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MEMORY OF THE NETHERLANDS: A PROGRAMMATIC APPROACH TO THE DIGITISATION OF CULTURAL-HISTORICAL RESOURCES IN THE NETHERLANDS

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Abstract

Memory of the Netherlands is the a large-scale digitisation programme carried out by the Koninklijke Bibliotheek, the national Library of the Netherlands. It represents a new point of view on digitisation of heritage collections:
The scope of the programme is to digitise as many objects as possible in a relatively short period (3 years). The programme is based on the following starting points: good quality images (sufficient for access on the internet for a general public), reduced costs, adherence to strict regulations and standards, little effort spent on selection, and no development of contextual material.
In most projects thus far, only relatively small amounts of digitised materials were produced. Most of the money was spent on technical issues and the development of contextual material. Lack of co-operation resulted in money being wasted on re-inventing the same solutions. In many cases the digital objects could not be re-used in other applications after the project's end. In the Memory programme we strive to avoid these pitfalls.
The programme is based on co-operation between institutions in the various cultural heritage domains: museums, archives, libraries, archaeological institutions and organisations dedicated to the conservation of monuments and historical buildings. The digitised materials, representing various media types (still images, video, audio, and text), and owned by the various institutions will be presented together. Thus optimal use is made of the place independent possibilities of the Internet. Cross-searching in a specific but fairly extensive domain as the cultural heritage should provide new opportunities for entertainment, research or just satisfying one's curiosity.
The storage of images and metadata is scalable. By realising this programme, KB does not only build a large digital collection, but also a stable, robust and scalable infrastructure for future digitisation projects.

Keywords: Cultural Heritage, Digitisation, Process Innovation, Semantic-based Access, Cross-over Presentation, Politics, Co-operation.

1. Introduction

When it comes to cultural heritage on the internet, the former Dutch State Secretary of Culture, F. van der Ploeg has set a trend during his term of office (1998-1902). Art and culture had to be brought outside the walls of the cultural institutions and their public outreach had to be increased substantially, under the slogans of 'democratisation of art and culture' and 'the treasuries open'. Digital access offers unprecedented possibilities to realise this. In 1999 the Koninklijke Bibliotheek, the national library of the Netherlands, submitted a project to the government that would be an important step towards a digital collection of resources about Dutch history, art and culture: Memory of the Netherlands. The inspiration for this project came from a number of recent studies, such as 'Alles uit de kast' ('Bring it all out', WTR-SURF 1998), an investigation into the financial and organisational preconditions for large-scale digitisation of the Dutch cultural heritage and 'Een digitale bibliotheek voor de Geesteswetenschappen' ('A Digital Library for the Humanities'), an investigation by The Netherlands Organisation for Scientific Research (NWO) into the need amongst humanities scholars for digitised resources (Viskil, 1999). The American digitisation project 'American Memory' was another source of inspiration.

The proposal built upon the experience gained in previous digitisation pilots by the Koninklijke Bibliotheek, but it implied a considerable scaling-up regarding content and organisation. A distinctive aspect was its programmatic approach: large-scale, with little selection, cross-sectoral, covering art, cultural and history in the broadest sense, focusing on digital content, and professionally set up. The proposal also addressed the problem of building up a stable and scalable technical infrastructure, and the acquisition and dissemination of knowledge about digitisation and project management. The intended audience was also fairly new to KB. Apart from academic users, a general audience and secondary education were targeted. For a national library this is a logical step, especially when it concerns resources that are interesting and useful for various user groups. The Dutch Ministry of Education, Culture and Science granted KB a substantial subsidy from the FES fund (Economic Structure Reinforcement Fund), with the urgent advice to give the educational component contained in the proposal due attention, to reinforce the digital learning environment in secondary education.

Since May, Memory of the Netherlands has been available on the internet. After the launch of the service, the content will be extended in less than a year from 35,000 images and text pages to 750,000, and 250 hours of moving images and 100 hours of audio will be added. In 2003-2004, twenty educational applications will become available as well.

Fig.1: Het Geheugen van Nederland / Memory of the Netherlands
(http:www.geheugenvannederland.nl) [Dutch and English interface]

2. Memory of the Netherlands

Four years ago, the digitisation of cultural heritage materials in the Netherlands was still in its infancy. Although in business and industry (the financial world, insurance companies, hospitals) digitisation had already been widely adopted as a solution for archiving, fast processing of information and accessibility, the cultural-historical world was still in the phase of experimental projects. Nevertheless high-quality websites were sometimes realised. 'Hundred Highlights', dating from 1995, was one of those early projects and is still one of the crowd-pullers on the website of the Koninklijke Bibliotheek. The objectives of the cultural-historical digitisation projects varied, but often they had the same point of departure: the object itself. Top quality and optimal precision were considered to be of paramount importance and the utmost care was given to every detail. To gain a clear understanding of procedures and costs, on the other hand, was deemed of less importance, let alone that issues like durability and stability, large-scale storage and user orientedness were addressed. After all, an important aspect of these pilot projects was to gain more knowledge and experience for the benefit of future projects.

Memory of the Netherlands aims to make available a large amount of cultural-historical collections to a wide audience, in an efficient way and in a short period of time (three to four years), and to develop educational applications for a number of them. These

collections originate from various types of organisations (museums, archives, libraries, organisations for the conservation of monuments and ancient buildings and archaeology). By now, more than 45 organisations are involved (see Appendix 1). This cross-sectoral approach is fairly new, especially on this large scale. Not much context is added to the collections. This is left to other expert organisations and individuals. The Memory focuses on the primary process of digitisation and on simple methods of providing access. Quality control of the images for use on the internet is an important aspect. Metadata are re-used in the form the participating organisation is able to provide. More internally oriented, but not less important for the future, is the attention paid in the project to the costs of digitisation, efficient production processes, co-operation in the cultural heritage sector, and normalisation of storage, access and procedures.

2.1 American Memory

In about ten years time the Library of Congress in Washington has realised an unsurpassed collection of digitised materials about the history and culture of America: American Memory (http://memory.loc.gov). It contains lots of images, with very little context, aimed at a wide audience who are given access free and without having to register. By now this collection contains more than seven million records (moving and still images, audio, maps, text, sheet music, etc.) The public's interest, although fairly limited initially, has grown expansively to many hundreds of thousands of hits per month. American Memory contains mainly materials from the Library of Congress' own collections. Occasionally external materials have been included or joint projects started up. The focus is on the possibility to cross-search all collections in their entirety, in a simple manner and with limited search options. Started out as a supply driven product, it has grown into a very popular and frequently used site. American Memory has had some imitators, although not many. The most well-known is the Scottish SCRAN project (http://www.scran.ac.uk) in which the educational applications play a more prominent role, but which on the other hand is not free. American Memory also served as a model for Memory of the Netherlands.

2.2 A programmatic approach

Memory of the Netherlands introduces a programmatic approach to the digitisation of cultural-historical materials in The Netherlands. History, art and culture in the broadest sense are the unifying element regarding the programme's content, while co-operation, professionalism and its large scale characterise it on the organisational level. This approach means a step forward from pilot projects that are small-scale, for a limited audience, experimental in nature, and short-term, to the realisation of an operational service including various cultural heritage organisations and large, varied user groups. The advantage of this large-scale, programmatic approach is that the processes can be managed in a much more professional way. This approach has yielded positive results before, with the other large-scale national programme run by the Koninklijke Bibliotheek, Metamorfoze (http://www.metamorfoze.nl), focusing on preservation and microfilming of library materials of Dutch origin, dating from the period 1840-1950 and threatened by paper decay. (The digitisation activities of Metamorfoze, started recently to replace the user's copy of the microfilm, make use of the Memory's infrastructure. Thus preservation (safekeeping) and digitisation (providing access) are linked more closely than before). Because of the large amounts of materials and the position of the Memory's co-ordinating office (financially, strategically and regarding expertise), favourable prices can be negotiated with scanning companies without compromising the quality. The approach in the various subprojects is highly uniform. More and more materials become available for comparison, allowing for a better understanding of the processes and costs. More effort can be put into the development of the technical and organisational infrastructure. Knowledge is better preserved and disseminated. A durable, stable form of access can be guaranteed. Ultimately, this all contributes to provide the public with better services.

2.3. Intended user groups

The choice of content, the search and retrieval options, the presentation and the amount of context provided, are all influenced by why we digitise and for whom. The Memory has two main target audiences: the general public with an interest in culture, and secondary education. But because a lot of attention is given to interoperability and possibilities for re-use, the digitised resources can be used for the benefit of other user groups as well.

Resources that have been made accessible for a wide audience can also be used in education or research. Materials that have been digitised for research may be interesting to a wider audience. On interface level, different environments can be created, adapted to the various user groups, with a different context, presentation and search options. (For the development of new presentation forms, see the paper for ICHIM 03 titled 'The Digital Production Line' by the same author). Digitised resources may also be re-used in tourism or in entertainment such as games. The more the images are re-used, the more the cultural heritage will lose its elitist image and become part of daily life. Is wide usage, now and in the future, not an important reason why so much effort is put into collecting, safekeeping and preservation?

2.4 Contextualization and presentation

The Memory of the Netherlands programme focuses on the primary process of digitisation of cultural heritage materials and provides free access to the digitised materials. The public get at their disposal large amounts of cultural heritage collections, which people can roam at will and which they can cross-search in one go. A disadvantage is that the various collections have different ways to provide subject-based access that are not always compatible, that relations between objects come about only by coincidence, and that objects are not placed in their context (other than the collection and the organisation from which they originate), resulting in a lack of connections between the objects themselves and between the objects and the knowledge available about them. An exception are the educational applications that are developed. These can illustrate how heritage materials may be used in a learning environment. Therefore, Memory of the Netherlands will be participating extensively in the Digital Production Line initiative (see above), which with the help of advanced IT research into for instance semantic web technology will develop solutions for supporting various forms of semantic-based access for collections of heterogeneous databases.

Because searching an image bank can be done effectively only when you are searching for specific objects and in fact already know how these objects will be described, a number of aids have been developed to increase accessibility, such as browsing options for relevant

metadata fields, and small selections from the collections to give the user an impression of what can be found in them.

Although an image bank that can be searched freely is very valuable as a basic provision, it is clear that larger numbers of visitors could be reached who would be interested in contextualized heritage materials. Therefore, in the next phase of the project co-operation will be sought with individuals and institutions capable of telling stories, carrying out research, or creating web exhibitions, based on (parts of) the collections or even selections of materials from various collections. This activity should not be restricted to professionals only. Possibilities will have to be created to enable the public to build on the digitised materials and present their personal stories, their hobbies and their interests in a web-based environment, to add personal data to objects etc. In the real world these kinds of stimulating processing tasks lie with the individual institutions: publishing houses, historical centres, museums, educational institutions, universities, social work etc. Although it has been predicted that the information chain would change radically, not only in the information provision sector itself, but also in the service industry and in business, in practice these changes are coming about not at all or only slowly. It would not be wise to integrate all links from the chain in one's own organisation all at once when it is not sufficiently equipped to deal with this. For this reason, the task to process the digitised materials available in the Memory will be entrusted to other organisations more fitted to this task. On the other hand, the Memory's organisation does feel obliged not to let the beauty of those digitised resources go unnoticed, but instead to help them to play a role in the cultural life of the internet. The best way to convince people is to show them examples, if only in the form of prototypes. On the internet, with the technical possibilities that are available, various new forms of presentation and processing of cultural-historical resources should be possible. In the next phase of the Memory project, about to start now, promoting these new possibilities will be a major point of attention.

2.5 Education

From the start though, the Memory has worked on examples of re-use in educational applications of heritage materials. In the last four years a network for secondary education in the Netherlands has been realised, called Kennisnet. The development of high quality

content for this network lagged behind. Educational publishers were disinclined for various reasons to deliver this content. Memory of the Netherlands was therefore given the task right from the start to make digitised heritage collections usable in secondary education. Initially the idea was to create a separate interface on the entire Memory collection, but based on experiences from school practice this was abandoned for the plan to develop a number of varied applications.

Because their actual utility value would be the best indication of success, the following starting points were drawn up for the applications:
compliant with the school curriculum and the examination requirements
attuned to existing teaching methods
educationally sound
developed jointly with people working in education and field-tested in the school environment
attractive and justified for teachers to use, but also attractive to the pupils themselves
complete, independent entities
complete with a 'reward' or check system
demanding few technical skills in preparation, use and maintenance
compliant with existing, widely available software and databases

The implications are that technically you can not be very innovative, that you stay in keeping with what already exists and do a lot of compromising between the developers who want to be cutting edge, and the teachers who prefer a gradual evolution of school practice. This is justified when you want to convince a less than enthusiastic user group that web-based educational applications offer endless new, sound, stimulating and attractive possibilities. The first reactions from the field are positive. Next year will yield more information on practical experiences with the applications. The responsibility for further development will have to be transferred to a third party. Content providers like heritage institutions are able to suggest materials and ideas, but the expertise to develop and maintain applications lies mainly in the educational sector itself, especially with educational publishers.

2.6 Organisation

To execute the Memory of the Netherlands programme, the Koninklijke Bibliotheek has established a project office (c. 10 staff) with project co-ordinators for digitisation and for the development of the educational applications, software developers, a quality manager for the text and image scans, a web master and a PR officer. The project office's main tasks are co-ordination and quality monitoring as well as gathering and disseminating knowledge about digitisation, the digitisation process and digitisation project management. The individual projects are carried out under the responsibility of the organisations that own the collections. The results - a series of images with their accompanying metadata records, plus a number of concise texts giving information about the collection and its background, the institute, and the digitisation process - are processed, made available and maintained centrally. Only the streaming materials are stored externally. To build the basic website we co-operated with an external company, but the Memory office is responsible for maintenance and further development of the website.
The educational applications are developed in close co-operation between the organisation that owns the materials, the project office, educational experts and text writers. Schools are also involved. Building the applications is done by external parties, but exploitation and maintenance lie with KB.

The collections are selected by an external board of advisors on the basis of the following principles:
interesting for a wide audience
suitable for use in an educational application
spread in time over the various historical periods and cultural-historical fields such as art history, social history, military history, etc.
adequate financial and organisational facilities in the organisation (are they able to start soon and finish within two years?)
good physical condition of the objects and sufficient metadata
This has resulted in a large diversity of topics and materials, illustrating what the final result could be if the programme were extended beyond its current three year period, although after these three years the Memory collection will already be large and valuable

also without further expansion. By adding more and more objects though, it would become even more potent and interesting.

Every individual project starts with a preparatory phase that takes on average two or three months. During this phase a project plan, a budget and a work plan are drawn up in accordance with normalised procedures and based on an sound analysis of the materials. Only when this is done, an agreement is entered into and the execution of the project can start. After final delivery of the subsite on the Memory website and of the educational application follow the final settlement of accounts and an evaluation. Due to the normalised reporting methods, overall evaluation of the various subprojects has been made easy.

Apart from project co-ordination and the development of the central infrastructure, knowledge on procedures and quality is gathered. This knowledge is disseminated amongst participants and other interested parties, amongst others in various publications. Of these, the "Guidelines and Procedures for Project Execution in the Context of Memory of the Netherlands" (http://www.geheugenvannederland.nl/zappengine/objects/Richtlijnen en_procedures_Geheugen_Openbaar_3.pdf), which will become available in English in 2003, is the most important to date. The execution of the programme has now reached the stage where it can be evaluated. The outcomes of this evaluation will also be publicised in the course of next year.

2.7 Standardisation

Application development implies standardisation, normalisation and interoperability. Black boxes and proprietary solutions may work well with restricted systems, but they are vulnerable, quickly outdated, and limited. Normalisation, open standards and an open architecture are concepts that in their short existence have already fallen victim to inflation. In fact it implies not much more than that you stick to clear agreements on interchangeability and disclose information on how systems and data are structured. Standardisation, when prescribed or de facto imposed, carries the risk of stagnation of development and impoverishment of the usability options. Every application is developed with a specific goal and user group in mind. This determines the choices of how to set up

the system and to carry out the work. These choices should be based on widely supported agreements on interchangeability, re-use and durability.

Memory of the Netherlands utilises a very simple metadata scheme, accommodating all the descriptive and semantic data that are available in each organisation. The search form, developed with a wide audience in mind, offers the search options 'who, what, where, when' as well as 'search any field'. Because of the heterogeneity and internal inconsistency of the structure and content of the underlying metadata, in a large number of cases only searching all fields at the same time will give good, though not very precise results.
The scanning resolution (300 dpi TIFF) is insufficient for archival copies, to produce printed materials, or to carry out high quality structural research, but the scanning method does produce high quality images for use on the internet (see Appendix 2), which is the objective. To strive for compliance with the highest possible norms (assuming these could be defined) would substantially limit the size of the content because of the production costs. Also the costs and organisation of storage would increase considerably, while it would not be clear at all whether the digital image would ever be used for a purpose that necessitated this top resolution.

The metadata is stored in such a way that it can simply be converted to other formats. The images as well can be retrieved and presented by other systems. Changes in storage location over the years will not influence usability.

2.8 Infrastructure

The development of the infrastructure has been guided by the following requirements:
integration in the general infrastructure of KB
aimed at fast access
reliable and stable
scalable
easy to maintain regarding hardware as well as software
content (collections and texts) can be added easily
based on open standards

This has resulted in the following structure. The metadata is integrated in the general metadata storage system in use in KB. It is structured in XML and stored in an Oracle database. For the data format a DTD is developed that is compliant with qDC. The images are stored in JPEG format in a file structure on a Compaq SAN, on which for the time being 1 Tb has been reserved for the Memory. The streaming formats are stored externally, to avoid overloading of our own network connections. The retraceability of the images and the connections between images and the streaming formats are dealt with by an application developed in-house (a generic search script), on a UNIX machine that also controls the integrity of metadata and images. For scalable formats a separate server has been installed, running MrSID.
For searching, the central indexing tools of the Koninklijke Bibliotheek are used (at the moment this is Alta Vista, but this could easily be replaced with other software)

The website runs under Windows and has been built by Coldfusion, using Cocoon and XSLT to process the XML. All parts of the website are stored in an Oracle database. Mainly through the use of JavaScript extra user functionality is supplied.
The entire configuration (with the exception of the storage of the images) is duplicated in a production environment and a test environment. Because development was outsourced initially, a development configuration was not foreseen, but since further development will take place in-house the entire configuration needs to be triplicated to allow for the appropriate development environment. A schema of the hardware infrastructure is shown in figure 2.

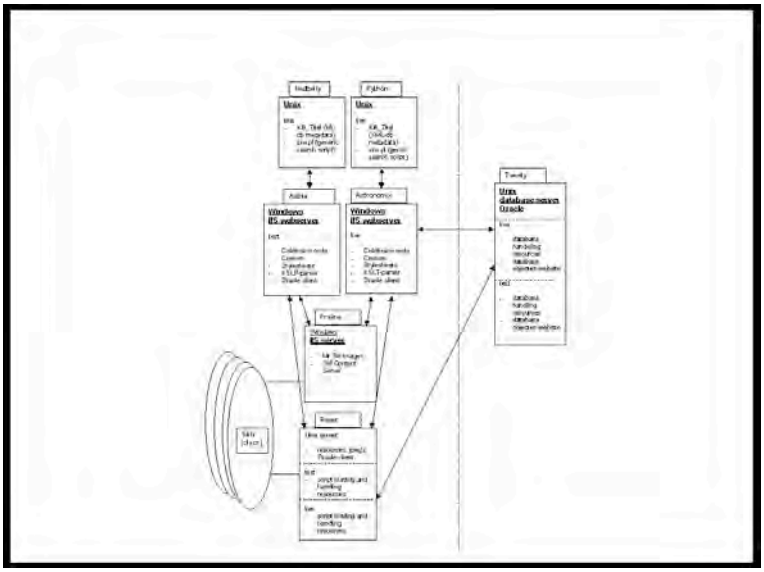

Fig. 2: Hardware infrastructure

The user interface is available in Dutch and English and both sections contain separate structures for the images and for the descriptions. The website is maintained with the help of a Content Management System (CMS), with which texts as well as structures can be added to the website. The CMS is designed for use by non-technical staff, although for advanced use substantial knowledge of HTML, Coldfusion and JavaScript appears to be required. New functionality is partly developed outside the CMS to limit the use of the CMS to its primary purpose: to add collections and simple texts.

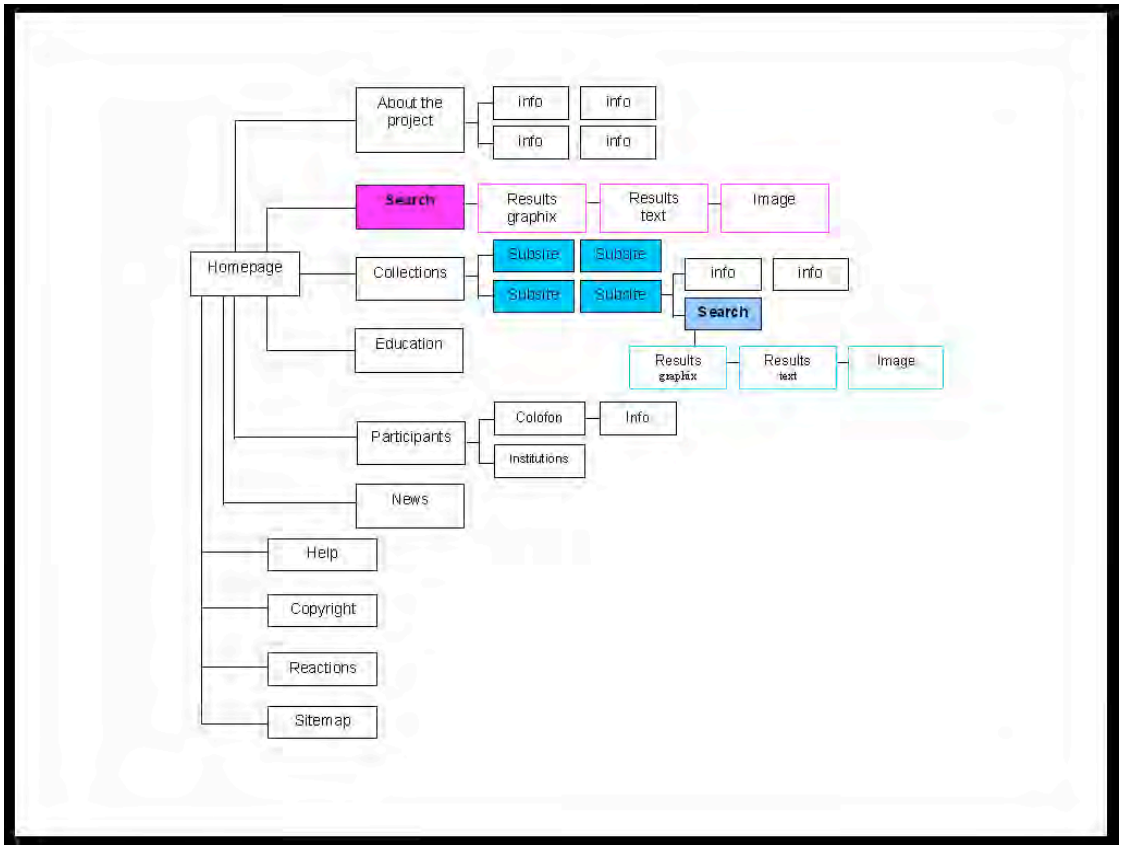

Fig. 3: Structure of the Memory of the Netherlands website. Interface available in Dutch and English. From the third level down, both image-driven and description-driven navigation are available.

Regarding the metadata as well as the images interoperability requirements were met. For the metadata a mapping to DC is available. The images are stored in a file structure with a unique ID. Because the images can be accessed via open URL's, any external system can retrieve the images if it knows their ID, independent of changes in storage location. The

SRU-protocol (Search and Retrieval by URL), developed in the context of the European TEL project (http://wwweuropeanlibrary.org), enables communication with other systems.

2.9 Durability

Memory of the Netherlands offers fast access to digitised images, texts, video and audio. Storage for archival purposes is not included in the programme. On the other hand, no digitisation programme can afford not to develop a policy for the future. Although not every internet application or publication has to be kept safe for all eternity, quality and importance should determine whether the results are worth the costs and efforts of long term preservation. In their funding, projects usually don't even have provisions for long term exploitation, let alone for long term preservation with its still rather uncertain future. Memory of the Netherlands has the ambition to continue service provision on the longer term. Exploitation (but not further expansion) has been guaranteed by KB for five years. Recently, the national library has built, together with IBM, a deposit system for electronic materials. Extension of the system with a long term preservation module is foreseen for the future. The Memory programme delivers a web publication which will in due course be stored as a publication in DAIS (the e-deposit system).

TIFF materials are used in the Memory programme to make derivatives for the internet. As soon as this has been done, the TIFF becomes useless, just like the printing plates in book production. Therefore it has been decided to delete the TIFF's immediately after completion of the collection. Nobody is willing to guarantee the costs for storage and accessibility of the TIFF's over time (at this stage requiring about 8 Tb). Besides, it is doubtful whether anybody will ever re-use them. Often it not even concerns objects that are vulnerable or in decay. Scanning them again, using the technology available at the time, will of course always be possible. Still, it goes against the grain with many people to simply destroy these materials that have been produced against considerable costs. The KB is exploring possibilities to realise a long term preservation and access model for digitised cultural materials (TIFF's and specific archival formats). Recently a substantial grant has been awarded for this purpose. On the other hand, nobody is willing to commit substantial contributions beforehand to the exploitation of such a system. Before inclusion in a preservation system for digitised materials will be possible, a lot of discussion will be

required about the criteria for inclusion: what is worthwhile to include, what will the maintenance costs be in the longer term and who is going to pay for them? In the meantime, the Memory, be it reluctantly, is keeping the TIFF's on tens of thousands of CD-roms.

2.10 IPR

Digitisation for the Memory does not imply transferral of rights. The materials that are included must be available for use free of costs and without registration, for private purposes, research and education (additional restrictions apply for some of the older film material). Commercial re-use is not allowed without permission of the organisations that maintain the collections. The programme does not have any facilities in place to pay compensation to rightful claimants. Not only would this increase the total costs of the programme considerably, a more principled argument is that heritage materials, collected and preserved at the expense of the community and with a clear social value should be freely available after a short period of time (instead of 70 years after the death of the creator, like now) for non-commercial, socially accepted purposes. It goes too far to discuss here the current situation regarding digital materials, but current European and national law make it extremely difficult for heritage institutions to carry out their social mission on the internet when contemporary materials are involved.

2.11 Good Practice and Lessons Learned

The first phase of the project will last another year. It is too early to draw conclusions from our experiences, especially regarding use and whether the Memory supplies a need. Still there are some aspect of the process that can already be commented on:

Formats

The chosen formats will be superseded in one or two years. By that time, multiresolution formats will be used more widely than the chosen formats such as JPEG, MPEG1 or WMA. At the time the metadata format was decided on, DC was not yet applied widely for texts and images. Because of the exchangeability it would have been prime choice right now. For search and retrieval of the objects, the first version of the SRU (Search and

Retrieval by URL) protocol was chosen. The right choice, but further development of the protocol in another context has resulted in a number of essential changes, causing incompatibility between versions. There is no alternative but to accept that you always lay behind developments once a specific choice has been made.

Scanning costs

Scanning costs would need to go down further to make large-scale digitisation of cultural-historical resources feasible. At the moment it is possible to contain the costs, but scanning companies need to invest substantially and on a regular basis in new, all-round machines and technology, to provide the quality internet can support and that users are increasingly demanding. Because of the large diversity of materials and the special treatment that the sometimes unique materials demand, staff costs continue to be a considerable factor. The costs of encoding moving images, on the other hand, have decreased considerably. Due to the increasing use of broadband, the quality that is required will increase and this will influence the production and storage costs.

Metadata

The creation of descriptive metadata, even if they are fairly minimal, are still a large cost item. The quality of the metadata (with the exception of that for printed materials and top items of collections) is often minimal and ambiguous and often completely lacking. The development of tools to generate metadata (semi-)automatically, seems feasible for text-based materials, but comparable aids for image materials are still in their infancy. The current heterogeneity of data formats and methods for semantic-based access used in the Memory allow for little precision. To normalise this by intellectual effort only, is not feasible. IT tools will have to provide a solution in due course.

Process Control

For the final result of digitisation projects it is really worth the effort to invest in quality monitoring of the process. Although digitisation of heritage materials does not differ much from other project activities, close co-operation between content experts and technical developers on all the aspects involved is essential. It also pays off to make an extensive analysis of the materials (objects and metadata) during the preparatory phase

and to document very precisely the various stages of the digitisation process. This contributes to efficient execution of the project, with high quality results.

Integration of heterogeneous materials

Making heterogeneous materials (text, images, video, newspapers, maps, sheet music, 3-D etc.) cross-searchable, yields big advantages for the users. It has become clear that the integration has to be realised mainly on the level of the metadata. Storage, subject description and presentation of the various types of materials all require their own specific methods, which can only be accommodated in a modular way. In the Memory, text and images have been dealt with in the same way, resulting in limited options for searching and presentation of texts. For this reason a separate trajectory has been chosen for the newspapers, where the integration will be realised at a later stage, in the end user interface. Text materials in the Memory (one of the smaller components) will be revised next year to allow for a better presentation.

3. Internet and ICT

The fast and widespread penetration of internet in society, and especially in people's private lives, have been an incentive for the government to stimulate digitisation of cultural-historical materials. Urged on by IT developments, heritage institutions moved, be it sometimes hesitantly, towards another way of thinking about their collections. Culture appears not to differ that much from other sources of information, recreation and entertainment. Collections are not only used for exhibitions or to be consulted locally, but can be made available more widely. Internet offers easy and relatively cheap options to realise this wide access. With the continuous improvement of PC's and the increasing number of broadband connections (it is expected that at the end of 2003, 40% of Dutch households has at least ADSL-light or cable access), there is no visible end to this process. After the internet hype died down, it has become clear that internet has become a continuous and important factor in social life and that it is desirable as well as justifiable to invest in this medium.

4. The future

With the launch of the Memory of the Netherlands website, a collection of digitised heritage materials has become available that at the beginning of next year will contain about three quarters of a million images (still images and text), 250 hours of video and some dozens of hours of audio. The functionality to search and retrieve the objects will gradually be improved and extended. A scalable infrastructure has been realised that can be re-used for other digitisation projects. Extensive knowledge and experience have been gathered and documented, resulting in a well-oiled organisation, clear agreements and an efficient way of working. Would it not be the most obvious course of action to utilise these achievements in a structural way for the digitisation of the Dutch cultural heritage? The willingness to do so is often paid lip service to in the Netherlands, but in practice there are many obstacles that can all be traced back to three aspects: funding, internal organisation and policy.

4.1 Funding and internal organisation of heritage organisations

In the Netherlands, the flow of (government) money to individual cultural institutions and the funding generated by the organisations themselves, does not tend to be very large, although the cultural sector as such is of great economic importance. The main focus of most institutions has of old been on maintenance of their collections. This is a precondition for access in the form of exhibitions, consultation or lending. Buildings, restoration, climate control, etc. all require a lot of effort and money. It is the primary task of cultural institutions to organise exhibitions and to attract the public to their premises. This is all very important, entertaining and instructive, there is no doubt about that. Digitisation will never replace contact with the real object. But not all members of the public feel the need for this immediate contact. What is more, a lot of valuable collections have been preserved but are hardly ever on view. Often they have not been described adequately, and even organisations themselves have only a vague idea of what they contain. A new large-scale rescue plan to make inventories and descriptions of these collections would be no luxury. Maintenance and organising exhibitions usually take up most of the available effort and money. If heritage institutions find it important to proceed on the road to digital availability, they will need to make choices when prioritising

activities within their organisations. More than that. A digital environment requires different staff competences. Do you need a digital attendant or a digital cleaner? Managing physical objects differs fundamentally from managing digital objects. To develop exhibitions on the internet requires another way of thinking and writing. These changes in staff skills also demand investments. Digital access to cultural organisations and integrated accessibility of materials is here to stay and offers a lot of new possibilities for the use of cultural heritage materials. For generations to come this will be the first and possible even the only path of access to our cultural past. If the cultural heritage sector does not offer this new kind of access, this means it will go back to archiving and conservation as a goal in itself.

4.2 Policy

The Dutch government, by far the most important source of funding for the cultural heritage sector, has embraced the idea of wide digital accessibility over the last five years. This implies bringing culture outside the walls of the institutions and providing wide accessibility, as well as getting young people and immigrants interested in our past. Internet is seen as an entry point to the treasures of our past. This attitude has made a large number of digitisation projects possible. Examples are: De Woonomgeving (Living Environment, http://www.dewoonomgeving.nl), which gives access to digital archival collections via cadastral maps of the Netherlands, Memory of the Netherlands, and the Cultuurwijzer (Culture pointer, http://www.cultuurwijzer.nl), a portal to cultural organisations, including an index to cultural objects available on the internet. Small-scale approaches and fragmentation of funds have been abandoned in favour of digitisation set up by large co-operatives. Not controlled in a centralist manner, but managed by the bigger institutions. Digitisation of heritage materials has been given a start, but still a relatively small part is available in digital form. Even less progress has been made regarding the contextualization of these materials. Large-scale infrastructural initiatives can only be taken forward on the basis of extensive co-operation and concertation, but also need clear individual policies in the organisations, supported by the government and the field.

Because of the competition amongst cultural organisations, and because of its important influence on the policies of the heritage institutions, the government will need to steer

policies in the direction of co-ordination and co-operation to keep large-scale cross-organisational and cross-sectoral digitisation initiatives going.

Not everything needs to be digital. Policies will have to be developed to guide the selection of objects and collections to be digitised. On the other hand, reverting to the level of individual objects and small groups should be avoided. It is large-scale availability of digitised resources that will give experiments with application development, contextualizaton and education a better chance. It will enable these projects to focus on the tasks of telling stories, creating digital exhibitions, experimenting and developing applications for and with the public. In the meantime, anybody who is interested in the past can roam the digital treasuries freely and unhampered, treasuries that have been realised through large-scale digitisation of resources. Change and innovation only happen when substantial investments are made. Small-scale initiatives are good to acquire expertise, to try out things, but there comes a moment when the sensible thing to do is to take a big stride forward, to avoid getting stuck in marginal activities.

5. Finally

For an investment like Memory of the Netherlands to be cost-effective in the long run, continuous development is needed. The expertise gained from the project can be disseminated more efficiently and the technical and organisational infrastructure can continue to be of service for some time to come. Possibilities for private funding need to be explored, so as not to be dependent on government funding, but this has more change of succeeding when there is a firm organisational and financial basis, with a bit of room to take up digitisation activities as such. Durability regarding exploitation and storage will benefit from durability in the organisation. The aims of projects like the Memory are not centered on the organisation itself, but on users from the general public, education, research, tourism, etc., to enable them to access and communicate with their own cultural past. That is of crucial importance to society, but it is also instructive, interesting and great fun. The KB will not stop at the national border with its Memory-project. Later this year and next year we will investigate the possibilities to connect to comparable projects in Europe, to extend the national services into a European service.

URL's:

Het Geheugen van Nederland / Memory of the Netherlands [Dutch and English version]: http://www.geheugenvannederland.nl

Koninklijke Bibliotheek, National Library of the Netherlands [Dutch and English version]: http://www.kb.nl

De woonomgeving (Living Environment, to be launched 25 September 2003): http://www.dewoonomgeving.nl

Cultuurwijzer (Culture Pointer): http://www.cultuurwijzer.nl
American Memory: memory.loc.gov

References:

WTR-SURF (1998). Alles uit de kast: op weg naar een nationaal investeringsprogramma digitale infrastructuur cultureel erfgoed . Utrecht: Wetenschappelijk Technische Raad SURF. (= 'Bring it all out': towards a national investment programme for a digital cultural heritage infrastructure) (http://www.surf.nl/publicaties/index2.php?oid=47)

Viskil (1999). Een digitale bibliotheek voor de Geesteswetenschappen: aanzet tot een programma voor investering in een landelijke kennisinfrastructuur voor geesteswetenschappen en cultuur […]; onderzoek en samenstelling Erik Viskil. Den Haag, NWO. (= 'A digital library for the humanities'), The Netherlands Organisation for Scientific Research (NWO)

Appendix 1: Participating institutions and collections.

	Institution	Title	Collection Description
1	Atlas van Stolk	18th century engravings and prints	180 prints and drawings illustrate the political history of the 18th century as well as the period's customs and traditions.
2	Atlas van Stolk	Jordaan collection	Prints by political cartoonist L.J. Jordaan from the period 1920-1960.
3	Centraal Bureau voor Genealogie (CBG) / Centre for Genealogy and Heraldry	The Netherlands in Portraits - beginning of the 20th century	30,000 portrait photographs with captions from the first quarter of the 20th century, collected from popular magazines.
4	Internationaal Instituut voor Sociale Geschiedenis (IISG) / International Institute of Social History	The Dutch Labour Movement until 1918	Photo's, prints, posters, banners, brochures and other objects.
5	Mauritshuis	Dutch 17th century painting	2,500 17th century paintings.
6	Nederlands Instituut voor Oorlogsdocumentatie (NIOD) / Netherlands Institute for War Documentation, and	War posters 1940-1945	Posters and placards.

	Koninklijke Bibliotheek / National Library		
7	Directie der Oostersche Handel en Reederijen (OHR) / Directorate of the Baltic Trade and Shipping Companies	The Dutch Baltic Trade in the period 1600-1850	Photo's, prints and paintings from various Dutch and foreign institutions.
8	Scheepvaartmuseum Amsterdam / Netherlands Maritime Museum Amsterdam	Land and maritime atlases from the 17th and 18th centuries	The Atlas Van Loon and Atlas Van Keulen, consisting of 24 volumes, show how people perceived the world during The Golden Age.
9	Koninklijke Bibliotheek / British Library	Atlases	Maps and panoramic views from the Atlas Van der Hagen and the Atlas Beudeker.
10	Gemeentemuseum Den Haag	Fashion between 1860 and 1940	The complete volumes of fashion magazine "Gracieuse". The collection consists of 25,000 pages from the period 1861-1936.
11	Internationaal Informatiecentrum en Archief voor de Vrouwenbeweging (IIAV) / International Information Centre and Archives for the Women's Movement	Women in movement on posters and in pamphlets	4,300 posters about the Women's Movement between 1898 and 2000.

12	Koninklijk Instituut voor de Tropen (KIT) and Tropenmuseum / Royal Tropical Institute	Colonial World Exhibitions	Objects collected between 1870 and 1940 from the Dutch Indies, a.o. photo's, prints, dolls, models and textiles. Also a collection of glass negatives from Dutch New Guinea.
13	Legermuseum / Dutch Army Museum	Military History of the Netherlands	6,000 photo's, prints, drawings and maps from the 16th to the 20th century
14	Rijksdienst Monumentenzorg (RDMZ) / Netherlands Department for Conservation	Monument photography	10,000 photo's of façades, houses, buildings and monuments between 1860 and 1945.
15	Rijksmuseum Amsterdam	Dutch 17th and 18th century painting	Paintings.
16	Rijksmuseum Amsterdam	Photo commissions 1975 - 2000	25 photo series on various themes of national importance, commissioned yearly by the Rijksmuseum's Department of Dutch History.
17	Rijksmuseum van Oudheden (RMO) / National Museum of Antiquities	The earliest history of the Netherlands	The Dutch archaeological collections on Prehistory, the Roman period and the Middle Ages.
18	Museum Boijmans van Beuningen, Rotterdam	16th century prints	5,000 prints from the collection of 16th century graphics from the

			Northern and Southern Netherlands.
19	Film Museum	The Netherlands through the eye of a camera	Selection of documentary films about the Netherlands, from the period between 1896 and 1980.
20	Historisch Centrum Overijssel (HCO) / Historical Centre Overijssel	Machine factory Stork 1868 -1968	10,000 photo's from the collection originating from the machine factory Gebr. Stork en Co in Hengelo.
21	Instituut Collectie Nederland (ICN) / Institute Collection Netherlands	Selected Topics and the Van Doesburg collection	2,000 works by Theo van Doesburg (1883 -1931) and a selection from the highlights of the ICN's collections.
22	Joods Historisch Museum (JHM) / Jewish Historical Museum	Dutch Jews, 19th and 20th centuries	Various objects illustrating the daily life of the Dutch Jews, from 1800 until WWII, including a collection of glass negatives by Jacob Merckelbach, a portrait photographer from Amsterdam.
23	Katholiek Documentatie Centrum (KDC) / Catholic Documentation Centre	Photo collection Catholicism in the Netherlands	More than 80,000 photo's and posters depicting official and personal Catholic life in the Netherlands. Also a collection of cartoons, a.o. drawings by Herman

			Focke.
24	Koninklijk Instituut voor Taal-, Land-en Volkenkunde (KITLV) / Royal Netherlands Institute of Southeast Asian and Caribbean Studies	The Dutch Indies in photo's (1870 - 1920)	Collection of historical photographs, illustrating colonial state formation and social transformation in the Dutch Indies.
25	Koninklijke Bibliotheek (KB) / National Library of the Netherlands	The Dutch Royal Family on picture postcards.	A collection consisting of 4,500 picture postcards of the Dutch Royal Family (1900 - 1970).
26	British Library / KB	The English' view of the Dutch	The view of the English on the Netherlands 1550 - 1900
27	Library of Congress / KB	Dutch - American relationships	A selection of photo's, documents, prints and maps, concerning various aspects of the common past of Northern America and the Netherlands between 1609 and 1960.
28	Moluks Historisch Museum (MHM) / Moluccan Historical Museum	History of the Moluccans in the Netherlands	Collection of photo materials from the period 1951-2000.
29	Nationaal Popinstituut (NPI) / Dutch Rock & Pop Institute	Popular music	Photo's of Dutch bands and artists between 1945 and 2000.
30	Nederlands Reclame Arsenaal (NRA) / The	Overview of the history of advertising	A selection of 14,000 posters, advertisements

	Advertising Arsenal		and advertising leaflets, covering the period 1870-1980.
31	Van Speelklok tot Pierement / National Museum 'From Musical Clock to Street Organ'	Automatic musical instruments 1500-2000	Photo's, film and sound fragments of musical clocks, musical boxes and street organs.
32	Nederlands Fotomuseum (NFM) / Dutch Photo Museum, Rotterdam	The Illegal Camera	Photo collection on the German Occupation 1940-1945.
		Indonesia in the making	Photo collection 'Dutch Indies' from the period 1947-1949.
		Land from sea	Photo collection 'The Big Flood',1953.
		Delta Works	Photo collection on the Delta Works.
33	Persmuseum / Press Museum	Political drawings by Van Straaten	The political drawings made by Peter van Straaten between 1972 and 2001 for daily newspaper Het Parool and the journal Vrij Nederland.
34	Internationaal Instituut voor Sociale Geschiedenis (IISG) / International Institute of Social History	Press photography	1800 photo's from the archives of press photographer Ben van Meerendonk from the period 1945 -1970.
35	Prentenkabinet, University of Leiden	Photography Dutch Indies	Photo collection 'Dutch Indies until 1940', covering economy,

			religion, culture and daily life.
36	Rijksdienst Kunsthistorische Documentatie (RKD) / Netherlands Institute for Art History	Portraits of Dutch people	30,000 painted, drawn, engraved and sculptured portraits of Dutch people, made between 1500 and 1900.
37	Rijksdienst voor het Oudheidkundig Bodemonderzoek (ROB) / Nederlands Instituut voor Scheepsarcheologie (NISA) / Dutch Institute for Naval Archaeology	Overview Dutch naval archaeology	A number of shipwrecks found in the Netherlands, with inventories and cargo's from the period 5000 BC - 1900.
38	Sociaal Historisch Centrum Limburg (SHCL) / Social Historic Centre Limburg	Earthenware factory 'De Sphinx' Maastricht	Design books, containing sketches and designs from 1850-1958.
39	Theater Instituut Nederland (TIN)	Theatre in the Netherlands	10,000 prints and drawings of theatres, performances, sets and costumes from the period 1600-1900.
40	Amsterdam University Library	Suriname Collection	The collection contains travel reports, planter's handbooks, ethnological descriptions, topographical maps and name books from the 17th

			century until 1975.
41	Zuiderzeemuseum	The Zuiderzee 1600 - 1950	Collection of objects, prints, paintings and photo's about the history of the Zuiderzee and life on its borders.
42	Nederlands Instituut Beeld en Geluid, voormalig NAA / Netherlands Institute for Sound and Vision	The industrial society Household modernization Broadcasting history The Multicultural Society	250 hours of video and 100 hours of audio. Cultural history regarding the development of the industrial society, household modernisation, the history of broadcasting and the multicultural society.
	Metamorfoze projects		
43	Theater Instituut Nederland (TIN)	Theatre Songs	The collection of theatre songs is a large collection of sheet music from theatre and entertainment, mostly from the period 1890-1960.
44	Nederlands Muziekinstituut (MNI)	Diepenbrock Collection	The composer Alphons Diepenbrock's archive (1862-1921), consisting of music manuscripts and correspondence.
45	Stadsarchief en Athenaeumbibliotheek Deventer / Town	Children's books from Overijssel	The collection of children's books from the province of Overijssel

	Archives and Athenaeum Library, Deventer		contains 435 often richly illustrated books from the period 1850-1940.
46	Stadsarchief Sittard-Geleen / Town Archives of Sittard-Geleen	Poems of Beltjens	Collection on the 19th century poet from Sittard, Charles Beltjens. Beltjens wrote mainly in French which makes him a typical exponent of the culture of the southern province of Limburg in the 19th century, when French played a predominant role.
47	Nederlands Instituut voor Oorlogsdocumentatie (NIOD) / Netherlands Institute for War Documentation	Illegal publications	The collections of Illegal Brochures and Illegal Pamphlets from the Second World War. The collection of brochures numbers about 300 illegal brochures amounting to a total of about 5,000 pages; the collection of pamphlets contains c. 1,000 items.
	Newspaper projects		
48	Koninklijke Bibliotheek / National Library	War and Revolution	Dutch daily newspapers. Volumes of De NRC 1910-1929, Het Centrum 1910-1929, Het Volk 1910-1919 and Het Vaderland 1920-1929.
49	Gemeente Archief Den Haag / The Hague	Het Vaderland	All volumes of The Hague based newspaper

	Haag / The Hague Municipal Archives		Hague-based newspaper Het Vaderland from the period 1930-1945
	Extra		
50	Meertensinstituut and KB	Folksongs and broadsides	The Wouters and Moormann collections of Dutch songs in broadsheets, quires and song journals. The collections consist of 5,000 pages with songs, dating mainly from the 19th and 20th centuries (a few from the 18th century).
51	Rijksprentenkabinet (Rijksmuseum)	Old photographs	Early photography. Portraits, townscapes and landscapes.

Appendix 2: Specifications Digitisation (shortened version)

Specifications for the digitisation of images

Master files
Resolution directly from original: 300 dpi (based on smallest meaningful detail).
Resolution of intermediary: 200-300 dpi (based on smallest meaningful detail).
Colour space: Adobe RGB
File format: TIFF IBM
Target to scan with every 'series' of scans: Kodak Grayscale Q-13

Other quality requirements

The images must be sharp
The images must as far as possible retain the tonal values and colours of the original
The images must be positioned straight
The images must be free of distortions (Newton Rings, uneven lighting, etc.) and scanning mistakes

Derivative Access Images

The following derivatives must be made from the master files:
Thumbnail 1: height 50 pixels, JPEG quality 3
Thumbnail 2: width 150 pixels, JPEG quality 3
Screen resolution 1: width 750 pixels, JPEG quality 6
Screen resolution 2: width 1000 pixels, JPEG quality 6
Screen resolution 3: width 1200 pixels, JPEG quality 6
Screen resolution 4: width 1500 pixels, JPEG quality 6
Scalable format: Mr.Sid.
For the derivatives, the same quality requirements apply.
It depends on the type of material which of the formats d-g are produced.

Specifications for the digitisation of audio-visual materials

Video:

Digitisation from film to digibeta (uncompressed scanning and digital storage on analogue carrier).
Encoding to MPEG1: 352 x 264 pixels,1,5 Mbs / 1500 Kbs, 25 fps
Transcoding to streams for Real and Windows Media
Broadband (Windows Media only): 352 x 264 pixels, 300 - 500 Kbs, 25 fps
Narrow band (Real and Windows Media): 192 x 144 pixels, 34- 56 -100 Kbs, 10 fps

At retrieval a choice is made for broadband or narrow band, after which the right bitrate is selected automatically, so-called multibit or sure stream.

Audio:

Digitisation to intermediary audio file: MPEG1, layer II, 256 kbs, 48KHz
Transcoding on the fly when uploading to MP3 in the following formats:
spoken word and music: Real 32 kbs-96 kbs; Windows Media: 32 kbs, 64 kbs
high quality musical performances (exceptions) also at: 128 kbs

