

Book Reviews

The Impact of Information on Society: An Examination of Its Nature, Value and Usage. Michael W. Hill. New Providence, NJ: Bowker Saur; 1999: 292 pp. Price: \$70.00. (ISBN 1-85739-124-1.)

This text meets the author's dual objectives of defining information and its role in society as well as pulling together various strands of information theory. Ranging from language and culture discussions, to observations on the changing role of information professionals in corporate settings, to information privacy issues, this text provides a broad introduction to the study of information. While Hill's overview text definitely has a UK perspective, it is still useful as a survey text here in the US.

Author Michael Hill is a chemist by training, but an information professional by practice, and has been honored as such by Aslib [The (UK) Association for Information Management], and FID (The International Federation for Information and Documentation). Hill cofounded the European Council of Information Associations. A sampling of his books includes: *Michael Hill on Science, Invention and Information* (1988), *National Information Policies and Strategies: An Overview and Bibliographic Survey* (1994), and *Patent Documentation* (1979; a revision of a German publication).

Hill moves from the general to the more specific (while remaining on an overview level throughout) in the structure of this book. As he notes, ". . . my training as a chemist. . . has led me to structure the book into first the equivalent of 'preps and props' followed by 'applications'" (p. x). He succinctly states the *raison d'être* for this text in Chapter 1: "Perhaps the most important change that has occurred in the last 50 years is that there is now a perception or realization that information *per se* is something to be collected, stored, managed and exploited. It has become a resource" (p. 2). The book dives into epistemological discussions in Chapter 2 on the nature of information and knowledge, concentrates on ethics in three full chapters in the middle, and concludes with a discussion of information in the near future.

The text is a bit abbreviation-heavy, especially in the author's use of abbreviations that are more common in Britain than in the US. While Hill does typically define his abbreviations at first use (e.g., "ICTs" for information and communication technologies), he uses them throughout the text without subsequent explanations.

The author makes a number of British references that are not explained. The meaning of such sentences is never entirely lost on an American reader, but explanations would be useful. For example, at the beginning of Chapter 2 (p. 10), Hill quotes the Warden of All Souls, with no mention that All Souls is one of the colleges of Oxford University. In Chapter 15, to illustrate the reality that when seeking an opinion, one asks a person perceived as knowledgeable on that subject, Hill says, "Lord Emsworth sought his pig keeper's views on pigs but not on any other topic" (p. 281). This reviewer happens to be married to a P.G. Wodehouse fan, and thus knew Hill was referring to a character in the Blandings stories, but many in the States, and perhaps even in England, would not understand this unexplained reference!

Throughout the text, Hill offers a variety of definitions of information, his own and others, including this succinct definition by two mid-century Bell Laboratory researchers, Shannon and Weaver: "their. . . definition of information [is] that which reduces uncertainty" (p. 13). Another short but apt definition cited is that of Blumenthal, an early management information systems writer, who ". . . deemed information to be the link between knowledge and observed phenomena" (p. 17).

Blumenthal's definition illustrates an interesting point that Hill makes first in the introduction, and returns to later in the text. Since the 1950s, the quantity of information from first-hand observation has increased dramatically (p. 7), as more people have traveled further from home and reported upon what they have observed. This aspect of the information explosion is not often noted.

As a physics librarian, this reviewer is delighted to note that the author also makes a number of references to, and quotes, physicists, especially when discussing types of scientific knowledge in the epistemological chapter (Chapter 2). In addition to quoting or citing Sir Isaac Newton and Stephen Hawking, Hill is clearly a fan of the late great theorist Richard Feynman, citing him at least three times, particularly when discussing science information literacy.

Indeed, this text includes a great number of quotes from all sorts of people, but especially from others in the broadly defined information field. This is appropriate for an overview text. For example, Hill quotes extensively from MIT's Steven Pinker, author of *The Language Instinct* (1995); Hill quotes from this text quite a bit), and the recent best-selling *How The Mind Works* (1999). Hill's quotes and discussions throughout this text can serve as a good introduction to Pinker's work. Oddly, he quotes Sartre from a source that he cannot remember, and thus does not cite, saying, ". . . a comment of Sartre's which I jotted down many years ago and have lost the reference" (p. 31)!

In his defense of scientific information as enhancing knowledge and thus experience, Hill says ". . . knowing that so prosaic an event as sunlight falling on raindrops can produce the splendour of a rainbow adds to rather than subtracts from one's sense of awe" (p. 34). This statement summarizes the theme and starting point of the most recent work by the UK biologist and inventor of the concept of the "meme," Richard Dawkins' *Unweaving the Rainbow: Science, Delusion, and the Appetite for Wonder* (1998).

Hill's scientific information theme is further explored in Chapter 3, which discusses the quality and reliability of information. He notes that those less than scientifically literate frequently make that "error . . . to which we are all prone, namely equating association with causation" (p. 49). He succinctly discusses the differences in reliability of peer-reviewed journals vs. Internet postings. Unfortunately, Hill rather calls into question his own reliability in this chapter, when he relays a tale of Benjamin Franklin writing to a London newspaper editor to complain about British lack of information on America, as indicated by the paper's report on whales leaping up Niagara Falls. Hill then says, "I trust all other statements by US Presidents are equally correct" (p. 48). Perhaps Hill was speaking in jest, and realizes Franklin was never President, but it is not clear!

Hill's chapters on comprehending and communicating cover cognition, language, and subjects in between, even touching on cadence or pace of speech. Intriguingly, he maintains in this

section that “. . . it is vital that we should always be building up our vocabulary if the full meaning and significance of information is to be communicated in all circumstances” (p. 64). Hill reiterates a classical point, popularized by Marshall McLuhan, but worth restating: “The physical medium and the nature and purpose of the communication affect the way information is expressed” (p. 81). He illustrates this point when stating his belief that “Probably the greatest impact on the way information is communicated on the Internet has been brought about by computer graphics” (p. 89). It is in the communication chapter that Hill touches on physics again (p. 90), noting how the Web has allowed for the creation of e-print archives (the most famous of which is XXX-LANL at the Los Alamos National Laboratory; however, Hill does not name any specific sites).

Hill’s chapter on aspects of information, knowledge, and document management (Chapter 6) may be especially interesting to librarians, as he discusses types of libraries, and trends in each area, especially that of the downsizing of corporate libraries, or the reworking of them into different information services. In this chapter, he also touches on knowledge management, noting the buzzword aspect of this term: “. . . it seems that the term is simply being used as a synonym for information management to make it sound more posh” (p. 98). But, he notes that knowledge management when it involves “being aware of the level of expertise and know-how which resides in members of staff and outside contacts and trying to make best use of it” (p. 98) is a worthy venture.

The two chapters on information ethics cover expectations, rights, duties, and responsibilities. Hill cites a variety of documents that guarantee some level of information rights, including the United Nations Declaration of Human Rights, the U.S. Constitution, and the European Convention on Human Rights. He notes that there are also forces countering the rights of individuals to access information, including a capitalist approach (ability to pay, p. 111) and our global society in which “increasing levels of anti-social and self-seeking behaviour are the norm” (p. 113). His discussion of the US Communications Decency Act is accurate and up-to-date (p. 127). The most readable portion of this ethics section is Hill’s discussion of rules and principles, which he bases on the UK Committee on Standards in Public Life (p. 134). These encompass: duty to client, trust, use of sources, acknowledgment of sources, use of all sources possible, maintaining integrity in records, integrity itself, honesty in dealings, and disclosure, accidental or deliberate.

The chapters on society, economics, and education are very much surveys, and perhaps would function better toward the beginning of the text, rather than their placement near the end. They seemed less interesting, due to the broadness of their scope.

In the final chapter—“The Information Society: Are We Now Part of It and Where Is It Heading?”—Hill notes as others have done that Western society has moved from an industrial to a service economy. He is not quite sure we are in an information economy yet, however, and thus disagrees with other information futurists such as Stan Davis, author of *Blur: The Speed of Change in the Connected Economy* (1998), who sees Western society as currently with one foot in the service economy, another in the first half of the information or computer economy (as noted in his June 8, 1998 keynote address to the Special Libraries Association conference, Indianapolis, IN).

Hill closes this overview text with a few glimpses into the crystal ball, predicting that:

It will not be long before enthusiasm for information this and information that falls out of favour, becomes unfashionable, and we shall be able to return to treating it. . . as part of the furniture of life (p. 282); and “. . . the present trend towards trivializing everything will end abruptly. . . the realization that issues must be looked at in depth will become general” (p. 283).

Hoping Professor Hill is correct on this last point, I will close this review by recommending his text as a decent overview, as long as one does not mind the periodic Briticisms.

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Reference

Davis, S. (1998). *Blur: The speed of change in the connected economy*. Reading, MA: Perseus Books.

The Weightless World: Strategies for Managing the Digital Economy. Diane Coyle. Cambridge, MA: MIT Press; 1998: 242 pp. Price: \$25.00. (ISBN 0-262-03259-7.)

Open the economics journal of your choice these days and you will undoubtedly find articles asking questions such as “Is inflation dead?”, “Has the traditional business cycle been permanently altered?”, and “Are we in a ‘New Economy?’”. The combination of dizzying technological innovations and an unusually long period of economic growth without inflation has raised questions about the relationship between these two elements. Is the world economy undergoing a fundamental structural transformation because of the changes in technology? Maybe we are overstating the connection between them because they happen to be occurring at the same time. Can we expect this type of economic progress to continue into the future?

There are many books out there attempting to explain a new world that has resulted from information technologies and their merging with economics and business. Add to this list of authors Diane Coyle, who explores these issues in her first book, *The Weightless World*. As the economics writer for the British newspaper *The Independent*, she has thought a great deal about where the world economy seems to be going and has some strong and useful opinions about what we should be doing. Fortunately, Coyle is not only a good thinker but also a good writer and, in spite of a near relentless pushing of the term “weightlessness,” has created an informative and readable book. Drawing background from a wide variety of disciplines, she is able to move beyond simplistic visions of hope and offer a substantive vision of the future.

Coyle starts with an interesting fact: a birthday card that when opened sings “Happy Birthday” has more computer power within it than existed on the whole planet in 1945, and the card weighs around a gram (p. 1). For Coyle, this astonishing fact signifies a shift toward a new type of economy where size has nothing to do with value. Since the 1950s, cars have become both smaller and lighter, yet at the same time more sophisticated through additional features such as power windows and doors, even on-board navigational systems. Similarly, computers were still weighed when imported into London in 1985, but as they became smaller and at the same time more powerful, their weight ceased to matter and the practice eventually ceased. We have moved into a new era with different criteria for value, but its actual meaning remains elusive.

Coyle struggles a little to define weightlessness, even while she sees it everywhere. “The key is dematerialization” (p. xii), she says. Other examples of weightlessness include objects that have

"infinite expansibility", which means that "the use of a dematerialized object by one person does not prevent another from using it" (p. 3). Coyle gives the example of the word processing program she is using. The example works well for information technology, but not necessarily for other services or products. Without a more secure definition, even though the book is well written and well argued, there seems to be something missing at its core. The shift that is a part of her essential assumption seems to have occurred, most notably, in the shift from manufacturing to service sectors and the growing dependence on digital technology; we just have not quite built the language to identify it very precisely.

Once the reader overlooks the sticky question of what weightlessness may or may not be, Coyle does a great job making her case. Her enthusiasm for her subject is clear and carries over to the reader. She states at the outset that outdated methods of compiling statistics of economic measurement and an overhyping of the benefits of technological change before these benefits have securely taken effect make her case more difficult. This is a great starting point, since our methods for compiling economic statistical data are in need of an overhaul. In the United States, for example, our recent shift from using the Standard Industrial Classification (SIC) codes to using the North American Industrial Classification System (NAICS) is a move toward improving this situation.

She still maintains a great faith in what the future of information technology can bring about in terms of our relationships to each other and to structures of work and government. Politically, Coyle positions herself firmly within the "third way" approach of Bill Clinton and Tony Blair. She is fiercely pro free trade, generally pro business, against too much government intervention (which she believes has already made the situation worse), and wants a shift back to local control. Yet, at the same time, she consistently remains concerned with what happens to those at the bottom of the socioeconomic ladder and looks for solutions that minimize damage to this group, while seeming suspicious of a totally free market approach to solving problems.

Much of the insecurity people feel during our time of tremendous change is brought on by a shift toward an empowerment of the individual that has occurred while many of our institutions have continued functioning as though this shift had not happened. Workers are becoming more like "free agents," and employers as well as governments will benefit when they get out of the way, let this shift develop, stop fearing technological change, and start reexamining these relationships. Coyle tends to speak with the inevitability of a Hegelian synthesis, as though there is no way to hold back what she sees coming. The only thing we can do is let it. If we don't, we will distort or pervert this inevitable movement to the detriment of us all.

What is happening is the development of a "third sector," a people-oriented service sector. Again, there is a little bit of difficulty defining what she means. She states that one of the lessons of economic history is that the most productive areas of an economy destroy jobs, opening up the least productive areas to create work (p. 64). In our era, this emerging sector will be made of two parts: specialized personal services, from "child minders and nurses to aromatherapists and aerobics teachers" (p. 64); and organizations such as nonprofits, charities, think tanks, lobby groups, and the like. Neither of these kinds of groups produces objects of weight, and each of these sectors will grow tremendously and continue to alter the current state of work. According to Coyle, the resulting change in the employer-worker relationship is what needs to happen anyway, namely increased flexibility that adopts options such as contracting, part-time work, and telecommuting. These new policies will help people cope with the change toward free agency (p. 118). Stepping back a little bit, Coyle suggests that this will also

change the way the government administers its safety net. It can't guarantee jobs and income, but governments can reduce the costs of uncertainty by changing the regulatory and social security safety net by allowing, among other options, a guarantee of "job training for someone who is unemployed for more than a short period" (p. 120).

Coyle examines her ideas with a special look at welfare. The welfare policies currently in place in the United States and Europe are designed for a world that increasingly does not exist, in which one either worked a full-time permanent job or didn't work at all. Today's welfare policy ultimately needs to function more like individual insurance policies, with guarantees of training because "financial and social risks people face have changed along with the technological foundations of our economies" (p. 164). She also floats ideas such as a guaranteed job to someone who has been unemployed for more than a year (p. 138), and recommends that we spend more on education.

Globalization and an increased emphasis on individuality as a result of technological change have changed both what a government is and what money is. Coyle argues that because increased free trade is inevitable, one of the next major challenges will be crafting the international agreements that are the underpinnings of the trade activity. This will be especially difficult given that another result of recent technological advances is a lessening of the importance of international boundaries. Industrialized countries will need to maintain more open boundaries to allow a freer flow of immigrants to follow capital.

Another large theme in the book is the realignment of political power back to local entities. This theme occurs in many places, but especially in Chapter 9, where Coyle argues that the emerging changes will mean the renaissance of cities. Since concentration naturally occurs in an economy by increasing the economies of scale and lowering transportation costs, eventually "city government will be more important than national government" (p. 209). I hope this is true, but it may be more feasible in good economic times and the reverse as problems arise. Another possibility is that there is always an overseeing organization that may feel the need to "step in" and show its constituents that it can solve the problem. There has been some talk in this country of a "devolution to the states," but it has so far been mostly rhetoric with little in actual practice. Similarly, larger bodies will need to be around to settle disputes. What happens when two powerful sides disagree on a city issue and one side is not happy with the solution put in place by city management? The losing side appeals to the State or Federal government. This keeps the larger body powerful and will be very difficult to remove. We can already see the reemergence of the "nation state" in some of the issues surrounding the Kosovo conflict. There is still hope that smaller entities will be able to build new networks at a local level in opposition, but they will need to try to get them in place soon.

One of the best parts of the book is Coyle's style. She is very opinionated, and though she will give a both a good argument and a less convincing one for her assertions sometimes on the same page, she is always interesting. She quotes an unusually wide range of thinkers such as Laurie Anderson, Alan Greenspan, Charles Handy, Tracy Chapman, Doris Lessing, Michael Porter, Jane Jacobs, and various government reports. Paul Krugman's name appears nearly as much as the term "weightless" even though he is one of the economists who most often question whether we are really seeing anything fundamentally "new" in this "New Economy".

As a reader, you feel as though you know Coyle well by the end of the book. I found myself wondering what her views are on a variety of topics not covered in the book. Some of these include monetary policy, unionization, the crises in Asia and Brazil, e-bay and Amazon.com, the Euro, SUVs, Germany's tax on part-time work, and others. I sincerely hope that she is working on a sequel

that examines these and other emerging questions; hers is an important voice.

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Modern Information Retrieval. Ricardo Baeza-Yates and Berthier Ribeiro-Neto. New York: ACM Press; 1999: 513 pp. Price: \$50.00. (ISBN 0-201-39829-X.)

This book is a comprehensive presentation of information retrieval from a computer science point of view. It presents the algorithms, formulae, and operational details of information-retrieval models, query languages, indexes, user interfaces, and visualization. The two principal authors use the first nine chapters to give a straightforward exposition of the major aspects of algorithmic information retrieval. The remaining six chapters are authored by leading researchers such as Edward Fox, Christos Faloutsos, and Edie Rasmussen. These ancillary chapters stand alone as "state of the art" contributions that enhance the core text.

The treatment throughout is expository, setting out the main themes and discussing the major aspects of every topic. The book can be used as a textbook at various levels of readership from undergraduate to graduate. There are schemas for the navigation among topics and chapters for various classes of readers. Each chapter includes a bibliographic discussion and there is an extensive bibliography. Happily, the authors have a web page for elaborations, updates, and corrections.

This is useful book that works successfully at several levels. There is, of course, the surface expository level that is an encyclopedic treatment of information retrieval. At a deeper level, however, the book works as a snapshot of the changing discipline of information retrieval. Perhaps the authors' greatest success is the thorough integration of the Internet into the presentation of all aspects of information retrieval. It is apparent that the Web has shifted the paradigm of information retrieval: "some web search engines are opting for avoiding text operations altogether" (p. 167). A whole series of traditional ideas are challenged: stemming and stopwords are less useful in the Web environment; structured retrieval models are promoted; the metaphor of navigating directed graphs becomes important; nonsequential organization of text replaces traditional linear text; text markup eclipses record structures; and information retrieval on the Web by classification proves more useful than keyword indexing. The profound implications of these Internet changes are so exciting that the classic information-retrieval material is thrown into a shadow.

The authors distinguish their algorithmic approach from the user-centered perspective. In fact, human judgment is never far from the surface of the discussion. Relevance assessment is claimed to be central to information retrieval as early as p. 2. Many of the traditional methods represent certain values and assumptions about the nature of text, as well as arbitrary threshold settings and so on. Text processing itself stands on assumptions about how to tokenize and normalize text into "words." No matter how impressive the formulae, it appears that information retrieval is fundamentally a very human process.

The book suffers a certain amount of compartmentalization. The assumptions of one algorithm or model may directly conflict with another. So, in one spot, we read that there are fundamental lexical problems in processing text, whereas in another spot, the

book presents a technique that assumes text processing is trivial. Apparently, information retrieval still awaits a single, evaluative exposition. To some degree, this conceptual chopiness drives a wedge between the core text and the ancillary chapters. For example, the core text echoes the standard complaint that commercial vendors continue to rely on Boolean approaches whereas ignoring superior weighted term methods. Only Rasmussen in an ancillary chapter mentions the weighted term tools introduced by commercial vendors years ago.

In general, the ancillary chapters are well done. Special mention should go to the human-computer interface chapter by Marti A. Hearst that comprehensively covers user interfaces and visualization. The chapter on digital libraries by Edward A. Fox and Ohm Sornil is authoritatively written and includes architectural issues and multilingual documents.

Overall, the authors have done an admirable job in surveying a rapidly changing field. It has very good prospects as a textbook, and it serves as an indicator of how the Web is changing everything.

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How Classifications Work : Problems and Challenges in an Electronic Age. G.C. Bowker and S.L. Star. *Library Trends*, 47(2), Fall 1998, pp. 185-340.

This special issue of *Library Trends* is a consideration of the issues and implications of creating and using a classification scheme. The sociopolitical issues raised by classification are a consequence of the classification scheme being used to define and justify a vocabulary and, subsequently, dialog within a domain. These issues are (rightly) not ignored in favor of the pragmatic concerns of applying a given scheme.

One article, "Social constructs and disease" (Huber & Gilaspy), describes how the sociopolitical context of the HIV/AIDS domain influenced the construction of a controlled vocabulary in that domain. The author points out that research in the domain has not followed a traditional model, so that a different communication cycle and, hence, form of vocabulary to that of traditional models was created. The article raises many important and interesting issues regarding the construction of a controlled vocabulary. The influence of the social constructs impacting on the body of knowledge associated with the vocabulary is rightly highlighted and discussed fully. Practical indications of how to construct the vocabulary are brief and further elucidation would have made the article even more useful.

Another article closely examining a specific classification scheme "The kindness of strangers" (Bowker) offers a close reading of the ICD (International classification of diseases). The administrative form and not only the semantic content affect the resultant application of the scheme. This article shows that classification schemes can develop biases reflective of their domain of application, and that this can result in the scheme becoming a powerful tool. The bias of the scheme is a requirement of it realizing its power and not necessarily something that requires elimination. It does not appear to be a tool that is strongly influencing practice in the domain of application; rather, the tool appears to take a form as a result of its domain of application. The sociopolitical pressures on the schemes' form are not minimal,

however, and the identification of traces of the schemes' history is a thread that runs through the article.

"The dynamics of classification systems as boundary objects for cooperation in the electronic library" (Albrechtsen & Jacob) argues that the DSM (Diagnostic and Statistical Manual of Mental Disorders) is such that it has been used as a device for the marginalization of the viewpoints of psychology in comparison to those of psychiatry. This article discusses the of classification schemes as boundary objects—a concept that has been introduced for the solution of heterogeneous problems. The article presents the view that classification schemes should not merely impose a structure upon a body of knowledge, but that they have a role in the construction of knowledge. The notion of a boundary object is adopted to support this view. A boundary object is a flexible entity, which is strongly structured to local conditions (domains) and weakly structured across domains.

"Psychiatrists make diagnoses, but not of their own choosing" (Spasser) also examines the DSM, concluding that its unexamined use results in the reproduction of its underlying assumptions. The article puts forward the goal that those who wish to construct classification schemes should be aware of the "shortcomings, biases and tacit assumptions of extant systems." The use of structuration theory as an analysis tool is presented, suggesting a means by which this worthy yet ambitious aim might be approached.

Several articles further the examination of the form of classification schemes in general. The theme of presenting nonmajority viewpoints is also continued. "Mapping beyond Dewey's boundaries" (Olson) considers means by which the structure in DDC can be expanded to include marginalized subject areas. The discussion recognizes that an indexing scheme, such as DDC, must represent the works that it is indexing, yet even if it is not a rigid structure, it can still allow the representation of minority viewpoints.

"Grounded classification" (Starr) also considers the form of classification schemes. The article compares the faceted classification of library with the data analysis system, grounded theory, of sociology. Both approaches attempt to enable efficient access to information using vernacular words. This suggests that a combination of the two may be fruitful. This is in keeping with the themes of other articles in the collection—the best scheme is the most natural.

"Seeking the subject" (Tobias) is the only article that directly considers electronic implementations. The viewpoint put forward is that library science practice must adapt to the emerging practice on the web. The demand for information searching tools means that users and developers will not wait for standards to be ratified and schemes to be promulgated before development commences. Successful schemes will be extensions of those successful developments that are already in place.

The dynamic possibilities of information technology, when considered alongside the principles presented in this collection, mean that more than ever before, it is possible to realise powerful classification schemes and that their importance will not diminish. The challenge will be to continue the development tradition and not to abandon the lessons learned thus far.

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The Organization of Information. Arlene G. Taylor. Englewood, CO: Libraries Unlimited; 1999: 280 pp. Price: \$35.00. (ISBN 1-56308-8.)

Chances are great that this book will become a classic introductory textbook. The book is a well-written, well-balanced, and

stimulating introduction to the very foundation of library and information science, namely, the organization and representation of information.

Arlene Taylor states in the Preface that the book is intended to precede more thorough introductions to cataloging and classification as, for instance, Bohdan S. Wynar's (1992) classic *Introduction to Cataloging and Classification*, which is edited by Arlene Taylor. In this sense, the book is intended to introduce cataloging and classification at a more basic level than the students meet in their first course on cataloging and classification at the graduate level. At the same time, the intention is to introduce cataloging and classification concepts in a broader framework than is typically done in introductory textbooks. That is refreshing.

The book is organized into ten chapters, a conclusion, a glossary, and an appendix, which contains an example of a subject analysis of a Web site. The first chapter is called "Organization in Human Endeavors," and it asks the basic question of whether there is a basic human need to organize. Luckily enough, Taylor concludes in the very first sentence that in fact there is "a basic drive in humans to organize" (p. 1). The chapter hereafter introduces four environments in which information is organized, these are: (1) libraries in general, archives, (2) museums and art galleries, (3) the Internet, and (4) data administration and office environments. This is done to make the reader familiar with the broader sense in which there is a desire to organize information.

The second chapter introduces the most common tools for organizing and retrieving information: bibliographies, indexes, finding aids, registers, databases, bibliographic utilities, and catalogs. The latter takes up the major part of the chapter; focus is on the historical developments of the catalog and the different kinds of catalogs.

The title of the third chapter is "Development of the Organization of Recorded Information in Western Civilization." The chapter brings the reader through the development of bibliographies, catalogs, and libraries from Antiquity until the twentieth century. A short overview of the development of the modern cataloging and classification movement is given; this overview, however, is condensed to mentions of the major developments within cataloging rules and classification systems. The chapter closes with a section on the mechanization of the field beginning with the typewriter in the 1870s and ending with computers. Taylor notes that this mechanization joins together the information science track with the library science track, since both are interested in and work with the organization of information.

These three chapters form a good overview of the principles and history of the field. It is rather short and at times too simplistic, however, it gives the reader (the student) a sense of the complexity and history of the field. The remaining chapters are all much more comprehensive than these three. Chapters 4, 5, and 6 treat the descriptive part of representation, and Chapters 7 and 8 treat subject representation.

Chapters 4, 5, and 6 treat the three parts of creating metadata for a set of documents: encoding, description, and access control. Taylor introduces in Chapter 4 two examples of encoding standards, MARC and SGML, with their respective applications and subsets, such as USMARC, UNIMARC, DTD, HTML, and XML. She gives examples of the different kinds of encoding standards, however, nothing more than a brief overview is given. Readers with a need for in-depth knowledge about the subject are referred elsewhere. Chapter 5 gives an overview of the different kinds of standards for providing a description of an information package [e.g., "book, article, videocassette, Internet document or set of 'pages,' sound recording, electronic journal" (p. 78)]. The chapter mentions and describes nine examples of "surrogate record creation tools" (ISBD, AACR2,

APPM, TEI, Dublin Core, GILS, FGDC, VRA, and EAD). These are described in a page or two, which means that the descriptions are limited to merely mentioning their basic features. In the sixth chapter, "Access and Access Control," focus is changed from representation to the search situation. The chapter starts with a strong argument for the main entry. This is a valuable discussion, and Taylor manages to give good reasons for maintaining the main entry—even in these technologically advanced times. The second part of the chapter gives the principles behind authority control.

Subject representation is treated in Chapters 7 and 8. In Chapter 7, subject representation and subject analysis is discussed. Taylor stresses that this cannot be done satisfactorily using automatic methods; she therefore discusses the problems and principles behind determining the subject matter of documents. Taylor touches upon the most important issues in this discussion and manages in a relatively few pages to convince the reader that some very serious problems are buried here. In the main part of the chapter, she expounds the principles behind controlled and structured vocabularies. Since this knowledge and the mastering of these principles and techniques are the core of the field, the focus on these is a good choice. In Chapter 8, the philosophical and historical background of classification is reviewed and commented on. The differences between enumerative and faceted classification are explained, and a number of issues in the history of classification are discussed. The chapter finishes with a discussion of the possibility of classifying the Internet.

Arrangement and display—or shelving and filing as it traditionally has been named—is discussed in a short chapter (Chapter 9). Taylor's point is that information packages in the information age still need to be arranged and displayed in such a way that allows for them to be found again; although the techniques for this is well developed, problems still abound. The same holds true for the display of records.

The last chapter in the book discusses system design. The point made is that system designers must become familiar with the problems and issues in the organization of information, and organizers must become familiar with system design, because only then, will it be possible to design and develop better information-retrieval systems than those we see today.

Each chapter finishes with suggestions for further readings, sometimes subdivided into topics. These suggestions are kept at a level and to an extent that make them valuable for the novice student. Also a big bonus is the 20-page glossary at the end of the book. This glossary defines the most basic terms used in the book. Any beginning student in the field would welcome this excellent glossary.

The book should be the natural choice as a textbook for the many new undergraduate courses on organization of information offered by schools of library and/or information science.

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Reference

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The Media and the Internet. Final report of the British Library-funded research project: *The Changing Information Environment: The Impact of the Internet on Information Seeking Behaviour in the Media*. David Nicholas, Peter Williams, Helen Martin, and Peter Cole. London: ASLIB; 1998: 205 pp. Price: £35.00. (ISBN 0-85142-415.)

The project whose results are the subject of this book was in operation from April 1997 to March 1998 and was funded by the British Library Research and Innovation Centre based at City University. As stated by the authors, the "project sets out to collect and evaluate data to obtain answers to some very important questions. For instance: does the Internet represent the information equivalent of the financial services big bang, and is it, indeed, powerful enough to change work patterns, restructure organizations and reshape industries?" Moreover, according to the authors "the aim of the research project was to examine very closely and comprehensively the impact of the Internet on a strategic information community to whom it appeared to be of immense significance." In order to narrow their focus, the authors attempted to adopt working definitions for three key study components: the Internet, the media, and information seeking. However, due to vagaries of the Internet and its meaning to millions of different users, no one definition was chosen; rather, the study results determined its definition. In order to answer these questions and gauge the impact of the Internet on the media, the authors conducted what appears to be an exhaustive and well-ordered study of media professionals and their relationship to the Internet.

To focus their study even more, the authors chose only one segment of the media—the press—including tabloid and broadsheet national and regional newspapers. They chose this segment because "it was felt that journalists, as information seekers and packagers *par excellence*, should be in the advanced guard of Internet users and setting a hot pace." Although they don't explain why journalists should be so Internet savvy, it seems a reasonable expectation of the authors. Although a broad range of media professionals were included (journalists, managers, online hosts, systems staff, information providers), the authors chose to focus on the Internet habits of journalists and librarians. In addition, two newspapers were chosen for additional research detail—*The Guardian*, a well-established Scottish newspaper, and *Sunday Business*, a unique start-up venture that saw its demise during the tenure of this study.

The study was based primarily on an interview with 252 subjects. Limited questionnaires (79 returned) and observation (28 individuals) was utilized as well. In addition, data was gathered from 57 media organizations and 350 individuals. They chose a balance between geographic spread, journalists and librarians, and Internet users and nonusers as factors to consider during the sample process.

Another important element of the study was a review of the current literature. Although much has been written about the Internet and its culture, the authors note that "most of it is very light, repetitive or speculative in nature. And above all much of it is US originated." The author's claim that the literature review section of the book "takes the best and most current of the Internet reports and news items available. . . ." However, they don't explain why they determined the literature they reviewed to be "the best." They used the literature-review process to establish general characteristics about the Internet, to review what is currently known about the use of the Internet by the media, and to place this study in the context of previous research.

During the course of the study, the authors identified a host of Internet issues. They included information overload, quality of Internet information, displacement of traditional information sources, and changes in work practices. Perhaps the issue of

most concern to nonmedia users is that of overload; that the Internet is just another source of unlimited information that is only useful when taken in context with information-laden faxes, e-mails, mailings, and telephone calls to journalists. But, overload was determined generally not to be an issue for journalists or librarians because journalists have always dealt with information overload, and librarians are good researchers and can make filtering judgments as to what information is valid and useful and what is extraneous. For those who found information overload a problem, it was due to too much information, its poor quality, the lack of good search engines, time factors, over reliance, and general concerns about use of *any* information sources. Information quality of the Internet was a concern of journalists, but not much more than other information sources. In the end, "the principal method by which quality problems were overcome or circumvented was. . .to choose trustworthy sites in the first place." The Internet may displace traditional information sources and that was of some concern to the media, however, the authors found little concern over this possibility in the media. Indeed, most found the Internet supplemented rather than supplanted traditional information sources. Perhaps the issue of most interest was the Internet's capacity to create workplace changes, and the authors identified some key areas of change. There was resignation among some journalists that eventually all will use the Internet. Among librarians was the feeling that the more traditional the librarian the less involved in Internet use. Some journalists also cringed at the potential for the Internet to "dumb down" journalism in general. Finally, relatively few promoted the idea of Internet use at home—an invasion of personal space. Interestingly, the authors found great differences regarding Internet use between librarians and journalists; they rarely shared the same views.

In analyzing the results of their study, the authors conclude that "what we discovered was not what we were led to believe from the published literature. . .Far from being in the vanguard of Internet revolution, the media appear to be nothing more than followers. . ." Indeed, much of their results belied what was reviewed during the literature search process. For instance, they state, relative to Internet user characteristics, that "far from being the stereotypical young and male, most are experienced journalists well into their thirties and forties, and in some media companies women outnumber men." Also, they note that "few journalists use the Internet, but even fewer have made up their minds about it." The author also notes differences in media use between the United States and the U.K.—that the use of computer-aided research "can only thrive in an environment where information is liberally and generously placed in the electronic public domain. This is a long way from happening in the U.K."

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The Invisible Computer: Why Good Products Can Fail, the Personal Computer Is So Complex, and Information Appliances Are the Solution. Donald A. Norman. Cambridge, MA: MIT Press; 1998: 302 pp. Price \$25.00. (ISBN 0262140659.)

Last night I watched *Pirates of Silicon Valley* on cable television and was fascinated by the role serendipity played in the rise of Steve Jobs and Bill Gates to the top of the silicon heap. They

had no benchmarks to speak of, little or no business experience, and no pre-existing market for their respective products. As I read Donald Norman's book, I recalled Steve Job's exquisite U.S. Festivals during the 1980s—as much a computer convention for Apple as a rock festival. I remember milling among the minions in the Inland Empire and wandering over to a tent covering Macintosh computers and concert-goers alike. I remember thinking, what a waste; no Atari, Pong, or Space Invaders. Three games I had grown up playing in the late seventies and early eighties. As I finished Norman's book (no small feat as it was less than enthralling), I thought how far the world has come since the early days of Microsoft and Macintoshes on display at the U.S. Festivals almost 20 years ago. Today, serendipity has been replaced by business acumen. Or has it?

Dr. Norman would have one believe "featurism" is as much a driving force in the sale of the personal computer as business acumen. In many respects he is right. However, new features and more speed are not really enabling us to do anything different taskwise with the PC than Mr. Jobs did 20 years ago. Certainly we have new communications mediums driving personal PC sales as much as new features. The Internet, WWW, and e-mail are not personal computers. However, they are adding a whole new host of "features," including e-mail and access to remotely located information. The Internet, the WWW in particular, create further utility for the PC.

The *Invisible Computer* is broken up into 12 chapters followed by an Appendix of examples of "information appliances" ranging from a miniature camera, home medical advisor, and home shopping list to devices implanted in our walls, furniture, clothes, and, yes, our bodies. If artificial limbs and heart valves have been in acceptance for some time now, are surgically implanted information chips for accountants, lawyers, and law librarians far behind? So goes Norman's logic in his last Appendix entry. Overall, the Appendix on Information Appliances lacked substantial empirical examples, so I went and found one of my own. At the Millennium Gloucester Hotel in London when one opens the in-room refrigerator to get a beer or coke, the refrigerator automatically debits your room. Unfortunately, if one wants to read the label on a "pint" or store one's higher grade ale in the same fridge, one's room is debited just the same. Hopefully, Dr. Norman's home shopping list will not debit our bank accounts when we pull an item off the shelves at our local supermarket to read the ingredients or cholesterol content. And if that cyberchip in my head starts to slow down or process a 0 instead of a 1 during the hot weather. . .

The theme of *Information Appliances* is best summed up in Chapter 4 in the author's take on the personal computer (PC),

I don't want to use a computer. I don't want to do word processing. I want to write a letter, or find out what the weather will be, or pay a bill, or play a game. I don't want to use a computer, I want to accomplish something. I want to do something meaningful to me. Not "applications," not some bizarre complex computer program that does more than I ever want to know about and yet doesn't really do exactly what I need. I want computing that fits my activities. I want the technology hidden away, out of sight. Like electric motors. Like the computers that control my car. (p. 75)

Computers try to do to many things asserts Norman and nothing, or very little, that we actually need or really want. They (computers) are far too complex,

The major problem with today's PC is its complexity. The complexity of the PC is pretty fundamental; it is built into its foundation. There are three major reasons for the complexity: the attempt to make a single device do too many things; the need to have a single machine suffice for every person in the world; and the business model of the computer industry. (p. 77)

The poor PC. I don't expect a corporate attorney to be an expert litigator or *vice versa*. Why do we expect the PC to be just such an

expert device? Perhaps a better example is that baseball managers covet players who can hit a curve as well as a fast ball. Most of the time we expect a fast ball, however, now and again one needs to be ready for the curve. The problem arises when the pitcher you're facing begins throwing curve after curve. No longer content with the traditional approach to using the PC as a word processor or spreadsheet tool, PC makers are equipping the personal computer with mind-boggling applications—including voice, image, and real time capability. At this stage in the development of the personal computer would it be efficient to produce a PC for each individual task rather than one unit laden with “features?” Dr. Norman seems to think so. Unfortunately, this book gives little in the way of empirical evidence that it's possible or even desirable to produce task-based “keyboard less” computers, despite the fact that he mentions in one of his many tirades against the PC, that he would have personal computers and their hardware hidden away and out of sight like those within his car. Driving a car is a fairly predictable experience. There are rules regulating ones driving behavior. No such rules or predictability govern the design and usage of the personal computer.

In defining an information appliance on p. 53, Dr. Norman sounds a familiar tone heard since the turn of the century,

An appliance specializing in information: knowledge, facts, graphics, images, video, or sound. An information appliance is designed to perform a specific activity, such as music, photography, or writing. A distinguishing feature of information appliances is the ability to share information among themselves.

The prime goal of the information appliance is to break through the complexity barrier of today's personal computers, the PCs. Computers are complex, difficult to learn, difficult to use, difficult to maintain. Moreover, as Chapters 4, 5, and 8 illustrate, this complexity is fundamental to the beast; there is no way to overcome it. After all, whenever one device is asked to do the work of many, it must compromise on how well it can handle each individual task. Design a tool for a specific task, and its physical form, features, and structure can be a perfect fit to that task.

The work of Frederick Taylor would seem to be the cure Dr. Norman is looking for in finding the quickest, most efficient way to accomplish tasks presently delegated to the PC. Richly rewarded will be the organization that can find the “one best way.” (Winslow, 1916). As the PC has literally hundreds, if not thousands, of potential uses for organizations, it is difficult to project what the end result will be. It would seem that hours and hours of time and motion study are in order if the computer industry is to achieve Dr. Norman's lofty goals of seamless and unobtrusive devices available on demand. [Dr. Norman uses the more palatable phrase “human-centered development” (p. 185) rather than time and motion studies.] There are so many variables involved, so many changing variables, one need only revisit the failed information appliance at a swank London hotel to realize the formidable task that lies ahead for the computer industry. The problem with this book is that it offers little in the way of solutions and much in the way of hypothesis. Not everyone is completely disenchanting with

the PC, although at times problematic, the PC is attracting new users everyday.

Norman does make a compelling argument in Chapter 6, “The Power of Infrastructure,” that current problems with the personal computer are likely to continue. (Or more predictable depending on which side of the Microsoft fence you straddle.)

Nonsubstitutable goods are infrastructure goods. That is, usually the product itself is of little direct use; it provides the basis for a whole array of other goods and services. As a result, the choice of one makes a strong commitment for the future. A nonsubstitutable good usually implies an investment, and the more additional goods purchased that are compatible only with that infrastructure, the more the customer is committed to stay with that infrastructure. A customer who buys Microsoft Windows now cannot easily go out and buy Macintosh OS later; the customer will have too much invested in learning time, too much money invested in nontransferable hardware and software to make such a switch easily. Yes, it is possible to switch infrastructures, but only reluctantly, and at great cost in time, money, and effort. (p. 118)

Norman's book seems well timed in light of Microsoft's antitrust problems, which given Microsoft's market dominance, are likely to continue. For better or worse, Microsoft is calling most of the shots in personal computer applications. Time and motion studies or “human-centered product development” do not seem to be foremost on their minds. Just the opposite may be true,

Actually, it isn't true that the current speeds and memory capacities are sufficient. They aren't, because it isn't in the industry's best interest to let them be. Nathan Myhrvold, one of the senior executives and gurus of Microsoft, once proposed, only partially in jest, “Nathan's First Law: Software is a gas, it expands to fill its container.” Moreover, he added, “It's a good thing for the computer industry that computer power expands so rapidly. This way we can build bigger and fancier software that require you to get a bigger and faster computer, so we can use up all that space too.” (pp. 81–82)

Overall, this book could just have easily been a 20-page article. Long on hypothesis and short on empirical evidence or examples of information appliances, *Invisible Computer* provides some ammunition for the case against a Microsoft world. Antitrust lawyers in Washington, D.C. should read this book. The rest of us should peruse it at our local library.

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