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Challenges for ICT/UCT Applications in Cultural Heritage

Seville: Instituto Andaluz del Patrimonio Historico, 2004 (in press).

Abstract

While a precise forecast for the next decades is clearly impossible, some major challenges that need to be addressed in the next 10-20 years can be identified. Technologically there will be a shift from Information and Communication Technologies (ICT) to Universal Convergence Technologies (UCT). In the cultural realm, these challenges include problems of repositories, the changing scope of cultural heritage; new links between national, regional and local; between culture, knowledge and scholarship; approaches to intellectual property and to models of culture. Five dangers are outlined, namely, over-zealous commercialism; anti-technology among scholars, anti-universal narratives; forgetting the past and a systematic destruction of memory. The need for a permanent E-Culture Net is outlined which would a) address these challenges; b) develop critical methods; c) create new models of culture that transcend Euro-Centric visions and d) focus on a Distributed European Electronic Resource (DEER).

The American vision of the Internet remains focusses largely on uni-lingual e-commerce.¹ By contrast, the European vision, through its links with tourism, clearly has financial dimensions, and at the same time is developing a multi-lingual approach to cultural heritage that includes historical and cultural dimensions. This vision extends beyond culture to new definitions of knowledge. While the rhetoric of the day may focus on profit schedules for the next quarter, it is important to recall that major changes in new media have much longer cycles entailing decades and even centuries before their full effects are appreciated.

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1. Introduction

There are adages that the only problem with predictions is that they concern the future.² The past decades have brought so many changes on such scales that any attempt to predict precisely the impact of the new Information and Communication Technologies (ICT) with respect to cultural heritage is doomed to future failure and/or retrospective mockery. Nonetheless, as an historian, it is useful survey past developments in order to discern which of these are likely to have an impact on the decade to come.

The Internet is changing rapidly and is changing quickly what is possible. In 1995, there were 5 million users of the Internet. In 2000, there were 200 million. In March 2004, despite complaints of a dot.com bust, the Internet has grown to 804 million. In 1995, over 95% of the Internet was in English. In 2004, English represents 35% of the Internet and European languages also represent about 30% of the Internet.³ In the next years there will be more Internet users in China than in the United States, and it is predicted that Chinese will become the most used language.⁴

Technologically, while convergence was a buzzword throughout the 1990s, there will soon be convergence at a new level whereby telephony, television and Internet systems become interdependent and then fully interchangeable. There is disagreement exactly when it will happen. In Japan, there are predictions that this convergence will be in place by 2010.⁵ According to the Siemens Corporation this convergence will occur by 2015.⁶ While this shift, which we have called a shift from Information and Communication Technologies (ICT) to Universal Convergence Technologies (UCT), is predictable, many details remain open: precisely how it will happen, whether a single global solution will be agreed upon, what the consequences will be. A unified solution on this front is certain to be one major technological challenge of the next decades. A second technological challenge pertains to the implementation and implications of nano-technology especially for interfaces. Will direct brain interfaces and brain implants become an everyday reality?

Elsewhere, we have suggested that the new media have technological, material, organisational, intellectual and philosophical consequences, namely, invisibility, virtuality, systemicity, contextuality and spirituality.⁷ These consequences change if one is aiming at an Information Highway (United States), an Information Society (Europe) or a Knowledge Society (Japan). The US quest for an information highway has highlighted technological, material and organisational consequences. The deeper potentials of networked computers lie in intellectual and philosophical consequences, which include dynamic, augmented knowledge and culture and different ways of knowing.

McLuhan proposed that each new medium uses the previous medium as its content and used oppositions (hot-cold) to characterize differences. Digital media and UCT create bridges that allow interchange across media and senses. This creates a digital bridge, whereby even illiterate persons can benefit from new media, which deserves even more attention than the digital divide.

In the cultural domain, key areas for development include problems of repositories, the changing scope of cultural heritage; new links between national, regional and local; between culture, knowledge and scholarship; European approaches to intellectual property and needs for new models of culture. There are also unexpected dangers including forgetting the past and a more systematic destruction of memory. The need for a Distributed European Electronic Resource (DEER) and later a World Network of Distributed Electronic Resources (WONDER) to answer these challenges is outlined.

2. Distributed Repositories

In the past fifty years, the challenge of digital culture first arose in the domain of memory institutions, namely, libraries, museums and archives. A first step lay in creating electronic catalogues. Then it turned to content which initially appeared to be a simple problem: if one created digital versions of existing books and images then one could share these without harm to the originals. In the meantime, a number of unexpected challenges have come into focus:

- 1) Scans of historical materials are much larger than one originally thought: hundreds of megabytes (up to 767 MB) for a single page of text and many Gigabytes (up to 30 GB) for a single image. Thus storage is a much greater problem than originally imagined.
- 2) Major digital reconstructions of sites, cities now range from 1-10 terabytes (TB).
- 3) Software continues to change so rapidly that there are serious problems of continued access to digital versions because it is difficult to keep these materials in an up-to-date form.
- 4) Many born-digital objects, especially in the form of new multi-medial and multi-modal art pose special problems of conservation and preservation.

The cumulative effect of these developments has been a gradual shift in perceptions of the needs of culture and of the humanities as a whole. From the early days of programmable computing in the 1940s there was often a tacit assumption that the number crunching of computers was a domain almost exclusively needed by and for the “hard sciences.” The rise of computational linguistics, of corpora and especially national corpora⁸ of language usage began to change this perception. The rise of high-level images of cultural objects and complex reconstructions of sites and cities means that the human sciences and cultural communities now have needs that entail petabytes and exabytes of digital materials if they are networked.

Indeed, whereas the sciences are concerned primarily with recording the latest findings in their fields, culture has a cumulative mandate to save not only artistic expressions from earlier eras but also the cumulative theories, commentaries, reflections and criticisms concerning these expressions. Science is concerned with establishing laws and principles that apply globally. By contrast, culture is concerned with recording expressions, which are unique at the national, regional, local and ultimately the individual levels (cf. section 4 below). As a result the long-term computational needs of culture and the humanities are

far greater than those of the sciences. Quests for e-science and scientific grids need to be complemented by grids for e-culture.

One of the paradoxes in these developments is the enormous chasm between rhetoric and reality. On the one hand, the rhetoric of computer and ICT sales personnel would have us believe that the latest machines have more speed and memory than we might ever have imagined necessary. On the other hand, there is the simple reality that the world's fastest machines are not even remotely capable of accomplishing the computing challenges of either science or culture. The large Hadron Collider at CERN is one example. Radio astronomy is another: researchers can use only about 1% of the information, which comes to them from space in real time because computer connections today are still much too slow.⁹ Similarly, cultural networks are able to share less than 1% of the materials which they have available locally.¹⁰ Surprisingly there is very little discussion of this gap between the rhetoric of everything has been solved and the reality of so much that needs to be done.

The idea of distributed repositories, that integrate a number of these challenges, offers an interim and probably a long-term solution. Discussions in the context of MINERVA (Ministerial NETwoRk for Valorising Activities in digitisation)¹¹ and with respect to the Lund meeting have brought into focus the problem of preservation of digital memory and led specifically to the idea of an European Digital Memory. One of the important actions of MINERVA has been to identify national libraries, archives and other memory institutions as competence centres for digitisation.¹² Meanwhile the EPOCH Network promises to integrate research in “processing open cultural heritage.”¹³

In December 2002, in the context of E-Culture Net,¹⁴ Christian Lahanier (C2RMF) outlined “the need for a European Open Source System based in a European Computer Centre for data Repository” in order to create “a prototype of the future European Mirrored Repository.” This idea was pursued and introduced to the highest levels of UNESCO, where it resulted in an initial twelve-year plan for a project entitled: EU-UNESCO Digital Centre of Memory of Culture (DCMC) in the context of major European museums and art galleries.¹⁵ In the United Kingdom, the Joint Information Systems Committee (JISC) is working towards a Digital Curation Centre (DCC)¹⁶ which is due to open formally in the fourth quarter of 2004.¹⁷ Meanwhile, the BRICKS IP (Building Resources for Intelligent Cultural-Knowledge Sharing Integrated Project in the 6th Framework Programme)¹⁸ explicitly “aims at establishing the organisational and technological foundations of a digital library at the level of a European Digital Memory.”¹⁹

Implicit in these developments are serious questions about the future roles and competences of memory institutions in which we can discern two competing trends.²⁰ On the one hand,²¹ major libraries such as the Bibliothèque Nationale de la France and institutions such as the Centre Pompidou (which have a joint committee on the problem), as well as networks,²² are exploring joint solutions to questions of digital preservation, especially in the case of born digital objects.

At libraries such as the Koninklijke Bibliotheek (The Hague) there are plans²³ to extend the traditional concept of deposit libraries, (whereby national libraries automatically receive one free version of every copyrighted book) to include electronic copies of everything that is born digital as well as things that are born analog. One example of what is possible is offered by the Moving Images Collection (MIC) that claims to be “the first centralised online catalog of film, television and digital video images culled from libraries, national archives, museums and broadcasting companies accessible to anyone via the Web.”²⁴

On the other hand, there is a temptation for major institutions to rely on newly arrived experts such as ERPANET (Electronic Resource Preservation and Access Network) to solve these problems. There is also a temptation to outsource their sources to Application Service Providers (ASPs) and Service Centres as envisioned by some of the large computer and ICT companies. A fundamental choice for the next decade(s) thus remains whether a) traditional analog memory institutions expand their scope to become analog plus digital memory institutions or whether b) a new category of digital memory institutions arises. In our view, the first of these options is preferable.

While these initiatives might at first glance seem to be in competition with one another, they are all expressions of a larger *Zeitgeist* that needs integration. Distributed repositories leading to a Distributed European Electronic Repository (DEER) offer a vision that integrates these fragmented efforts into a coherent action plan, which can be further solidified through national policies. Such a (DEER) can make the cumulative contents of these collections permanently accessible (cf. section 10 below) and play a central role in the future of e-learning.²⁵ This assumes major growth in the high-speed connectivity offered by infrastructure frameworks such as GEANT,²⁶ the Trans-European Research and Education Networking Association (TERENA)²⁷ and national high-speed networks. Great progress has been made in terms of the big picture. The problems of the last mile, the last kilometer, the last hundred yards, or even the last 10 meters linking the specific building and a given individual to the network remains a major challenge for the next decades.

3. Changing Scope of Cultural Heritage

One of the reasons why storage has become so central an issue is because the scope of digital cultural heritage has continued to expand. In the 1970s, initial efforts were on remote access to references to cultural objects largely through library and museum catalogues. During the 1980s and 1990s, the quest expanded to include images of those contents, i.e. digital versions of paintings, full texts of manuscripts and books, monuments, sites and in some cases even whole cities. Even so, the emphasis remained focused on tangible heritage. During the 1990s, the efforts of UNESCO drew attention to the importance of intangible heritage in the form of oral traditions, language, music, dance, and customs.²⁸

The initial emphasis was on digitizing the expressions of culture as if they were simple products or objects. These expressions were products of theories, some aesthetic, others

philosophical, sociological, and psychological. Nineteenth century scholars such as Rudolf Eitelberger von Edelberg,²⁹ who had the first chair of art history in Vienna (1851), began to collect these materials in their *Sources of Art History* (1879-1908)³⁰, an effort that was continued by Julius von Schlosser's *Literature of Art*³¹ (1924, 1935, 1985).³² These primary theories were complemented by a secondary literature that assessed the significance of both the theories and the expressions they inspired and have become the literature of art history. One of the challenges of the next decades will be to make such contextual materials available in digital form and to relate them to cultural objects and expressions. A related challenge is to make visible changing interpretations of these sources.

In the nineteenth century, neo-Kantians such as Cohen at Marburg assumed that theory arising from a spirit of the times (*Zeitgeist*) determined a worldview (*Weltanschauung*) which led in turn to cultural and other expressions. This inspired the work of Ernst Cassirer, Erwin Panofsky and the Warburg school.³³ Aby Warburg (1866-1929), first in Hamburg then in London set out to complement the *Word* and *Image* sections of his library with sections on *Orientation* ((Religion, Science, Philosophy), and *Action* (Political and Cultural History)).³⁴

Over a century of scholarship has gradually revealed a more complex and nuanced picture of relationships between theory, expression and awareness. The development of Renaissance perspective, which some have called the most important invention of Western culture, offers an interesting case in point. Empirical examples of three-dimensional spatial effects gradually evolved from the 1280s through to the early 1400s. Brunelleschi's first demonstration of the principles of perspective (c. 1418-1424) preceded Alberti's first treatise on perspective (1434). Although Vasari (1550) was aware of perspectival practice and theory, he mentioned no specific manuscripts or editions. In simple terms there was no written awareness of perspective in the form of bibliographies during the first two centuries of its existence.

Awareness of such texts in the form of bibliographies on perspective began with Lomazzo (1590 with 7 titles) and only grew slowly in the course of the next centuries.³⁵ Awareness of the links between theory and practice only became a serious object of study in the second half of the nineteenth century, with more studies in the twentieth century than the first four centuries of perspective's existence. In other words, if perspective can be seen as a typical case, the equations of world-view, theory, practice and awareness assumed by nineteenth and early twentieth German theorists and historians of art were misleading at best.

The realm of digital culture is thus much more than the expressions of tangible and intangible culture. As Ernst Cassirer noted in the *Logic of the Cultural Sciences* (1942) it entails myth, language, art and knowledge.³⁶ Precisely how they relate remains an open question. Hence, one of the larger challenges facing digital culture in the next generation is to re-examine the evidence more systematically in order to re-assess the complex interplays of theory and practice in cultural expressions.

Related to these quests to re-contextualise cultural expressions has been a growing mastery of and fascination with architectural and spatial information. The NUME (*Nuovo Museo Elettronico*) project demonstrates the potentials of showing developments in a city such as Bologna in the course of millennium. The Terravision demonstration by Art+Com (1994)³⁷ and the SANTI (*Sistema Avanzado de Navegación sobre Terrenos Interactivo*) project (1999)³⁸ have shown how such an approach can be related to the surrounding landscape and at various scales including satellite images from space. Related also to these attempts to reconstruct physical environments are a growing number of projects which attempt to reconstruct technological processes (e.g. silk production in Bologna,³⁹ olive oil machines in Andalusia and copper production in the famous mine at Falun).⁴⁰ In Italy, a reconstruction of the ancient city of Pompeii is being used to simulate theories about economics and sociology in the first century A.D.

Recent developments in car navigation systems and informed mobility by Navteq⁴¹ point to emerging possibilities. Complete maps of all roads in Europe are already available at 10 and 50 meter scales including perspectival bird's eye views. Such maps allow one to plan journeys using fastest or the most scenic routes. They also provide information about petrol stations and hospitals. This could readily be extended to include cultural sites.

Given sufficient random memory and high-speed connections one can readily imagine how such a system could be linked to the approaches explored in Terravision, SANTI and NUME such that one could link these virtual trips with satellite views, virtual museums and other memory institutions. Besides their interest to drivers of automobiles, such systems could provide students with new ways of studying geography whereby they can make virtual visits to any sequence of cities and places. One could use the geographical approach while zooming down to a city, a museum, a wall and a specific painting and then switch seamlessly to a library approach to gain further information and knowledge about the painting, sculpture or other cultural artefact.

Tourism

Such an approach would also allow travelers to plan visits in new ways. Indeed, such developments in Geographical Information Systems (GIS) and Geographical Positioning Systems (GOS) have obvious implications for tourism, which now accounts for 12% of the world's Gross Domestic Product (GDP), and is the single most important source of income in the G7 countries.⁴² A system sponsored by the French Ministry of Culture⁴³ called Hypercarta⁴⁴ already points the way to such potentials (figure 1). There have of course been numerous IT and ICT projects aimed at tourism. What is important in the French example, however, is a vision that links collection, value-added materials (valorization as MINERVA would say for cases where an earlier generation would have spoken of notes, commentaries and reconstructions) and reservation methods as part of a single tourism system. In this vision, access to cultural heritage remains largely free of charge while at the same time inspiring tourism with considerable economic consequences.

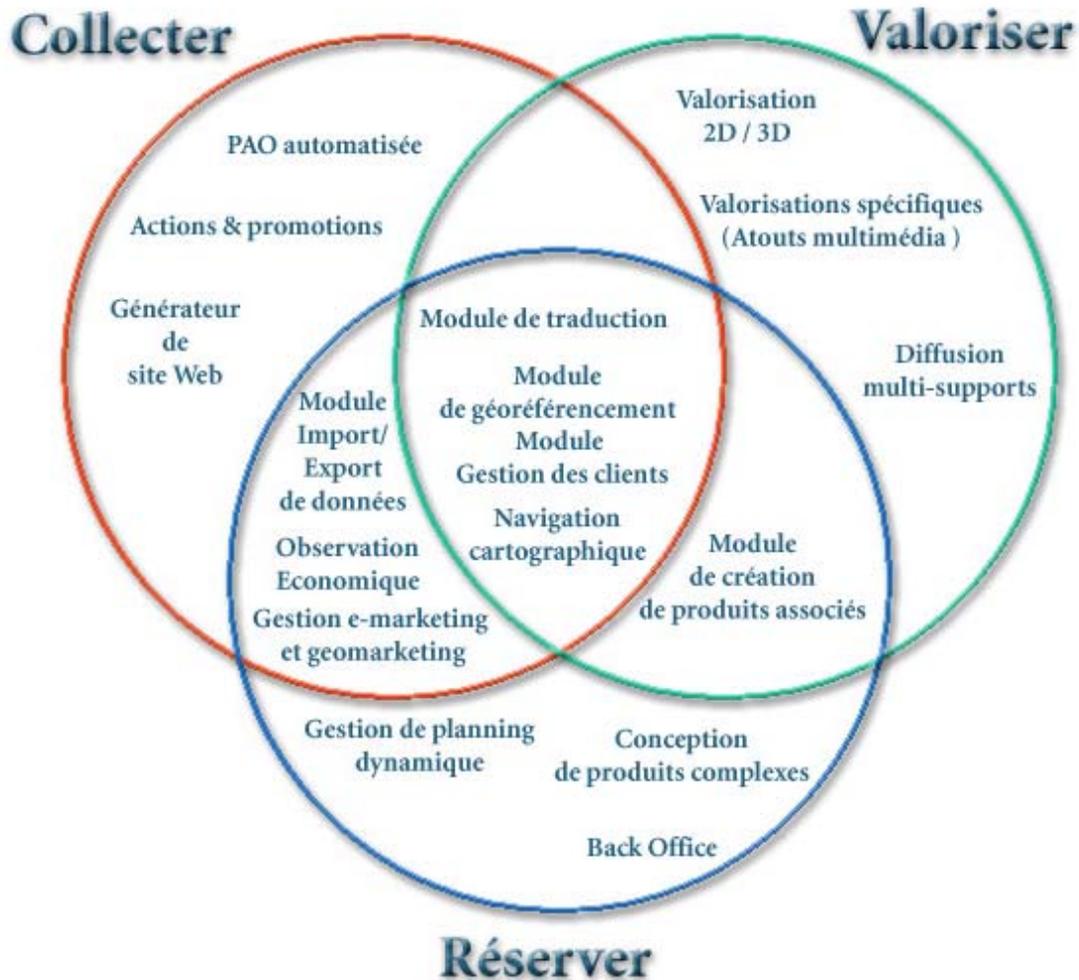


Figure 1. A global approach of the French Hypercarta system which links collection, value added materials and reservation as part of a tourism system.⁴⁵

One of the challenges of the next decade will be to integrate such national solutions in a European and ultimately a global system such that we can move seamlessly between different countries and languages. The advent of Europe's Galileo satellite system for global positioning (2008) will introduce new possibilities, which are already being considered.⁴⁶ A next step will be to develop the approach developed in NUME such that spatial navigation can be complemented by temporal navigation. Eventually one will wish to have reconstructions not just of archaeological sites but also of buildings such as temples, churches and town halls such that one can trace how their interiors changed over the centuries as periods such as the Romanesque, Gothic, Renaissance and the Baroque imposed their imprint on both interiors and exteriors.

The Italian Centre for supercomputing (CINECA) working with the Italian RAI television, has already demonstrated how the concept of blue rooms can be extended to such virtual reconstructions of archaeological sites.⁴⁷ If truly high-speed connections as envisioned by GEANT and grid computing evolve as planned, this approach could be

extended to classrooms such that, instead of just reading about sites such as Pompeii, teachers and students could find themselves within virtual reconstructions of such sites, able to compare contemporary ruins with various attempts to rebuild them.

Connected with this one would also wish to see how scholars from different countries have imposed different interpretations on the same monuments and sites depending on their schools of thought. Whereas 19th century thinkers such as Ranke believed that their goal was to reconstruct history as it really was (*wie es eigentlich gewesen*), and late 20th century thinkers protested that no objective reconstruction is possible, the goal of 21st century historians may increasingly be to represent fairly and systematically, various, often fully conflicting interpretations, concerning any given building, monument or site (cf. dynamic knowledge in section 6 below).

Need for New Methodologies and Permanent Networks

In the realm of print we have a series of methods and procedures to ensure the quality and reliability of an article or book: e.g. footnotes, bibliographies, peer review. In the digital realm such clearly articulated methods are missing. We have many reconstructions but no framework for their comparison, no critical methods to determine which example is better than another. E-Culture Net drew attention to some of the problems entailed in this domain, which loom as an enormous challenge for the next decades.

Connected with this are institutional and organizational problems. In Europe, technological problems are typically dealt with in the Framework Programmes (e.g. FP5, FP6 etc.). These five-year programmes typically generate 1-4 year projects. The EU assumption is that after that time there must be a product which then generates sufficient money that the project can proceed on its own. In the case of technological innovations this is a reasonable proviso to ensure a reality check. In the case of networks concerned with developing agreement on new methods this approach is insufficient. The best way is usually not the most economically attractive, i.e. the cheapest, nor is it always the most expensive.

Moreover, the methodological problems noted above cannot be solved in such time frames. To be sure it is possible to provide a tentative working solution within the time frame of a project with its typical Work-Packages (WPs). Needed, however, is a small community of scholars who trust each other sufficiently to share work in progress, to share notes and to develop critical methods together. This requires both a reliable, permanent, high-speed network, and funding that may be modest but is sustained.

4. Heritage as National Policy

From at least the time of the Renaissance rulers and politicians have recognised that collections of cultural objects constitute much more than simple objects of prestige. In the latter seventeenth century, Louis XIV demonstrated how Versailles could help to shape cultural politics and affect politics in other spheres. Versailles became not only a building that was imitated in direct copies such as Salzdahlum⁴⁸ and adaptations such as

Schönbrunn and Charlottenburg. Jacob Burckhardt in his classic *Civilisation of the Renaissance* considered both this tradition of art as a way of strengthening the state and the state as a work of art.⁴⁹

More recently countries are using their cultural institutes (e.g. Istituto Italiano di Cultura,⁵⁰ British Council,⁵¹ Goethe House⁵²) to reflect and spread their culture in digital form. While there is some danger that such bodies become starting points for a new wave of cultural imperialism, there is a more obvious challenge of sharing national achievements while at the same time recognizing the interrelatedness and interdependence of all cultures. Ideally, co-ordinated national policies as foreseen in projects such as MINERVA can assure that efforts in individual countries can be linked and compared with those elsewhere in ways that increase mutual appreciation and understanding. The Council of Europe's European Heritage Network (HEREIN)⁵³ and the creation of an European Culture Portal (by the EU Directorate General on Education and Culture) are useful steps in this direction.⁵⁴ Lacking thus far is a permanent network linking memory institutions and educational institutions to share content and develop new critical methods as foreseen by E-Culture Net. In addition there is a challenge of creating something more than portals and centres that simply spread Western values: centres should also learn to be aware of cultures in the countries where they are stationed.

5. Links between National, Regional and Local

In the 19th century, the rise of national governments led to an emphasis on national cultures often to the detriment or even exclusion of regional or local cultures. One major exception was Germany where culture remained the responsibility of individual states (*Länder*). The advent of the European Commission posed these problems at a new level and led to an initial "solution" in the form of the principle of "subsidiarity."

The past decades have seen a slow transformation in this approach. Although the principle of non-interference with local and regional cultures remains sacrosanct, there is a growing recognition that if the Commission represents only national and international trends then the inherent value of these regional and local dimensions will be obscured or simply forgotten. This has led to a new vision of a unity of diversities (Ruffolo).⁵⁵

Parallel with this political problem of access to local, regional, as well as national levels, have been very practical problems of access. The nineteenth century vision was to impose a single standard. While theoretically attractive, such centralised visions ignored how local and regional groups naturally resist outsiders who wish to impose national and international systems on their collections.

As a result there is an emerging policy of accepting the local and regional variant systems and creating bridging and mapping methods to national and international collections. One strategy is via the new Digital Autonomous Cultural Object (DACO) protocol.⁵⁶ Another is via Autonomous Content Entities (ACE).⁵⁷ The goal is simple. Instead of trying to replace local and regional diversity we need to make it accessible so that we eventually

have not just international and national versions but also regional and local versions of histories and stories.

The nineteenth and twentieth centuries rightly emphasised the importance of authority files for names. Using handwritten and later typewritten card catalogues this meant that all references to a given person needed to be written in a standard way. Alternative spellings in the form of a *see also* meant that one had to go to a different point in a large catalogue. With electronic media this problem effectively disappears. One can add as many local and regional variants of the name as one wishes, as long as there is an unequivocal accepted version that serves as an anchor for the rest. This challenge extends beyond everyday spelling in a single language to include multilingual problems. With a properly structured database, a French person can type in the city of *Liège*, a Flemish person can type in *Luik*, a German can type in *Lüttich* and all will arrive at information concerning the same city in Belgium. This approach can extend beyond languages to include dialects.

Such complete equivalences are more often the exception rather than the rule. In major languages, even words that look the same such as the terms culture and civilization, have very different connotations in English, French, German and other languages. Hence, once again, the challenge becomes one of mapping and bridging between meanings in order to keep intact their cultural and historical differences, rather than seeking to impose a uniform template for translation that threatens or destroys entirely their cultural diversity.

This challenge has been noted by Accès Multilingue au Patrimoine (AMP) Consortium.⁵⁸ A challenge for the next decade will be to find a larger context whereby what began as a preliminary project within France, can be extended to include the whole of Europe and at some point become an international effort. One solution would be a permanent form of E-Culture Net, which includes the AMP Consortium and has the DEER as a practical goal. Under discussion are plans to move E-Culture Net to a new European University of Culture (EUC) with campuses in Berlin (Aesthetics), Florence (Humanities); Madrid (Languages and Literature) and Paris (Philosophy and Internet). This could serve as an ideal starting point for a more permanent structure which would explore and foster European cultural diversity.

6. Culture, Knowledge and Scholarship

Implicit in these developments is a subtle but fundamental shift in the role of standardised names and standards. Library systems typically record the standard title of a book and yet library catalogues have traditionally continued to list all the variant titles in different languages. In the National Union Catalogue, for instance, this means that multilingual records of a given title are usually spread over many pages among other titles. Using electronic lists, the standard title can serve as a bridge among these variations such that one can choose to see, all titles in one language or all titles in various languages without distraction from a given language.⁵⁹

On the surface this shift could appear to be a new triumph of relativism whereby truth no longer matters. On closer reflection this shift is more complex. Instead of fighting about which common form is accepted as an absolute authority, one accepts one common form as the working authority, and uses other documented variants as alternative means of reaching this common form. Truth and precision in reflecting only documented variants remain of paramount importance.

From a larger historical perspective, major advances in scholarly forms⁶⁰ have a much slower rhythm than might be expected. The advent of printing with Gutenberg (c.1454) focused almost exclusively on primary literature. Indeed, it was not until the mid-seventeenth century that secondary literature began through publications such as the *Journal des Savants* (1665)⁶¹ and not until the efforts of Otlet and Lafontaine⁶² in the late nineteenth century that international bibliographies of secondary literature became a reality.

Today many reference works as well as catalogues of primary and secondary literature, including reviews, abstracts and citation indexes are available in electronic form, yet a systematic correlation of these resources is still lacking. European projects such as IMASS⁶³ have begun to explore how the concept of virtual reference rooms might address these challenges, which are destined to become more urgent in the coming decades. As a result, access to any author should provide a simultaneous survey of their primary works, the secondary literature on those primary works as well as reviews, abstracts and citations.

In terms of the larger historical perspective, electronic media are leading to a need for further differentiation in our notions of secondary literature. In the 20th century the efforts of new criticism (Leavis, Empson etc.) focused on analyzing the layers of a text as if nothing else existed (internal analyses). Others focused on comparative studies of one text with others leading to new forms of multi-, inter- and trans-disciplinary studies (external analyses). Meanwhile, from the 1850s onwards, a third group has developed restoration (and conservation) from a general concern into new disciplines. Finally, the notion of reconstructions, which became a conscious activity in the 15th century Renaissance has been enormously stimulated by the rise of electronic Computer Aided Design (CAD) and Virtual Reality programmes. We all recognize such differences between internal analyses, external analyses, restorations and reconstructions and yet they are not yet reflected either in the way we organize library shelves or in our electronic retrieval systems. To achieve this is one of the larger challenges of the next decades.

Dynamic Knowledge

As McLuhan noted long ago, there is inevitably a danger of approaching the past through a rear view mirror, such that one shackles the possibilities of a new medium by applying to it the limitations of an earlier medium. Hence, in the past decades many of the early experiments in digital culture have done little more than render in digital form the limitations imposed by earlier analog methods. Analog print culture required that knowledge was presented in a static, linear form. This meant that any attempt to record

knowledge tended to capture only the state of knowledge at a given time. Accordingly a list of Rembrandt's paintings in 1650 was different than a list in 1750, 1850 or 1950. All lists of an artist's or author's drawings, paintings, manuscripts, books, indeed all lists of artistic and cultural production were subjected to the same limitation. They were effectively frozen snapshots of knowledge at a given time, usually reflecting also the personal interpretations of a given individual.

Digital culture need not have these limitations.⁶⁴ Because digital records can effectively take the form of databases, various lists and interpretations can all be integrated into dynamic lists whereby one can see how paintings by or attributed to Rembrandt or other artists change over time. Implicit in this development are new possibilities of surveying changes in scholarship temporally and spatially. Whereas print culture focused on one interpretation often to the exclusion of others, digital culture allows new surveys of multiple interpretations and new understanding of how these interpretations shift over time. Instead of complaining that many interpretations of a text are possible, we are now in a position to make these alternative interpretations visible, as a first step towards a new synthesis.

With respect to chronology, a number of individual software programmes already exist to translate Jewish, Arabic, or Chinese calendars into Christian (Julian and/or Gregorian) calendars. Needed are new integrations whereby such translations become a basic feature of all research.

In the case of cartography, the new technologies can do much more than provide access to the latest maps as outlined above. They can help us to visualise how the boundaries of countries change over time: for instance, how the boundaries of Poland change from a small country in the year 1000 to Europe's largest country around 1440 and then become smaller again. Ultimately, the new technologies can go further to show how Poland's maps of its own country may differ considerably from Russian and German maps of Poland. This applies equally, of course, to all contested areas around the world.

In the early days of computing text, lists and databases were very separate categories. The advent of Standard Generalised Markup Language (SGML)⁶⁵ introduced the idea of separating the encoding of texts from the ways they were displayed. This created new bridges between the categories of texts, lists and databases but remained difficult to master. The rise of eXtensible Markup Language (XML) removes many of these earlier difficulties such that texts can increasingly function as if they were databases that can be queried from a number of viewpoints. This implicitly opens many new avenues for dynamic treatment of knowledge. Indeed as scientific- and knowledge- visualization methods mature, it is possible to foresee how knowledge in lists, which in printed form were either alphabetical, chronological or geographical will be accessible interchangeably in multiple formats and also as graphs and other visualizations. These are challenges which should become part of efforts for a Semantic Web. We need to be able to move seamlessly between different display methods, different levels of knowledge, map between different meanings and even between different kinds of knowledge.

7. European Approaches to Intellectual Property (IP)

Europe was one of the pioneers in establishing principles for intellectual property in the form of copyright, patents and other legal agreements and conventions in order to protect the rights of authors, artists and other creative individuals. Even so one of the secrets to European creativity lies in not trying to copyright everything. As such it is in contrast to countries such as the United States where there is now a quest not only to copyright images of famous actors but also all possible actions of virtual thespians, which simulate the themes and actions of an actor. Such an approach would have made many achievements of the Renaissance impossible.

In Europe, complete texts of books are copyrighted to prevent simple plagiarism, but citations in the form of references are allowed and even encouraged. Indeed this approach has been one of the secrets of European creativity. Although there is copyright on *the Bible*, Ovid's *Metamorphoses* and other classics, there is no copyright on their chief stories, themes and figures. This freedom has inspired much of the art and cultural expressions since the Renaissance and a veritable plethora of quotes, citations, references, and allusions not just in terms of snippets of texts but also in terms of topoi, themes, images, figures, motifs, symbols, emblems and other visual expressions.

Paradoxically, while citation indexes have become very much the fashion in the past decades, it is striking that retrospective citation indexes have not yet been forthcoming. The earlier quest of institutes such as the Warburg to trace the continuity of images by following the inheritance of symbols from Antiquity (*das Nachleben der Antike*) has not been systematically continued. Were such a repertoire to be developed it could serve both as a check against plagiarism and as a stimulus catalogue for new creativity. While discouraging simple copies one could thus use earlier examples as an incentive for new expressions: the old as a springboard for the new rather than a land where nothing is so old as the new. Open source is looming as more than a cheap alternative. It offers new dimensions for sharing through open theory⁶⁶ and perhaps even open design.

8. New Global Models of Culture

From the time of the voyages of discovery in the fifteenth century and onwards there was an implicit assumption that Europe's answers were applicable in other countries. In the eighteenth and nineteenth centuries with the rise of colonialism and imperialism there was an implicit and sometimes explicit belief that Europe's models were applicable everywhere.

Critics such as Said⁶⁷ and proponents of post-colonialism⁶⁸ have eloquently and rightly pointed to the shortcomings and excesses of this approach. However, in their enthusiasm to criticise, they have often forgotten to note that this approach also led to a systematic study of languages, which had not been recorded by their inventors and which would have been long forgotten were it not for European intervention and interest. From early studies especially by Jesuit missionaries and subsequent studies by archaeologists, historians, anthropologists, ethnologists, ethnographers, sociologists, ethno-botanists and

many others, Europe has frequently shed light on cultures with forgotten languages such as Egypt (e.g. Champollion)⁶⁹ and Cambodia (cf. Pelliot).⁷⁰ Through remarkable scholars such as Max Mueller, Europe has inspired systematic study of other religions and cultures not undertaken by those cultures on their own. In the process, Europe has lost not only its imperialist zeal but has begun to explore models of cultural understanding which are no longer Eurocentric.⁷¹ This is part of a worldwide trend. In the United States there is growing interest in comparative cultural studies.⁷² In Australia and Canada, largely through interaction with aboriginal peoples, there is a growing interest in alternative ways of knowing.⁷³

Philippe Quéau (UNESCO, Moscow) has linked such different ways of knowing specifically with different languages. For instance, whereas the English word, knowledge is etymologically linked with the verb “can” (cf. German *können*), the French word for knowledge, *savoir* is etymologically linked with taste (cf. *sap*, *sapienza*), whereas the Sanscrit word for knowledge is linked with creation and generation.⁷⁴ This points to a need for much more than multilingual databanks, namely, the challenge of being able to search using very different models of knowledge and ways of knowing.

Thanks particularly to the work of UNESCO, there is a general acceptance that culture is both tangible and intangible, with high and low dimensions. Even so, finding models that acknowledge the value of nomadic⁷⁵ as well as settled cultures, the importance of pre- and non-literate cultures as well as literate cultures, while at the same time giving due recognition to complex, ancient cultures such as China and India remains one of the most important challenges of the next decade(s) and beyond. A challenge lies in relating intangible theories, which Warburg classed under Orientation (Religion, Science, Philosophy), to their tangible and intangible cultural expressions.

One way forward lies in using the idea of cultural activities as an approach in moving towards a new model. Such a model acknowledges the intrinsic worth of all persons, while accepting the reality that pre-literate cultures typically have less cultural creations and “products” which become part of an accumulative, collective memory than those in literate or print literate or new media societies. Their goals, beyond those of mere survival, tend to focus on creating some kind of meaning or connecting, which links them with a world beyond them and with ordering via pattern and ornament that makes more manifest this process of connecting.

The advent of literacy adds imitating to basic goals. The advent of print literacy expands these goals to include matching, mixing and later exploring. Such basic goals can be linked with a small number of basic cultural activities (figure 2). In this approach, many basic goals are there from the outset. This is our common humanity at its deepest and most primordial level. While “technological” advances such as literacy, print and new media affect the quantity and often quality of cultural production and expression, a deeper change lies in the targets and audiences of these expressions. In pre-literate cultures, the purpose is to express common goals, insights and values of a group or tribe which leads via myths and legends to some form of religion, a word which is etymologically linked with the verb “to bind”, to bring together.

Cultural Goal	Technology	Means
1.Connecting 2. Ordering	Pre-literacy	1. Thinking, Mental Sense Making Mythology Religion Philosophy 2. Doing, Physical Sense Making Building Making 3. Expressing Literature Art Mathematics
3. Imitating 4. Matching 5. Mixing 6. Exploring	Literacy Print	3 Representing 4. Expressing Directly via Written 5. Translating Media 6. Transforming Media
7. Spreading	New Media	7. Publishing with Tolerance 8. Sharing 9. Helping

Figure 2. Seven goals and nine means as ingredients for a new model of culture.

In literate society, this sense making, which had largely been oral- verbal evolves into (epic) poetry, song and other expressions, and becomes increasingly linked with individuals who begin as shamans and bards and become poetic, literary and artistic figures. In print societies, the individuation of these individuals gradually becomes more pronounced to the point that the quest for individual expression may parry with, compete with and sometimes even threaten the binding themes of society and culture in a larger sense. So the artist as a cohesive force becomes a partial outcast to the extent they are more partial, becomes the rebel, the weirdo, even the madman, excluded from the norm, while challenging the norm to expand its horizons of inclusion.

The advent of new media radically increase the potential range of diffusion and dissemination of cultural products but also introduce new parameters for the purposes of such activities. On the surface, it means that marketing and sponsoring become inextricably linked with cultural processes. At a deeper level the commercialization of culture misses the point about its deepest dimensions. Granted paintings can be bought and sold just as some weaker representatives of the faith are available for a price. Even so, one cannot buy creativity, just as one cannot buy true faith. Dissemination should at some point increase tolerance and be helpful. In this approach, cultures are not simply about what they produce but also how they go about sharing their cultural products and creations. Dictators may build great buildings and enormous monuments, but this does not make them scions of great cultures. Great expressions may always be of interest, but

they are of greater interest if they benefit others rather than coming at the expense of human suffering and death.⁷⁶

The profound advantage of this approach is that it acknowledges the intrinsic contributions of pre-literate, literate, print and new media cultures, while simultaneously allowing for development in the direction of complexity without imposing simplistic linear frameworks of bigger is better. Precisely how one can develop such a model in a multi-lingual, multi-cultural framework, that accepts parallel world-views and belief systems without trying to remove or destroy them is one of the larger challenges of the next decades. Closely linked with this will be new interface challenges. How can we create interfaces that allow non-literate and literate persons to communicate? How can we create interfaces that reflect different amounts of aesthetic distance in cultural systems? Indeed how can we help persons in different cultures to distinguish contexts which are intended as serious from those which are intended to be playful, humorous or ironic? Indeed intention and intentionality pose enormous challenges for future digital databases in the cultural realm.

9. Dangers

While the new media bring many potential advantages, they also bring dangers. Some of these dangers are obvious and as might be expected these are being addressed on many fronts: e.g. the challenges of permanent storage using new media; challenges of authenticity and veracity. More subtle are those dangers which are not yet clearly recognised. For the purposes of this essay five such dangers are outlined here: 1) over zealous commercialism; 2) an anti-technology stance of some intellectuals; 3) a trend against universal narratives; 4) a tendency to perceive the past only in terms of the present; 5) a tendency to destroy systematically the evidence and collective memory of the past.

Over Zealous Commercialism

The role of cultural institutions as one of the major dimensions in tourism is well recognised.⁷⁷ The enormous popularity of shops in major museums and galleries such as the Louvre or National Gallery point to the considerable potentials not just of postcards and posters but a whole range of reproductions, souvenirs, scholarly books, documentaries, videos and even games. All this is legitimate and deserves to be further developed. To be sure there are tendencies towards a Disneyfication of culture, but this again is a danger that is recognised and hence not our concern at this point.

Our concerns in this respect concern three less obvious trends. One trend is within the publishing industry to make the domain of reference works and standard works into a sector for profit making. In the past, a serious scholar bought their physical copy of a standard dictionary such as the Oxford English Dictionary (OED) and this one-time investment remained for life. Today a one-year licence to the OED even via national bodies such as the Joint Information Systems Committee costs well over 200 pounds, such that the cost of using this dictionary in a typical career of 30-40 years would range

from 6,000-8,000 pounds. A scholar working in 5 languages would thus need to reckon with 30,000-40,000 pounds just for access to five standard dictionaries. This trend is evident not just in reference works such as classification systems, dictionaries and encyclopedias but also in the realm of classic literature in a given language. The costs of access to such collections exceed the budgets of scholars who are not independently wealthy.

Some will rightly note that these costs are usually covered by universities and that those who belong to those universities thus have automatic access to such materials. Hence for them the problem does not exist. Here two points need to be made. First, the extent to which universities subscribe to such reference materials varies enormously. A particular scholar is thus entirely dependent on the resources that happen to be available at their local university. Second, and much more significantly: only a small percentage of the population has formal links with a university. What provisions will be made to ensure that access to materials extends beyond a small elite at the universities? Will the computer revolution truly benefit only a clique or all citizens?

A second trend, not much publicised, entails a tendency to privatise cultural heritage. This trend has important precedents. Sir Henry Wellcome (1856-1936) through his “will established the Wellcome Trust, whereby five Trustees ensured the profits of his company were to be used for medical research. This was the first time in Britain that a bequest was made whereby trading profits were dedicated to the advancement of knowledge for the benefit of mankind.”⁷⁸ In the 1970s, the trustees effectively rewrote the will and dispersed what was possibly the greatest medical, anthropological and ethnological collection in the world. Some have claimed that the reason was political. A Labour government did not want such clear evidence that the extraordinary efforts of a single individual could achieve so much.

Since the 1970s, there have been a number of cases around the world where museums have sold pieces, which were bequeathed to them on the assumption that the museum would look after them in perpetuity. In most cases, these sales used pragmatic arguments of survival: better to sell one or two masterpieces and have money to continue, rather than needing to close the entire collection. Even so, they opened the possibility of scenarios whereby major collections could potentially be put up for sale and dispersed.

This danger is now becoming a reality. In Italy, for example, Mr. Berlusconi has set up a corporation that uses cultural heritage as mortgage collateral for other business ventures. Patrimonio Spa⁷⁹ has already mortgaged Italian Cultural Heritage worth more than 1 billion euros. As a result, major monuments such as the Trevi fountains could suddenly find themselves in the hands of entrepreneurs. Culture, which traditionally serves the awareness of a country, with added potentials for tourism, could find itself being used for very different ends.

Such developments are the more frightening when seen in the context of a third international trend. In October 1998, the World Bank, in conjunction with the Government of Italy organised a conference “Culture Counts”⁸⁰ which aimed to “sharpen

the economic, social, and political reasons to invest in the cultural dimension of development.” At the time this was presented as an excellent example of the generous ways in which the World Bank was looking beyond purely financial gain.

In retrospect, the World Bank’s concern may need to be seen as part of a larger trend whereby the World Trade Organization (WTO) is trying to renegotiate the earlier notion of cultural exception⁸¹ and claim that all cultural activities and products should be seen purely as commercial ventures. Individuals such as the former French Minister of Culture, Catherine Trautmann⁸² have expressed very eloquently why they oppose this trend. A growing number of individuals have pointed to the dangers that such an approach would pose⁸³ especially qua cultural diversity,⁸⁴ and yet the quest to reduce culture to commercialism continues.

As a result of the above one of the greatest challenges of the next decade(s) will be to ensure that we hold intact and foster the unique role of culture as a cumulative corpus of collective memory. If we fail to do through an over-zealous emphasis on short-term commercialism, we risk losing one of the pillars of our tourist industry. More significantly we shall undermine our cultural diversity, which is a key to our present and future cultural identity.

Anti-Technology

The enormous potentials of ICT and UCT outlined above have inspired many innovations and are leading to emerging fields such as humanities computing, new developments in textual and hyper-textual analysis and many new methodological discussions concerning sources, authenticity, veracity and reliability, a range of questions which were previously sparked by the introduction of manuscript and later print culture.

At the same time, a number of intellectuals are intuitively against all technology as if this posed a threat to their humanist aims.⁸⁵ Instead of seeing the new technologies as extensions of man, as did McLuhan,⁸⁶ they perceive technologies simply as a threat to independent thought and insight. Instead of seeing technology as a tool to help in their their critical analysis, reflection and synthesis, they see technology as something simply to be opposed.

In the past, it was the scholarly world, which helped to articulate and uphold a set of values that rose above the greed and short-sightedness of the everyday to open larger vistas of comprehension and understanding. Ironically, in a world where it is ever more difficult to attain viewpoints that reflect sufficiently developments at a global level, a significant number of scholars are rejecting the very tools that could help them to achieve such comprehensive viewpoints. Without such electronic tools, it may well prove impossible to develop new universal narratives of a tolerant type to sustain and foster values of democracy and freedom of speech. Meanwhile those with purely commercial and political agendas are using the new technologies to their more narrow ends.

Anti-Universal Narratives

Parallel with this rejection of the past, there are claims that universal narratives are also a thing of the past and thus no longer relevant. The protagonists of the -isms and the post-isms rightly point to the multiple possibilities of interpreting texts, passages and even words. This insight is hardly new. Problems of interpretation are well known in other great languages and cultures of the world such as Sanskrit, Chinese or Arabic. The founders of new criticism such as Richards,⁸⁷ and Empson⁸⁸ expounded such ideas over seventy years ago and biblical scholars have wrestled with challenges of interpretation for over two millennia.⁸⁹

Pointing to problems of interpretation is clearly a good thing, to the extent that an overemphasis on some elements of Hegelian, and Kantian world views that led to oppressive Fascism, Marxism, Communism and other -isms in the twentieth century, brought much human suffering. On the other hand, in a world where democratic procedures are becoming an ever-smaller minority, there is an equally greater need for new models and explanations that go beyond the comfortable security of a small group of highly industrialised nations. As outlined in section 8 above, in contrast to earlier colonial and imperialist frameworks, these new models need to acknowledge the values and contributions of other major cultures. Lacking such models, Europe, which only represents about 5% of the world-population, is in danger of being dismissed as a force that is no longer relevant in the modern world.

While the existence of competing and sometimes conflicting interpretations is obvious, the real challenge is how to find new ways of representing differences fairly in narratives that go beyond a single school or faction. If we cannot achieve new narratives that go beyond these factions and are universal in their aim, the larger world is destined to dismiss cultural studies and related efforts as merely another faction in what is already a tiny minority. Some thinkers have rightly begun to complain,⁹⁰ but to complain that models are lacking is not enough: we need new, embracing models.

Present without a Past

The personal narrative navel gazing of -isms gurus is often in a context that overlooks the past. Many of the recent -isms such as de-construction-ism, post-modern-ism, and post-colonial-ism, are so much focussed on the present that they often overlook many dimensions of the past.⁹¹ Indeed, some systematically ignore or even deny the continued value of the past, thus denying a collective memory over time and the cumulative nature of culture.

Others speak of the end of history. One of the most striking examples of this trend is Francis Fukuyama's *End of History* (1992),⁹² which claimed that the fall of the Berlin Wall signified the complete triumph of western capitalism over all other societal models such that historical "development" and by implication study of the past were no longer relevant. Various commentaries by Huntingdon,⁹³ Baudrillard⁹⁴ and Derrida⁹⁵ have taken

issue with details of the claim but have not yet come to terms with larger questions implicit in Fukuyama's approach.

Although the Berlin Wall has been taken as a symbol of the fall of communism and the triumph of capitalism, communism continues to be the dominant ideology in China and North Korea and has not disappeared from Russia. The Chinese influence in Tibet, the rise of the Maoists in Nepal, the resurgence of leftist and authoritarian governments in Africa, South America, and significant parts of the South East Asia, the difficulties of fostering democratic tendencies in Afghanistan, Iraq, Iran and elsewhere suggest that notions of an unequivocal triumph of capitalism are overstated at best if not blatantly misleading.

China, India, Malaysia, Burma, Cambodia (Myanmar) and Thailand cannot really be seen as full democracies in the Western sense. Indeed, with their age-old respect for the wisdom of elders, can such cultures ever function in the same way as countries where persons are elected independently of their age? In a world where considerably more than half, some would say more than 75% of the globe's populations do not follow straightforward principles of free elections, to speak of the triumph of capitalism is more than premature.

Indeed, in the 14 years since the fall of the Berlin Wall (09 November 1989), the world looks considerably less democratic than it did then. The scare of September 11, 2001; problems with the World Trade Organization (WTO), uncertainty of the economy, increasing unemployment even in the richest countries such as Germany are shaking confidence in capitalism so thoroughly that any abandonment of history seems more than premature. Perhaps more than ever before, we need awareness of the larger rhythms of historical realities to buffer us from the modish predictions of fashionable -isms. Meanwhile, other disturbing developments make such concerns even more urgent. While some intellectuals are consciously ignoring the past, some non-intellectuals are consciously destroying memory of the past so that it cannot be studied even if one wished to do so.

Year	Domain	Country
1992	Libraries	Bosnia ⁹⁶
1997	Built Heritage, Monuments	Tibet ⁹⁷
1999	Churches, Monuments	Serbia ⁹⁸
2000	Built Heritage	Malaysia ⁹⁹
2000	Built Heritage, Archaeology	Belize ¹⁰⁰
2001	Museums, Libraries,	Afghanistan ¹⁰¹
2002	Libraries, Archives	Palestine ¹⁰²
2003	Museums, Libraries	Iraq ¹⁰³

Figure 3. Recent Examples of Destroyed Heritage both in War and in Peacetime.

Systematic Destruction of the Past

Traditionally there has been a long history of destruction of cultural heritage. Among the most famous examples is the Library of Alexandria which was destroyed by Julius Caesar (47 A.D.), by Christians (391 A.D.) and by the Arabs (641 A.D.),¹⁰⁴ although it was but one of many examples.¹⁰⁵ The twentieth century saw a dramatic rise in lost collective memory¹⁰⁶ through conscious destruction of heritage especially by the Nazis¹⁰⁷ and by Communist Russia in countries such as Lithuania.¹⁰⁸ Notwithstanding UNESCO's efforts to the contrary, such willful destruction is increasing. While the press made a great noise about the Taliban's destruction of the Bamiyan Buddhas¹⁰⁹ in Northern Afghanistan in 2001, almost nothing was said of the hundreds of painted caves which were destroyed by U.S. bombs in the ostensible hunt for Osama bin Laden. Such actions are disturbing examples of a global trend (figure 3).¹¹⁰ A report from Lhasa in Tibet (1997) gives some indication of the scale of this destruction:

The demolition is part of a five-year wave of modernisation in Lhasa which by the end of last year had led to the demolition of 350 of the 600 historic buildings which stood in the Old City when the Chinese arrived four decades ago. Twenty-eight historic buildings in the area are reported to have been demolished since January, 15 of them in the last month.¹¹¹

While the destruction of heritage with its “bibliocide” and “monumento-cide,” is not obviously linked with ICT, the new media clearly offer incentives for extremists such as the Taliban to destroy the Buddhas. More importantly the new media allow those with an agenda of killing memory a context for rewriting the histories of persons who no longer have an official written past. In the absence of documentary evidence it becomes possible to assert the stories that match one's own agendas through propaganda.

In this context, intellectuals who are consciously against history and speak of the death of history¹¹² are more than slightly disturbing. Willful destruction of sources fits perfectly into a political agenda that poses major dangers because those whose history is eradicated will be at the mercy of those who claim or simply enforce the right to write history as they see fit. Those who argue for purely contemporary cultural studies thus become consciously or unwittingly threats to historical traditions of cultural diversity.

10. Need for a Distributed European Electronic Repository (DEER)

Independent of the role played by memory institutions in the development of national or larger repositories (cf. 2 above), there is thus a fundamental need for new links between distributed repositories such that users can gain access to the big picture offered by networked digital knowledge and culture. First steps in this direction are already evident through the rise of virtual national union catalogues¹¹³ and the emergence of networks such E-Culture Net.¹¹⁴ In a networked world we need to share examples in order to develop and share new critical methods.

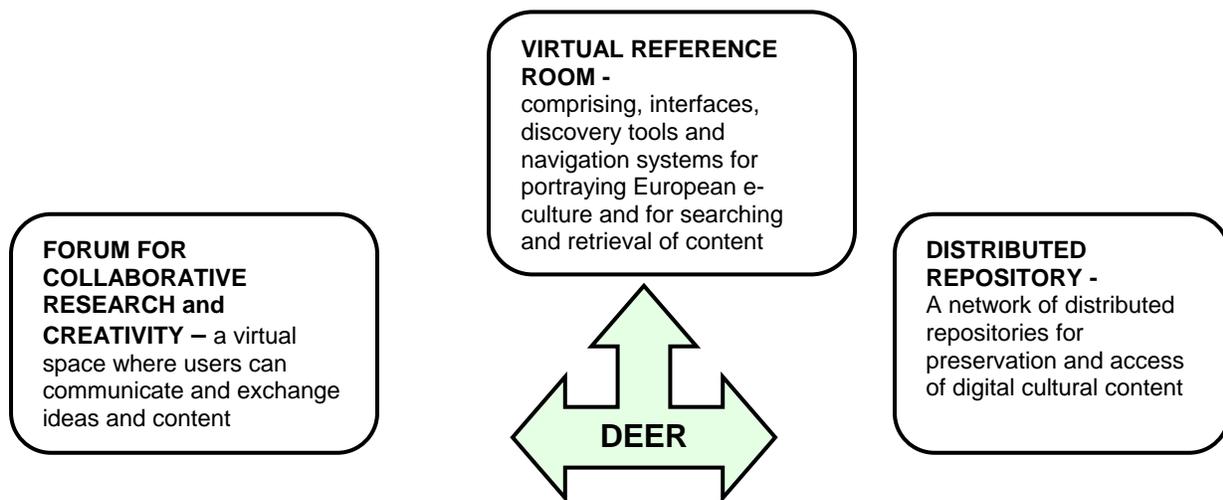


Figure 4. Main elements of an initial Distributed European Electronic Resource (DEER) as outlined by Suzanne Keene and Francesca Monti.¹¹⁵

Networks are already increasingly radically the scope of materials to which we have access. In 1630, the largest libraries of the world such as the Vatican and the Herzog August Bibliothek had around 130,000 books. In 1950, the largest libraries (e.g. Bibliothèque Nationale, British Library and Library of Congress) had between 10 and 15 million books. National union catalogues in Germany now have over 40 million items. The network of the Research Libraries Group now has access to over 115 million titles.

If various union catalogues and networks were systematically combined, we would have access to hundreds of millions of books. Access to such numbers would be more than a simple increase in scale. We could begin to automate efforts begun over a half century ago with projects such as the Union Catalogue of Incunables¹¹⁶ whereby we gain insight into the numbers of extant copies of books and their locations: elements of which are essential for the still emerging field of reception history.

Such a distributed repository of titles must become a starting point for a distributed repository of the full texts to which they point. To make such texts fully accessible, the development of 1) a distributed repository will require: 2) the development of virtual reference rooms which incorporate the dimensions of dynamic knowledge outlined above and 3) a forum for collaborative research and creativity (figure 4). Together these elements will lead to a Distributed European Electronic Resource (DEER). While such a project can be seriously underway within a decade, it is necessary to accept a far longer time-frame for so fundamental a change in our access to culture and knowledge as a whole. It may well take at least a century before the enormous challenges of creating a World Online Distributed Electronic Resource (WONDER) becomes a reality.

11. Conclusions

The new media entail something much more profound than the advent of new technologies in our offices and homes. They are transforming the way we store our collective memory, the ways we access this memory and even our definitions of knowledge. Potentially they can transform our learning, work and leisure activities.

One of the most obvious challenges of the next decade entails the creation of reliable, permanent, distributed repositories, to complement the existing roles of analog memory institutions. A second challenge entails increasing the scope of digital cultural heritage to include not only tangible and intangible heritage but also the theories underlying these expressions and the commentaries arising from them, thereby contextualising many materials which are becoming accessible online. This process will be further helped through new links between national, regional and local expressions whereby multiple interpretations of events become accessible and the full range of multi-lingual, multi-cultural diversity will become visible.

The new technologies offer much more than digital access to existing analog objects and records of culture. Whereas analog media were limited to static, linear lists of knowledge, which were either alphabetical, chronological or geographical, digital media permit dynamic lists that can generate all these alternatives on demand. Indeed, digital media introduce various possibilities of dynamic knowledge that provide more systematic surveys of existing claims. Digital media thus open new avenues for scholarship and potentials for the re-organisation of knowledge. These potentials are increased through European approaches to intellectual property that protect the full contents of cultural products and expressions while encouraging citations, references, and allusions that foster cultural continuity and cumulative, collective memory.

At the same time, the advent of the new technologies is not without dangers. Five such areas were identified: 1) an over-zealous commercialism that undermines scholarship, tourism, cultural diversity and potentially even our cultural identity; 2) an intuitive opposition to all technological tools; 3) assumptions that universal narratives are no longer possible; 4) assumptions that history is no longer relevant and 5) willful destruction of historical sources.

Ultimately culture is something much more than expressions in isolation. It is a cumulative combination of expressions, linked with theories and commentaries, reflections, and criticisms that requires permanent, multi-lingual, multi-cultural, multi-valent access to be fully creative. This requires a combination of 1) distributed repositories; 2) virtual reference rooms and 3) a forum for collaborative research and creativity functioning as a virtual agora in the form of a Distributed European Electronic Resource (DEER) as a first step to a global equivalent (WONDER). A permanent network such as E-Culture Net could address the challenges outlined above; help to develop critical methods; create new models for culture that transcend Euro-centrism and help to make the DEER and WONDER a reality.

Acknowledgements

I am grateful to my colleague Johan van de Walle and my former assistant Alexander Bielowski for kindly reading this article, for offering helpful comments and for providing references.

Notes

One of the great problems with websites is that they often move and sometimes disappear altogether. All the websites were checked as working in June 2004. Those which are inactive are noted in brackets as formerly. Every effort has been made to give the original title such that this can be entered in Google should the address change at a future date.

¹ Cf. Global Reach: World E-Commerce Growth (based on Forrester Research).

See: <http://glreach.com/eng/ed/art/2004.ecommerce.php3>

² For a recent assessment of the current state of digital culture see the author's: "Europe's Cultural Heritage in the Digital Age," Closing Plenary: *Digital Resources in the Humanities (DRH) Conference, 2003, University of Gloucestershire, Cheltenham Campus*, September 2003.

³ Global Reach: Global Internet Statistics. See: <http://www.glreach.com/globstats/>

⁴ Ibid. See: <http://www.glreach.com/globstats/>

⁵ *The State of the Japanese Internet Market 2000 Digest*, Tokyo: Impress, 2000, p. 59. Cf. Ken Ichiriki, *Study Group on the Next Generation Internet Policy, e-Japan Initiative for the IT Revolution*, June 2000.

⁶ Arthur F. Pease, Siemens, "Building the Unlimited Expressway."

See: http://w4.siemens.de/FuI/en/archiv/pof/heft2_02/artikel11/index.html

⁷ For a fuller discussion see the author's *Understanding New Media: Augmented Knowledge and Culture*, Calgary: University of Calgary Press, (Autumn 2004, in press).

⁸ Uses of the British National Corpus. Cf. <http://www.natcorp.ox.ac.uk/using/>

⁹ It is estimated that they would need to have a throughput of at least 60 Gigabits/second in order to achieve a practical solution. See the work of the SERENATE group for more details. See: <http://www.cordis.lu/ist/rn/serenate.htm>

¹⁰ Without gigabit connections it is not possible to share most large image collections let alone reconstructions of sites. For interesting experiments using 200GB maps by E-Culture Net, See: <http://www.eculturenet.org/FP5/publicPDF/deliverable10c.pdf>

¹¹ See: <http://www.minervaeurope.org/>

(Cf. formerly: <http://www.minervaeurope.org/publications/globalreporhtml/france-fr.htm>)

¹² MINERVA Competence Centres for Digitisation.

See: <http://www.minervaeurope.org/competencecentre.htm>

¹³ Excellence in Processing Open Cultural Heritage (EPOCH). See: <http://www.epoch-net.org/>. Cf. the Cordis website. See: http://www.cordis.lu/ist/directorate_e/digicult/epoch.htm

¹⁴ E-Culture Net Thematic network in FP5.

See: <http://www.eculturenet.org/FP5/>

¹⁵ This initiative became the basis for the storage module of the Distributed European Electronic Resource (DEER) prototype in E-Culture Net which was not funded in the first round of FP6..

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- ¹⁶ JISC Requirements and Feasibility Study on preservation of e-prints.
See: http://www.jisc.ac.uk/index.cfm?name=funding_7_02.
The Digital Curation Centre (DCC) has:
the University of Edinburgh (lead partner) and the University of Glasgow, which together host the NeSC; UKOLN, at the University of Bath; the Council for the Central Laboratory of the Research Councils (which operate the Rutherford and Daresbury Laboratories).
See: <http://www.dcc.ac.uk/>
- ¹⁷ The Digital Preservation Coalition in conjunction with ERPANET made a bid for this tender. See: http://www.developmentgateway.org/node/130667/browser/?&page_no=45
ERPANET will bring together memory organisations (museums, libraries and archives), ICT and software industry, research institutions, government organisations (including local ones), entertainment and creative industries, and commercial sectors (including for example pharmaceuticals, petro-chemical, and financial). The dominant feature of ERPANET will be the provision of a virtual clearinghouse and knowledge-base on state-of-the-art developments in digital preservation and the transfer of that expertise among individuals and institutions."
- ¹⁸ BRICKS. See: http://eoi.cordis.lu/dsp_details.cfm?ID=32324.
Cf. http://www.cordis.lu/ist/directorate_e/digicult/bricks.htm
- ¹⁹ Projects such as BRICKS reflect a trend that is coming from the technological community to create distributed, modular software in the form of grid middleware. In this context pioneers in the field claim that even languages such as C++ will be obsolete within a decade. Cf. the work of Denis Caromel, INRIA and specifically his keynote at REUNA in Santiago (May 2004). See: <http://www-sop.inria.fr/oasis/personnel/Denis.Caromel/>
- ²⁰ Gail M. Hodge, "Digital Preservation. Overview of Current Developments," *Information Services and Use*, volume 22, 2002, pp. 73-82.
See: <http://www.arch.usyd.edu.au/~adong/courses/deco3002/assets/hodge-digitalpreservation.pdf>
- ²¹ OCLC Public Affairs Information Service. Cultural Protection, December 2002/January 2003. See: <http://www.pais.org/hottopics/2003/DecJan/resources/web.stm>
- ²² E.g. European Commission on Preservation and Access.
See: <http://www.knaw.nl/ecpa/>
and the International Network for the Conservation of Contemporary Art (INCCA).
See: <http://www.incca.org/>; Cf. Casus Multimedia -- VU 2003
See: <http://www.cs.vu.nl/~eliens/onderwijs/multimedia/mmc/incca.html>
At a national level the French Archives have articulated an approach.
See: <http://www.archivesdefrance.culture.gouv.fr/fr/archivistique/index.html>
- ²³ There has been a European Commission project on a **Networked European Deposit Library**. See: <http://www.clir.org/pubs/reports/pub116/sec4.html>.
- ²⁴ Kate Evans-Correia, "Linux powers building of online digital images catalog" *SearchEnterpriseLinux.com*, 05 Sep 2003.
See:
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- ²⁵ Cf. INSPIRAL Project. See: <http://inspiral.cdrl.strath.ac.uk/about/about.html>
- ²⁶ GEANT. See: <http://www.dante.net/geant/about-geant.html>
- ²⁷ TERENA. See: <http://www.terena.nl/>
- ²⁸ UNESCO Intangible Heritage.
See: http://www.unesco.org/culture/heritage/intangible/html_eng/index_en.shtml

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- ³¹ *Die Kunstliteratur*, Vienna: Schroll, 1924.
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- ³³ Cf. the author's: "Panofsky's Perspective: a Half Century Later," *Atti del convegno internazionale di studi: la prospettiva rinascimentale, Milan 1977*, ed. Marisa Dalai-Emiliani (Florence: Centro Di, 1980), pp. 565-584. For another discussion of recent trends see the author's: « Learning and Communication with Old and New Media,» *UNESCO Conference: Das Verbindende der Kulturen. SEKTION: Integrales, lebendiges, gemeinsames Lernen, Orientierungs- und Sinnfragen, Mehrsprachigkeit und Kulturnavigation, Vienna, December 2003*, Vienna, 2004 (in press).
- ³⁴ Warburg Institute Library Classification Scheme.
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- ³⁵ Cf. the heading of earlier bibliographies in the author's bibliography.
See: <http://mmilinux.unimaas.nl/sums/develop/> with username sums and password summa.
- ³⁶ Ernst Cassirer, *The Logic of the Cultural Sciences*, New Haven: Yale University Press, 2000, p. 25. Translated from: "Zur Logik der Kulturwissenschaften," *Göteborgs Hogskolas Anskrift*, 1942.
- ³⁷ ART+COM. See: <http://www.artcom.de/> under Projekte and under Terravision.
- ³⁸ VidealAB. See: <http://videalab.udc.es/> under Representación del Territorio under SANTI (Sistema Avanzado de Navegación sobre Terrenos Interactivo).
- ³⁹ Patrizia Coluccia, Francesca Garofalo, Maria Chiara Liguori, Silvia Monfardini and Francesco Serafini, "A Survey of Virtual Reality in the VIS.I.T. Theatre: from Research to Divulgateion," *Cultivate Interactive*, October 2001.
See: <http://www.cultivate-int.org/issue5/cineca/>
- ⁴⁰ Center for Digital Interpretation, Falun, Sweden.
See: <http://www.cdisweden.com/eng/projekt/index.html>
- ⁴¹ Navteq. See: <http://www.navteq.com>
- ⁴² Tourism now represents over 12% of the world economy. Cf. Tourist.com: Travel & Tourism Key Facts and Figures. See: <http://www.tours.com/travelstats.php>
- ⁴³ Système d'Informations Touristiques Géolocalisées pour l'Internet Fixe et Mobile.
See: http://www.cetir.net/prog_r&d/hypercarta/hypercarta.htm
- ⁴⁴ Hypercarta. Un support cartographique 2D/3D.
See: http://www.cetir.net/image/plaquette/hypercarta_01.pdf
- ⁴⁵ Hypercarta System. See: <http://www.franck.michaux.net/>. For a glimpse how this fits into the French National Policy cf. the MINERVA by France.
See: <http://www.minervaeurope.org/publications/globalreport/globalrephm02/france-e.htm>

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See: http://europa.eu.int/comm/dgs/energy_transport/galileo/index_en.htm.
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See: http://europa.eu.int/comm/dgs/energy_transport/galileo/applications/leisure_en.htm
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See: <http://www.boisestate.edu/courses/hy309/docs/burckhardt/burckhardt.html>
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- ⁵¹ British Council. See: <http://www.britishcouncil.org/>
- ⁵² Goethe Institute. See: <http://www.goethe.de/>
- ⁵³ European Heritage Network (HEREIN). See: [http://www.coe.int/T/E/Cultural_Co-operation/Heritage/European_Heritage_Network_\(HEREIN\)/](http://www.coe.int/T/E/Cultural_Co-operation/Heritage/European_Heritage_Network_(HEREIN)/)
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- ⁵⁷ ACEMEDIA (FP6 project 001765) Cf. IST Evaluation Summary Report, p. 165:
See: <http://www.eculturenet.org/internal/evalreport.pdf>
- ⁵⁸ France, Ministère de la Culture, Actualités under Revues et Lettres.
See: http://www.culture.gouv.fr/culture/mrt/numerisation/fr/f_01.htm#Autres
- ⁵⁹ Meanwhile there are interesting developments in the library world whereby bibliographical relations and access records are replacing authority files. Cf. Sherry Vellucci, "Bibliographic Relationships," *International Conference on the Principles and Future Development of AACR*, Toronto 25-27 October 1997.
See: http://collection.nlc-bnc.ca/100/200/300/jsc_aacr/bib_rel/r-bibrel.pdf.
- ⁶⁰ For another discussion of this theme see the author's: "Four Ways that Digital Communications are Transforming Scholarship: Sources, Names, Claims and Scope," Unpublished Paper, Maastricht, 2002.
See: <http://www.mmi.unimaas.nl/people/Veltman/publications.htm>
- ⁶¹ See: <http://classes.bnf.fr/dossism/gc189-35.htm>.
Cf. also the *Göttingische Gelehrten Anzeigen* (GGA), 1739 – 1892.
See: http://gdz.sub.uni-goettingen.de/de-old/projects/gga/gga_de.html.
- ⁶² Mundaneum. See: <http://www.mundaneum.be/content/mundaneum/qqsmots.html>
- ⁶³ I-Mass Project. See: <http://www.i-massweb.org/>
- ⁶⁴ For a fuller discussion of this topic see the author's: "Cultural and Historical Metadata: MEMECS (Metadonnées et Mémoire Collective Systématique)," *WWW9*, Amsterdam, 2000 (in press), pp. 1-13. Published electronically as: "Cultural and

Historical Metadata, MEMECS (Metadonnées et Mémoire Collective Systématique)," *Cultivate Interactive*, Issue 1, July 2000. See: <http://www.cultivate-int.org/issue1/memecs/>

⁶⁵ OASIS. SGML: General Introductions and Overviews.

See: <http://www.oasis-open.org/cover/general.html>

⁶⁶ Open Theory See: <http://www.opentheory.org/>

⁶⁷ Edward Said, *Orientalism*, New York: Random House, 1979. Said's description of the Austrian school of orientalism was more subtle.

⁶⁸ Postcolonialism, Nation and Gender.

See: http://www.eng.fju.edu.tw/Literary_Criticism/postcolonism/#theorists

⁶⁹ "The Egyptologists" by Jimmy Dunn.

See: <http://www.touregypt.net/featurestories/egyptologists.htm>

⁷⁰ Angkor Wat. The largest religious Monument in the World.

See: <http://www.angkorwat.org/>

⁷¹ Cf. the author's "Goals of Culture and Art," Lecture to the IIC, Kuala Lumpur, September 1999. See: <http://www.mmi.unimaas.nl> also on the site of the International Institute of Communications, <http://www.iicom.org>. Published electronically in *TRANS. Internet-Zeitschrift für Kulturwissenschaften*, vol. 1, Vienna.

See: <http://www.adis.at/arlt/institut/trans/ONr/veltman1.htm>.

⁷² E.g. Ohio State University (OSU). Comparative Studies.

See: <http://comparativestudies.osu.edu/>

Cf. OSU Comparative Studies. Library Resources.

See: <http://www.lib.ohio-state.edu/ghumweb/comparative/>

⁷³ Reg Crowshoe and Sybille Maaneschmidt, *Akak'stimen. A Blackfoot Framework for Decision Making and Mediation Processes*, Calgary: University of Calgary Press, 2002.

⁷⁴ Philippe Quéau, "Information Policies for Knowledge Societies," *EVA Moscow*, 1-5 December 2003. See: http://evarussia.ru/upload/doklad/dokladEn_1080.doc.

⁷⁵ Commission on Nomadic Peoples. See: <http://users.ox.ac.uk/%7Ecnpc/>.

⁷⁶ In these insights may lie unexpected answers to the provocative questions posed by Kishore Mahbubani's recent book: *Can Asians Think?* (1998). In the year 1000 as the author points out, Asia was the leading civilization and Europe was only just beginning to recover from barbarian invasions. A millennium later, in the year 2000, the West rather than the East appears to be the leading civilization. Does this mean, asks the author rhetorically, that Asians are less intelligent and cannot think? Obviously not. Standing back, however, we can see that for the past millennium the West has increasingly opened itself to learning about other cultures, whereas the East has frequently created physical and metaphysical walls to keep out other cultures.

This is hardly to say that all the actions in the name of Christianity were always Christian in the deepest sense of the word. Significantly, Western efforts to resort to raw power have proved and are proving as powerless as such efforts elsewhere. The British Empire was defeated metaphysically by a Gandhi who refused to fight physically. Those who seek to be imperial powers today would do well to remember that example. The quest to understand, to publish with tolerance, to share and to help has triumphed over contrary methods. Intelligence is everywhere. What counts is how we use intelligence and subject it to a greater, common good.

⁷⁷ Organisations such as UNESCO have also pointed to dangers especially in developing countries when such cultural sites draw enormous crowds that may in fact upset the balance of the local culture.

⁷⁸ Cf. University of Wales, Swansea. Sir Henry Wellcome.

See: <http://www.swan.ac.uk/egypt/infosheet/Wellcome.htm>

⁷⁹ Senato della Repubblica. Gruppo Democratici di Sinistra -L'Ulivo, "Patrimonio SPA e Salvadeficit: La Grande Truffa di Tremonte e Berlusconi.

See: <http://www.parlamento.it/dsulivo/dossier/patrimonio%20spa.doc>

⁸⁰ Dev News Media Center. "World Bank and Italy Partnering to ensure "Culture Counts." See: <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20019043~menuPK:34457~pagePK:34370~piPK:42768~theSitePK:4607,00.html>

⁸¹ UNESCO. Culture Trade and Organisation.

See: http://www.unesco.org/culture/industries/trade/html_eng/question17.shtml

⁸² Catherine Trautmann, "The cultural exception is not negotiable," *Le Monde*, Paris, October 11th 1999. See: <http://www.culture.fr/culture/actualites/politique/diversite/wto-en2.htm>

cf. Verane Castelnau, "France's diplomacy in international economic organizations," *Weltpolitik.net*, 18 January, 2002.

See: <http://www.weltpolitik.net/regionen/europa/frankreich/952.html>

⁸³ Patrick Boylan, "Culture and World Trade," Focus, *ICOM News*, no. 1, 2002.

See: http://icom.museum/pdf/GB_04.pdf

⁸⁴ Joost Smiers, *Arts under pressure. Promoting Cultural Diversity in the Age of Globalization*, London: Zed Books, 2003; cf. José Álvaro Moisés, "The "Cultural Exception", the WTO and Brazil," May 2002.

See: <http://www9.cultura.gov.br/textos/ja22.htm>; Cf. Sasha Costanza-Chock, "[CRIS - AL]. The "Cultural Exception", the WTO and Brazil," *Wed*, 16 Jul 2003 12:59:34 -0400

See: http://www.comunica.org/pipermail/crisal_comunica.org/2003-July/000662.html

⁸⁵ Ronald Bailey, "Rebels Against the Future. Witnessing the birth of the global anti-technology movement," *Reason Online*, 28 February 2001.

See: <http://reason.com/rb/rb022801.shtml>.

Cf. Richard Terra, "Anti Technology Movement Targets Nano-Technology, *NaNoDot, News and Discussion of Coming Technologies*. Foresight Institute, 19 March 2001.

See: <http://nanodot.org/article.pl?sid=01/03/19/1818205>

⁸⁶ Marshall McLuhan, *Understanding Media: The Extensions of Man*, New York: McGraw Hill, 1964.

⁸⁷ C. K. Ogden and I. A. Richards. *The Meaning of Meaning: A Study of the Influence of Language Upon Thought and of the Science of Symbolism*. 1923. New York: Harcourt Brace, 1930.

⁸⁸ William Empson, *Seven Types of Ambiguity*, London: Chatto and Windus, 1930. Cf. "Frank Asked: What are the Seven Categories of Ambiguity? Who is it that created the construct, and when? Does the concept still have validity today?" See: http://www.philosophos.com/knowledge_base/archives_10/philosophy_questions_1092.html

⁸⁹ The term interpret or interpretation occurs at least 63 times in the King James version of the Bible. See: <http://www.biblegateway.com/cgi-bin/bible> using the word “interpret” for the King James bible. Cf.

[bin/bible?search=interpret&SearchType=AND&version=KJV&restrict=&StartRestrict=&EndRestrict=&rpp=25&language=english&searchpage=0&x=13&y=4](http://www.biblegateway.com/cgi-bin/bible?search=interpret&SearchType=AND&version=KJV&restrict=&StartRestrict=&EndRestrict=&rpp=25&language=english&searchpage=0&x=13&y=4)

⁹⁰ See, for instance, Terry Eagleton, *The Illusions of Postmodernism*, Oxford: Blackwell Publishers, December 1996; Roger Kimball, *Experiments against reality: The fate of culture in the postmodern age*, Chicago: I.R. Dee, 2000; Hilton Kramer, Roger Kimball, eds., *The Survival of Culture: Permanent Values in a Virtual Age*, 2003; Keith Windschuttle, *The Killing of History: How Literary Critics and Social Theorists are Murdering Our Past*, Paddington, NSW, Australia: Macleay Press, 1996. 1st paperback ed. San Francisco: Encounter Books, 2000; David Stove, *Anything Goes: Scientific irrationalism: origins of a postmodern cult*, New Brunswick, NJ: Transaction Publishers, 2001. Cf. Howard Bloom, *The Closing of the American Mind*, New York: Simon and Schuster, c1987.

⁹¹ Some postmodernist intellectuals are interested in a Disneyfication of history cf. Jamie McKenzie, “The Disneyfication of History: Why Books, Libraries and Librarians Remain Essential,” *fno.org*, vol. 6, no. 3, November-December, 1996.

See: <http://www.fno.org/nov96/thanks.html>.

⁹² *The End of History and the Last Man*, by Francis Fukuyama; Free Press, 1992. Cf. Roger Kimball, “Francis Fukuyama & the end of history,” *The New Criterion*, vol. 10, no. 6, February 1992.

See: <http://www.newcriterion.com/archive/10/feb92/fukuyama.htm#back1>

⁹³ Samuel P. Huntington, Huntington, *The Clash of Civilizations and the Remaking of World Order*, New York: Simon & Shuster, 1993. Cf. Compiled by Steve Muhlberger, Nipissing University for the *World History of Democracy* site, “Chronology of Modern Democracy. Five Different Views.” Originally posted December 8, 1999; updated March 16, 2000 and September 23, 2003

Cf. <http://www.nipissingu.ca/departement/history/muhlberger/histdem/chronpag.htm>

⁹⁴ European Graduate School: Jean Baudrillard. Reversion of History. Translated by Charles Dudas. *L'Illusion de la fin: ou La greve des evenements, Galilee: Paris, 1992.*

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Cf. Jean Baudrillard. French Theorist and Philosopher. From *The Illusion of the End*, 1992. See: <http://grids.jonmatttox.com/people/ baudrillard.html>;

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⁹⁵ Stuart Sims, *Derrida and the End of History*, Kallista: Totem Books, 1999.

⁹⁶ András Riedlmayer, “Erasing the Past: The Destruction of Libraries and Archives in Bosnia-Herzegovina,” *Middle East Studies Association Bulletin*, July 1995. See: <http://fp.arizona.edu/mesassoc/Bulletin/bosnia.htm>.

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See: <http://www.harvard-magazine.com/issues/nd96/right.biblio.html>

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¹⁰⁸ Cf. Republic of Lithuania - Lietuvos Respublika.

Content of data base: Banned literature and newspapers

Specific period: The first year of the Soviet occupation 15.6.1940-21.6.1941 of Lithuania.

Censoring body: GLAVIT (The Supreme Board of Publishing and Literature, Council of Ministers of the Lithuanian SSR). Cited by: Beacon for Freedom of Expression.

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¹¹⁴ E-Culture Net. See: www.eculturenet.org.

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¹¹⁶ The *Gesamt Katalog der Wiegendrucke* is headquartered in Rostock.