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Book reviews

Book reviews – and introducing science and its literature

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The first two books to be reviewed are about science and the third is about information technology. The end-product of the work of many scientists is publication. Intensive studies have been made of the behaviour of scientists; two names come to mind in this field – Derek de Solla Price and Robert K. Merton.

Price, an Englishman who took care to maintain his English accent, came to Yale University, where he was appointed professor of the History of Science in 1959, via Cambridge University and Raffles College, Singapore. His best known book is perhaps *Little Science Big Science* [10]. In it he showed that the number of scientific journals has doubled every 15 years since 1750, reaching a total of about 30,000 by 1963. Price also pointed out that "80 to 90 per cent of all the scientists that have ever lived are alive now" and that at the end of a scientist's career "only 10 to 20 per cent of scientific work will antedate his experience".

Robert Merton's stature may be assessed from papers published on the occasion of his Fetschrift [3]. Merton, an American professor at Columbia University, is considered to be "the founding father of the sociology of science" [2]. His career is described by Garfield [4]. His book *On the Shoulders of the Giants* [9] very well known. In the Fetschrift book, A.L. Stinchcombe says about Merton's description of choices with institutional consequences: "When scientists, for example, choose early publication as a method of claiming rights in a finding, rather than choosing secrecy, the high rate of early publication has the consequence of supporting the communism of science, supporting equal access of all scientists to past achievements regardless of intellectual property."

Publication plays an important part in two of the books to be reviewed below. In the "Feuds" book, Hal Hellman, the author, suggests that disputes about scientific discoveries may have been a factor which contributed to the development of the modern scientific paper. Such a paper is one that "(a) is refereed or evaluated by the author's peers before it can be published and (b) includes explicit clear references to what has been accomplished previously as away of clearly delineating what the author is actually contributing." Robert Merton noted that 72% of simultaneous discoveries were followed by disputes in the seventeenth century, but that they had declined to 33% in the first half of the twentieth.

One of Hellman's feuds is called "Wegener versus everybody: Continental Drift." Wegener wrote a book in 1912 entitled *The Origins of Continents and Oceans*. The fourth edition, published in 1929 contained a number of additions. The third edition (1922), published in several languages, attracted considerable attention. One reviewer wondered whether geology can still be considered a science if it is "possible for a theory such as this to run wild". Another called the book "a fairy tale". Wegener's

work became the foundation of Plate Tectonics as I discovered when Plate Tectonics happened to be the subject of a search completed when I first became interested in citation indexes. His book is still being cited dozens of times in 1998.

In another part of "Feuds" Hellman describes the famous encounter between Charles Darwin and Wilberforce, Bishop of Oxford. Hellman says that science historians generally agree that Darwin was not aware of Mendel's hybridisation experiments with pea plants, carried out six years before Darwin wrote *The Descent of Man* – but thereby hangs a tale.

I carried out another search back in the seventies to find out more about the so-called re-discovery of Mendel's results. Gregor Mendel carefully recorded the number of different types that were produced by crossing different strains of peas. The different types were produced in numbers that occurred in the ratio 3 : 1. From these results laws of inheritance were formulated based on the way that chromosomes and so parental genetic factors are combined. Darwin, allegedly without knowing about Mendel's results, developed his ideas about the survival of the fittest arising from two factors – the most successful combinations of genes and gene mutations.

Mendel reported his results to a meeting of the local society at Brunn. They were duly published in the society's Proceedings [8]. The Proceedings were taken by 120 libraries, of which 11 were in the United States. However Mendel's article was "ignored" and genetics as a science was born following its "discovery" 34 years later by De Vries, Correns, and Von Tschermak independently in 1900. Mendel's paper was translated by William Bateson into English and controversy followed.

It is understandable that Mendel's article in German in the Proceedings of a local society in a small German town appeared to be ignored. In fact it was not ignored, since it was cited a number of times between 1866 and 1900 without its importance being recognised. According to Gustafsson [6] the citations came from professor Hoffman (1869), A. Blomberg (1872), the Russian scientist I.F. Shmalhausen in 1874 and W.O. Focke in 1881. Mendel's' work was mentioned in an article about hybridism in the ninth edition of *Encyclopedia Britannica* (1881), and even this did not bring about its recognition.

It is hardly possible to discuss the second book – by John Maddox – in a book reviews section with the sub-title "science and its literature" – without also mentioning the magazine *Nature*. Maddox – Sir John Maddox since 1994 – was its editor from 1966 to 1973 and from 1980 to 1995. In an article about this magazine, Garfield [5] quotes from New Scientist: "It is difficult to make an exhaustive list of his achievements. . . as editor, so radically did the magazine improve". Garfield also thinks that: "*Nature* is much more international in its coverage than *Science*." *Science* fulfills a similar function to *Nature* in the United States. As at 1983, 85% of *Nature's* circulation was outside the UK.

Great Feuds in Science, Hal Hellman, John Wiley, New York and Chichester, 1998, 240 pp., £16, ISBN 0 471 16980 3.

In the Introduction to his book, Hellman emphasises that scientists are not just desiccated calculating machines. He says "I want to show that scientists are susceptible to human emotions; that they are influenced by pride, greed, jealousy, and ambition, as well as religious and national feelings; that they are subject to the same frustrations, blindness, and petty emotions as the rest of us. As a result, this is a history of the losers as well as the winners."

One of the most publicised examples showing scientists as they really are and the role of a formal paper in establishing discovery priority is described by Watson [11]. Watson and Crick's discovery of the double helix structure was one of the most important discoveries of modern times. In the final stages of research, Watson made sure that the single page paper by himself and Crick describing the discovery

was delivered immediately to the offices of *Nature* and was immediately published. The authors wanted to ensure that they were not beaten to the post by the publication of similar research which they knew was being conducted elsewhere. Short as it was, the paper included what may become its most important conclusion: "it has not escaped our notice that our proposed structure readily suggests a mechanism of inheritance". The earlier research from the nineteen forties onwards which led to the discovery has been described by Lederberg [7].

Returning to the book, ten disputes are covered in it, but I can only mention a few of them here. The first discussed is probably the most celebrated. It was between Pope Urban VIII and Galileo Galilei: "This feud was the start of the still existing schism between science and religion. . . If any single event can be said to have created an enmity between science and religion, the trial and the resulting sentence was it." The heliocentric (sun-centred) proposals made by Copernicus, published as he was dying a century before, was "a long-winded academic treatise in Latin that few read or cared about which could be safely ignored by the Catholic Church. But Galileo's *Dialogue*, was: clever, lively, and eminently readable. . . an overnight hit that the church could not ignore."

Indeed it was not ignored. The Pope was furious. In 1633 at Galileo's trial: "under threat of torture, imprisonment, and even burning at the stake, he was forced to his knees. . . to renounce his belief. . . that the earth moves round the sun." He was "placed under house arrest for the rest of his life. . . a public funeral was not allowed and his remains were quietly hidden away. . ."

Hellman says that: ". . . the Catholic Church is still suffering the effects of that fateful drama and is still trying to sweeten the bad taste that many people sense in their mouth when the trial is mentioned." It seems extraordinary that Pope John Paul ordered an acquittal in 1980. If a bad taste really did remain 300 years after the affair, did this acquittal do anything to remove it?

Hellman describes the Newton/Leibnitz feud as "clash of titans. . . both men were genuises". Their clash was about The Calculus. It seems that Newton discovered it first but did not publish it until 40 years later, while Leibnitz was second although he waited only nine years to publish! Contrast this behaviour with that of Watson and Crick as described earlier.

The feud about who first discovered the calculus was strongly influenced by the personalities of the protagonists. According to Hellman "Newton's name had become a household word so in spite of his extraordinary brilliance it is possible to think of him as a normal being. Leibnitz, however, remains a curiousity. . . in spite of the many controversies in which he was entangled, it does not appear as if he had been really victorious in any one of them."

Remarks about dirty tricks were made during this feud. Newton's followers "persisted in believing. . . that their hero had been robbed." Some of Newton's unpublished papers were shown to Leibnitz when he visited London in 1676. However "modern scholars. . . are convinced that Leibnitz did not actually build his discovery on these items." Both men were members of the Royal Society and they traded insults via that organisation which was hardly impartial. Its committee "consisted, with one exception, entirely of Newton's partisans."

Several other feuds are well known including the famous controversy at a packed meeting of the British Association for the Advancement of Science in 1860 at which Bishop Samuel Wilberforce, called "Soapy Sam" by his Oxford students, attacked Charles Darwin who was unable to attend because he was ill.

Concluding the review of this fascinating book by discussing "Derek Freeman versus Margaret Mead", Mead was a national American hero – "a guru to vast number of young people during the turbulent 1960s" – says Hellman. Mead demolished the eugenics idea – proposed by Francis Galton in 1883 – to improve mankind by selective breeding, later to be adopted by Hitler. Mead did some research on young Samoans perceived as a gentle, peaceful people free from jealousy and condoning free love. She believed that

"nurture" would be shown to win over "nature". Samoans, nurtured in idyllic surroundings, could be contrasted with the pain of adolescent Americans where the "strain is so great that frequent downfall is inevitable". Mead's book *Coming of Age in Samoa* "was probably the most widely read anthropology book ever published".

In 1983 an Australian professor, Derek Freeman, who had also studied life in Samoa, wrote a book which was published by the highly respected Harvard University Press rebutting Mead's findings. Mead had died in 1978. Freeman was quoted as saying: "There isn't another example of such wholesale self-deception in the history of the behavioural sciences". The furore which this caused continues to this day. Pros, cons, and motivations are described by Hellman.

This book is entertaining and easy to read for the non-scientist. The blurb on the dust cover says: "In each engaging story, Hellman offers fresh insights into the very human drama of the real process of scientific discovery" – and that just about sums it up.

What Remains to be Discovered, John Maddox, Macmillan, 1998, 434 pp., £20, IBSN 0 333 65008 5.

Can we no longer live with the knowledge that we are ignorant of many things?
The self-esteem of homo sapiens is hardly dented by electronic simulators.

The first quotation above from this book indicates how much remains to be discovered. The second, from "The Thinking Machines" chapter, hints at its extraordinary scope. As it says on the dust cover, having occupied a commanding view of scientific discovery as editor of *Nature* for 22 years, he (Maddox) "proves with unrivalled authority that the big questions are waiting to be answered". This book, as suggested by the reputation of its author, will be less appealing to the general public that "Feuds". Quoting again from the dust cover: "The scientific community has waited with much anticipation for it".

The reason why the book is for the scientific community is that many of the topics are not presented like science is presented on television – as if our span of attention is limited to a few minutes. The book needs your undivided attention – particularly when specialised subjects such as Chaos Theory are discussed. However many parts of it – such as the chapter about "The Genome and its faults", dealing with subjects like "The Human Genome Project", are totally absorbing. Since I am not a scientist I am unable to provide a critical review. I will therefore describe a few of the items in each section which I found new (in other words most of it!) and interesting. People in the information business who read this book will, I am sure, find it just as interesting as I did.

The book describes research currently in progress, the reason for doing it and what may be discovered. Following an introductory chapter it is divided into four parts: "Matter", "Life", "Our World" and "Conclusion". "Matter" deals with things like the big bang, particle physics, and space/time, "Life" with the age of the earth and life upon it, genomes, and eugenics and "Our World" with the brain, neural networks, and climate. In "Conclusion" some of the particularly difficult questions requiring an answer are discussed. Numerous notes and references and a good index are included.

I had not appreciated that particle physics research, having passed through a phase of very expensive international competition, is now mainly concentrated in the outcome of experiments undertaken with the large hadron collider at CERN in Geneva. Having sub-divided quarks into up, down, and strange quarks, the pressing requirement is to find out more about the Higgs field whose physical meaning is recondite – that is requiring special knowledge – says Maddox. "The value of the strength of the field is supposed to be zero even in empty space. Is that nonsense? Not necessarily say the theorists." I am glad to know that what to me is self-evident nonsense makes sense to the recondite gentlemen of CERN. I will leave them to it.

I can understand the more direct benefits which could come from genome research described within the "Life" section. The importance of the Watson and Crick discovery of a structure in the shape of a double helix (mentioned above) now becomes evident. Genes are chemical structures linked together to form DNA molecules which occur in the strands of the double helix present in the chromosomes of every cell. A genome is the sequence of genes which form the genetic code specifying all the information flowing from one generation to the next. The Human Genome Project is an international effort to identify the functions of about 100,000 genes. Doing something with this information once you have got it is another matter. Maddox says: "Suppose a certain sequence of 12 nucleotide (chemical structures) bases is particularly significant. . . Finding every occurrence of this sequence in the human genome with a 100 MHz processor and a disk capable of storing the 3000 million items of information in the whole genome would take 10 minutes of high speed computation." One of the many outcomes of this research could be the development of means to attack tumour cells once their genetic identity has been identified.

The section in "Our World" part of the book called "Avoidance of Calamity" provides some excellent information to set against "The end of the world is nigh" type of popular science fiction. This section is all about ineffective antibiotics, being struck by comets, sea level changes, El Nino, global warming, etc. Because I am rapidly running out of space I choose "dodging planetary missiles" as being the selected subject with which to end this review. Apparently 130 impact craters have been found on earth so far including the Arizona crater formed 50,000 years ago creating an explposion equivalent to a 40 megaton nuclear weapon. However the Chicxulub crater in Mexico, caused by a meteorite which arrived 64 million years ago was about 10 km in diameter. It might have been responsible for a world-wide dust pall killing vegetation and species of dinosaurs. It is comforting to know that none of the large or small objects with known orbits "is thought likely to hit the Earth in the next few centuries." Less comforting is the fact that "objects perhaps only a kilometre in size with an explosive power equivalent to a million times the power of the Hiroshima atomic bomb are necessarily less completely catalogued."

Residential Broadband, George Abe, Macmillan Technical Publishing, Indianapolis, 1997, 500 pp., £51, ISBN 1 57870 020 5.

George Abe works at Cisco – a major force in telecommunications systems. He has used his experience to very good effect. This is one of those rare down to earth books which brings together in one place all that inter-related information which you can never find in one place. It is expensive but well worth the price. Its short introduction makes a good start: "On July 11, 1997, a startup company by the name of @home went public on Wall Street. @home is a system integrator providing data services over cable networks. Stock was offered at $10.50 per share and rose to $25.00 during its first day of trading. By the end of the first few weeks, its market capitalization was established at over $2 billion. Not bad for a 2 year old company with cumulative losses of $50 million and fewer than 10.000 customers." Such is the current interest, perhaps frenzy, of product developments and investment surrounding a new product area called *residential broadband*.

What is going on here? Who, besides the backers of @home, are cashing in, and who is missing out? What are the issues? Residential broadband is a tremendously diverse subject, embracing high technology, government regulation in the public interest, and entertainment production values. Residential broadband is the meeting ground for consumer electronics, the Internet, telecommunications, cable television, satellites, politics, and the film industry. How could there not be huge public and professional interest?

"Frenzy" and "huge interest" are the right words for George Abe's subject. His book is well-rounded. All the forces influencing its progress are gathered together – instead of technology, politics, markets, etc., being scattered about separately as they usually are.

"Residential broadband" means that the network delivering data into homes needs to be broadband enough to be able to transport data at a rate of at least 2 Megabits per second (Mbps). The market is enormous. Abe says that there are 909 million TV households in the world and 280 million TVs in the US. Worldwide PC sales in 1989 were expected to be 97 million in total. Viewing hours in the US per year per household are about 4.37.

A driving reason from the viewpoint of the industry is VOD – Video On Demand – meaning, in the main, *movies* on demand. This subject was discussed by Cawkell [1]. The conclusions reached about a superhighway with VOD as a major ingredient were:

"Since about 1990, considerable research and customer trial of interactive TV services have taken place. The hype accompanying supposed information superhighway prospects have been replaced by the realities of providing services which will meet a demand at a price which encourages mass use.

It is assumed that entertainment services will lead, followed by information services, together justifying system investment. Little is said about scaled-up forecasting based on small-scale trials and although the costs of the technology will decrease further, unless a large organisation is prepared to shoulder the risk and make a large investment, progress will be slow.

Much more needs to be known about the technical solutions required before networked movies can be introduced. The research work being done, mainly at universities may provide some solutions."

I now believe that the "solutions" mentioned in the last paragraph are quite a long way off – so does Abe. He writes: "VOD can be a popular consumer service. It can be expensive to deliver, however, and high costs have service providers looking for alternatives." He then goes on to discuss "nVOD". (Near Video On Demand): "With nVOD the service provider elects to offer a particular movie beginning at certain intervals, say every 15 minutes, on a small number of channels – say four", but "In our example 24 channels would be needed to show only six movies." At the end of a 75-page Chapter 1 "Market Drivers", the author says "Residential Broadband is attracting top-flight talent in entertainment and engineering". In the following chapters he examines "the engineering challenges and technical foundations". However he does more than that. For example, comments about regulatory issues – an important political matter – are scattered throughout the book.

If this enthusiastic review motivates you to obtain a copy you may have some difficulties – at least in Europe. It may be a good idea to phone Macmillan Technical Publishing (remotely related to the *Nature* Macmillan) at 201 West 103rd St., Indianapolis to find out how to get it.

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Indexing and Abstracting in Theory and Practice, F.W. Lancaster, 2nd edn, Graduate School of Library and Information Science, University of Illinois Press, Champaign, IL, 1998, 412 pp. ISBN 0 87845 102 1.

The first edition of Lancaster's text on indexing and abstracting quickly gained respect as an important tool when it was published in 1991. This update carries on the tradition, but it is not all that one might wish it to be. While text and references have been updated throughout, new chapters written, and the content of others changed dramatically, the imprint of the first edition is still visible, despite the changes that have taken place in the field in the past seven years.

The preface states that the book is designed primarily for teaching indexing and abstracting, but that it is also intended to be useful to managers of information services and other individuals who are concerned with content analysis. The true scope would be better stated as "indexing and abstracting for databases", because back of book indexing, except for a few short passages, is almost completely excluded. Back of book indexing is an important part of the field of indexing, and its existence and validity should be acknowledged, even if it declared to be out of scope.

The first 12 chapters of the book have not been changed significantly except for updating. These are the chapters which cover the basics of indexing and abstracting. New chapters on indexing of multimedia sources, and on indexing and the Internet have been added. The chapters on text searching, automatic methods, and the future of indexing and abstracting have been extensively revised and rewritten; the first of these has been retitled as well.

The exercises remain the same as in the first edition, except that the current edition of the *UNBIS Thesaurus* is used. A strong point of the exercises is that the author works each one, and states his reasoning at length, making it clear that these is no one "right" answer for indexing. The appendixes on abstracting principles and on modular content analysis also remain. While the glossary has been dropped, the one in the first edition was very brief, so it will not particularly be missed. A new appendix by James Lufkin, "The fatal abstract: A tutorial farce in one act" has been added.

One of the strong points of all of the author's writings is his emphasis on evaluation and quality of indexing systems, and this book is no exception. An interesting update in this edition is his description in the chapter on quality of indexing of the method he developed for evaluating the quality of Medline indexing by comparing the work of the indexers against a standard. The description provides both guidance for evaluation of indexing and clear evidence of just how difficult it is to control variables so that the evaluation will be valid – that it will measure what it purports to measure.

He also makes a point that this reviewer has rarely seen: that comparisons of full text and controlled vocabulary search generally suffer from an unacknowledged limitation: they do not control for the length of the record. Since the length of the record has a major impact on retrievability, the failure of most researchers to acknowledge this impact casts doubt on the value of their results.

Throughout the book, the author refers to the literature critically, indicating where he disagrees with an author and why. This critical analysis is one of the strong points of the book, assisting readers in evaluating claims and proposals made in the literature.

While the book has been updated in general, and the references are current, the author seems to have been biased by the framework of the first edition; too much of it remains in the basic chapters (1–12). Most of Chapter 4, on precoordinate indexes, is primarily of historical interest. While the author connects his comments with current practice, the detailed discussion of types of indexes is of more interest from an historical point of view. There is a discussion and an appendix on "modular content analysis" in abstracting which dates to the 1960s; the structured abstracts found especially in medicine (and in the ANSI/NISO standard for abstracts) today are different, and the amount of space given to the historical matter is out of balance.

A striking example of the imbalance between history and current developments and practice occurs in the chapter on "Enhancing the indexing", which gives four pages to the Western Reserve semantic code system of the 1950s before stating that this system was "too ingenious for the intended application", and too expensive and complicated to apply.

In contrast, just under two pages are given to subheadings in the same chapter, using Index Medicus as an example. Here it is stated (p. 188) that false associations are less of a problem than 30–40 years ago "because a higher level of precoordination exists in most systems". It is hard to see how this claim could be made if the full range of systems, including those of such organizations as H.W. Wilson, Engineering Information, the Department of Energy, and the Library of Congress are considered. All of these, and numerous others, were using precoordinated subheadings or articulated strings at the time referred to. The level of precoordination today may even be lower, as some organizations have switched away from subheadings or articulated strings to single terms designed for postcoordination. The author's statement makes sense only if it is interpreted as limited to precoordination of words into adjectival phrases or similar constructions, excluding precoordination of phrases themselves, but this is not what was said.

A text designed for introductory courses in abstracting and indexing should give some attention to professional matters, but the American Society of Indexers (and other national societies) are not even mentioned, nor are publications such as *The Indexer*, the journal of the (British) Society of Indexers and a number of affiliated societies, including ASI; or *Key Words*, the newsletter of ASI.

The chapters on principles and practice of indexing have a significant gap in that the use of strictly controlled vocabularies is assumed. There is no recognition of the fact that in many systems uncontrolled terms are used as a supplement to the controlled vocabulary in an attempt to gain the advantages of both controlled terms and free text. The use of uncontrolled keywords in conjunction with controlled vocabulary is mentioned in the chapter on text searching, but the chapters on how indexing is done make no mention of this possibility, producing an unbalanced view of the way in which indexing is actually performed in many organizations.

The discussion of machine-aided indexing (MAI) using automatically provided candidate terms is located in the chapter on automatic methods, giving a misleading impression. While it is true that the primary difference between this form of MAI and automatic indexing lies primarily in whether a human is in the loop or not, the level of machine aids is really a continuum, and this should have been acknowledged in the chapter on the practice of indexing. The use of MAI is increasing today, and in most of the systems where human involvement in indexing survives at all, it seems highly likely that MAI will become a fact of life.

The chapter on indexing multimedia sources is a valuable new addition. Not surprisingly, given the state of the art, there are more questions than answers, and developers of multimedia indexes will need to refer to specialized sources. Nonetheless, the chapter provides a good introduction.

Throughout the earlier chapters of the book, the author gives a balanced treatment of the relative value of controlled vocabulary indexing and natural language searching. However, in the chapter on text

searching he seems to take a different position. For instance, Figure 104 (p. 132) compares the pros and cons of natural languages and controlled vocabulary. This chart indicates that free text is usually more specific, improving precision, while the diverse ways of representing concepts make high recall difficult in broad "conceptual" searches. What is not acknowledged here is that recall can also be lowered in searches on narrow topics if there are multiple ways of stating the topic. The chart also does not acknowledge the synergistic potential of using both full text and controlled indexing.

As another example, there is a discussion of hybrid systems which takes as its example case a system consisting of three elements: a small vocabulary of about 300 broad subject codes, codes for geographic areas, and key terms selected from the titles or texts of documents. The author gives the appearance of believing that such a system would be a good compromise between a full-fledged vocabulary and no controlled vocabulary at all, but the examples of benefits are all in disambiguation, e.g., the different meanings of "strike". There is no hint here that such a hybrid system offers no real assistance with issues of synonymy or the implicit occurrence of concepts.

There are other limitations to the chapter on text searching. While a full treatment of this topic is out of scope in a book on indexing and abstracting, the chapter is almost completely confined to reports of research studies. It fails to give a sense of the present-day importance of text retrieval software and its level of sophistication. Presenting a general picture of the state of commercial implementations would be of more value to the audience for this book than reporting on research studies, and it would not go out of date any sooner.

The chapter on automatic indexing, abstracting, and related procedures does a good job with indexing and abstracting, acknowledging the limitations of the current art, but also indicating its potential value.

The chapter on indexing and the Internet gives a good, if brief, analysis of search engines, intelligent agents, and hypermedia, but hardly discusses indexing per se at all. For instance, the human indexed directory services such as Yahoo! or OCLC's Intercat project are not mentioned. Even though the author justifiably tried to stay away from discussing particular services, the existence of this kind of effort should be acknowledged. He might well have had some pithy comments to make about the viability of such efforts.

The closing chapter on the future of indexing and abstracting is very unsatisfying. This would have been the place to pull together the disparate threads of conventional indexing and abstracting, text analysis, automatic indexing, and so on into an analysis of where we actually stand today, with the author's best judgment of where we may go in the near future. Instead, the chapter is devoted to a discussion of digital libraries, which are not considered elsewhere in the book. If the author believes the future of indexing and abstracting lies in the digital library concept, we should have had evidence of this before the closing chapter.

The index to a book on indexing and abstracting ideally should serve as a model of indexing; at the very least it should be serviceable and cover the major bases. The index to the first edition was criticized by reviewers, and the index to this edition is not much better. For instance, access to initialisms and full versions of names is inadequate. There are two entries under "Educational Resources Information Center", and two entries plus a see also reference under "ERIC", but the entries are different. There are no cross references from such initialisms as "NASA" and "NISO" to the full form of the names, where the entries are located. Conceptual indexing is also insufficient: for instance, there is a discussion of indexing with broad terms or codes on pp. 244–245 to which a user might wish to refer, but there is no access from terms such as "broad".

And I have one significant quibble with the author's judgment of what was worth referencing. He excludes the construction and properties of controlled vocabularies on the ground that this topic is treated

in detail elsewhere. He offers two references on the subject, but omits the bible of present-day thesaurus developers, Aitchison et al.'s *Thesaurus Construction and Use: A Practical Manual*, while including a work that, while worthy, was published in 1974, has been long out of print, and, due to its complexity, is of more use to theoreticians than to developers of operational thesauri.

The author has undertaken a very difficult task in today's environment, that of providing an introduction to abstracting and indexing while also giving basic coverage to the closely related topics involved in text searching and the Internet. He has not been completely successful, but he has produced a text that will be very useful both to students and to information managers, as long as it is used with careful attention to its limitations.

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