Connecting Scholarly Communities and Networked Resources. The Arts and Humanities Data Service and the Urgency of Collaborative Endeavour

By:

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I. Introduction.

The Arts and Humanities Data Service was established by the Joint Information Systems Committee of the UK’s Higher Education Funding Councils in 1995/6 to collect, catalogue, and preserve the electronic resources which result from humanities research, and to encourage their scholarly re-use. Though focusing on a well-defined set of electronic resources, the AHDS confronts a common range of collections development and management challenges. As a testbed of sorts, its strategies for meeting these challenges offer a number of salient, scaleable, and sobering lessons for digital resource curators. In particular they highlight the task of the curator as a genuinely “public” one; that is, one which demands extensive and creative interaction with communities of users, data creators, and a range of other information services. Strategies for collections development, cataloguing, and encouraging scholarly use will be set out after a brief look at the particular kinds of digital resources the AHDS has set out to collect and manage.

II. Digital research data.

The growing use of computers made by humanities scholars in their research has resulted in an outpouring of digital resources with significant secondary use value. Yet that value cannot be realised unless the resources themselves are systematically collected, preserved and their existence notified to the widest possible scholarly community. In some cases, the resources with which we are concerned take on their importance because they are the primary evidence upon which scholarship is based. Computer-generated simulations of historic and ancient monuments and artefacts, of architectural structures, of performance spaces, and of objects’ d’art, result from scholarly interpretation and creative impulses. Yet they are infrequently realised in a physical form or made accessible for consultation and re-use. In music, too, the computerised record can be the primary one, for example where analyses of the structure and composition of sound rely upon computer-generated “performance pieces”. Computerised records of archaeological excavations are also a kind of primary source. Developed in the course of “destroying” an archaeological site, they become a surrogate for the site itself; the only window onto something which no longer exists in its original or undisturbed form.

Another kind of “digital research data” results from the non-destructive manipulation and integration of documents and artefacts, yet take on all the characteristics of primary resources in their own right. Historical, linguistic, and lexicographical databases are all examples. They are developed as secondary resources which may be used to summarise, quantify, order, or selectively retrieve information that is found in manuscript or printed documents, or in spoken language. As primary resources, databases may be analysed to illuminate slightly different issues than those they were initially constructed to address, or combined with other like materials in more synthetic or comparative investigations. The combination in recent years of micro-samples from the US census has greatly enhanced our understanding of the social, economic, and demographic impact of the nation’s nineteenth-century industrial development. In the same way, combinations of linguistic corpora hold a key to a more comprehensive understanding of language, and perhaps to accurate and instantaneous machine-translation of spoken and written texts. Databases also frequently contain typologies which make generically useful reference tools. A computer-aided analysis of early modern economies, for example, may produce equivalence tables comparing an array of differently described
weights, measures, and values.iii In textual studies the incremental accretion of computer-
tractable texts developed over thirty or more years in aid of stylistic and content analysis,
has extended horizons for scholarly investigation.iv Yet these fruits can only be harvested
if the corpus of digital research and teaching products is maintained over time and made
accessible to scholarly users.

III. Collections development.

The AHDS’s collection is an extensively distributed one and in this respect shares much
in common with many other virtual collections. A substantial component resides in the
five Service Providers that have been established for history, textual studies, archaeology,
the visual arts, and the performing arts, respectively.v Each Service Provider is
responsible for collecting, cataloguing, and managing resources of relevance to the
academic communities that they serve and for encouraging their use within those
communities. This faculty-level model mirrors that of libraries which employ subject
librarians, and enables us to engage at each of our Service Providers appropriate
specialists who are able to relate with and thus identify and respond more effectively to
their communities’ information needs.

The collections which are maintained by our Service Providers will themselves
become distributed and include resources managed at others sites with which we have data
exchange and user access agreements, or which are accessible to AHDS users via
interoperating catalogues. This further level of distribution reflects a fundamental change
in the nature of computer-based research in the humanities as scholars take advantage of
the world-wide web and other means of electronic publication to “finish” and make more
widely accessible the resources which at one time were compiled solely for private
analytical use. It also reflects the proliferation of data and text archives, and of virtual
libraries, archives, and museum collections, and our sense that the academic communities
that we serve both demand and deserve more uniform (if not necessarily free) access to
the resources upon which their scholarship relies.vi

The successful management and integration of a highly distributed collection relies
heavily upon our adoption and declaration of certain standards.viii Technical standards
used to store information in machine-readable form (e.g. GIF and TIFF for image files,
ASCII for text) and including the formal languages which are used to represent the
syntactic and semantic features of a digital resource (e.g. SGML for electronic texts,
delimited ASCII files for alphanumeric databases) determine how resources may be
migrated through changing technological regimes and delivered to users who will want
access to them from a variety of different hardware and software platforms. Accordingly
they impinge upon our data management and preservation practices but also on the level
and nature of the service that we are able to offer our users. Data documentation
standards are also necessary for consistently recording information about resources’
format, provenance, contents, and the terms and conditions of their use.

Our approach to standards is both collaborative and permissive. It is collaborative
because the standards adopted by individual information providers need to be approved
by the widest possible community in order to achieve the level of data interchange and
access that we require. The lion’s share of the AHDS’s work on standards will therefore
be conducted in expert work groups which represent particular technical, media, and
disciplinary perspectives and which will, from those perspectives, evaluate, report upon,
and recommend relevant practices for the range of resources that comprise our collections.
The fruits of these labours will be reported to the community in our Service Providers
Handbook and Standards Reference Guidelines - a document which will also identify our
collection management practices and notify depositors, users, and collaborating resource managers about what they may expect from the AHDS and its collections.

Our approach to standards is permissive because we have no interest in excluding from our collections (or from our users’ purview) potentially valuable legacy and other resources which were created using obsolete or idiosyncratic practices. All resources must meet a number of minimum requirements (particularly with regard to the level and kind of documentation supplied with them). Above and beyond that, a series of “benchmarks” will notify users about the degree of conformance to AHDS standards (and thus functionality) they can expect from any single resource. We may, for example, recommend SGML encoded ASCII texts as our interchange format of choice for electronic texts, and state a preference for those electronic texts conforming to the Text Encoding Initiative’s guidelines for the use of SGML. These recommendations need not exclude from our collection electronic texts which are encoded with SGML but not TEI conformant or those which are encoded with an entirely different mark-up language altogether such as COCO. They will, instead, notify users about the level of service they can expect from the AHDS with regard to any particular electronic text in its collection. Thus, depositors and users may know that TEI-conformant texts will be fully and completely validated (in the sense that they may be parsed), and delivered to users in a variety of different formats or for use with very different application software. SGML-encoded texts which are not TEI conformant can be validated but there may be limits in the number and variety of formats into which they can be rendered before delivery to end users. COCO texts may exist within the collection though without any guarantee that they have been fully and comprehensively validated or that they can, for example, be translated into TeX before delivery to users. These benchmarks will also help AHDS Service Providers to prioritise what investment they make in validating and possibly enriching resources which they accession. Should the Oxford Text Archive acquire a LaTeX-encoded version of Melville’s *Moby Dick* and discover that it generates substantial user interest, it may be invest in improving the text’s serviceability for example, by rendering it into a TEI-conformant form.

We also include an educational element in our collections development strategy because we know that we will offer a far better service to our depositors and our users if the resources that we accession or gain access to are more rather than less conformant to the community-wide standards we adopt. Accordingly we seek to encourage good practice amongst scholarly data creators. AHDS-sponsored training days and workshops will play an important role, but not necessarily the primary one. To be effective, training in the use of standards needs to be widespread and preferably offered by those who provide front-line support for scholarly computer users. Our greatest energies in this area will therefore be invested in a publication series entitled *Guides to Good Practice*. These instructional documents will be written by and for subject specialists and for the university-based support and teaching staff which provide them with computer training and support. Some of the documents will be written by our Service Providers and provide guidance about how to create and document digital resources so they may be preserved and re-used. Here we envisage guides for the construction of historical database, electronic texts, linguistic corpora, archaeological GIS, computerised excavation records, and art historical image banks, for example. Other *Guides*, commissioned from active scholars, will provide guidance with regard to more specific applications (e.g. constructing historical databases from censuses or parish registers, full-text transcriptions of illuminated manuscripts) or methods (e.g. approaches to occupational coding, mechanisms for recording information about historic sites and monuments, or classifying digitised images of art historical objects).
Our collections development strategy also includes a promotional component to raise awareness of the scholarly investment that is involved in the creation of viable, well documented, and re-usable digital resources. The activity is vital. Humanities scholars are normally rewarded for their traditional published outputs. There is little incentive to consider and adopt those standards and good practices which will help ensure the long-term future and secondary use of the resources they create, or to deposit such resources with an appropriate archive. What we seek is a transformation in the professional reward structure so that deposit of a viable, re-usable, and well documented dataset reaches parity with publishing a scholarly article or monograph. Awareness is only an initial first step. A second one is likely to involve the establishment of mechanisms and criteria for the peer review of scholarly digital resources. The benchmarks which develop out of our collaborative efforts to identify community-wide standards may supply at least some of the necessary criteria. Their elaboration, and their adoption in peer review procedures relies upon a more substantial initiative and upon the good will and participation of professional associations and accrediting and funding bodies. Here we have had support from four funding agencies which are between responsible for a large and important component of the computer-based humanities research effort in UK universities. The Economic and Social Research Council, the British Academy (including its Humanities Research Board), The Leverhulme Trust, and the Wellcome Trust’s History of Medicine Programme either require or recommend that their grant-holders deposit any datasets they produce with an approved data archive. There are also encouraging signs from the UK’s Higher Education Funding Councils. Their quadrennial assessment of university departments’ research output (the so-called Research Assessment Exercise) allows scholars in many arts subjects to declare deposited datasets alongside more traditional printed publications, as evidence of their research activity. Still, there remains a great deal more to do.

The AHDS’s collection building efforts, then, are extensively and necessarily collaborative. They rely upon our adoption of various standards which must be identified through extensive consultation with appropriate expert communities if we are to achieve the level of interoperability and interchange that a distributed collection requires. They rely as well upon data creators’ adoption of standards and good practices and thus on an instructional initiative which is doubly collaborative: with experts capable of contributing to our Guides to Good Practice and with teachers and computer support staff who are in a better position than we are to offer methods training where scholars need it most - at their own institutions. We rely finally on our effective communication with those agencies - professional associations, funding agencies, even scholarly publishers - which may be in a position to help scholars gain the credit and reward that they deserve for producing and depositing high-quality digital resources.

IV. Cataloguing.

Providing uniform on-line access to information about our diverse holdings is a central aim of the AHDS. The problem that we face is one of integration and it exists on two levels. Firstly, our collections are extensively distributed across a range of sites which will have their own on-line catalogues. Secondly, resources are described according to very different practices according to their format (media type) and content. Thus our text archive is building a catalogue of records comprising a selected range of elements from the TEI header and encoded in SGML. Our history archive, on the other hand, already stores catalogue records in SQL database tables which include fields of information drawn from the standard historical study description. Our archaeologists intend a catalogue which will record information about its own very diverse holdings (including GIS, excavation databases, etc.) while interoperating with those on-line archaeological resources mounted
maintained by other agencies (e.g. National Monument Records or Sites and Monuments Records). As our visual arts and performing arts services develop, they will identify the description needs of the resources which they manage and use them to implement their own cataloguing solutions.

Our first aim, then, is to identify the most appropriate ways of describing the different kinds of resources which are held at or known to our Service Providers. Our second is to develop a general framework for data description within which we may position these rich and distinctive resource-specific descriptions. Our third is to identify the network protocols and technical systems with which we may implement that framework and enable interoperation among the Service Provider catalogues. Once more, our approach is necessarily collaborative and relies upon the participation of subject and media specialists at several levels. Resource specific data description practices will emerge from a series of expert workshops which will be hosted jointly with the UK Office for Library and Information Networking, and will assemble specialists who are knowledgeable about the standards used to describe resources within particular and well-defined domains (e.g. electronic texts and linguistic corpora, geospatial data, historical data, art historical image data, digital sound). Using the Dublin Core and the Warwick Framework as touchstones, the same work groups will be asked to identify a common element set which may enable them to integrate the very different data descriptions which are commonly used within their particular domains, and to report their findings to the particular communities that they represent. By integrating the core information requirements that are identified for particular domains, we aim to elaborate a core element set which may work as well across domains. With an integrated Users Information Requirements we may then proceed to design and implement a technical solution which will enable uniform access to information about our diverse holdings, launching this implementation phase with an international technical review meeting hosted jointly by the UK’s Joint Information Systems Committee of the Higher Education Funding Councils and the Conference for Networked Information.

Though it is early days, it is worth reflecting a moment about the functionality that we intend for our integrated catalogue. An example an Elizabethan scholar who is interested in the Bard, for example, will enter the AHDS catalogue and search for “Shakespeare, William B”. An initial query may return some very rudimentary information about the resources which are known to the underlying catalogues that are maintained by our Service Providers - an electronic text of Hamlet at the Oxford Text Archive, a computerised record of the Globe Theatre’s excavation at the Archaeology Data Service, a database of Shakespearean performances since 1800 at the History Data Service, and a series of computer-modelled Shakespearean set designs at the Performing Arts Data Service. The search and its results will be based upon the core descriptive elements which are common to all our resources, yet may not yet reveal sufficient information for the user to assess whether any of the resources that are identified are worth pursuing further. That richer level of description may be returned as the result of a more constrained second-order search, for example on information about the Globe Theatre site excavation.

Because the AHDS’s collection is extensively distributed and includes interdisciplinary and mixed media resources, our cataloguing problem is a microcosm of a well-known generic one. Further, we recognise that the scholars that we serve both demand and deserve more uniform access to information resources irrespective of where or how they are stored. For both of these reasons it has become essential to respond and relate to the various international resource discovery and retrieval initiatives that are currently underway in order to draw extensively on their promising work, and to offer our own cataloguing problem as a testbed for its further development.
V. Encouraging scholarly use.

Humanities scholars are for good reason slow to integrate digital resources into their teaching and research. With the exception of on-line library catalogues and a selected range of bibliographical and other reference tools, few digital resources provide information in enough depth or breadth to satisfy scholars’ curiosity and information needs; those that do, require a level of computational expertise which few possess. Amongst the more user friendly and so accessible resources, we may include on-line journals, computer-assisted learning packages and electronic books, as well as the mass of freely available information which may be found on the world-wide web. With on-line journals, commercial publishers have learned that humanities scholars will be coaxed on line when the electronic library offers the same critical mass of titles and back issues that are available on the shelves. The best computer-assisted learning resources and electronic books are applauded for their novelty value. They are criticised, however, when their relatively limited and constraining utility is compared with that of other more traditional and frequently less costly paper counterparts. The development and extension of the world-wide web has been a very mixed blessing. Resources proliferate yet their scholarly value is at best questionable and their discovery difficult. Far richer resources are available at text and data archives, but scholars uptake of them is severely constrained by their lack of computational know-how, and the absence in most universities of adequate front-line training and support in computer methods and use. xv

Our approach to encouraging use of our collections comprises four strands of activity: helping humanities scholars to articulate their digital information needs so that we can respond to them in our collections development and cataloguing activities; offering a range of in-house services to those interested in using our collections; providing instruction in the secondary use of digital research data; and enriching or building “special collections” around those datasets which are in high demand. The identification of scholar’s needs with regard to digital resources is notoriously difficult because it requires focused input from user communities which are not themselves necessarily able to appreciate the potential scholarly value and use of such resources or to understand the technical issues which impinge upon their form, content, and functionality. It is further complicated by the fact that our user community is a highly stratified one and that its members have very different needs depending upon the stratum or strata that they occupy within it. Needs differ by discipline and by standing within discipline (the needs of academic staff are different than those of students). And our user community includes the library and computing support staff to whom both scholars and students will naturally turn for help in finding and using digital information resources. Their needs too are distinctive and must be taken into account of in the development, documentation, and delivery of digital collections. xvii

To identify users’ needs, Service Providers will be sponsoring workshops in the subject areas for which they are responsible, and include in these workshops representatives from the various constituencies in those subject areas. Each workshop will also include a core of “experts” who have experience in encouraging the more effective integration of digital resources into teaching and research in the particular subject area under review. There is no shortage in the UK. The national Computers and Teaching Initiative sponsors subject centres which closely complement the subject orientations of the AHDS’s five Service Providers. xviii There are also numerous local (that is, university-based) initiatives operating either at a departmental level (e.g. where departments have specialist expertise in the application of relevant computer methods) or a cross-departmental one (e.g. the numerous humanities computing centres which have developed
in university arts faculties, libraries, and computing services). The workshops will help us
to identify what resources users require, how they would prefer to find those resources,
and the levels and kinds of support they require in order to incorporate those resources
into their own work. The categories bear directly upon our collections (what we
accession), our catalogue (its look, feel, and functionality), and our in-house user services.

In-house services will concentrate mainly on helping users to identify resources
which suit their needs, and to acquire those resources in a form which is suited to their
particular operating environment. Service Providers may also provide some guidance in
the interpretation and use of the documentation which is associated with any dataset.
More implementation-specific help, for example, in using a particular GIS package to
analyse an AHDS dataset, will inevitably have to come from other agencies, preferably
those which have greater proximity to our users and more awareness of their local
operating environments. Offering instruction in the effective use of secondary data in
teaching and research is one means of overcoming the inherent limitations on the level of
user support that a national service can provide. Thus, we aim to include in our Guides to
Good Practice series, documents which provide guidance in the secondary use of the
various kinds of digital resources that make up our collections.

Enriching or developing special collections around resources which are might be in
high demand are additional means of encouraging use. It involves the identification of such
resources and here we rely upon the information that we glean from our work in
identifying users’ needs, but also by looking for patterns in the enquiries we receive about
our holdings. Enrichment involves making an extant resource or set of resources more
accessible and may take several forms - enhancing the level of documentation that is
supplied with a particular resource, translating it into a more serviceable format, or
developing tools for its on-line exploitation. The development of special collections
entails an aggressive approach to accessioning, possibly involvement in data creation, and
aims to develop a critical mass of complementary materials which both attracts and
encourages use. In each of these four areas, our progress relies upon our extensive
consultation with user communities (so that we may identify and address their needs),
and with national, regional, and local (that is, university-based) agencies. Resource
enrichment and the development of special collections may rely upon additional
partnerships - with data creators and with information services which have an interest in
developing tools to support on-line data visualisation and analysis.

VI. Conclusion

In extensively networked digital environments the boundaries which hitherto defined well
established and complementary roles in the provision, curation, and use of scholarly
information resources have become substantially blurred. The obfuscation may be
explained partly with reference to the interdependent phases which constitute the life-
cycle of any digital resource. How a resource is created impinges upon whether and how
it may be brought in to any collection (either through acquisition or through some
reference in an on-line catalogue or network gateway), managed, and made available for re-
use. The act of creation is in this respect determinant, but not exclusively so. To be made
available for even some limited public consumption they must meet certain basic user
requirements. In this respect, users’ needs may govern how resource are created,
catalogued, and ultimately delivered, and they may do so in ways which are in conflict,
even incompatible with, the needs and interests of the resource creator. Nor should the
needs of the digital resource curator be overlooked. The formats and levels of
documentation that are required to preserve a digital resource over the longer term and
deliver it to different and differently interested parties, may not be those which are either convenient or even helpful to its creator or its intended users.\textsuperscript{xix}

Located centrally within this web of conflicting needs, digital resource curators must take on the role of brokering agents, endeavouring at once to reflect and influence the activities, decisions, and articulated needs of their data creating and data using clientele. In a world where the creation, description, collection, and use of digital resources are at best pluralistic activities and at worst anarchic ones, the digital resource curator relies more than others on the elaboration of a framework which will enable the most effortless migration of resources (and information about resources) across platforms and between communities. The development and adoption of community-wide information interchange standards will be a crucial building block. So will the development of tools which are capable of recognising and implementing such standards in the various acts of resource creation, discovery, delivery, and use. These objectives cannot be achieved by any one community operating in isolation - all have become interdependent in this digital age. They must be achieved through collaborative endeavour. Here digital resource curators may not take the leading role. They must, however, take a prominent one.

\textsuperscript{i} See our web pages, under construction at http://ahds.ac.uk/. Lou Burnard and Harold Short An Arts and Humanities Data Service: Report of a Feasibility Study (Oxford, November 1994). The report is available electronically via the URL ftp://ota.ox.ac.uk/pub/ota/AHD/report.ps (PostScript file); other versions will be found at the same location with file names report.tex (TeX source) and report.plain (ASCII text). Printed copies are available from the AHDS Executive (info@ahds.ac.uk), cf. Daniel Greenstein and Jennifer Trant, “The Arts and Humanities Data Service. Collecting digital research data; building a framework for digital resource preservation and interchange”. Ariadne (July/August, 1996) available at http://ukoln.bath.ac.uk/ariadne/


\textsuperscript{iv} cf. Ward E. Y. Elliott and Robert J. Valenza, “And then there were none: Winnowing the Shakespeare Claimants”, Computers and the Humanities (forthcoming, 1996). This work it represents on authorship could not have been undertaken had Elliott and Valenza been unable to avail themselves of electronic editions of Shakespearean texts which they collected from a variety of different sources.

\textsuperscript{v} The Services Providers are: The Archaeology Data Service, York University; The History Data Service, The Data Archive, Essex University; The Oxford Text Archive, Oxford University Computing Service; The Performing Arts Data Service, Glasgow University; The Visual Arts Data Service, The Surrey Institute of Art and Design. The Service’s Executive is located at King’s College London.

\textsuperscript{vi} The AHDS’s Archaeology Data Service (ADS), for example, aims to collect datasets produced by academic archaeologists in the course of their research. A significant component of the archaeological record, however, is collected and maintained by the Royal Commissions for the Ancient and Historical Monuments of England, Scotland, and Wales, respectively, and by consultants who work frequently under the auspices of county archaeological offices. Accordingly, for the archaeological community, more uniform access to extensive on-line information managed elsewhere is as important as the central deposit of archaeological research data. In its collections policy, therefore, the ADS’s aims to build collections of academic-produced archaeological data and to develop an on-line catalogue which will provide users more uniform access to its holdings and those of other collecting institutions.

\textsuperscript{vii} The Oxford Text Archive and the History Data Service - two AHDS Service Providers - already have made extensive contact and informal data exchange agreements with other text and data archives, respectively, and have thus gone some way toward the development of distributed collections. Other examples in the library world include the University of Virginia (http://www.viva.lib.va.us/) Princeton University (http://cethsun.princeton.edu/menu.html). Provision of uniform access to electronic resources has taken an interesting turn in both the UK and the US where initiatives are developing subject-based web gateways. See the Access to Network Resources projects which make up part of the Joint Information
Systems Committee’s Electronic Libraries Programme in the UK (http://ukoln.bath.ac.uk/elib/lists/anr.html) and the American Arts and Letters Network sponsored by the Coalition for Networked Information, the American Council of Learned Societies (http://www.aaln.org/).

The following typology is explained in David Bearman, “Item Level Control and Electronic Record Keeping” (paper given at the Society of American Archivists, San Diego, August 29, 1996), and in Greenstein and Trant, “The Arts and Humanities Data Service. Collecting digital research data”.


For UKOLN see http://ukoln.ac.uk/ For the joint initiative see Lorcan Dempsey, Daniel Greenstein, Jennifer Trant, “The Arts and Humanities Data Service (AHDS), The UK Office for Library and Information Networking (UKOLN). A co-ordinated strategy to identify shared metadata requirements” (September, 1996, obtainable from info@ahds.ac.uk).


The international review meeting is scheduled to take place in June 1997 as part of the second annual JISC/CNI conference. Information will be posted in due course on (http://www.cni./org/).

Until recently, these initiatives have focused on the interoperability and interchange of resources within particular domains. The various families of MARC records have enabled the development of integrated online public access catalogues. Similar standards have emerged for museum information (for example, from the Consortium for the Computer Interchange of Museum Information, - http://www.cni.org/pub/CIMI/www/part6.html), and for archival finding aids (for example, the Encoded Archival Description - http://sunsite.berekeley.edu/Finding Aids/EAD/eadmodel.html). The work on the Dublin Core and the Warwick Framework hold forth promise for information interchange across domains.

The AHDS’s Oxford Text archive has a substantial collection of electronic texts which bear upon the development of eighteenth-century enlightened republican thought. Its use in teaching and research requires extensive familiarity with methods of text processing and analysis which few humanities scholars possess. Our History Data Service has exceptional collections bearing on the changing structure and composition of nineteenth-century British society, yet most remain inaccessible to historians who have little or no knowledge of quantitative methods and multi-table databases.

This idea is developed in Daniel Greenstein, “Electronic Information and Historians: A Consumer’s-eye View” in Seamus Ross and Edward Higgs, eds., Electronic Information Resources and Historians: European Perspectives (Oxford, forthcoming).

See http://www.cti.ac.uk/