

## Research in Library Reference/Information Service

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IN 1967 GUY GARRISON asked whether it was even possible to conduct research on library reference/information service.<sup>1</sup> He answered his own question in the affirmative but went on to stipulate conditions for that response. Garrison's speech provides a conceptual base for this article rather than the earlier issues of *Library Trends* which only partially covered the territory I hope to explore.<sup>2</sup>

The title includes the clumsy compound "Reference/Information Service" because the two terms have never been carefully distinguished in the past and certainly are not clearly separated in current parlance.<sup>3</sup> Instead of attempting to choose one and explain away the other, this article will simply accept the compound and modify Rothstein's classic definition of traditional reference service.<sup>4</sup> I will use the phrase "reference service" when the author of a particular article uses it and will speak of "reference/information service" when an author uses the phrase or when making general comments.

For this article, then, library reference/information service is the personal assistance given by a librarian either in the form of referral to likely sources of information or in the form of information itself. This review will focus on the provision of information in response to questions, and will not cover research on other activities traditionally associated with library reference departments such as bibliographic instruction or interlibrary loan. Although some may object to this restriction, I do it in the interest of expansion in another direction.

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In his perceptive speech on "Research in Reference: Is It Possible?" Guy Garrison began with the Rothstein definition and followed it with a necessary caveat:

Satisfactory as this may be in discussing the organization and administration of reference work in libraries, it is too narrow to take in all the current *research* that is pertinent to reference work in libraries. In order to see library reference work in a broader setting, I would define it as all the information-gathering activities of people, the roles which libraries play in these activities, and the impact of these activities on libraries.<sup>5</sup>

Garrison's point is well taken. I agree with him and assume that the body of research relevant to library reference/information service includes much more than studies conducted in or about libraries.

Research is, perhaps, a more difficult term to define since the word is very widely used and means many different things to different people.<sup>6</sup> Here again, Garrison's speech is helpful. He cites Jesse Shera, whose classic definition, based on Francis Bacon and Charles Darwin, describes research as: "An answering of questions by the accumulation and assimilation of facts which lead to the formulation of generalizations or universals that extend, correct, or verify knowledge."<sup>7</sup> Although Garrison accepts this definition and believes that "much of what passes for research, such as the endless surveys of reference resources and reference needs, is not research and should not be so considered,"<sup>8</sup> he does consider some such studies in his speech as well as those which are based on a broader concept of reference/information service and a more scientific definition of research. Like Garrison, I will take a broad view of what research is relevant to library reference/information service; I will favor a scientific understanding of research without completely rejecting the fact-finding activities related to it, in that they are disciplined inquiries which yield useful information. I will describe work which, in my judgment, is either important in itself, valuable for its contribution to a group of related studies, or useful as a base for future investigations. My focus will be on the last ten years, although I may occasionally go back further in order to call attention to influential material. With the exception of a few items from England or Australia, the work selected for comment here was done in the United States.

### **Domain**

Garrison began his speech by describing what Marcia Bates would call the "domain" of his review, i.e., "the bibliographic territory searched."<sup>9</sup> My search has been less direct than Garrison's but it can be

## Research

described for the benefit of those who wish to go beyond what can be covered in this article. I began by scanning the chapter on "Research in Reference" in Murfin and Wynar's bibliography<sup>10</sup> and examining the titles of dissertations listed under the heading "Reference service" in the Davis bibliography of completed dissertations<sup>11</sup> and the Lundeen list of dissertations in progress.<sup>12</sup> If I was not already familiar with work cited in these dissertation bibliographies I searched for articles by the authors or tried to contact them directly. Next I reread several review articles which had come to my attention and skimmed several bibliographies on the reference interview.<sup>13</sup> At one point, I requested online searches of the ERIC and LISA databases but this effort proved unproductive. There is no simple term or combination of terms that will retrieve articles describing research in this area and other sources were already providing a sufficient number of items. Next, I checked the last ten years of *RQ*, the official journal of ALA's Reference and Adult Services Division, paying particular attention to Charles Bunge's columns on "Research in Reference" which appeared irregularly from 1968 to 1972. I also checked the contents of *College & Research Libraries* from 1972 to date, the contents of the *Journal of Academic Librarianship* which began in 1975, and the complete file of *Library Research* which began in 1979. Finally I searched my personal files of material and discussed the topic with colleagues.

### Framework

In 1967 Garrison suggested that, because reference work is only one small piece of the information flow process, "we need two definitions of reference—one for administrative purposes inside libraries and another for research purposes."<sup>14</sup> In 1982 it seems that there are at least four perspectives from which to examine library reference/information service—all of them receiving attention from persons who do research. Some have focused on the description of reference/information service as it exists in libraries today. Others have studied the *raison d'être* of library reference/information service—the needs of people for information. Coming closer to what happens when people use library reference/information service, some have studied the process of asking and answering questions in libraries. Others have examined the same process in a broader context. Many of the latter have not been particularly interested in library reference/information service, but their work is still of great value to librarians, and needs to be considered in a comprehensive view of research on reference.

## **The Description of Library Reference/Information Service**

Until the mid-1960s, descriptive studies of reference service usually focused on measuring it either in terms of what sources were being used, by whom, and how often or by recording data on the types of people asking questions, the topics of the questions, or the time it took to answer them. The nature of the service was stable and quality was not being investigated. Recent years, however, have seen the emergence of several different kinds of studies. Measurement is still a concern but the focus has changed, and there is a new interest in examining how potential users perceive reference/information service. Evaluation has become more realistic and new forms of reference/information service have been carefully examined.

### **Measurement**

Rothstein in 1964<sup>15</sup> and Weech in 1974<sup>16</sup> described many studies measuring reference service in various ways, but these efforts were largely local and/or occasional rather than national and periodic. Currently, there is interest in establishing definitions and procedures which would make national periodic surveys possible.

Because librarians have not agreed on definitions for the activities that constitute reference service nor on how to count those activities, data are not available to indicate how much library reference service is provided in this country and how the amount varies from year to year or from library to library. Scholars from outside the library community who wish to analyze library service levels usually employ circulation statistics. They do this not because reference/information service is necessarily considered unimportant but because reliable statistics on this service are just not available.<sup>17</sup>

During the 1970s reference librarians working through the Committee on Reference Statistics of the ALA Library Administration Division's Library Organization and Management Section, established basic definitions that could be used nationally to count "information contacts" and persuaded the National Center for Education Statistics (NCES) to use those definitions in its periodic surveys of various types of libraries. The effort to establish definitions was one which involved years of committee work and considerable discussion in the library community.<sup>18</sup>

It is unclear at this writing whether enough libraries will use the definitions correctly in gathering data for subsequent reporting to NCES to make the results a valid indicator of reference service in any one

## Research

stratum of the library community. The tools have been prepared, however, and there have been programs at every recent ALA Annual Conference to help reference librarians gather valid statistics.

Several attempts have been made recently to relate the volume of reference service to other measurements of library activity.<sup>19</sup> The most impressive of these is an analysis of the volume of reference transactions in the twenty-three departmental libraries of Ohio State University by Marjorie Murfin and Fred Ruland.<sup>20</sup> The investigators began the study wondering, "Is there any useful purpose served by collection of reference statistics on any but a local level?" After working out a logical explanation of factors that might influence the volume of reference transactions and using data collected for NCES in statistical tests which revealed correlations between that volume and other library service variables, Murfin and Ruland conclude that national measurement is useful, especially if several relatively simple changes are made in the way data is collected and presented by NCES.

Murfin has completed an analysis of data on reference activity in the recent NCES report of college and university library statistics. In order to perform analysis similar to what was done at Ohio State she had to supplement NCES data with additional data gathered through her own questionnaire. An article reporting Murfin's findings has been accepted for publication in *College & Research Libraries*.<sup>21</sup>

Paul Kantor, who developed several measures of reference service as part of the LORCOST (Levels of Output Related to Cost of Operation in Scientific and Technical Libraries) Project funded by NSF, has suggested that these measures might be used by NCES to accumulate national data on the availability of reference service.<sup>22</sup> The LORCOST study was done in cooperation with a national sample of seventy-three scientific and technical libraries, sixteen of which were involved in the study of reference services. Kantor used observational data to measure the availability of reference services (e.g., hours reference service is offered per week, time patrons spend waiting, probability someone is ready to serve, time spent assisting patrons) and self-reported data to measure "behavioral outcomes" of the reference encounter ("patron satisfied," "patron quits," "refer elsewhere," "give up," and "try again"). In cases where patron was not satisfied, "causal factors" are analyzed (e.g., "question not made clear," "could not think of source," "we don't have source," "source does not have information"). Kantor is using this technique in other studies and makes both forms and analysis available commercially.<sup>23</sup>

Two studies measured the degree to which potential users are aware of reference service. In both cases, the investigator explored awareness of many services of a reference department besides question answering, though the latter was an element in both studies. Jerold Nelson sent a questionnaire to a sample of faculty members at six very similar colleges in California.<sup>24</sup> Of the eleven references service listed, "answer to a factual question" was a service known to just 61 percent of the 694 respondents; five other services were better known. Mollie Sandock interviewed a small sample of students at one large urban university.<sup>25</sup> Although the sample was very small, the study was carefully done and revealed that only 42 percent of the students knew the reference department would answer a factual question, while 26 percent were sure it would not.

Two other studies explored a query which often puzzles eager reference librarians—"Why don't they ask questions?" Mary Jane Swope and Jeffrey Katzer interviewed a sample of library users at Syracuse University to determine what proportion of them had questions and what proportion of those who did have questions would ask a librarian for assistance.<sup>26</sup> Of the 119 persons interviewed 41 percent had questions but 65 percent of them would not ask a librarian. The sample was small but in ten years the findings have not been seriously challenged. Linda Lederman explored the possibility that people do not ask questions because of "Communication Apprehension," a phrase communication theorists use to identify a "fear of talking."<sup>27</sup> Although findings did not support her hypothesis, the study is a useful example of the possible value of communication research to the understanding of library reference/information service.

## Evaluation

In 1974 Weech described the innovative technique called "unobtrusive testing" which Terence Crowley and Thomas Childers used in their doctoral dissertations to evaluate the accuracy of answers given by public libraries.<sup>28</sup> The technique was used widely during the 1970s but not in any study large enough to have generalizable results until late in the decade when the Suffolk Cooperative Library System asked Childers "to perform a massive study of reference performance."<sup>29</sup> As in his dissertation, Childers found that the client's chance of getting a correct answer is about fifty-fifty. He also concluded that because both correct answers and incorrect answers occurred in libraries with various characteristics, it is difficult for a client to predict the quality of response he will receive from a particular library on a particular question.<sup>30</sup>

## *Research*

Robert Haro's review of the dissertations by Crowley and Childers suggested that the findings had serious implications for academic libraries.<sup>31</sup> Marcia Myers investigated those implications in a study of telephone reference service in academic libraries.<sup>32</sup> Using unobtrusive measures, Myers found that academic libraries in the Southeast gave correct responses 49 percent of the time. Her study also used various statistical tests to establish the relationship between percent of accurate answers and such variables as size of library collection, size of reference collection, number of hours the library is open and number of hours reference service is offered.

Ronald Powell investigated similar relationships in his recent doctoral study.<sup>33</sup> Powell used a set of test questions administered obtrusively to investigate the relationship between reference performance in public libraries and several quantifiable reference variables. Like Myers, he found a strong relationship between size of reference collection and the ability of librarians to answer questions accurately. Other variables investigated were the number of reference and bibliography courses completed by participating librarians, experience of participants, and number of questions participants answer per week.

In their unobtrusive tests of reference service Crowley, Childers and Myers used questions seeking specific facts. A recent study of three college libraries in Australia used questions seeking general information.<sup>34</sup> Janine Schmidt's research was viewed by the investigator as "a pilot study to test a methodology."<sup>35</sup> It is still interesting to note that findings—the user has at best an equal chance of receiving a completely correct answer—are similar to those of Childers and Myers.

In the full report of his Long Island study, Childers raises several questions about unobtrusive testing including the following methodological question:

Would library staff perform differently on the same test of reference/information performance administered (a) unobtrusively and (b) obtrusively, as an overt test. To date no systematic exploration of this rather basic question has taken place. There are a number of obtrusive and unobtrusive tests of reference/information performance; yet they have all employed different test questions, thereby precluding close comparison of the two techniques. A systematic study of the differences would begin to indicate whether the higher cost of the unobtrusive method is worth it.<sup>36</sup>

The complexities of trying to answer this question are many but Weech and Goldhor have completed a pilot study that deals with some of them and concludes that results are different with the two methods.<sup>37</sup> Whether

the difference is truly worth the cost is a question that cannot be answered with the evidence available at this time.

### **Innovation**

Perhaps the most revolutionary development in library reference/information service in the past ten years has been the introduction of what was once called "computer-based reference service" but is now more likely to be called "online search service." Originally, computers were used to search bibliographic databases in the batch mode, but now both bibliographic and nonbibliographic databases are usually searched interactively, i.e., online. The introduction of this innovation to libraries and other information centers has inspired a number of studies. Two of the most useful were done by corporations that were and are vendors of the services—SDC and Lockheed.

The SDC study was a survey of users of online services as of 1974-75.<sup>38</sup> All organizations subscribing to any one of ten major search services were asked to be involved in the study which was funded by the National Science Foundation. Questionnaires were returned by 472 managers and 801 searchers; onsite interviews were conducted with twenty-five organizations and fifty individuals. More than 80 percent of those who returned questionnaires were "working in libraries and traditional information service units."<sup>39</sup> The questionnaire and interviews asked about such matters as: how the services were introduced; selection and training of staff; selection, access and use of online systems and online databases; costs of using online services; problems and challenges involved; areas of impact. The SDC survey provided essential information at an early point in the dissemination of this innovation and has already proved to be useful as a source of baseline data.

The Lockheed study was very different. In the mid-1970s Lockheed conducted an experiment called DIALIB which investigated the use of the public library as a linking agent between the general public and the databases available through the Lockheed DIALOG system.<sup>40</sup> Four public libraries in California participated in the three year experiment which was carefully monitored by Lockheed and by researchers under contract to the vendor. Numerous reports on DIALIB have appeared in the library literature.<sup>41</sup> In sum, DIALIB found that people will use a public library to gain access to a search service, that libraries can offer the service without major difficulty, and that people are willing to pay fees for searches in public libraries.

This last matter, fees for searches in libraries supported by public funds, was one of the most hotly-debated issues of the 1970s and inspired

## Research

a number of data-gathering efforts. They will not be described here because most are covered in the bibliographic essay appended to *Financing Online Search Services in Publicly Supported Libraries*, the report of an ALA survey.<sup>42</sup> Describing the practices of 985 such libraries, this publication reports that 72 percent charge a fee of some kind but most charge only for certain cost categories—those that are directly related to a specific search. The ALA report, which presents financial data for several different types of libraries, also contains data on other aspects of the online services such as the number of searches per year and the length of time a library has been offering the services.

The British Library Research and Development Department (BLR&DD) also funded a number of projects concerned with the use of online bibliographic services. Those involving public libraries are described in a report edited by Nick Moore.<sup>43</sup> The first of these, the BIROS (Bibliographic Information Retrieval Online Service) Project, involved cooperation between the Lancashire Library, the library school at Manchester, and BLR&DD. It “took the form of action research that is introducing the service and investigating the consequences”<sup>44</sup> and used such methods as studying online search logs, and interviews with staff and users. BIROS was complemented by experiments with online search services in different parts of Great Britain all under the umbrella title of “The Guidelines Project.” One result was a set of guidelines developed by Stella Keenan to “suggest a sequence of actions and decisions that must be made if an authority is considering the establishment of an on-line information-retrieval service.”<sup>45</sup>

A less technology-intensive innovation, Information and Referral service or I&R, has been documented by Thomas Childers. His federally financed study, beginning in 1977, was designed to have two phases:

In its first phase, the project will describe the extent and nature of I&R in enough public libraries to provide a reasonably accurate national picture. In the second phase, I&R will be described in seven libraries in enough detail to share those libraries' I&R experiences with the field.<sup>46</sup>

Childers has reported on both phases in a book on *Information and Referral Services: Public Libraries*, scheduled for publication by Ablex in 1983.<sup>47</sup>

I&R services in British libraries are usually called community information services. Two recent projects, both supported by the British Library (BLR&DD), have attempted to collect, organize and disseminate community information through public libraries by using Prestel, the viewdata system created and maintained by the British Post Office.

The Aslib Research and Consultancy Division directed and monitored the first attempt which involved six central reference libraries in the London area. Results are "characterized by the lessons learnt and difficulties outlined more than the hard data obtained."<sup>48</sup> A second BLR&DD sponsored study of community information on Prestel was conducted by the London and South Eastern Library Region (LASER).<sup>49</sup>

In both projects, the role of the library as information provider was only part of what was studied. Equally or more important in both cases was investigation of the public library as a site where the public can gain access to information from over 500 sources available on Prestel. The second project (LASER) was built on the first and the two together present an invaluable body of information about the potential of videotext for library reference/information service. Although entrepreneurs in the United States are experimenting with viewdata and teletext services, there have been no comparable published studies of collaboration with libraries. It seems likely, however, that these information services will soon be available in this country and the British results could be very useful to reference librarians.

The most recent descriptive work on library reference/information service covers territory quite different from the studies just mentioned. Supported by funds from the H. W. Wilson Foundation, Bernard Vavrek and others at the Center for the Study of Rural Librarianship at Clarion State University have surveyed libraries serving populations of less than 25,000 to discover the characteristics of reference service in that setting. A report was published as this article went to press.<sup>50</sup>

### Information Needs and Uses

The library reference/information service described in the studies noted above exists because individuals need to use information in various ways. It seems logical, therefore, that research on those needs and uses be considered an important component of research on library reference/information service. Until the 1950s, little research was done on information needs and uses. During that decade, however, people designing retrieval systems for scientific and technical information began analyzing the needs and characteristics of those who used their systems. Results were summarized in bibliographical essays which appeared in the *Annual Review of Information Science and Technology (ARIST)* from 1966 to 1972 and again in 1974 and 1978. The studies were not as useful to system designers as was hoped, partly because they revealed such a wide range of information needs and uses.<sup>51</sup> Generaliza-

## Research

tion based on the studies is not easy, although a Rutgers dissertation has done so with interesting results.<sup>52</sup>

When John Martyn wrote the 1974 review article in *ARIST*, he reported that studies of information needs and uses were beginning to occur in areas outside science and technology. Susan Crawford confirmed that trend in her 1978 review article with a succinct summary of the whole field:

Thirty years later, and after some 1000 papers on information needs and uses, what can we conclude about the state of the art? First, the scope of use studies has been extended to include users in a wide variety of disciplines, among them, psychology, education, policy making, and law. It appears that almost everyone's needs are now being surveyed—senior citizens, urban populations, minority groups, as well as scientists and technicians.<sup>53</sup>

In 1975 Lois Bebout, Donald Davis and Donald Oehlerts proposed a study of humanists' information needs<sup>54</sup> but none was ever done. Recent interest has focused on studies of the average citizen rather than on the specialist. The U.S. Office of Education's unit dealing with libraries (called, at various times, Bureau of Libraries and Learning Resources, Division of Library Programs, Office of Libraries and Learning Resources) has sponsored several studies dealing with information needs.

In 1972 Childers received a federal grant for a digest of the literature and a bibliography on the knowledge/information needs of the disadvantaged which would form a base for future research.<sup>55</sup> Later the same agency funded a study of the information needs of urban residents conducted by Westat, Inc. and the Regional Planning Council of Baltimore.<sup>56</sup> Brenda Dervin's chapter in the report of that project presents a content-analytic scheme of the information needs of the average citizen and reviews research on various aspects of the citizen's information "system." This material was revised and expanded for publication in Kochen and Donahue's *Information for the Community*.<sup>57</sup>

Dervin and others have moved beyond identification of need in a study of "The Development of Strategies for Dealing with the Information Needs of Urban Residents." This study, also funded by the Office of Education, has resulted in several massive reports. These are documented and partially summarized in a conceptual article which argues that this area needs a change of focus.<sup>58</sup> Instead of asking, "What do people want to know?" we should ask, "How can the librarian intervene? What questions can he ask? How can he enter the user's informing processes? What can he deliver that will be 'informing' to that unique individual?"<sup>59</sup>

In a very different study sponsored by the Office of Education, Chen and her associates at Simmons College gathered information for the White House Conference on Library and Information Services.<sup>60</sup> They conducted telephone interviews with individuals in 2400 households to determine the everyday information needs of New England residents and the sources used to satisfy those needs. Libraries were one of the sources but not the most important one. A similar finding was the result of a study to investigate the "Information Needs of Californians."<sup>61</sup> This study was sponsored by the State Library of California and also was intended for delegates to the White House Conference.

A very different perspective on information can be gained from the research of Fritz Machlup, Kenneth Leeson and associates, who examined the economics of how scholarly information is disseminated through the printed word and reported results in four volumes. Machlup is now working on another multivolume work which will have the collective title *Knowledge: Its Creation, Distribution and Economic Significance*.<sup>62</sup> Both of these sets provide essential philosophical and scholarly background for the context within which library reference/information service is offered.

### **The Process of Asking and Answering Questions**

In 1966, at the Columbia University conference on the Present Status and Future Prospects of Reference/Information Service, Alan Rees asked two challenging questions: "Is the reference librarian really necessary? Is it possible for a user with an information need to exploit library resources without the interposition of a mediator?" Then he mentioned several designs for future information systems which assume the absence of the reference librarians, and added:

It is my belief that our limited understanding of the nature of the reference librarian/user dialogue makes it most difficult to formalize and program this process at the present time. It has yet to be proved that an effective programmed dialogue can be maintained at the man-system interface. Would this necessarily be more effective than that achieved by the reference librarian? Is it justified to engineer expensive time-sharing systems on the assumption that an effective dialogue can be achieved? Do we really understand the problem?

A great need for research is apparent, and unless this is undertaken, little more knowledge concerning the reference process will exist in ten years' time than is available at present. It is depressing to consider that insight into the factors involved in providing reference has remained relatively static for more than thirty years. It is becoming increasingly apparent that the behavioral sciences have much to offer

## Research

to librarianship by way of insight and research methodology, and since many of the problems underlying reference work are psychological, some fruitful research might be undertaken. If such research is not conducted within the library profession, it is likely that systems analysts and behavioral scientists will engineer information/reference systems independently, with the reference librarian perhaps eliminated or downgraded to the task of delivering documents or of handling routine factual-type questions.<sup>63</sup>

Other comments in this article make it clear that the reference librarian/user dialogue Rees refers to is the same process librarians recognize as the reference interview, the dialogue with a questioner through which a librarian finds out what he or she really wants to know. Although the interview, sometimes called question negotiation, cannot really be separated from the search which follows, it is useful to consider the interview separately because it has generated so much comment in recent years.

Two annotated bibliographies on the reference interview were published in 1979. O. Gene Norman's selected list, which emphasizes the ten years previous to 1979, includes forty-four items.<sup>64</sup> A comprehensive bibliography by Wayne Crouch entitled *The Information Interview* covers literature since 1960 and includes seventy-six items.<sup>65</sup> Only 25 percent involved some type of systematic research.

Two of the research items in the Crouch list report on a National Science Foundation sponsored study to "model the user interface for a multi-disciplinary bibliographic information network."<sup>66</sup> The Office of Computing Activities at the University of Georgia and the Campus Computing Network at UCLA "investigated the interactions occurring between users of computer-based bibliographic data bases and the intermediaries (librarians and profile analysts) who prepare search profiles and analyze the search results."<sup>67</sup> James Carmon reported that the investigators recognized in traditional library reference service and interface with users similar to what they were studying and looked for literature which analyzed how reference librarians did their work. They found nothing useful and concluded that "the complexity of the problem has been vastly underestimated."<sup>68</sup> After gathering data from questionnaires, tape recorded interviews, search profiles, profile revisions, and search results they created a model which emphasizes the "non-deterministic" nature of the interview process. Although the project investigated question negotiation with the hope of discovering how it could be programmed for automated systems, the investigators found that "the intermediary is an integral component of the interface and is essential to the adaptive capability of the interface."<sup>69</sup>

That conclusion has not stopped other researchers from trying to automate question negotiation. In fact, this topic has received increasing attention in recent years. The Carmon report is very important however, as the first empirical analysis of what happens in the reference interview. The investigators used several different sources of data to analyze the interview and their conclusions provide useful insights into this phenomenon.

Wayne Crouch and Pauline Atherton recently completed a study for the National Library of Medicine that examined the reference interview as an interpersonal communication phenomenon and sought to identify behaviors that facilitate or impede information exchange. Pre-search interviews were videotaped and analyzed in intensive "debriefing" sessions with both clients and intermediaries.<sup>70</sup>

Since reference librarians have always recognized the importance of the reference interview, one might well ask why it was not analyzed earlier. Examination of the doctoral study by Mary Jo Lynch<sup>71</sup> and reflection on the difference between the interviews she examined and the interviews studied by Carmon and his associates may provide an answer. Interviews preceding data base searches are usually of some length, conducted by appointment and conducted in private. Interviews Lynch examined in a traditional reference setting are usually brief, impromptu, and conducted in public. When the Lynch study was designed, only Robert Taylor<sup>72</sup> and Bernard Vavrek<sup>73</sup> had done research on the content of the traditional reference interview and both relied on the reports of librarians.

Marjorie Murfin and Egill Halldorsson<sup>74</sup> had used a slightly more empirical method but its objectivity may still be questioned. The method Lynch designed is not easy to use and the study probably will not be replicated. Recent work on the content of the reference interview has been done in the online situation and it seems likely that this will continue to be the best research environment. For one thing several paper records can be generated automatically before and during an online search whereas the traditional reference interview disappears without a trace. Also, since clients make appointments for the interview which is expected to take some length of time, it is relatively easy to get their permission to record the event in some way.

Although the substantive content of the traditional reference interview has not been studied often, there have been several studies of the quantity and quality of other forms of communication during the interview. Michael Roloff has summarized this literature in a review article for *Library Research*<sup>75</sup> and made some useful suggestions about

## Research

what work needs to be done in the future. Thomas Eichman has shown how findings from linguistics research can illuminate problematic aspects of this topic.<sup>76</sup>

No discussion of research on the reference interview would be complete without mentioning Gerald Jahoda, who spent several years working with various associates to analyze the whole reference process and develop materials to help students understand it. Jahoda began by analyzing models of the reference process suggested by Rees, Saracevic, Shera, Crum and Bunge and then developing his own.<sup>77</sup> Supported by a grant from the Office of Education, Jahoda tested this model by collecting over 400 questions from reference librarians in twenty-three science and technology libraries and then asking other librarians to indicate the steps they would follow in developing and following a search strategy. Analysis of these responses enabled Jahoda to revise his model of the reference process and develop instructional modules for each step.<sup>78</sup> Question negotiation was one of the six steps in Jahoda's model and the related module contains a "Checklist for Identification of Queries to be Negotiated" and a "Checklist for Evaluating Negotiation."

Jahoda's work covered much more than question negotiation and included several modules for teaching how to search for information once it is determined what information is needed. This topic has received a great deal of attention in recent research and commentary. The 1981 volume of *ARIST* contains a wide-ranging and perceptive chapter by Marcia Bates covering search techniques from a psychological point of view, i.e., studies which focus on "the subjective experience of the human being who is doing the searching."<sup>79</sup> Carol Fenichel contributed an excellent review of research on online searching to a recent issue of *Library Research*.<sup>80</sup>

As with the reference interview, it seems likely that future research on searching will be done in the online environment. Records can easily be produced for analysis as was mentioned earlier and the environment is free of the stereotypical notions which have come to be associated with libraries. Traditional reference service will continue to occur, however, and it would seem important that the librarians who do it keep in touch with the findings of research in the online environment. Shera promised years ago that automation would be a boon to the reference librarian primarily because of "the opportunity it affords to analyze the reference process," and suggested that "machine simulation of that process cannot be accomplished without an understanding of the process itself."<sup>81</sup> That understanding will be useful whether or not machines are used.

## Artificial Intelligence

Although Shera did not speak of Artificial Intelligence (AI), he seemed to understand what was coming. Recent years have seen the rapid development of this interdisciplinary field. Linda Smith reviewed "Artificial Intelligence in Information Systems" for the 1981 volume of *ARIST* and defined AI as "research efforts aimed at studying and mechanizing information processing tasks that normally require human intelligence."<sup>82</sup> Smith points out that much AI work is still experimental. She also notes, echoing Shera, that "building systems to perform tasks requiring intelligence may provide insights into how humans perform these same tasks."<sup>83</sup> It is partly for those insights that reference librarians need to be aware of progress in AI.

## Conclusion

The last decade has witnessed considerable research activity in the field of library reference/information service. The future promises a similar level of activity, especially if we can accept as evidence the fact that approximately eight of the twenty topics selected as priorities in *A Library and Information Science Agenda for the 1980s*<sup>84</sup> are related to topics discussed in this review. Since it began, the purpose of reference/information service has been to connect an information system with the human beings who need what that system contains. Information systems have changed as have information needs, but research has only begun to study the many dimensions of the connection.

## References

1. Garrison, Guy. "Research in Reference: Is It Possible?" In *Libraries in Transition: Response to Change. Selected Papers From the North Central Library Conference*, compiled by Bernard Schwab, pp. 44-49. Madison: Wisconsin Library Association, 1968.
2. Rockwood, Ruth H., and Shores, Louis. "Research in Readers' Services." *Library Trends* 6(Oct. 1957):160-70; Rothstein, Samuel. "The Measurement and Evaluation of Reference Service." *Library Trends* 12(Jan. 1964):456-72; and Weech, Terry L. "Evaluation of Adult Reference Service." *Library Trends* 22(Jan. 1974):315-35.
3. Lynch, Mary Jo. "Information." In *The Information Imperative for Libraries: Essays in Honor of Margaret E. Monroe*, edited by Gail Schlachter, pp. 21-41. Littleton, Colo.: Libraries Unlimited, 1982.
4. Rothstein, Samuel. *The Development of Reference Services Through Academic Traditions, Public Library Practice and Special Librarianship* (ACRL Monographs No. 14). Chicago: ACRL, 1955, p. 3.
5. Garrison, "Research in Reference," p. 44.

## Research

6. Lynch, Mary Jo. "Research as the Foundation for Standards." In *Setting Standards for Libraries* (Papers presented at the ALA Standards Committee Program, 29 June 1981, San Francisco, Calif.). Chicago: ALA, 1982.

7. Shera, Jesse. "Darwin, Bacon, and Research in Librarianship." In *Libraries and the Organization of Knowledge*, edited by D.J. Foskett, p. 209. Hamden, Conn.: Anchor Books, 1965.

8. Garrison, "Research in Reference," p. 44.

9. Bates, Marcia. "Rigorous Systematic Bibliography." *RQ* 16(Fall 1976):17.

10. Murfin, Marjorie E., and Wynar, Lubomyr R. *Reference Service: An Annotated Bibliographic Guide*. Littleton, Colo.: Libraries Unlimited, 1977.

11. Davis, Charles H., comp. *Library Science: A Dissertation Bibliography*. Ann Arbor, Mich.: University Microfilms International, 1980.

12. Lundeen, Gerald, comp. *Doctoral Dissertations in Progress in Library and Information Science*. Honolulu: Graduate School of Library Studies, University of Hawaii, 1981.

13. Bates, Marcia. "Search Techniques." In *Annual Review of Information Science and Technology*, vol. 16, edited by Martha Williams, pp. 139-69. White Plains, N.Y.: Knowledge Industry Publications, 1981; Roloff, Michael. "Communication at the User-System Interface: A Review of Research." *Library Research* 1(Spring 1979):1-18; Smith, Linda. "Artificial Intelligence Applications in Information Systems." In *Annual Review of Information Science and Technology*, vol. 15, edited by Martha Williams, pp. 67-105. White Plains, N.Y.: Knowledge Industry Publications, 1980; Crouch, Wayne W. *The Information Interview: A Comprehensive Bibliography and An Analysis of the Literature*. Syracuse, N.Y.: ERIC Clearinghouse on Information Resources, 1979; and Norman, O. Gene. "The Reference Interview: An Annotated Bibliography." *RSR: Reference Services Review* 7(Jan./March 1979):71-77.

14. Garrison, "Research in Reference," p. 44.

15. Rothstein, "Measurement and Evaluation."

16. Weech, "Evaluation of Adult Reference."

17. See, for example White, Lawrence. *Is Productivity Stagnant in Public Services? Some Evidence from Public Libraries* (Faculty of Business Administration Working Papers Series No. 78-71, July 1978). New York: New York University, pp. 9-13.

18. Emerson, Katherine. "National Reporting on Reference Transactions, 1976-78." *RQ* 16(Spring 1977):199-207.

19. Kaske, Neal K., and Aluri, Rao. "Analysis of LIBGIS 1977 Data on Reference Statistics" (ED 202 468). June 1980; Harter, Stephen P., and Fields, Mary Alice S. "Circulation, Reference and the Evaluation of Public Library Service." *RQ* 18(Winter 1978):147-52.

20. Murfin, Marjorie, and Ruland, Fred. "Measurement of Reference Transactions: An In-Depth Statistical Study of Demand and Capacity in Twenty-two Libraries Over a Two Year Period." In *Library Effectiveness: A State of the Art*, edited by Neal K. Kaske and William G. Jones, pp. 194-217. Chicago: Library Administration and Management Association/ALA, 1980.

21. Marjorie Murfin to Lynch, personal conversation, March 1983.

22. Kantor, Paul. "Quantitative Evaluation of the Reference Process." *RQ* 21(Fall 1981):43-52.

23. Forms and analysis are available from Paul Kantor, President, Tantalus, Inc., 2140 Lee Road, Cleveland, Ohio 44118.

24. Nelson, Jerold. "Faculty Awareness and Attitudes Toward Academic Library Reference Services: A Measure of Communication." *College & Research Libraries* 34(Sept. 1973):268-75.

25. Sandock, Mollie. "A Study of University Students' Awareness of Reference Services." *RQ* 16(Summer 1977):284-96.

26. Swope, Mary Jane, and Katzer, Jeffrey. "Why Don't They Ask Questions?" *RQ* 12(Winter 1972):161-66.

MARY JO LYNCH

27. Lederman, Linda C. "Fear of Talking: Which Students in the Academic Library Ask Librarians for Help." *RQ* 20(Summer 1981):282-393.
28. Weech, "Evaluation of Adult Reference," pp. 327-29.
29. Childers, Thomas. "The Test of Reference." *Library Journal* 105(15 April 1980):925.
30. *Ibid.*, p. 927.
31. Haro, Robert P. "Review of Crowley T., and Childers, T. *Information Service in Public Libraries: Two Studies.*" *College & Research Libraries* 33(Sept. 1972):411-12.
32. Myers, Marcia. "The Accuracy of Telephone Reference Services in the Southeast: A Case for Quantitative Standards." In *Library Effectiveness: A State of the Art*, pp. 220-33. After this article was completed, I learned that Jassim Jirges's dissertation (Rutgers, 1980) involved unobtrusive testing of telephone reference service in academic libraries in the Northeast. His findings will be published with those of Marcia Myers in a book with the tentative title of *Telephone Reference/Information Service in Academic Libraries: Two Studies* scheduled for publication in late 1982 by Scarecrow.
33. Powell, Ronald. "An Investigation of the Relationships Between Quantifiable Reference Service Variables and Reference Performance in Public Libraries." *Library Quarterly* 48(Jan. 1978):1-19.
34. Schmidt, Janine. "Evaluation of Reference Service in College Libraries in New South Wales, Australia." In *Library Effectiveness: A State of the Art*, pp. 266-94.
35. *Ibid.*, p. 289.
36. Childers, Thomas. *The Effectiveness of Information Service in Public Libraries: Suffolk County: Final Report*. Philadelphia: School of Library and Information Service, Drexel University, 1978, p. 21.
37. Weech, Terry L., and Goldhor, Herbert. "Obtrusive versus Unobtrusive Evaluation of Reference Service in Five Illinois Public Libraries: A Pilot Study." *Library Quarterly* 52(Oct. 1982):305-24.
38. Wanger, Judith, et al. *Impact of On-Line Retrieval Services: A Survey of Users 1974-75*. Santa Monica, Calif.: System Development Corporation, 1976.
39. *Ibid.*, p. 231.
40. Summit, Roger, and Firschein, O. *Final Report: Investigation of the Public Library as a Linking Agent to Major Scientific, Educational, Social and Environmental Data Bases*. Palo Alto, Calif.: Information Systems Programs, Lockheed Palo Alto Research Laboratory, 1977.
41. See, for example Cooper, Michael D., and DeWath, Nancy A. "The Cost of On-Line Bibliographic Searching." *Journal of Library Automation* 9(Sept. 1976):195-209.
42. Lynch, Mary Jo. *Financing Online Search Services in Publicly Supported Libraries*. Chicago: ALA, 1981.
43. Moore, Nick, ed. *On-line Information in Public Libraries: A Review of Recent British Research* (British Library Research and Development Reports No. 5648). London: British Library, 1981.
44. Oulton, Tony. "The BIROS Project." In *On-line Information in Public Libraries: A Review of Recent British Research*, edited by Nick Moore, p. 2. London: British Library, 1981.
45. Keenan, Stella. "The Guidelines Project-Phase I: England." In *On-line Information in Public Libraries*, p. 15.
46. Childers, Thomas. "Trends in Public Library Information and Referral Service." *Library Journal* 104(1 Oct. 1979):2035-39.
47. Thomas Childers to Lynch, personal conversation, May 1982.
48. Sullivan, Katherine. "Prestel and Public Libraries: The Aslib Project." In *On-line Information in Public Libraries*, p. 41.
49. Yeates, Robin. "Prestel and Public Libraries: The LASER Project." In *On-line Information in Public Libraries*, pp. 46-53.

## Research

50. Vavrek, Bernard. *Reference Services in Rural Public Libraries*. Clarion, Pa.: Center for the Study of Rural Librarianship, School of Library Science, Clarion State College, 1982.
51. Martyn, John. "Information Needs and Uses." In *Annual Review of Information Science and Technology*, vol. 9, edited by Carlos Cuadra, pp. 3-4. Washington, D.C.: ASIS, 1974.
52. Poole, Herbert. "Theories of the Middle Range or Information Use by Scientists and Engineers in Formal Information Systems." Ph.D. diss., Rutgers University, 1979.
53. Crawford, Susan. "Information Needs and Uses." In *Annual Review of Information Science and Technology*, vol. 13, edited by Martha Williams, p. 711. White Plains, N.Y.: Knowledge Industry Publications, 1978.
54. Bebout, Lois, et al. "User Studies in the Humanities: Survey and a Proposal." *RQ* 15(Fall 1975):40-44.
55. Childers, Thomas. *The Information Poor in America*. Metuchen, N.J.: Scarecrow Press, 1975.
56. Warner, Edward S., et al. *Information Needs of Urban Residents* (Final report from the Regional Planning Council of Baltimore and Westat, Inc., Rockville, Md., to HEW, Office of Education, Division of Library Programs, under Contract No. OEC-0-71-455). Washington, D.C.: RPC Baltimore and Westat, Inc., 1973.
57. Dervin, Brenda. "The Everyday Information Needs of the Average Citizen: A Taxonomy for Analysis." In *Information for the Community*, edited by Manfred Kochen and Joseph C. Donohue, pp. 19-38. Chicago: ALA, 1976.
58. \_\_\_\_\_ . "Useful Theory for Librarianship: Communication Not Information." *Drexel Library Quarterly* 13(July 1977):16-32.
59. *Ibid.*, p. 29.
60. Chen, Ching-chih. "Citizen Information Seeking Patterns: A New England Study" (Executive Summary Report for the White House Conference on Library and Information Services, Nov. 1979). In *Information Seeking: Assessing and Anticipating User Needs*, edited by Ching-chih Chen and Peter Herson. New York: Neal-Schuman, 1981.
61. King Research, Inc. "Information Needs of Californians." Report commissioned by the California State Library for the California Governor's Conference on Libraries and Information Services, March 1979.
62. Machlup, Fritz, and Leeson, Kenneth. *Information Through the Printed Word: The Dissemination of Scholarly, Scientific and Intellectual Knowledge*, 4 vols. New York: Praeger, 1978-80; and Volume 1 is, *Knowledge and Knowledge Production*. Princeton, N.J.: Princeton University Press, 1980.
63. Rees, Alan M. "Broadening the Spectrum." In *The Present Status and Future Prospects of Reference/Information Service* (Proceedings of the Conference held at the School of Library Service, Columbia University, 30 March-1 April 1966), edited by Winifred B. Linderman. Chicago: ALA, 1967.
64. Norman, "The Reference Interview."
65. Crouch, *The Information Interview*.
66. Carmon, James L. *Model: the User Interface for a Multidisciplinary Bibliographic Information Network-Final Report*. Springfield, Va.: NTIS, 1975.
67. *Ibid.*, abstract.
68. *Ibid.*, p. 7.
69. *Ibid.*, p. 100.
70. Crouch, Wayne W., and Atherton, Pauline. "Presearch Interview Project Progress Report" (ED 205 182), covering 1 May 1979 to 15 Jan. 1980; and Crouch, Wayne. "Verbal Behaviors of Librarians in Presearch Interviews" (ED 205 187), April 1981.
71. Lynch, Mary Jo. "Reference Interviews in Public Libraries." Ph.D. diss., Rutgers University, 1977; and \_\_\_\_\_ "Reference Interviews in Public Libraries." *Library Quarterly* 48(April 1978):119-42.

MARY JO LYNCH

72. Taylor, Robert. "Question-Negotiation and Information Seeking in Libraries." *College & Research Libraries* 29(May 1968):178-94.
73. Vavrek, Bernard. "Communication and the Reference Interface" (Pittsburgh Dissertation Series No. 14, Graduate School of Library and Information Science), Ph.D. diss., University of Pittsburgh, 1971.
74. Murfin, Marjorie, and Halldorsson, Egill A. "The Performance of Professionals and Nonprofessionals in the Reference Interview." *College & Research Libraries* 38(Sept. 1977):385-95.
75. Roloff, "Communication at the User-System."
76. Eichman, Thomas. "The Complex Nature of Opening Reference Questions." *RQ* 17(Spring 1978):212-22.
77. Jahoda, Gerald, and Olson, Paul E. "Analyzing the Reference Process." *RQ* 12(Winter 1972):148-56.
78. Jahoda, Gerald. *The Process of Answering Reference Questions: A Test of a Descriptive Model* (Final Report to HEW, Office of Education, Office of Libraries and Learning Resources, Jan. 1977). (ED 136 769).
79. Bates, "Search Techniques," p. 139.
80. Fenichel, Carol. "The Process of Searching Online Bibliographic Databases: A Review of Research." *Library Research* 2(Summer 1980):107-27.
81. Shera, Jesse. "Automation and the Reference Librarian." *RQ* 3(July 1964):4-5.
82. Smith, "Artificial Intelligence," p. 69.
83. *Ibid.*, p. 90.
84. Cuadra Associates. *A Library and Information Science Research Agenda for the 1980s*. (Final report to the Department of Education, Office of Libraries and Learning Technologies, Sept. 1981.) (ED 211 123).