



# Digital Danish Archaeology. Gods and Graves - an Internet Publication on the Bronze Age

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## Abstract

Publications on the Internet are still in their infancy and with Gods & Graves we have taken our first steps at the National Museum in Denmark. Gods & Graves is a presentation of spectacular finds from the Danish Bronze Age based on two large archaeological databases. It allows the Internet visitor to go behind the scenes in the National Museum's Bronze Age exhibition and gain access to pictures of objects which are normally kept in the Museum's stores, and to see photographs and drawings from the archives as well as reading original textual information. Gods & Graves is a pilot project to CultureNet Denmark.

## 1 Introduction

In 1996 the International Documentation Committee "CIDOC" met for the first time outside the north-western hemisphere in Nairobi, Kenya (CIDOC 1996). This gave the delegates a welcome opportunity to discuss the conditions for information technology (IT) within museum communities in different parts of the world. The attitudes were very different. Some regarded the emergence of the Internet as a revolution for the possibilities of communication and instant access to knowledge for people in Africa. Others regarded the Internet as a tool for the upper class to keep information away from the others. Is this also true if we substitute the words "people in Africa" with "smaller museums in Europe"? Is IT only for the rich? In Africa a computer costs the same as employing a museum professional for one year. In the Nordic countries the equivalent is less than a month. Despite this, a lot of museums in our part of the world are at the same level as the African ones, they cannot find the money to invest in information technology.

On the other hand many efforts have been made in the field of digital archaeology in Denmark during the last 20 years, as in our neighbouring countries. More presentations at CAA clearly demonstrate this (Hansen 1993; Andresen and Madsen 1996). But despite the progress there is still a long way to go, and as time passes it is getting more obvious that conditions for digital archaeology are much better in the centre(s) than in the periphery. We have to change peoples way of thinking before we can get much further at the local level. I would argue that the result is that access to relevant information is problematic if you are located outside the sphere of the attractive digital centres and it could still get worse, if we are not taking this dilemma seriously. It is not enough to digitise the information, it must also be widely accessible. This problem must be addressed for instance via free access in public places like libraries, schools and museums.

In 1994 the Danish government (the Ministry of Research) published the report "The Info-society year 2000" and based upon that a policy document in 1995 "From vision to action

- Info-society 2000". The Ministry of Culture's contribution to the IT policy was the establishment of a "CultureNet Denmark" and in order to speed the process eight pilot projects were supported by the Ministry in 1996 and in 1997 a further nine received funding. The CultureNet's aim is to use information technology to give the public better access to the many state and state-supported institutions, their collections, services and events. The pilot projects are very wide-reaching from this years "Danish Operas 1900-1996" to last years archaeologically "Gods & Graves".

The paper will focus on the Gods & Graves project, as it is a breakthrough in making scientific and administrative information available both to the general public and to the researcher using the good old "new technology". Gods & Graves is a publication on the Internet and it allows the visitor to go behind the scenes in the National Museum's Bronze Age exhibition and gain access to pictures of objects which are normally kept in the Museum's stores, and to see drawings and photographs from the archives as well as reading original textual information. The Internet publication contains descriptions of 219 graves and sacrificial sites from Denmark's early Bronze Age with pictures of most of the objects, including many close-ups, in addition to drawings, sketches and photographs from the excavation reports. Introductory chapters give a general introduction to the Bronze Age, to the project and to the databases from which the material is taken. The publication also includes a comprehensive glossary and a chronology which can be called up on the screen at any time.

## 2 Background

The Gods & Graves publication is based on material from two large databases located at the National Museum in Copenhagen: The National Archaeological Record (DKC) and the Object Register of the Department of Prehistory and Early History (GENREG).

The National Archaeological Record (DKC) is a database of archaeological sites and monuments. DKC has the task of registering all cultural-historical remains from the past to

the present from the land and on the sea-bed. For practical reasons efforts have until now been concentrated on prehistoric finds and monuments. The central registration of the cultural history of more recent times will be started in the course of 1998. The record is primarily a tool intended for use by museums, universities and related institutions. As the database contains sensitive information it is not freely accessible. However, we are giving the public access to selected information in the register, while the professionals have full access to texts, maps etc. regulated by the use of passwords. The database contains information on almost 140,000 locations, which also can be viewed on digital maps using the Record's interactive mapping-system.

The other major database behind Gods & Graves is the object register GENREG. This holds information about The National Museum's collections which contain well over a million items, mainly from Denmark's prehistory and history, but also including a large ethnographic collection. In 1987 the Museum began electronic registration of this enormous amount of material, and now, 10 years later, the task is almost complete. The result is a database containing information in text form relating to about 1 million museum numbers and with about 200,000 pictures.

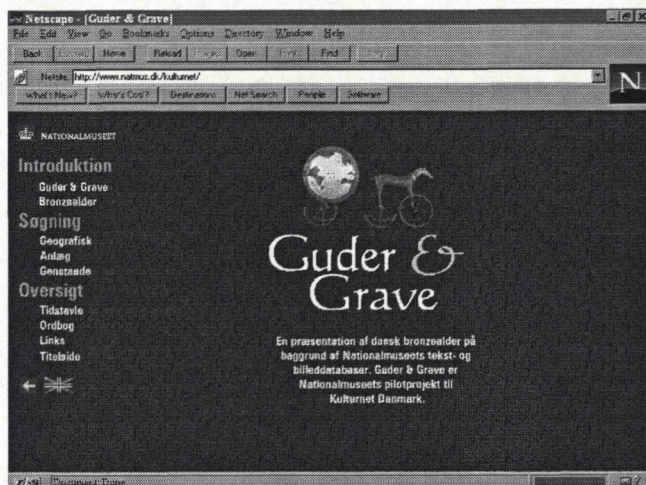


Figure 1. The welcome screen to Gods & Graves - the National Museums pilot project to CultureNet Denmark.

The main purpose behind the Gods & Graves pilot project was to test and develop techniques which in the future will let us use the computer to combine information automatically from the two databases. We also wanted to test the Internet technology to link and present information from the databases on-line. This will allow the public or the researcher to query the databases from many different angles and retrieve relevant information on the archaeological site, its geographical location, the recorded structures on the site and finally to view pictures of the objects and read a variety of related descriptions.

A good part of the Gods & Graves project could be done automatically, but we ended up with a substantial material that could only be solved manually. Anyway the exercise gave us the opportunity to view and work with the data from a new perspective. The experiences from the pilot project

will be used in the future development of the museums' databases.

### 3 Presentation of the system

Gods & Graves is designed in such a way that the user can always orientate him- or herself in the system with the help of a navigation column at left side of the screen. This means that even from the title page one has an idea of what information and search facilities the publication offers (see Figure 1). Access to the data is through three main chapters; "Introduktion" (Introduction), "Søgning" (Search) and "Oversigt" (General information). Each chapter is subdivided so that with a single click one can move on to the desired information.

The chapter "Introduktion" gives access to a description of the Gods & Graves project including a short guide to the use of the system and also a general introduction to the Bronze Age. Both texts contain references (hyperlinks) to more information.

Figure 2. Geographical searches. From the map of



Denmark the user can either choose a name from one of the boxes on the right (like here: "Borum Eshøj"), or "click" on one of the six regions on the map. From the regional map it is possible to choose a particular site by "clicking" on it. The red dots are graves. The blue dots are sacrificial sites.

Similarly the chapter "Oversigt" contains a glossary, a time chart, references to other relevant Internet pages in addition to the project description, an interim report and the final report. The glossary and the time chart can be called up onto the screen at any time. The search possibilities are of course the system's most important facility. Text and pictures from the two databases DKC and GENREG can be accessed from three angles. The user can search by geographic position, monument type or artefact type. These queries should be considered as different avenues to the same information.

Using the geographic querying it is possible to search via a "clickable" map of Denmark, a technique, which in simplified form derives from DKC's mapping system. Alternatively, via comboboxes one can give a placename or the name of a hoard or a burial mound, for example "Borum Eshøj" (see Figure 2). Which ever way is used, the locality is presented with a detailed map (see Figure 3) showing the precise geographic location of the find along with topographic details. In addition detailed information on the antiquarian and archaeological activity at the site over the years is given. It is normally information on excavation,

preservation and perhaps on the legend associated with the site. For instance the story about how the chamber in a mound was found, when a wounded hare hopped into a hole in the mound and the farmer's wife followed after. The texts are illustrated with both recent and contemporary photographs, water-colours and drawings (see Figure 4). The texts alone are a gold mine, so even though Gods & Graves is very visually orientated, the texts are not just there for decoration.

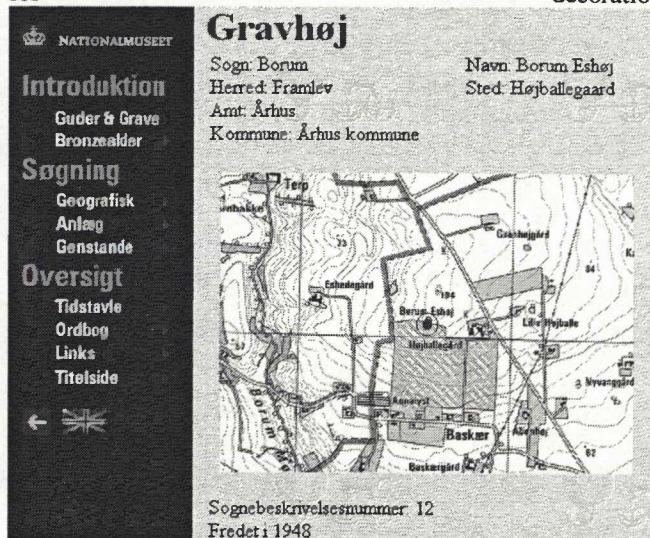


Figure 3. For each of the Bronze Age sites included in Gods & Graves there is geographic information and a modern map with the archaeological site marked. It is also possible to read about the finds and excavations and see related photographs and drawings.

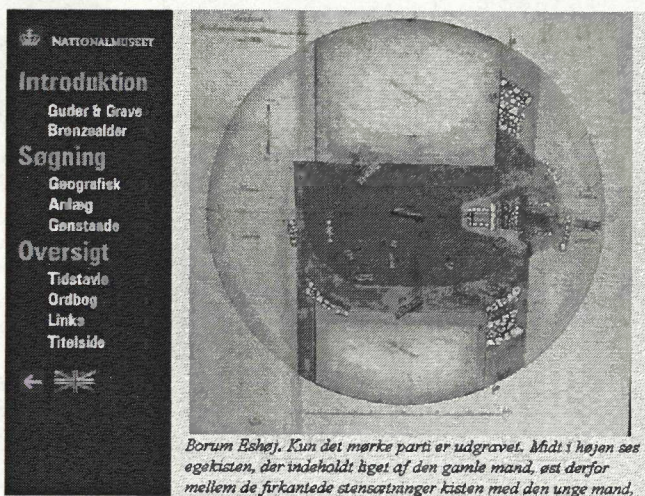


Figure 4. Borum Eshøj. Plan of excavation 1875.

In addition to the text, each query on a locality results also in a series of standardised “Facts about the site”, for example what features or constructions are registered at the particular site as well as dimensions of burial mounds and graves. There is also a hyperlink from this part of the publication so that one can see pictures of the artefacts which have been found at the site or find an elaborate explanation in the glossary.

If the user only wants to access pictures of artefacts and is not interested in the archaeological information this can be done direct by querying by “Genstande” (Artefacts) from the navigation column. This query on the other hand, leads

through a hierarchically built list of the accessible artefact types, so that one can see depictions of all bronze swords, oak coffins or beltboxes for instance (see Figure 5). The pictures are at first fairly small (thumbnails) but they can always be enlarged, whereby decorative and technical details become fully visible (Figures 6 and 7). Just as it is possible to jump from a locality to the associated artefacts, one can of course also get from a given artefact to information on the site it comes from.



Figure 5. Example of a “Search by object” (bæltedåse) via main- and sub-categories.

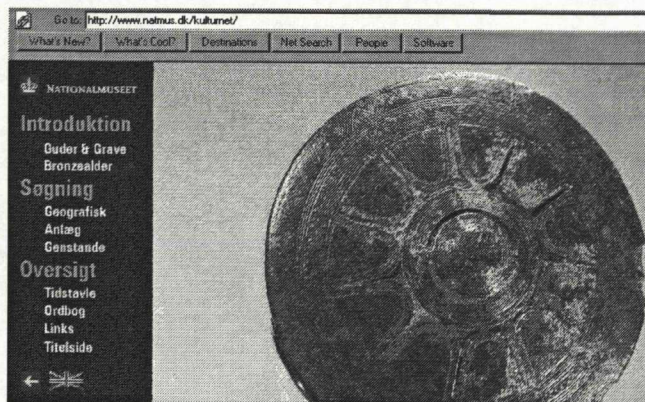


Figure 6. The result of the query in Figure 5 is eight beltboxes. One of them is from “Maglehøi” in North Sealand.

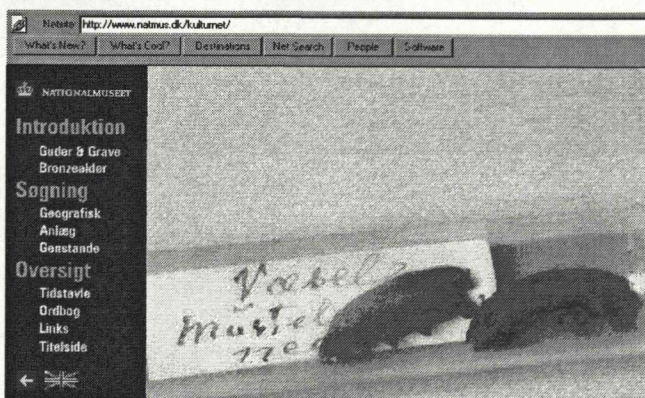


Figure 7. Among the “magic” content in the beltbox from Maglehøi are two jaws from a Weasel.

The last query type is through “Anlæg” (Monuments / Structures). Here the user can choose via a list of for example all burial mounds, cremation graves or hoards. The results are, as described above, the same set of details in the form of text and illustrations associated with the particular locality.

It is always possible to call up the time chart or the glossary on screen just as the information can be reached via the many hyperlinks. The glossary contains a little over 100 references on Bronze Age artefacts and monument types as well as more general subjects like burial customs, bronze casting and dendrochronology. Many entries contain reference to named localities. In this way one can for example go direct from a description of "snoreskørt" (skirt made of cords) to Gods & Graves information on the Egtved girl's grave, where one can also see the conservator Gustav Rosenberg's reconstruction sketch from 1924 (see Figure 8).



Figure 8. One of the features in Gods & Graves is a glossary. The example shows the explanation in Danish of "snoreskørt" (skirt made of cords), the activated hyperlink to Egtved with Gustav Rosenberg's sketch of the Egtved Girl from 1924.

#### 4 The technology

Gods & Graves is developed from, as explained above, the two un-connected databases DKC and GENREG. A new database was designed for the project, which joined the two big databases together, and which, amongst other things, solved the problem of the different ways of recording inventory numbers. The CultureNet database, which was implemented in Access 7.0, is in its structure much more simplified in comparison with the original databases. Amongst other things many one-to-many relationships are reduced to a many-value-text field, where the text is pre-formatted to HTML-code (with the formatting as lineshift, hyperlinks etc.) This solution was chosen to reduce the time it takes to generate HTML-text.

Gods & Graves consists of both static HTML-pages and of HTML-pages which are dynamically generated. For the most part a "cgi"-program (common gateway interface) is used while fewer pages are generated with java-script. A cgi program or cgi script is a program which runs on the web

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server and returns information (in HTML-code) to the client who queries. A cgi program can be written in many different languages. For Gods & Graves it has been done in Visual Basic 4.0.

With a query to the database the following happens. From a computer (the client) a query is sent via the Internet to the National Museum's web server. Here a cgi program starts, which first makes a query in the Gods & Graves database and then generates a HTML-file which is finally returned to the client. Here the client's browser generates the final presentation of the page which can incidentally have a surprising result. At any rate the client's browser is a source of great uncertainty in connection with designing an Internet publication.

In Gods & Graves there is access to text and illustrations on 219 localities encompassing 1550 inventory numbers. For comparison it might be mentioned that registered in the museum's collections from this period are circa 9500 numbers. The number of artefacts is bigger than the quantity of inventory numbers because groups of artefacts can be registered under one number. The majority of the artefact pictures accessible in the Gods & Graves database are digital photos (around 2000 items). Where it has not been possible to take new photos, for example of the oak coffins, older ones have been used which have been thus digitised. The pictures of the artefacts which are presented in Gods & Graves are in JPEG format compressed to circa 25-50 Kb, though they are recorded in a considerably better resolution (10 Mb) and are saved after lossless compressing as 2 Mb pictures. It will be possible to show them in a considerably better quality when technology allows without having to take new photos.

#### 5 Conclusion

There can be no doubt that publications on the Internet still are in their infancy. But the work with Gods & Graves has been enormously informative for those involved. As a direct result we have now opened on-line access to DKC - The National Archaeological record, with the use of more or less the same techniques. Differentiated access to the data is controlled by password, so that there is access for local museums, administrators, researchers and interested public without compromising data security. In other words the database cannot be misused as a treasure map for metal-detector armed antiquity hunters, but it can be used to give the public an interest and respect for antiquities and an understanding of the amount of work behind archaeological collecting and registration.

Hansen, H J, 1993 European archaeological databases: problems and prospects. In: Andresen J, Madsen T and Scollar I (eds.).  
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*Internet references*

CultureNet Denmark: <http://www.kulturnet.dk/>

Gods & Graves: <http://www.natmus.dk/kulturnet/>

The Danish National Archaeological Record: <http://www.dkc.natmus.dk/>

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