronic journal. The concept of this journal, 'Internet Archaeology', is to present texts and illustrations as well as raw data, distribution maps, chronologies *etc.* It is an innovative concept, but one with major difficulties. A considerable time investment will be needed to develop such a multimedia presentation. For a text based article this is not a big problem. But to translate and present all the existing raw data, photos and texts of a research project will take a large amount of time, which will probably not be cost effective because of the small group of people interested in this very detailed information. Another problem is that archaeologists are often unwilling to share their (painfully collected) data with others.

We think therefore that an electronic journal should contain attractive looking summaries in HTML format. The entire article can be offered as a Postscript document for readers who want hard copy. We regard this as a more justified investment of resources than a complete multimedia article, which



contains all the raw data but which is of interest to only a small number of people. We would ask that the journal is free, because we believe that a wide distribution of archaeological information is more important than minimal financial returns.

### 10.4.3 Additional services

Before the pilot project ends a few small tasks will be carried out. By mid-1996 we will have implemented a multi server search engine, by which we can index all the documents on Dutch archaeology present on different servers. Furthermore a distribution list (ARCHWEB-L<sup>5</sup>) will be implemented. Anybody, archaeologist or not, will be allowed to join this list. A form is available on ArchWEB allowing people to join or resign from the list. All members will be allowed to send messages to the other members of the list, although these messages will be screened before they are distributed.

The first phase of the ArchWEB project ends on the 1st September 1996. The team has found alternative finances to pay a part-time project coordinator. It is considered essential for an up-to-date information service to employ a coordinator, as the maintenance of the web site requires continuous attention. The information offered must be coordinated, documents must be acquired and translated into HTML, users must be made aware of the service and its possibilities *etc.*

It is not yet clear whether, and if so how, ArchWEB will continue after the first phase of the project. The small budget that allows the project coordinator to continue does not allow for additional activities. The project team will have to raise new funds in order to be able to develop new services. In any case, the team will keep up with new developments such as lay-out improvements with HTML (backgrounds, tables, frames, Java scripts), search engines, making phone calls via the Internet, video conferencing, interactivity by means of Java *etc.* Additionally, whenever possible, new developments that may improve our service will be implemented.

## 10.5 Conclusion

The future of electronic information services like ArchWEB depends heavily on the future of the WWW and of the Internet as a whole. To many visitors the WWW and its technical abilities is still an astonishing and intriguing medium. They are at first amazed that you can travel the world using a mouse. After a while, however, users stop 'surfing' and only visit a small selection of sites with information of interest to them. From that point on the attention of the user can only be drawn by the quality of the information and its lay-out.

There is no reason to believe that archaeologists will use the Internet differently from other scientists or, for that matter, the general public. As within other

disciplines and the public at large, the interest among archaeologists is increasing. The number of links in ARGE has grown to 350 in the first ten months of its existence.

We have also noted, however, that the use of the WWW is not yet widespread among Dutch archaeologists. Many of them do not have access to the Internet at work, and if they have, they predominantly use e-mail.

Those that are connected to the Internet, nevertheless, do appreciate a local information service like ArchWEB, even if they do not actively participate. Up until now the web has developed into a medium the function of which lies somewhere between a dynamic, mass communication media like newspapers or television, and a more static and individual media like a book. Although it may disperse information as quickly as the former, its distribution is not yet as wide. As to the range of the information, the web has a similar intermediate character. Web visitors seem to expect topical subjects, although they do not have to be updated on a daily basis, as well as easily accessible facts and perhaps slightly more specialised background information.

The nature of the web determines the kind of information that can best be presented. It is not very useful, for instance, to offer an archaeological study programme to students who already have a printed version. It may, on the other hand, be useful to announce changes in the locations of lectures, in dates of exams *etc.* When the web is used in such a way, it may eventually be a more effective means of communication than conventional ones.

However, many Dutch archeological organisations have no idea how they can use the WWW efficiently for communication, and whether they should incorporate it in their communication strategy.

As ArchWEB counted 17,000 visitors in its first year, we believe that it has justified its existence. The most important criterion for its survival, however, will be that it uses medium specific facilities to present its information. Otherwise people will immediately revert to conventional media, because for the moment the WWW is considered to be nothing more than a supplementary means of communication which enables information to be distributed in a different way.

To conclude, we believe that the Internet will eventually become an important means for information exchange among archeologists and with the general public, and that information services like ArchWEB can serve as catalysts in this process.

### Notes

1. Due to the speed of developments in cyberspace some statements and prospects will already be outdated when this paper is released.
2. <http://archweb.Leidenuniv.nl/>



3. The home page of ArchNet in Connecticut (<http://spirit.lib.uconn.edu/ArchNet>), the virtual archaeological WWW library, receives an average of 17,500 visits per month. The Archaeological Resource Guide of Europe (ARGE, <http://www.bham.ac.uk/ARGE>) has a monthly number of visits of about 500.

4. <http://www.umu.se/arke/>

5. [Weblist@archweb.leidenuniv.nl](mailto:Weblist@archweb.leidenuniv.nl)

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