

EUROPEAN PERSPECTIVES

Some European Contributions to Information Science

by Michael K. Buckland

2016 Annual Meeting Coverage

EDITOR'S SUMMARY

European contributions to the field of information science are often overlooked or forgotten in the popularity and prominence of the Association for Information Science and Technology, previously known as the American Society for Information Science and Technology. Areas covered include information science theory, bibliographical descriptions, documentation theory, library science, classification, information retrieval, bibliometrics and standards. One noteworthy contributor to the field of information science as a whole is Karl Marx, who is credited as a "herald of the information society." Two international conferences, the International Conference on Scientific Information in Washington D.C. in 1958 and the Royal Society Scientific Information Conference in London in 1948, are cited as recognizing the importance of the field. Another conference series highlighted here is the Conceptions of Library and Information Science, which promotes innovations from the European community and is maintained primarily by Europeans.

KEYWORDS

information science history
libraries
Europe
documentation
bibliographies

Michael Buckland is professor emeritus at the University of California, Berkeley. He can be reached at buckland@ischool.berkeley.edu.

The prominence for several decades of the *American Society for Information Science and Technology* and of its *Journal* might give the impression that information science has been primarily a North American field. Removal of *American* from the new name, Association for Information Science and Technology, and the holding in Europe of the first Annual Meeting outside of North America, provide a suitable occasion to take note of some European contributions done, or at least initiated, in Europe. What follows is a personal choice. It is limited to contributors known to be dead and excludes contributions by Europeans after migrating to North America. Of course, not all contributions find acceptance. The International Standard Book Number system, which originated in Britain, has been adopted globally. Successive library cataloging codes were collaborations between, mainly, Europe and North America. The ISO paper formats (A4, etc.) spread everywhere except the United States. Other contributions were ignored and forgotten.

A caveat: Claims concerning who really had priority in any field are hard to establish with confidence and should be treated with caution. They may have been early contributors rather than the very first. No guarantees are offered!

Recognition of the Field

Karl Marx deserves credit as an early herald of the information society. (See also related paper in this issue of the *Bulletin*: "[Tomato Tomahto: European Perspectives on Information Science](#).") Widespread recognition of the significance of information science came through two major international conferences. The largest was the International Conference on Scientific Information held in Washington, D.C., in 1958, but the first and, perhaps, more formative, was the Royal Society Scientific Information Conference in London in 1948.

Information Science Theory

Two of the leading theorists of information science were English. Robert Fairthorne was a pioneer of avant-garde movies and of the use of tabulating machines for complex calculations before digital computers became available. He wrote extensively about the foundations of information science with rigor, penetrating clarity and wit. B. C. “Bertie” Brookes was a physicist who became a specialist in the presentation of technical information at University College London. He worked on quantitative methods within information science and became a tireless and highly influential teacher and mentor. Brian C. Vickery, born in Australia, educated in Egypt and active in England, also became a very influential thinker and writer.

Bibliographical Description

The Swiss botanist Conrad Gessner got an early start on bibliographical description with his *Bibliotheca Universalis* in 1545 and in the early 19th century an Italian political refugee in England, Sir Anthony Panizzi, laid the foundations for cataloging codes with his *91 Rules for Compilation of the Catalogue*, which appeared in the *Catalogue of Printed Books in the British Museum*. The establishment of the Bibliographical Society in London marked a major milestone in the development of historical bibliography.

Documentation and Documentation Theory

Belgian bibliographer Paul Otlet was a leader from 1895 onwards, theorizing the role of documents in society and exploring the potential of new media to develop new forms of document more flexible than the traditional bound book. His vague, impractical, but grandiose schemes eventually resulted in his being discredited, but his institute flourished for decades as the International Federation for Documentation and he has recently become a fashionable icon of early information science.

The French librarian Suzanne Briet significantly advanced Otlet’s ideas in her 1951 treatise *What Is Documentation?*, but her work was ignored even in France until the 1990s when her semiotic insights into the nature of documents and recognition that information science was a “cultural necessity” began to receive the attention they deserved. As the founding

director of studies of the educational program at the Institut National des Techniques de la Documentation in Paris in 1951 she has a claim to being the founding mother of the i-school movement.

Otlet’s interest in the transformative effects of new media was echoed in France in the middle of the first decade of the 2000s in the extensive studies exploring the transformative impact of the transition from paper to digital technologies by the indefatigable Roger T. Pédaque, a collective pseudonym for a network of some hundred scholars.

Understanding of the social role of information has been profoundly influenced by French *histoire du livre* writers and the famous Panizzi lecture “Bibliography and the Sociology of Texts” given by a New Zealander active in Britain, Donald F. McKenzie, in 1985.

Library Science

Library services are, of course, ancient, and Frenchman Gabriel Naudé’s *Advis pour dresser une bibliothèque* of 1627 is considered the first manual. But *library science* as a term and as the basis for modern library techniques originated in Germany. When the Bavarian royal library in Munich was unable to cope with a flood of material from 200 confiscated monastic library collections around 1800, librarian Martin Schrettinger understood that formal technical systems were needed to enable readers (as well as librarians) to find what they needed by themselves quickly and easily. For the technical guidelines that he developed he coined the phrase *Bibliothek-Wissenschaft* (library science) in his textbook in 1808. Schrettinger’s work anticipated both the modern public access catalogs and the transformation of scholar librarians from intermediaries into less visible, less intrusive, but ultimately more useful facilitators [1].

Classification and Representation

The “Brussels expansion” of Dewey’s Decimal Classification, better known now as the Universal Decimal Classification, moved library classification theory and practice a long way towards a faceted structure. Later, S. R. Ranganathan, an Indian librarian trained in England, advanced faceted classification much further. In the second half of the 20th century, library classification theory

was primarily a British and Indian preoccupation. In Britain an informal group with membership by invitation, the Classification Research Group (1952-1968), was the international epicenter of classification theory.

Complementing faceted analysis is the role of syntax (grammar) in indexing: the explicit specification of relationships. After all, the mere listing of the three keywords *bit*, *dog* and *man*, does not indicate who bit whom. Around 1960 in France, Jean Claude Gardin combined graph theory with formal relationships to develop SYNTOL (syntagmatic organization language), a formal framework for organizing representations of scientific data. In the United Kingdom, the Czech-British Jason Farradane experimented similarly with “relational indexing.” Later, the British National Bibliography developed PRECIS (Preserved Context Indexing System) to manipulate complex strings of terms in subject headings. These ingenious and powerful systems could not compete with cheap, efficient character-string searching, but they may well be reinvented with the rise of AI.

Information Retrieval

Information retrieval refers to the use of systems to retrieve relevant documents from a collection. The first use of the term *relevance* in relation to information retrieval has been attributed to Samuel C. Bradford, librarian of the Science Museum in London, in his book *Documentation* (1948). The first important use of the relevance, recall and precision formulation for retrieval evaluation came with the Aslib-Cranfield experiments at the Cranfield College of Aeronautics in England in the years around 1960. Led by Cyril Cleverdon, the first Cranfield experiment assembled a test collection and created four quite different search mechanisms for it: the Universal Decimal Classification (think of Dewey’s Decimal Classification on steroids), a conventional subject index, a faceted classification and uniterm (keyword) coordinate indexing. Questions were designed to match a single document within the test collection. The systems did not perform very well and did not retrieve the same documents. The simplest retrieval system (keywords) worked best but there was little difference in performance. The second Cranfield experiment examined variations in indexing and vocabulary control and the test collection was later used by other experimenters. The Aslib-Cranfield studies inspired

the many subsequent TREC and similar retrieval evaluation conferences, which for 50 years have consistently continued to reach the same findings.

The development of search engines has been major component of information science, partly inspired by Vannevar Bush’s famous essay, “As We May Think,” a questionable vision based on Bush’s development of a microfilm-based rapid selector machine developed from 1938 onwards. But Bush’s technology had already been developed, patented and demonstrated a decade earlier by Emanuel Goldberg, Russian immigrant working for Zeiss in Dresden, Germany.

Bibliometrics

The term *bibliometrics* appears to have been coined in Britain in a 1969 paper by Alan Pritchard entitled “Statistical Bibliography or Bibliometrics?” but the topic itself has a much longer history including early studies by Cole and Eames in 1917, by E. W. Hulme and by Gross and Gross. Samuel Bradford, early user of *relevance*, published a mathematic model of the dispersion of literature, Bradford’s law of scattering, in 1934. His method of quantitatively identifying core journals in any field has had huge consequences in the currently prevailing obsession with using citation counts, impact factors and the like as an easy but dubious alternative to honest peer evaluation. In addition, ambiguities in his explanation and his mathematical formulation led to a cottage industry of competing revisions by the mathematically inclined.

The father figure of the more general field of scientometrics is Derek de Solla Price. Although he did most of his work in the United States, he started in England. It should be acknowledged, however, that the mythic origin of scientometrics was in Singapore where Price noticed the exponential growth in size over time of the annual volumes of the *Philosophical Transactions of the Royal Society*.

Microforms

Where would we be without photocopying? We can note that the three historically important developments in photocopying were all pioneered in Europe: microfilm, photostats and microfiche. René Dagron famously used

tiny rolls of microfilms attached to the legs of homing pigeons to fly microfilmed reports over enemy lines during the German siege of Paris in 1870. Photostats (copying directly onto sensitized paper) was invented by a French academic, René Graffin, around 1900 to facilitate his editing of old Syriac texts. When commercially developed, photostat equipment transformed office work. Microfiches, small sheets of microfilm produced by Robert Goldschmidt and Paul Otlet in Belgium to demonstrate the feasibility of ultra-compact, portable libraries, later became a major publication format for technical reports.

Infrastructure and Standards

Visiting the World Fair in Brussels in 1910 German chemist Wilhelm Ostwald was so impressed by Paul Otlet's ideas that he spent his Nobel prize money to establish his own information institute (The Bridge) in Munich. Ostwald's World Format paper format was the basis for the ISO A4 system. His monographic system was an early form of hypertext, and he started the "guide to the literature of" genre with his guide for chemistry.

It was three Europeans – Ostwald, Otlet and H. G. Wells – who popularized the idea of a (Wikipedia-like) "World Brain."

Like Ostwald, the librarian and New Testament scholar Adolf von Harnack understood before others did the importance of infrastructure and society's need for advanced information services. In 1921 Harnack justified the chair in

librarianship at the University of Berlin on the need for economic competitiveness and intellectual production.

Other

The Conceptions of Library and Information Science (CoLIS) series of conferences has mitigated a tendency to neglect attention to ideas within information science. CoLIS originated in Finland in 1991 and has remained primarily a European initiative.

No account of European contributions to information science would be complete without paying tribute to the *Journal of Documentation*. Since its initiation in 1945 J Doc has maintained consistently high standards for over 70 years under a series of able editors, starting with the Polish-British bibliographer Theodore Besterman. It served as an important outlet for North American as well as European authors, and after five decades it was possible to produce an impressive account of the development of information science using primarily material that appeared in this one journal: *Fifty Years of Information Progress: A Journal of Documentation Review* [2].

But for lighter reading than J Doc, try a lurid murder mystery, *La table des matières* [The Table of Contents]. Who did it? I won't tell. But, curiously, in this French novel almost all major contributions to information science are revealed as having been made by francophone Europeans [3]. ■

Resources Mentioned in the Article

- [1] Garrett, J. (Fall 1999). Redefining order in the German library, 1775-1825. *Eighteenth-Century Studies*, 33, (1), 103-123. Retrieved from www.jstor.org/stable/30053317
- [2] *Fifty years of information progress: A journal of documentation review*. B. C. Vickery (Ed.). London: Aslib, 1994.
- [3] Fayet-Scribe, S. (2007). *La table des matières*. Paris: Editions Panama.