Robber barons of the information age

The political economy of academic publishing

Christopher Merrett

This article questions the current model of academic publishing, particularly the role of international publishers. It suggests that universities should recapture the process and take a determined stand on the issue of ownership of intellectual capital. The implications for indexers are briefly addressed.

Universities fund research in a variety of ways: for example, through providing libraries, laboratories, office space, computers, fax machines, phones and, of course, salaries. The output, intellectual capital, is in effect the product of an investment, much of it provided by the state in the form of subsidies. But a great deal of it is given away free of charge to profit-orientated commercial publishers, who also use the voluntary time of academics to review submissions and assess their potential, and to serve on editorial boards. Sometimes there are other volunteers in this process: patients in clinical trials and the respondents to questionnaires spring to mind. When published, this donated knowledge, to which editing and layout represent the only added value, is sold back to universities at enormous profit. Suffice it to say that no commercial enterprise would last five minutes using such a business model (Merrett, 2001). Commercial publishers pull off this confidence trick by understanding only too well the nature of the fissures and faults in academic life and the vulnerability this creates for universities.

Tertiary institutions have been slow to realize the implications of this situation. Until recently they thought themselves, somewhat quaintly, to be operating within a model of academic discourse that had its origins in the 19th century. This involved a convenient relationship between the university and the learned society, both of them fundamentally altruistic concerns. Academics wrote up research in the form of articles and handed these over for review by their peers and then publication by learned societies and university presses, which administered the process and made their journals available to libraries at reasonable cost. As John Sutherland (2002) points out in a perceptive recent review, the university was traditionally a guild in which ideas, information and knowledge were exchanged without reservation, although not always without acrimony of course. Sutherland plays cleverly and correctly on the concept of gift: academics gave lectures, for instance; knowledge was passed on freely to those who could recognize its importance; and graduates were admitted to a privileged circle. ‘That’, he says, ‘is what a university used to be. Hierarchical, orderly, generous.’

This model constituted a highly efficient, and indeed democratic, method of propagating information and knowledge. Given a good information retrieval system (and when well run, libraries are easy to use) any literate, informed person can learn how to use a library and find a volume of published research on a shelf. Indeed, a right-wing American commentator of the deluded early 1990s ‘end of history’ school maintained that libraries were the last bastion of the communist ethos, by which he meant that they had refused to treat information as a commodity and saw themselves as a resource belonging to the community. His insult was a compliment indeed. The collegial, altruistic model served universities well for many years before it was subverted by international publishing houses that realized that considerable sums of money could be made from academic publishing. It was a situation ripe for exploitation by the enterprising and the unscrupulous. The only surprise was that it took so long to materialize.

The Maxwell legacy

The key figure in this situation was Robert Maxwell, born Jan Ludvig Hoch in 1923 in Ruthenia, then part of Czechoslovakia. His early life is obscure but he was clearly a resourceful individual who fought for the Czech Legion in France in 1940; by 1945, in an extraordinary process of assimilation, he had become a British officer named Maxwell with a Military Cross won in Normandy. At the end of the war he discovered that most of his family had perished in the Holocaust. According to Tom Bower (1992: 80), ‘Maxwell believed in money’ and after the war he carefully studied the economics of selling encyclopaedias. He owned a then obscure publishing house called Pergamon and the key event in its history was the 1955 United Nations Geneva Conference on the Peaceful Use of Nuclear Energy. Maxwell knew next to nothing about science. But he quickly realized the commercial worth of conference papers, particularly those researched and written by European academics lacking publication opportunities, and he began to establish a series of journal titles with well-populated editorial boards. He complemented his business acumen by a shrewd understanding of academic vanity and promotion requirements. Having scooped the Geneva papers (including a contribution by Niels Bohr), Maxwell began to take over the publications of learned societies, such as the British Abstracts of Medical Sciences, and moved from conference to conference making contacts. Interestingly, he arranged with the Soviet Union at the height of the Cold War to translate
and publish scientific papers in the West, a mutually beneficial arrangement that suited Moscow’s political needs and Maxwell’s business interests, especially after the launch of Sputnik in 1957 put Soviet science on the map.

Pergamon increased its range of journal titles from 3 in 1951 to 400 by 1990, and even acquired a Latin motto. The scientific journal was the secret of Maxwell’s success and many of their titles began ‘The International Journal of...’. Maxwell provided academics ‘with kudos by publishing important but esoteric material which did not sell in large numbers’ (Cox, 2002: 276) or articles from unfashionable subdisciplines such as urban geography. As Bower (1992: 84) puts it: ‘Relentlessly, universities throughout the world were being offered an increasing range of journals which, because of the prestige of the editorial boards, their librarians were initially eager to buy.’ But as early as the 1960s there were complaints about unrealistically high subscription rates, a growing monopoly, and the duplication of published conference papers in journals (Biochemical Pharmacology was apparently one notorious example). Maxwell claimed that he made little out of academic publishing, but he was a master at exploiting the ambiguities and weaknesses in academic discourse, establishing a personal empire built on the ‘devoted and untried work of many scientists and educators’ (Davies, 1992: 28).

In 1972, the UK Department of Trade and Industry described Maxwell as ‘not a person who can be relied on to exercise proper stewardship of a publicly quoted company’ (Davies, 1992: 29) as he had been less than honest with his book-keeping. Maxwell parted company with Pergamon but later became a Labour MP (for Buckingham) and owner of the Mirror Group. He died at sea in 1991 after a career that can only be described as flamboyant: a banker for the KGB, a close associate of Yuri Andropov, and possibly a Mossad agent as well. After his death it was discovered that he and his sons had defrauded pension funds to the tune of £2 billion. Undoubtedly he was one of the most unlikely but important figures in the history of tertiary education and academic publishing. Maxwell was publishing newspapers, having acquired the International Publishing Corporation (IPC). From 1979 Elsevier started buying up other publishing companies, such as Bowker and Saur and then Holt, Rinehart and Winston, Harcourt, and Academic Press for sums in the billions of US dollars. The Reed–Elsevier merger took place in 1993 and the company is now quoted on the London, New York and Amsterdam stock exchanges. It portrays itself as philanthropic and environmentally friendly but the real agenda is contained in its key objective:

to be an indispensable source of information-driven services and solutions to its target customers, through the delivery of highly valued and demonstrably superior and flexible solutions, increasingly via the Internet.1

Reed Elsevier claims that 9 million scientists and researchers rely upon Science Direct, its online database, with 30 million abstracts linked to 10,000 titles as the ‘resource of choice’; and that LexisNexis, its Law equivalent, provides access to 3 billion documents from 32,000 sources. It uses terms like ‘product’, ‘leveraging’, ‘core businesses’, ‘targeted acquisitions’, ‘leading edge systems’, ‘niche markets’ and ‘strong brands’ – words and phrases with which toiling academics and librarians true to their calling and concerned with concepts like truth, precise use of the English language and academic freedom and responsibility, can have little identity. Richard Hoggart (1993: 283), now one of the grand old men of British cultural studies, condemns such business language as ‘a string of verbal jellied-eels, a confetti of anxiously up-to-the-minute clichés’, lightweight, dehumanizing, free of the burden of any values, meaning or principles. But this has not in any way inhibited profits. A more traditional firm is Taylor and Francis, an Anglo-American company founded in 1798 when it started publishing Philosophical Magazine, a pioneer scientific title.2 It provides an interesting contrast with Reed Elsevier but proves that excessive profit margins are not a feature of the large companies alone, as can be seen from Table 1.

The journals crisis

The political economy of commercial journal publishing so alarmed the British government that it initiated an investigation through the Office of Fair Trading (OFT). In cautious civil service language, its September 2002 report ‘The market for STM journals’ declares that the ‘market may not be working well’ and concludes that ‘commercial journal prices appear high, at the expense of education and research institutions’ (Office of Fair Trading, 2002). OFT made use of Bergstrom’s (2001) study of journals in his field of economics. The results were both fascinating and very alarming: that commercial publishers were charging 6 times

![Table 1 Turnover and profit of two leading academic publishers (£m)](image-url)

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<thead>
<tr>
<th>Publisher</th>
<th>1997</th>
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<tr>
<td><strong>Reed Elsevier</strong></td>
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<tr>
<td>Turnover</td>
<td>2987</td>
<td>3163</td>
<td>3390</td>
<td>3768</td>
<td>4560</td>
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<tr>
<td>Profit (£m)</td>
<td>812</td>
<td>813</td>
<td>792</td>
<td>793</td>
<td>990</td>
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<tr>
<td>Profit (%)</td>
<td>27.2</td>
<td>25.7</td>
<td>23.4</td>
<td>21.1</td>
<td>21.7</td>
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<tr>
<td><strong>Taylor and Francis</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Turnover</td>
<td>116</td>
<td>137</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit (£m)</td>
<td>19.9</td>
<td>22.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit (%)</td>
<td>17.5</td>
<td>16.3</td>
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as much per page as learned societies and up to 16 times as much per citation. Identifying 300 significant titles in his discipline, he calculated that if a library bought them all, it would spend 90 per cent of its budget on 40 per cent of the total pages. It is well known that ‘society journals are often the most rigorous, and the publishing companies exploit a niche for people wanting to publish material that hasn’t made it into the very best journals, but which is still of interest to their peers’ (S. Johnson, personal communication, 4 Dec. 2002). OFT’s cautious overall verdict was that commercial journal publishing exhibited ‘unusual features’. It remained stoically unimpressed by industry counter-claims of cross-subsidization and risk economics, pinpointing the root problem as the positional advantage derived by publishers from demand inelasticity: in other words, the relative insensitivity of demand to price. An effective monopoly has been founded upon the reluctance of academics and libraries to break ranks or act in concert. But although commercial publishers have done great damage to educational institutions, they are skating on very thin ice: donated labour can be taken elsewhere and all the publishers own is a title and a subscription list.

In libraries a much-discussed issue, and possibly the one that engenders the greatest conflict with academic colleagues, is known simply as the ‘journals crisis’. This is based on the awkward fact that in general the price of journals has been rising faster than inflation and therefore at a rate strongly out of kilter with the buying power of library budgets. The harsh facts are illustrated by American Research Libraries (ARL) data for the period 1986–2000 (Table 2), which show that journal subscription costs have fast outgrown budgets and both they and monograph prices have exceeded standard inflation. Even with the transfer of resources from elsewhere to shore up the journals collection, the number of titles purchased has declined steeply, although not as fast as the real losers, monograph acquisitions. An additional problem lies with inertia in the buying pattern that derives from the inherent nature of journal publication and factors that are both bibliographic and financial.

One of the monopolizing symptoms of current publishing practice is that of aggregation, a process by which a publisher sells electronic access for a very high price to an enormous bundle of text, abstracts and indexes – an all-or-nothing deal with a negotiable price. There are of course advantages in such systems: integrated, wider access is one, and it is easy to see how a particular research project might benefit over a relatively short time span. But for a library serving an average academic community over the long term the implications are potentially disastrous: dependence, loss of control over one’s collection and its shape (good libraries do not subscribe to a range of titles by sheer chance), lack of ownership and archival uncertainty, and a growing homogeneity in which each library basically offers the same fare. In general, electronic journals have brought greater liability than benefit to libraries with their technical instability; contorted, irrational and unstable licensing arrangements; archiving insufficiencies; and cataloguing problems, all of which have presented additional staff costs. The bottom line is that there is increasing pressure on libraries from commercial publishers to rent access to academic work on short-term leases. Conversely, there is a strong body of opinion in academia that will not compromise the idea that ‘research libraries have archival and preservation responsibilities’ (Kyrillidou and Young, 2002). These are becoming increasingly difficult to exercise and may become more so if recent behaviour by Reed Elsevier becomes standard practice. In 2002, 30 articles disappeared from Science Direct without explanation; and the company is believed to have played a part in the discontinuation by the US Department of Energy of a web-based indexing service that was sustained by federal funds.

The consequence of increasing monopolization and technological change in academic publishing has been to place a stranglehold on libraries. Cutbacks in acquisitions, particularly of journal titles, have been considerable. The antidotes – cooperative acquisition, inter-library lending and the creation of regional and national consortia – have been puny, an inverse Canute-like attempt to stem the outgoing tide. The issue here is not simply one of libraries. This is a university problem in the broadest sense and the answer will be found only in radical, collaborative action.

Challenging the status quo
For various reasons, universities have been slow to act either in their own interests or in unison, and so far the radical challenge to the status quo has come largely from individual academics and from independent initiatives. One of the best-known developments has been the Public Library of Science (PLOS),3 which has demanded ‘free and unrestricted access to the published record of scientific research’ through an archive of scientific and medical literature created from the deposit of papers six months after publication. PLOS motivated this using the analogy of a midwife delivering babies, arguing that revenue is made from the short-term publication process, not from an archival storage function, which in any case has its roots in public financing. The idea was supported by over 30,000 signatories from 182 countries. After a campaign lasting about a year, only two titles (Journal of Biology and Genome Biology) had capitulated, with 17 others offering a qualified compliance. Another 16 showed willingness, but only through their own websites. This was hardly enough to fulfil PLOS’s stirring call to the effect that ‘no single entity, whether a publisher or

Table 2. ARL survey of library material costs for North American libraries, 1986–2000

<table>
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<th>Category</th>
<th>Percentage change</th>
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<tr>
<td>Journal subscriptions</td>
<td>226</td>
</tr>
<tr>
<td>Journal expenditure</td>
<td>192</td>
</tr>
<tr>
<td>Monograph costs</td>
<td>66</td>
</tr>
<tr>
<td>Overall inflation</td>
<td>57</td>
</tr>
<tr>
<td>Monograph expenditure</td>
<td>48</td>
</tr>
<tr>
<td>Journals purchased</td>
<td>−7</td>
</tr>
<tr>
<td>Monographs purchased</td>
<td>−17</td>
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Source: Data from Case (2001).
a government, should have monopoly control over any portion of the scientific literature'.

PLOS failed, mainly because of reluctance on the part of academics to participate in a boycott of non-compliant titles. But it did engender debate, and it popularized ideas in the general consciousness that hitherto had been fragmentary and peripheral. The upshot has been a new strategy bringing together what is described as a ‘coalition of scientists’ to publish online public domain journals subject to peer review and the highest academic standards. Access will be unrestricted, limited simply by normal academic protocols. This is intended as a grassroots operation with a publication cost per article of $300, although a subsidy is available. Writers will retain copyright, but license their work to the public domain subject to proper attribution in a fashion analogous to open-source computer software. The idea of ‘unimpeded open distribution’ is based on the idea of a central database governed by one seamless search procedure, an integrated resource liberated from restrictive monopolies. One specific objective is to set up journals to provide competition for Nature and Science, and during 2002 PLOS received a $9-million grant for the launch of online journals to be known as PLoS Biology and PLoS Medicine.

A related development is the Budapest Open Access Initiative (BI), also committed to open access, the lowering of barriers, and competition. A novel concept of the BI is the archiving of pre-print work and updates, even if the final published work is not open-access. A similar, earlier initiative was the Scholarly Publishing and Academic Resources Coalition (SPARC), an ARL project that produces competitive, low-cost alternatives such as Organic Letters to challenge titles like the notoriously highly priced Tetrahedron Letters. Another project was based on dissatisfaction with Kluwer’s Evolutionary Ecology (EE) whose editorial board decamped en masse in 1999 to found Evolutionary Ecology Research (EER) under SPARC’s auspices. In 1998, EER’s costs were $80,000 but it earned over $250,000 in subscription revenue, yet another example of the derivation of exorbitant profit. In recent years its professional profile has declined. Interestingly, EER’s editors have made a strong plea to subscribers to buy both electronic and print versions as a package – for archival reasons (Rosenzweig, 1999).

**Intellectual property rights**

Whether or not these initiatives will succeed depends upon the development of a new, reformed economies of academic publishing. Even when the profits of multinationals, the dividends of their shareholders and the lavish lifestyles of their executives are taken out of the equation, together perhaps with administrative and operational costs such as subscription lists and paper, publication still incurs expenditure. Current thinking is tending towards the idea that the author pays. For those with research grants and other forms of subsidy there may be good reasons for looking at this: the final act of a research project is publication of its results and there is no reason why this should not be funded in the same way as a piece of scientific equipment or a large-scale survey. Where it fails, of course, is in the humanities, whose research tends to be more individualistic and less well funded. Proponents of the ‘author pays’ approach argue that foundations, governments, research and university bodies, endowments, funds freed by existing publications and writers’ organizations will fill the gap, but a suspicion lingers that writing on some unorthodox topics will simply not see the light of day.

The ultimate revolution in academic publishing would be for universities themselves to claim rights to the knowledge they produce and to find a means to disseminate it in an economical way that is compatible with academic freedom and the freedom of information. Indeed, they need to accept that this is their duty. SPARC has provided a model and practical support, already being implemented by universities in the USA, Britain and the Netherlands, in which institutions, or groups of institutions, set up online repositories representing their knowledge production (Crow, 2002). This could have two main beneficial effects: it would allow a university to set the conditions under which its intellectual capital was accessed by the rest of the world and reinforce freedom of information; and it would be a highly visible monument to institutional productivity, which at present is not always easy to identify. Recapturing control of its output means leaving publication to academics, librarians, indexers, university presses and administrators. The inputs are research, writing, review (coupled with what SPARC calls certification), editing, organization, description and archiving, all of them tasks within the competence of personnel already employed by tertiary institutions. The databases created would need to be inter-operable; that is to say, accessible by common search processes, a concept long familiar to librarians of course. An institutional archive of this nature would yield a great deal of information about how its intellectual capital is used – citation analysis is an obvious example – which should lead to the sort of fame, respect and promotion that academics derive from publication in prestigious journal titles.

Such a development involves coming to grips with the issue of ownership of intellectual capital. The Pelletier case in California provides some indicators of current legal thinking. Pelletier was a doctoral student working on the crystallization of a protein called pol. Beta, but researchers working for a commercial concern published their findings ahead of her. She sued on the grounds of theft of property, a set of data from her laboratory, by former colleagues. She won, although damages were reduced to a nominal $1 on appeal. This turned on its head the old assumption that facts originate in Nature, or some other supernatural entity, and are in the common domain waiting to be discovered. Copyright, patent and trademark law protect various types of creativity and originality, but not discoverable fact. The verdict reinforced a growing belief that many data are in reality artefactual and that discovery is a process involving creativity. To give an example, census data are not just a set of facts simply copied from the real world around us, but a model based on human agency and selectivity. In the words of McSherry (2001: 218), data are ‘constructed in social and political activity’. There is, therefore, an increasing tendency to blur the boundary between data (or information) and knowledge, together with acceptance of the fact that intel-
lectual capital has become proprietary. There are, of course, implicit threats to academic freedom in this situation but it gives the academy an opportunity to claim what is its by right, which is particularly important for Third World institutions. Universities must perhaps of necessity become knowledge owners as well as knowledge producers.

There are many dangers involved: the commodification of academic endeavour that would place a market value on everything produced by a university is clearly a situation to be avoided. True academics know that research has other dimensions but the use of intellectual capital as a commodity must continue to exercise the right and 'duty to discover and teach what they find important and true'. Otherwise, of course, there is the risk of the market-place running the university, a place in which the creation of a commodity called knowledge is governed by contractual rather than collegial ties, and teach what they find important and true'. Otherwise, of course, there is the risk of the market-place running the university, a place in which the creation of a commodity called knowledge is governed by contractual rather than collegial relationships. Universities would become investors banking on the possibility of future profits, pursuing not the truth but financial gain, and indistinguishable from any other commercial venture. Sutherland (2002) puts a humorous gloss on this, speculating about the 'twenty-five-year-old millionaires in the Computer Science department, parking their Lamborghinis alongside the dean's Ford Fiesta'.

Bernard Naylor (2002), former president of the Library Association, puts the problem in blunt and uncompromising terms when he talks about 'the greed of publishers . . . self-indulgence of scholars . . . indifference of learned societies . . . [and] the fleeting attention span of the senior administrators of academe' and concludes, 'we can't go on like this'. No, indeed, we cannot. There is a need to return to the essential verities of academic discourse and understand that this issue is not essentially one of print versus e-format, library budgets and exchange rates, but of ownership and the use of intellectual capital.

After 50 years, we need to lay the ghost of Maxwell and bury his malign legacy. The PLOS and Budapest initiatives are worthy and important and will provide competition, but universities need to claim rightful ownership of their property. The Pelletier case has enormous importance in terms of both promise and of danger. It suggests that both data and knowledge are proprietary, an alarming thought for the academy, but this is in fact nothing new. Eves have been closed to this fact since the 1950s by accepting short-term benefit from commercial interests at the expense of long-term liability. The Pelletier judgement undoubtedly contains hazards regarding academic freedom. But it also implies promise: universities as institutions can claim a right to their intellectual capital, protecting both their investment and civic and educational freedoms. A revolution is required and the good news seems to be that technology, legal opinion, economic survival and the struggle for academic autonomy are all pointing in the same positive direction.

**Indexing implications**

What would such massive change in academic publishing mean for indexers? The points that follow are by their very nature speculative, but are offered as a starting point for discussion.

1. Indexers would work for universities and other research institutions as opposed to commercial publishers. Such integration with the academic world could be of benefit to the indexing profession.

2. Publishing initiatives, whether managed by individual institutions or collectives, would by their very nature be started *ab initio*, presenting an excellent opportunity to show how online databases should be organized and made accessible – by way of contrast to the chaos of the World Wide Web (WWW). While it is clear that the linear order represented by a library’s print collection cannot be replicated, a system akin to the librarian’s ‘mark and park’ approach would be vital as an antidote to the frustratingly fleeting visibility of many online documents.

3. There would be a sharpening of the debate about the relative merits of pre- and post-coordinate indexing. It is clear from current experience of retrieval from the WWW that the use of equally weighted, unqualified free-language descriptors devoid of context or hierarchy is extremely inefficient and uneconomic. Retrieval from an online database such as that proposed above will depend on classification and a controlled thesaurus, although the necessary extent and nature of this is open to debate. The need to balance recall and precision suggests a structured thesaurus.

4. Once again the closely related natures of indexing and classification are likely to be evident, together with the artificial barriers that are sometimes created between them, perhaps bringing closer together librarians and indexers in a mutually beneficial, and academically creative, partnership. This suggests that while some of the fundamentals of indexing policy and practice might need to be challenged and re-examined, it would be an excellent opportunity to establish a position for the profession not only in a machine-readable world but also in one unshackled from rapacious profiteering and more in tune with the civil right to freedom of information.

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**Villainous record**

Captain Wragge, in Wilkie Collins's novel, *No name* (1862) is a villain, a swindler. He scrupulously records his fraudulent transactions in 'five or six plump little books, bound in commercial calf and vellum and each fitted comfortably with its own little lock ... “Day Book, Ledger, Book of Districts, Book of Letters, Book of Remarks, and so on”'. Arrived in York, seeking whom he may plunder, he claims:


Hazel K. Bell, Hatfield
Also-greats

Hazel K. Bell

I ended my article in the last *Indexer* issue on ‘The greatest and the worst indexes’ (these being assessed entirely by praise or scorn that had been expressed in *The Indexer*) by asking for comments, votes and further suggestions on those selections. I have received two letters suggesting other contenders for the ‘greatest’ category.

Peter Rooney, whose original idea the list was, advocates *Dialogues of Plato* translated by Benjamin Jowett, first published by Macmillan in 1892, then by Oxford in 1920, and Random House in 1937. The last-mentioned edition has 1618 pages, of which the index occupies 116. The style is run-on; subentries are arranged in order of essay as printed in the two-volume translation. The page references appear as D, and E from top to bottom.

Rooney supplies an example (without page references):

Writing
- the art of, taught in schools (Protagoras)
- invented by Theuth (Phaedrus)
- injurious to the memory; (ibid)
- written compositions apt to be unintelligible; require the aid of dialectic;
- ought to have a serious purpose; inferior to the thoughts and aspirations of the soul;
- the ‘writing of our minds’ (Philebus)

The passages in *Phaedrus* recite the common claim of the ancients that the invention of writing has led to the deterioration of people’s memories and their power of thought: Homer’s epics were originally recited from memory. Likewise, Socrates never wrote any essays; they were recorded or invented by Plato. The Chinese are said to reject indexes for another reason.

Another correspondent points out that Hans Wellisch’s own extensive index to his book *The conversion of scripts – its nature, history, and utilization* (Wiley, 1978; xviii, 509 pp) has name indexes in Cyrillic, Greek, Hebrew, Arabic, Korean, Chinese and Japanese, in addition to the Roman (or Romanized) names included in the general index of names and subjects. For this index, Wellisch received the first H. W. Wilson Indexing Award, in 1979, with the citation: ‘the index was specially commended for its clarity, precision, and appropriateness in both its intellectual content and its typographic form.’

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Notes
1. Reed Elsevier’s website may be found at www.reed Elsevier.com
2. Taylor and Francis’ website may be found at www.tandf.co.uk
3. Public Library of Science’s website may be found at www.publibyofscience.org
4. American Research Library’s website may be found at www.arl.org
5. For an overview see Marcella and Newton (1994).

References

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