Die erdwissenschaftliche Fachliteratur der Aufklärung: ihr Zugriff und Erschließung durch EDV

Geological Literature of the Enlightenment: its Electronic Access and Exploration

Von

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mit 1 Abb. / with 1 Fig.

Schlüsselworte:

18. Jahrhundert
Aufklärung
EDV - Erschliessung
Erdbohrkunde (vor 1800)
Grossbritannien (London)
HAMILTON William (1730 - 1803)
HUTTON James (1726 - 1797)
Irland (Dublin)
Literaturerschließung
Neptunistenstreit
Österreich (Wien)
Technologietransfer
Vulkanismus

Zusammenfassung:

Das naturwissenschaftliche Erbe Europas und Nord-Amerikas unterzieht sich einer Revolution in Zugang und Auswertung von Altbeständen, wobei die Situation in den Geowissenschaften Teil einer breiteren Entwicklung ist. An dieser Stelle sichert die retrospektive bibliographische Erfassung in Form von On-line Datenbanken oder CD-ROM Fachbibliographien eine neuartige dokumentarische Basis fur den modernen Forscher. Seine Vorteile werden anhand mineralogischer Fachliteratur des englischen und deutschen Sprachbereiches vor 1800 nachgewiesen.

Abstract:

The heritage of the Natural Sciences in Europe and North America is undergoing a revolution in terms of new forms of access and exploration of pre-1914 printed sources;- a revolution in which the research situation for the Geosciences is simply part of a wider development. In this context the retrospective bibliographical control now offered in On-line or CD-ROM databases creates a new departure point for the modern researcher. The advantages are demonstrated in respect of English and German mineralogical reference literature of the late eighteenth century, the era of dispute between Vulcanists and Neptunists.

Professionals working in the Geosciences are far from alone in wishing to promote the cultural heritage of their discipline. Their counterparts in Faculties of Medicine or Science have long been convinced of the merits of such work. However, quite apart from fresh insights into modes of scientific discovery and communication, it must be noted that many long disregarded or neglected library holdings suddenly achieve new eminence, a new priority for those excecuting high quality research in the cultural legacy of their discipline.

By the mid-1990s such welcome scrutiny for the maps, reports, surveys and treatises of early geological research will be taking place within a transformed European library infrastructure. Some aspects of this structure are already very familiar to researchers from their mainstream concerns, for example the use of electronic retrieval systems, CD and online database products for relevant literature or abstracts. However, for the geologist focusing specifically on cultural and historical aspects of the discipline, it may come as a shock to discover that such electronic resources can assist in the identification and location of older - not just current - published materials.

This less familiar dimension of a new library infrastructure is one which we will now briefly explore, taking as a test case some key concerns of geologists working at the time of the Enlightenment. The era is one of the most significant for the discipline, insofar as it saw the work of James HUTTON (1726 - 1797) and his contemporaries; likewise, the emergence of much field evidence - and bitter debate - between the Vulcanists and Neptunists, those who perceived volcanic action, rather than oceanic erosion, as the crucial factor in the formation of the Earth. To trace the relevant literature of this debate in the mid-1990s, however, an investigator may now call on resources not previously available to earlier surveyors as we shall see.

1. 1. The Cultural Legacy of Library Automation

During the 1980s there has been a major effort to modernise and automate library catalogue provision, especially in the National and University Library sectors of Western Europe and North America. For many researchers, the facility of an Online Public Access Catalogue (OPAC) is part of normal searching and enquiry routines, whether directly in person in the Library, or at a site remote from it, thanks to a PC and a local or wide area network subscription e.g.via the WIssenschaftsNetz (WIN), or the Joint Academic Network (JANET) of the United Kingdom, or the Internet in North America. The further availability of OPAC library data in CD-Rom format will upgrade even more these levels of remote access to a particular Library's holdings.

While such catalogue conversion has mainly been associated with current or recent library holdings, the technology is perfectly adaptable for older printed materials;

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in principle from the first incunabula prior to 1501 through to the pamphlets or monographs of the nineteenth century. In Continental European Libraries one of the most noted examples of this adaptation is the OPAC facility of the Bavarian State Library at Munich. In the first instance it offers access to imprints dating from 1982; in the second, it makes available some 600,000 entries for the period 1501 - 1840. Thereby, a Central European scientific inheritance, i.e. from the work of AGRICOLA to that of HUMBOLDT, from DE LUC to GALITZIN, is at the disposition of the geoscientist for electronic browsing and structured enquiry. Prior to the late 1980s, such a researcher would have experienced difficulties, insofar as the fragility of the former manuscript catalogue pages and typescript slips for pre-1840 holdings simply did not allow for robust investigation by those who had made the journey to the Staatsbibliothek. How different is the situation now since September 1992, insofar as the BSB OPAC is fully available within the networked databases and utilities of the German Library Institute/ Deutsches BibliotheksInstitut based in Berlin, i.e. the Union Catalogue/Verbundkatalog of the DBI-Link (T. BRAUN, 1993,p.14).

In terms of scale the catalogue conversion at the State and University Library of Lower Saxony at Göttingen is comparable to that at Munich; by 1990 already some 400 000 of the 1 100 000 titles for the period 1501 - 1945 had been converted, although not yet integrated within the Verbundkatalog (F.-G. KALTWASSER, 1990, p.124). Insofar as the Göttingen Library is already a designated collection point for the literature of the Geosciences, the inheritor of some former GDR historic Institute materials in particular,[256] the full automation and networking of its catalogues after the mid-1990s should attract much critical attention from those tracing the development of the early geosciences. Thanks to long-term cooperation with the British Library at London, English language texts of the eighteenth century held at Göttingen are already available for remote access, courtesy of the on-line host, British Library Automated Information ServicE (BLAISE), as one of several retrospective on-line databases, namely, the Eighteenth-Century Short-Title Catalogue (ESTC). In the 1992 CD-Rom edition of this on-line file, a CD containing some 305,000 entries for the century, the Library at Göttingen holds copies for well over 12,200 of these. Such a heritage is a tribute to the systematic purchasing of books for the University by the Hanoverian legation in eighteenth century London (B. FABIAN, 1979, p.223). This English-language material, with its numerous texts of geological and mineralogical interest, has therefore been easily available for over a decade to the explorer of Göttingen's older printed books.

From the perspective of the Continental European researcher, however, it may be well be asked how did this anomaly arise, this privileged ease of access to a minority language group of publications within the Göttingen Library? The answer is found in the strength and continuity of the professional bibliographical tradition in the British Isles, from one generation of scholars and librarians to the next. For example, just over a century ago, Thomas Graves LAW of the prestigious Signet Library in Edinburgh was already debating on the need for a "*Co-operative Catalogue of English Literature up to 1640*", and on the wisdom of including entries from overseas (T.G. LAW, 1893, p.97) In the North American and British Library contexts, the question of catalogue conversion has always been closely linked with that of overall retrospective bibliographical control of the printed record for these countries. Clearly, due to their historic copyright status, the catalogues of the Bodleian Library, Cambridge University and the British Library itself in London would have enormous significance as a national biliographical record, if available as an online database.

Given the scale of such a task, some restrictions in focus and scale of coverage were essential. With the generous support of the American Society for Eighteenth-Century Studies, and the U.S. National Endowment for the Humanities, the decision was taken in June 1976 to explore the creation of an Eighteenth Century Short-Title Catalogue as an on-line database. (A similar venture for the Incunabula held in various British, American and European libraries rapidly followed suit.) Relevant material for the ESTC database comprised firstly those items printed in Britain and her dependencies and/or North America during 1701 - 1800 in any language, and secondly, those items printed in the English language anywhere else during the same period, as assembled from the title-page evidence and catalogue entries sent from over 1,000 contributing libraries worldwide. As just mentioned, the State and University Library at Göttingen featured among the earliest contributors to the project, while the University Library and Frankesche Stiftungen at Halle, and the Karl-Alexander Bibliothek at Eisenach are rather more recent recruits.

Thus for nearly two decades very substantial staff effort in Northern Germany, Britain, Ireland and North America has developed a new catalogue resource for geoscientists - and others - to explore. From the linguistic perspective, however, the ongoing automation of the majority non-English holdings at Göttingen and Munich does assume special importance. If the evolution of the geosciences as a whole is to be recognized, and past advances in various linguistic cultures to be fully acknowledged, it is essential that the pre-twentieth century published record be equally accessible, regardless of language difference. Thus the degree of library modernization in various countries has a direct influence on the accessibility, repute and familiarity of their authors' previous contribution to the discipline. On the one hand, the ESTC places at our disposition the world of James HUTTON (1726 - 1797); the importance of the latter's Theory of the Earth (1788) is unquestioned. However, if - using ESTC - we are to situate HUTTON's work in context some striking factors emerge, as illustrated in the following search results.

1. 2. HUTTON and his European contemporaries.

HUTTON does illustrate the issue of national versus worldwide reputation quite well, since -for earlier commentators- his work represented the founding of geological science per se, rather than just a seminal influence in

[256] e.g. the Library of the *Königlichen Preussischen Geologischen Landesanstalt und Bergakadenie zu Berlin*

English geological expertise. Certainly, if we consider the statistical milieu of the second, 1795 edition, of Theory of the Earth, as represented in the ESTC CD-Rom, the scale of foreign competition for HUTTON is quite restricted. As is evident from the diagram, non-Anglophone places of publication for all ESTC entries dating 1791 - 1800 comprise a mere 1.6% of the total (D. STOKER, 1993). Such imprint locations will serve mainly to highlight the further rayonnement of English language authors abroad. Thus the development of electronic catalogues, can- for those unaware of their parameters - reinforce certain preconceptions about the contribution of particular countries to a discipline. While convenient, such database resources - if used in isolation - do not necessarily demonstrate the historical reality of scientific exchange and communication, the use of journal, newspaper as well as monograph sources, - in a number of languages, if the need arose.

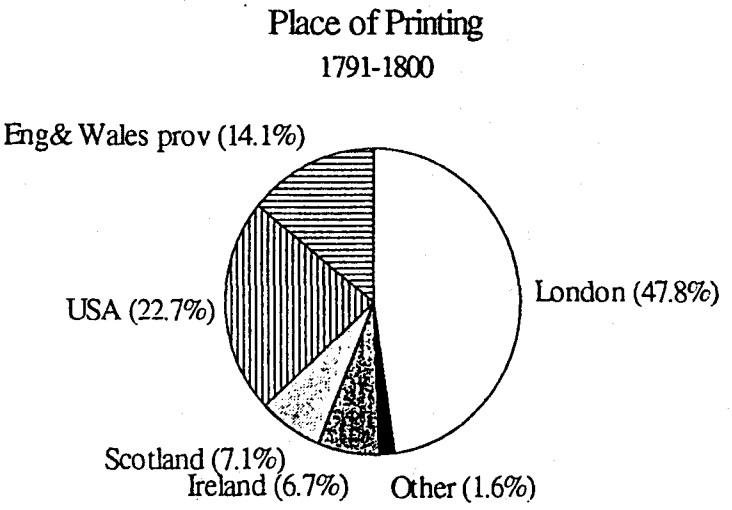

Fig. 1 Places of Printing for ESTC entries, 1791 - 1800. (Stoker, 1993)

1. 3. Observations on the formation of basalt, and sampling of ores, 1770 - 1790

With its particular emphasis and perspective, the ESTC is especially valuable for monitoring the United Kingdom circulation and even wider geographic adoption of non-Anglophone scientific work. It will certainly, for example, reveal the extent of translated texts in a given subject domain of the century, for instance, from French, German or Italian scientific authors into English. It can also on occasion show the circulation which a particular English language edition from London or Dublin enjoyed on the Continent.

Among the debates of HUTTON's era, that between the Vulcanist and Neptunist schools of thought was quite crucial. Simply to illustrate the retrieval capability of the ESTC in locating primary texts relevant to this polemic, let us utilize one or two key concepts as search terms, namely two crucial areas of geological evidence, "*volcanos*" and "*basalts*". Precisely to help in such a general enquiry for relevant entries, the ESTC provides the facility to search by keyword in title, imprint and notes, as well as by the more narrowly defined terms of specifically known author name, title, date, place, language and genre of publication. If - for the CD-Rom edition - we use the relevant search qualifier "*kwt*" (keyword in title), in association with the concepts *"basalt(e)s"* or *"volcano(e)s"*, there are five and nine such *"hits"* or Treffer respectively.

Sample entries are provided in the online detailed print - as distinct from *"browsing"* format - in order to demonstrate the full degree of assistance given to the researcher in this electronic union catalogue.

In relation to sample entry (a) we see the work of Sir William HAMILTON (1730 - 1803) whose *Observations on volcanos*, -like those of Rudolph Erich RASPE (1736 - 1794) - were among the few specifically identified by HUTTON in his use of geological evidence (DEAN, 1991, p.14). In the design of the entry, there are several points of interest; for example, the date of input in the IC or Information Code field, namely 8.12.1979, which underlines the years of cataloguing effort represented in the database. Details of collation in the copies of each title highlight the presence or absence of illustrations - and maps in particular. Shelf numbers are provided to allow for advance ordering of the item prior to actually visiting the Library in question. Through the verified location symbols (lbv) for British, overseas and North American Libraries, the intending researcher is no longer confined to London, thanks to the ubiquity of the printed catalogues of the British Museum or British Library. The location symbols integrate the relevant call or shelf number, thus at the Library of Leeds University, we are referred to the *"Geology Stack A-O.062 HAM"*; at Yale University (CTY) to *"Beinecke 1975 609"* or, in the case of the University of Texas at Austin (TXU) to *"QE 522"*. Had this particular edition of HAMILTON's Observations been microfilmed within the ESTC's parallel RPI project*, this would have been indicated, thus perhaps removing the need for an actual research visit in person.

Sample (b) demonstrates further utility. The fame of Sir William HAMILTON, British Ambassador to Naples, contrasts sharply with the obscurity of the Reverend William HAMILTON, an Anglican Clergyman in County Donegal, Ireland, who spent quite some time surveying the nearby Atlantic basalt cliffs of the Giant's Causeway in County Antrim. Systematic provision of epithets and/or dates of birth and death assists the researcher to differentiate between such namesakes, despite any uneven coverage of biographical directories in his or her own Library. HAMILTON's work on *"Basaltes"*, although obscure today, nonetheless did enjoy wide diffusion; the location indexes refer us not only to the most significant Irish National and University Libraries at Dublin, but also to Cambridge and again to the Beinecke collection at Yale.

Moreover, just as the *Observations on Mount Vesuvius, and Mount Aetna* were immediately (1773) translated into German, and published in Berlin, so too were these Letters on the Antrim coast. ESTC reveals a most interesting location or *Signatur* for the 1786 edition of HAMILTON's Letters, namely, Got 8: MIN.II, 4909. Could this have been the copy used by his German editor at Helmstedt, near Brunswick, Lorenz Florenz VON CRELL

(1744 - 1816), the founder of the *Chemische Annalen*, the first German Chemistry journal? While CRELL himself did not translate the text, he certainly oversaw its publication at Leipzig, as we see from the GV 1700 -1910 entry:

HAMILTON, Will., Briefe über d. nördl. Küste d.Graffschaft (sic) Antrim, &c. Aus d. Engl. v. F.Th. KÜHNE; nebst v. VELTHEIM's Abhandl. über Bildung des Basalts u. e. Vorrede von Lor. v. CRELL. gr.8, Leipz.787. Weygand.

Thus the retrieval capacity of ESTC can illuminate some of the more curious entries of traditional hard copy bibliographies, revealing once active lines of communication between scientists which have long since become eclipsed. In terms of critical attention, such authors are completely overshadowed by their more celebrated peers.

A final and even more eloquent link is seen in Sample (c), one of the responses to a keyword search, focusing on entries with the term *"mine$"* or *"minin$"* in the title, and Dublin as the place of publication. Excluding random noise, as in, for example, titles with the verb "*to undermine*", some exceptionally rare material comes to light, as sample (c) illustrates. The work is a translation of an edition originally published at Vienna in 1770, the *Beschreibung des vollkommen verbesserten und auf alle Fälle eingerichteten Bergbohrers*. In the treatise *Erdbohrkunde*, published at Prague, this Vienna edition by *"A. F. GAISS"* (sic) (=? Anton Ferdinand VON GEISSAU (1746 - 1809) was described by the bibliographer as one he had not managed to actually see; it was *"sehr selten"* (A. BEER, 1858, p.383). The only other copy noted so far for German libraries is that of the Deutsches Museum at Munich.

The milieu responsible for this case of mining technology transfer between Austria and Ireland is quite remarkable. The translator, William James MCNEVEN (1763 - 1841) graduated from the Faculty of Medicine at Vienna in 1783. Thanks to the protection of VAN SWIETEN, the private physician of MARIA THERESIA, his father, the exile Irish doctor, William MCNEVIN O'KELLY AB AGHRIM (sic) (1714 - 1787), was able to achieve numerous reforms in the medical curriculum at Prague University prior to 1784 (VON WURZBACH 1867). Through his subsequent membership of the Royal College of Physicians at London, MCNEVEN presumably came in contact with the Newman Street circle of Richard KIRWAN (1733 - 1812), the noted Irish chemist, and future Inspector of His Majesty's Mines in Ireland. Certainly the patriotic tones which are unmistakeable in the 1770 treatise would have appealed to the inclinations of both exiles:

Ich habe dieses bishero allezeit meine Hauptbeschäftigung seyn lassen, in Hoffnung dereinst vielleicht bey Bergwerken selbst angestellet zu werden, und als wahrer Patriot sodenn nach meinen geringen Vermögen den Nützen der allerhöchsten und verehrungswürdigsten Landesobrigkeit und meiner Mitbürger zu befördern.

(A.F. VON GEISS, 1770, p.VI)

Thus, as in the case of the Reverend William HAMILTON, lines of direct communication emerge between countries and milieux which appear quite astonishing, in no way deserving of obscurity. With the further expansion of the ESTC database, with the full automation of significant Continental library catalogues, we can expect even more surprises. Thus the cultural legacy of the geosciences, investigated and explored with the most modern techniques, promises to change and revise certain assumptions about the advance of the discipline. Such new insights can only be to the benefit of all concerned.

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