

## Education in Documentation at Western Reserve University Yesterday, Today, (and Tomorrow?)

ウエスタン・リザーヴ大学におけるドキュメンテーション教育  
過去と現在 (および将来)

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### 要 旨

本稿は、ドキュメンテーション教育に関する純粋に学術的な研究成果というよりも、ウエスタン・リザーヴ大学に身を置き、この領域に於ける発展を経験した筆者の観察が大部分を占めるものである。

ドキュメンテーションという言葉が現在の意味で米国に於て用いられ始めたのは1950年頃であるが、筆者は自分の図書館員および教員としての経験から、情報の発生、記録、出版、配布などの面から出発し、それがいかに整理されるかという一貫した過程を学生に納得させる必要を感じた。そこで、1948-49年にかけては“書誌的体系の整備”に関する選択科目を設け、つづいて1949-50年には“索引および抄録”の科目を設けた。さらに、1950年には、上記週1時間の2つの選択科目を合せて、週3時間の“ドキュメンテーション”という科目を設けた。この科目を通して、学生は少くとも、問題の所在およびインフォメーション伝達の完全なサイクルについての理念を持つことができ、幾分か技術はマスターしたと考えられる。

この頃から、マイクロプロダクションおよび計算機の利用が盛んになりはじめ、従来の分類・索引の理論および実際の利用に対して再検討を加える必要が出てきた。そこで筆者の担当する上述のコースに、1954年に至って、“コーディネイト・インデクシング”および“技術報告書”のユニットを加えることにした。

その後も、この方面の進展は目覚ましく、1955年には情勢に即応し研究を進める目的を以て、バットル・インスティテュートからペリー、ケント両氏を迎え、“情報・通信研究所 (C.D.C.R.)”を設立する運びとなった。この研究所の活動および1956年1月に開かれた会議の影響を受け、1956年春の筆者の科目では、情報の危機、機械化の問題、主題分析、コーディング法などが強調されるようになった。同年春、ペリー氏は“文献探索の機械化”の最初の科目を教授し、同年から翌年にかけては、さらに“言語工学”の科目が追加された。それにつれて、筆者担当の科目内容も変更を見るに至り、3つの科目がドキュメンテーションを総合的に扱うようになった。

この間に研究所の仕事は着々と進展し、現在のGE225の母体である計算機がペリー氏の手により完成



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され、アメリカ金属学会と提携した研究も開始された。このような状況の変化と、特定科目の設置により、筆者担当の科目は、ドキュメンテーションに関心を有しない学生にもそれが何であるかを納得させ、原理的事項およびそれに伴う技術の必要性を解説する傾向を帯びるに至った。そのためには、急増するこの分野の文献に目を通すことが必要であり、その中から重要な問題を抽出して科目の中に採り入れるように試みてきた。

特定のコースとしては、“マイクロ・レコーディングの図書館および企業体における利用”(2年後廃止)、“ドキュメンテーション特殊研究”、“専門情報機関”、“計算機による情報処理”、“文献探索の機械化”などの科目が1958年から1962年に亘って順次開設され1963-1964年には“図書館技術のオートメ化”、“I. R. システム I”、“同 II”、“計算機による情報処理”、“言語自動処理”、“I. R. 理論——概説”、“専門情報機関とサービス”という形に統合され、現在に至っている。この他1953年から、シエラ氏による“分類理論”の講義が行われていることも付加する必要がある。

現在でも、この領域における発展に備えてカリキュラムをいかに編成すべきかという点で論議が戦わされているが、博士課程の必要が増大し、また情報科学に関する講義を図書館学校以外の学部・学科で取れる組織を考える必要に迫られていると言えよう。

現在の情報の処理および利用の発展状況を考えると、図書館学とドキュメンテーションは一体と見なされねばならぬという感が深い。それに伴い、将来においては、従来の“ドキュメンテーション概説”を2分し、1科目は、特にドキュメンタリストになる意志を持たない学生に、その意図するところを十分に理解させることに重点を置き、他の科目は、ドキュメンタリストおよび情報科学者志望の学生に、ドキュメンテーションと図書館学の関連の全体像を与え、図書館員の寄与を認識させることにしたいと考えている。

最後に、一つ確実に言えることは、ドキュメンテーションの科目は、常に変貌を遂げてやまないであろう、ということである。(M. F.)

The writing of this brief essay has been interrupted by a presentation of one of the scientific triumphs of today—the report of the Ranger VIII moon-shot, and the exhibition on the television screen of pictures taken only a few hours ago by cameras activated by a “command” from the earth when they were only a few thousand miles from the moon, relayed 238,000 miles across space in a matter of seconds, and reproduced and broadcast around the world by Telstar and other devices which seem equally “miraculous” to the layman. These achievements of scientific and technological research are also in part triumphs of documentation, the full story of which may never be fully told. The extent and variety of the information which has been accumulated, not only in recent years, but also over centuries in all fields of science and technology, and which was put to use in

carrying out this project seem beyond one person's comprehension. Yet the information has been gathered, applied, and the project successfully accomplished.

After seeing such a demonstration, it seems quite presumptuous for me to tell the story of how the idea of documentation was introduced into one library school's curriculum and to outline briefly how the program has grown from a single general course to an offering of many specialized ones. However, questions which were asked me frequently during my visit to Keio University and the Japan Library School in 1960, and received both personally and in letters since that time, together with the request that I prepare a paper for Director Hashimoto's “Koki” have made me turn my thoughts backward, and I shall try to summarize, as best I can, some of the events, the reasons,

and the publications which resulted in the presentation in 1950 of the first course called "Documentation" in an American library school. (Because this account of its early development will be in large part quite personal and closely involved with my own experiences, I am going to tell some of them in the first person, rather than to try to retreat into academic impersonality!) In telling the later story of the establishment of the Western Reserve University Center for Documentation and Communication Research and of the expansion of its educational program I shall be brief, but will hope to show the direction of our progress and some of our hopes for the future.

It will be impossible to recount—or even to remember—all of the factors which made clear to me the need of a course in the library school's curriculum which we called "Documentation"—a term which was beginning in 1950 to be used in the United States, although long used abroad. As a reference librarian in the Science-Technology Division of the Cleveland Public Library before World War II, and as librarian of the Case Institute of Technology during that war, the demands of research workers and experience with the use of existing tools for organizing and searching for information made me quite familiar with their many inadequacies. Some actual work in gathering terms for a library science glossary, in preparing geological definitions for another dictionary, in doing a little science writing for a children's encyclopedia, and in aiding others in gathering data for three technical handbooks made me understand some of the problems of the making of reference works. This was supplemented during the years 1945–1950 by experience in critical analysis of reference books while I was a member of the Subscription Books Committee of the American Library Association. During those years I also became acquainted with the publishers of a number of reference works, and learned from them about their problems of publishing and distribution.

When I began in 1943, to teach a course in Reference Work at Western Reserve University's School of Library Science, I came quite soon

to the conclusion that it was more important to make the students understand how information was first recorded, then published and disseminated, how it later was organized into reference tools, and what kinds of sources there were, than it was to stress the memorizing of specific titles, and my teaching began to show my orientation. In the summer of 1945 I read Vannevar Bush's essay "As We May Think" in the *Atlantic Monthly*, and it was for me, as for many others, if one judges by its frequency of citation, a landmark article, and I began to search for more discussions of our growing information crisis and to bring them to the attention of my classes. I became acquainted with the *Journal of Documentation* which was started about that time, and followed it with interest. In 1948 the plans and later the reports of the Royal Society *Scientific Information Conference*, and the publication of S.C. Bradford's little book called *Documentation* gave me many more ideas for development. My course in Reference Work was expanded in 1948–49 by an additional one-hour elective credit offered for extended coverage in the area of bibliographic organization, and in 1949–50 by another one-hour elective in indexing and abstracting. Finally in 1950 these two one-hour electives were combined and expanded into the three-hour course entitled "Documentation" which was described on our catalog as a

Survey of the various means of recording and locating research materials with emphasis on the state of bibliography today. Special attention will be given to such procedures of documentation as indexing, abstracting and the handling of serial publications.

From the beginning this course has combined a wide variety of readings, lectures, class discussion, and a certain amount of practical work in indexing and abstracting, although there has been no pretense that students can acquire real skill in these techniques in the limited time available. However, they have gained some first-hand understanding of the difficult problems existing services have to face. My presentation has attempted to point out and

follow roughly the complete cycle of the communication of information, from the "gleam in the eye" of a research worker with a new idea or fact, through its recording, publication, bibliographic identification, subject analysis, indexing, abstracting, storage, and ultimate recovery by a patron who needed that information, perhaps to start the whole cycle over again.

In 1950 the possibilities of high speed computers for use in what we now call Information Storage and Retrieval Systems seemed still within the realm of science fiction, but many quite radical developments in new tools and methods of organizing and making information more readily available had already indicated that scholarly publication patterns and demands were changing. The publication of Robert Binkley's "New Tools for Men of Letters" (*Yale Review* 24: 519-37, Spring 1935), of Fremont Rider's *The Scholar and the Future of the Research Library* by the Hadham Press in 1944, had brought the attention of the research world to the possibilities of microreproduction as a means of publication and duplication of specialized information. (The American Documentation Institute was founded in 1937 with one of its chief purposes the promotion of the use of microfilm.) Experimentation with the use of photography, the development of quite simple devices for arranging and holding in a frame existing Library of Congress cards, and reproduction by photo-offset had resulted in the publication in book form of the *Catalog of Books Represented by Library of Congress Printed Cards*, and the beginning of its cumulative supplements. Marginal and internally punched cards were already being used for quite unconventional approaches to the organization of specialized areas of subject information. In the summer of 1950, at an American Library Association meeting in Cleveland I heard a paper on a method of preparing a cumulative list of serial titles using IBM punched cards, and the first issue of *Serial Titles Newly Received* (later called *New Serial Titles*) appeared in January 1951. Readings and discussions of these developments were included in the first

course, but there was also much emphasis on methods of indexing and abstracting. There was also a brief demonstration of the possibilities of use of marginal punched cards, and this seemed to stir the imagination of several students who tried at once to organize their own systems.

Over the years, although the idea of a documentation cycle, from the first recording of information to its ultimate use by others, has continued as the basic order in which topics have been studied, there have been frequent revision in emphasis, and additions to the course content. Many of the changes can be traced to specific articles, to conferences attended and to contacts with particular people. In the summer of 1950 the Graduate Library School of the University of Chicago held a conference on *Bibliographic Organization* and although I did not attend, the publication of its proceedings in 1951, the report of the *UNESCO Conference on the Improvement of Bibliographical Services* held in Paris in November 1950, and Dr. Jesse H. Shera's article on "Documentation; Its Scope and Limitations" which appeared in the January 1951 *Library Quarterly* resulted in much more emphasis in my course on bibliographic organization and the efforts for its improvement both nationally and internationally.

In September of 1952, Dr. Shera came to Western Reserve as the Dean of the School of Library Science, and his interest in the whole field of documentation was a great stimulant to the development of my course as well as to the future program of the school. One area of documentation research which had not been touched upon in my outline was added that year—research in classification—a topic in which he was particularly interested. The Dean also added immediately a course in the Theory of Classification to the school's curriculum.

In 1953, I attended a *Workshop on the Production and Use of Technical Reports* which was sponsored by the Catholic University of America. This was my first real "documentation" conference, and I brought back to my students a much better conception of the technical report problem than I had had before. I

heard Mortimer Taube discuss his Uniterm coordinate indexing ideas, learned about efforts to improve the quality of technical writing, and also listened to a presentation for the first time of a paper on education for documentation by Maurice Tauber. I met many of the people who were actively at work in the documentation field, and could then visualize them as real people instead of names on title pages or in indexes. My course outline for 1954 included a unit on coordinate indexing and one on the management of the technical report literature. In the fall of 1954 the American Documentation Institute decided to move its convention out of Washington for the first time, and the meeting was held in Cleveland. Here again I had the opportunity to meet a group of active documentalists, and was much impressed and excited by the reports of research being carried on. I also had my first contacts with some of the makers of computer and tabulating equipment. It was at that conference, for instance, that the first presentation was made of the Eastman Kodak's Minicard system and I remember my amazement when we were told how much money had been spent on the project.

At that conference Dr. Shera began making contacts and plans for a full-fledged conference on documentation to be held at Western Reserve University. For this a planning conference was held in March of 1955, and shortly thereafter, in April, two of the most active contributors to the plans of the conference, James W. Perry and Allen Kent came from Battelle Institute on Columbus, to establish, in connection with the Western Reserve School of Library Science, the Center for Documentation and Communication Research. The purpose of the Center as stated in the original announcement was:

1. To conduct research programs for the definition of techniques and principles underlying the organization of recorded information for effective use by the businessman, the professional man, the scientist, the scholar, the administrator, and the technician;
2. To improve the accessibility of recorded

information (on a contract basis) for industrial, governmental, and educational organizations through the identification and establishment of bases for synthesis where fragmentation now exists;

3. To offer students in the library school not only the opportunity for study of information systems in operation, individual research, laboratory experience, and advanced seminars, but also the educational advantages of contact with national leaders in the field of documentation.

The development of the Center, and the planning for the *Conference on the Practical Utilization of Recorded Knowledge* held in January 1956, provided much material to enliven and enrich the course in Documentation. The conference itself offered an opportunity for a number of students to attend as well as to help with the assembling of material which was distributed in advance. My course outline for the spring of 1956 shows its influence clearly. The excitement and the urgency of the information crisis were much more vividly portrayed to the students, the significance of mechanized approaches to the organization of information began to be brought out at length, and there was expansion in the discussion of subject analysis and methods of coding for use in various manual and mechanical systems. Mr. Perry and Mr. Kent both spoke to my classes on some aspects of machine literature searching.

In the same spring of 1956 Mr. Perry offered the first course in Machine Literature Searching, and in 1956-57 the School of Library Science Catalog lists this and a second one called Language Engineering. The course description for my introductory Documentation course was revised at this time, to show more clearly its orientation.

**Documentation:** Survey of the various means of recording, locating, and duplicating research materials, with emphasis divided between a consideration of the larger aspects of bibliographic organization, and of practical methods of documentation such as abstracting, preparation of literature reviews, indexing, and the

use of mechanical systems for bibliographic work.

**Machine Literature Searching:** Review of recently developed methods and equipment for analyzing, sorting, correlating and retrieving recorded information. Punched card systems and more flexible systems now being designed and developed, surveyed in terms of parameters of scientific, business and other applications. Emphasis placed on coordination of new techniques with conventional indexing and classifying methods. Demonstration of various systems, coding techniques.

**Language Engineering:** Review of the role of language in constructing indexes and classification systems; language as a system of symbols for designing concepts; language symbols and concepts as basic tools for communicating by written records. Designing for coding systems and artificial languages for use with punched cards and electronic equipment. Application of information theory and the theory of games in designing codes and machine language.

With the introduction of these courses the educational aspects of the program of the Center for Documentation and Communication Research began to take form. It was exciting to see the Center grow, to watch it expand from one office, to two, and then to a whole house which also became quickly overcrowded as the research program developed. In the winter of 1956-57, I remember very clearly a faculty meeting at which Mr. Perry, pre-occupied with drawing diagrams for a series of electric circuits, suddenly declared he had the idea for a searching machine which would be really suitable for subject information work. Shortly thereafter he produced a small prototype about the size of a bread-board, and then began the construction of his large searching machine in the basement of Dean Shera's home. This, though cumbersome because of its use of hand wired electric relays, showed the basic principles of computer operation, and actually carried out extensive literature searching investigations while research for the American Society for Metals literature searching service was being developed. (This was the machine which was

shown at Keio in the summer of 1960 in the motion picture about the development of the American Society for Metals project.) Even my non-technically minded students found it was fascinating to watch this machine, its flashing lights, its noisy clackety-clack, its Flexowriter input tape, and its ringing bells. No modern, neatly covered, high-speed computer seems to have the impact on the students which our early "monster" did! (The principles worked out in this machine were eventually used by the General Electric Company in their GE 225 computer.)

As the program of the Documentation Center began to expand, it seemed necessary to plan my survey course to fit in, and to serve in part as a "feeder" to the Center's offerings, but it continued also to serve as an orientation to the meaning of documentation to non-documentation minded students as well. From the beginning my purpose had been to present the problems of complete documentation at an elementary level, to try to open the eyes of all who elected the course (and this included most of those specializing in adult library services) to the exciting developments which were happening all around them. Many of the students were not scientifically oriented nor even interested in the problems of the organization of scientific literature. They had a dread of mechanization of anything, and the idea of computers terrified many of them. I tried to emphasize the significance of these modern developments as they might apply in any subject area, and watched anxiously for articles which might show the needs for documentation improvements in the humanities and social sciences. I always tried to stress the relationship of traditional librarianship to the field of documentation. The intricacies of mechanized devices, the mathematical bases of computer "language", the highly specialized research in language, coding, etc. were never stressed, but their significance was mentioned over and over.

By 1956 the literature of documentation was becoming much more voluminous and also more and more specialized. I found that keeping up with the literature, and selecting readable

articles for the neophyte became increasingly difficult. The mass of reports of individual experiments, of beginning theory, the over-enthusiastic descriptions of new "hardware", required careful scrutiny before readable and sound articles could be selected for beginning students. My series of reading lists on many aspects of documentation began to assume considerable size. With such a rapidly changing field, the practicality of a textbook seemed questionable. Even today, when a few textbooks have appeared in specialized areas of documentation, there is nothing which can take the place of wide reading in many sources. (It is, unfortunately, becoming more and more difficult to find up-to-date articles at the elementary level!)

In more recent years many other trends and developments have been reflected in the survey course content. The use of computers for concordance making, KWIC indexes and book catalogs, the development of indexing and retrieval systems such as MEDLARS, research going on in automatic translation, abstracting, the development of computer languages such as FORTRAN, SYNTOL are touched upon, and pertinent readings provided as far as possible. At present the following topics are covered in my survey course, each accompanied by a carefully selected reading list:

- The scope of documentation today. Its relationship to librarianship
- Historical background
- The literature of documentation
- Recording, transmission and publication of research
- Translation problems and research
- Microforms, copying, copyright
- Bibliographic organization, national and international
- Bibliographic standardization
- Developments in inter-library cooperation—  
Union lists, catalogs and information centers
- Mechanization and library catalogs
- Mechanization and permuted, concordance, or KWIC indexes
- Citation indexes
- Table of contents and other current awareness

- services
- Subject approaches to information—The general problem
- Abstracting methods; Current services and their problems
- Indexing by conventional means
- Classification research
- Non-conventional systems for subject analysis, manual and mechanized
- Modern information storage and retrieval systems and the place of the computer.

At the end I try to summarize a few of the latest "far out" experiments and spend a little time thinking of the future. (This sometimes sounds like science fiction!)

As the program in documentation has expanded, the make-up of my student group has changed, and more students who are really interested in advanced work in the field have come into the class. Even for them, however, the background story and the wide reading seem to be useful. They are free to read more advanced material and they contribute actively in class discussions. This course, which is terminal for the non-documentalist, is regarded at present as a pre-requisite for those who wish to go further into the field.

I shall not try to report in detail the chronology of additions to the specialized courses offered by the Center for Documentation and Communication Research, but will simply list the titles of courses, with the years in which they first appeared in our catalog. (In many cases the courses were actually offered a year before they appeared in the catalog, because copy for that publication had to be prepared far in advance.)

- 1958 Library and Industrial Applications of Microrecording. (Dropped after two years)
- 1959 Special Studies in Documentation
- 1960 Specialized Information Centers
- 1961 Information Processing on Computers. (The GE 225 was added to the Center's facilities in late 1960 or early 1961)
- 1962 Machine Literature Searching II. Numeric Orientation to Computers.

The 1963/64 catalog listed no changes, but

actually several new courses were offered, and the scope of others changed. The present list of courses includes, beyond the introductory Documentation survey, the following :

**Automation of Library Processes and Procedures :** Survey and evaluation of the possible uses of data processing equipment within the traditional library functions—administration, acquisitions, catalog production, circulation, intercommunication, etc. Punch cards, computers, micro-records, photography, and visuals; comparative costs; library current installations.

**Information Retrieval Systems I :** Analysis of retrieval systems. Review of conventional and non-conventional means of acquisition, analysis, coding, storage, file organization, retrieval, and display of information. The structure and use of indexing languages is related to computerized and manual indexing systems. User needs and the systems approach.

**Information Retrieval Systems II :** Practical experience with respect to the operation of an information retrieval system. Component parts of a total system will be analyzed to illustrate their interaction.

**Information Processing on Computers :** Historical review of computer developments, functions performed, and organization of computers. Punched card systems and stored-program computers surveyed in terms of information retrieval, scientific and business parameters. Principles of programming, systems organization, and symbol manipulation, with emphasis on application of high speed computers.

**Automatic Language Processing :** Survey of computational linguistics and statistical approaches to processing text with emphasis on their application to information retrieval systems.

**Introduction to Information Retrieval Theory :** An elementary treatment of certain mathematical tools needed in the construction of abstract theories and models in the field of information retrieval. Application of these tools to the design and evaluation of retrieval systems.

**Specialized Information Centers and Services :** A review of the principal U.S. information centers and abstracting-indexing services. Differences between libraries, information centers, and information services are explained in terms of user groups, objectives, types of information

provided, and the systems utilized to implement objectives. The role of coordinating agencies (such as the National Federation of Science Abstracting and Indexing Services, the National Referral Center for Science and Technology, and the Science Information Exchange) is analyzed.

**Research in Information Retrieval :** Opportunity will be provided for registrants to participate in Center research activities connected with projects such as the Comparative Systems Laboratory.

Besides these courses, mention must also be made of Dean Shera's course on the *Theory of Classification* which has been offered since 1953, and which covers an important area of documentation.

Even now there is discussion of further change and expansion of the curriculum. The developments in Information Science, (both real and terminological) the increasing demand for work beyond the Master's Degree or at the Doctoral level, keep the Center and the rest of the Library School in a state of flux concerning the documentation program. The research program at the Center has attracted specialists from the United States and from other parts of the world, and visiting scholars and practitioners of distinction frequently are to be found spending several weeks or months at Western Reserve. They have contributed several valuable series of lectures, as well as advice for the developing program. The work of the Center, much of which is interdisciplinary in nature, can provide the basis for much more advanced study of the generation and transformation of information, systems design and testing, library automation, indexing languages, file organization and the automatic processing of natural language text. There seem to be strong influences which would like to promote the development of an Information Science curriculum outside the current library school program, one which would still take cognizance of important library-developed procedures, but one in which the orientation of courses would be specifically keyed to the sciences. Whether this will ever materialize remains, of course,



to be seen. Convinced as we have been that librarianship and documentation are interlocking disciplines, movements which might tend to separate them farther will need to be weighed very carefully.

What is the future for the original Documentation course? I am sure that as specialization, and new workable methods in Documentation and Information Science increase, there will continue to be a great need for a survey course which will serve as a bridge between traditional or conventional aspects of librarianship and the areas of documentation research, I have always tried to convey the idea that documentation and librarianship are integral parts of the communication of recorded information, that each has, and still can contribute to the betterment of the other and that

there must be understanding of the purposes and accomplishments of both disciplines by the other. Perhaps, sometime in the future, if the proportion of students wishing to specialize in documentation grows, or if a separate program for Information Science is developed, it may be feasible to offer two survey courses with somewhat different orientation, one still aimed at giving the librarian who does not wish to specialize in Documentation a fuller understanding of its purposes, and contributions to library progress, and another developed to give the documentalist or information scientist an over-all picture of the relationship and interaction between documentation and librarianship, and a recognition of the contributions of the librarian. One thing seems sure, the course can never remain static!