for computers providing information on the Internet, and the programs presented are themselves virtually standard. They are widely used, easy to obtain, and relatively well supported. (Programs that are freely available are usually provided as is, without any guarantee, and without telephone support. They are well supported by user groups on the Internet accessible through USENET news, etc.). Arguably, this view of the Internet, with UNIX as the preeminent operating system, and freely available programs presented as the standard service programs, might be less defensible in late 1995 than it was when this handbook was written. UNIX might or might not keep its place as the preeminent Internet operating system; the standard programs presented might be augmented or replaced by other programs.—*John P. Edwards, Teachers College, Columbia University*

***Digital Libraries '94: The First Annual Conference on the Theory and Practice of Digital Libraries, June 19–21, 1994, College Station, Texas.*** Ed. J. L. Schnase and others. Hypermedia Research Laboratory, Texas A & M Univ., 1994. 221p.

This book is a compilation of papers presented at the First Annual Conference on the Theory and Practice of Digital Libraries held in College Station, Texas, in June of 1994. Since then, of course, a second conference has been held, and the proceedings of that conference are also available in a separate publication. Both these proceedings and the 1995 proceedings can also be accessed online at URL http://bush.cs.tamu.edu.

The genesis for the 1994 conference was the 1993 solicitation from the National Science Foundation/Advanced Research Projects Agency/National Aeronautics and Space Administration (NSF/ARPA/NASA) that invited universities and their partners in the scholarly and commercial sectors to submit proposals for projects that would implement some aspect of the digital library. The solicitation was deliberately vague so as to encourage maximum creativity in proposals. Because only a few of the many proposals received

were funded, the digital libraries conference was organized as a forum for researchers to air the many diverse ideas contained in all the proposals. Consequently, this book contains papers that describe many of the projects for which proposals were submitted. To ensure the quality of papers presented, the editors report that each received at least three reviews. The result is a high-quality volume of conference proceedings.

The book contains twenty-nine scholarly papers and thirteen position statements—short one- or two-page papers describing digital library research. The authors of the NSF/ARPA/NASA solicitation had hoped that a very wide range of proposals would be generated. The papers in these proceedings reflect exactly that. Rather than coalescing around a single vision of the digital library, they reflect a very wide diversity of ideas and research. These proceedings make it clear that, at the time the papers were written, digital library research was concerned mostly with the pieces that might one day lead to the digital library. The papers are highly diverse, and it is difficult to find common themes that unite them. Probably for that reason, the editors made no attempt to organize the papers by topic. Some papers do not fit neatly into a single category but straddle several. Nevertheless, as diverse as they are, some common strands can be gleaned from the papers.

One group of papers examines the digital library broadly. The authors ask the questions:
• What is a digital library?
• What are the assumptions underlying the digital library?
• What kinds of digital libraries are there (taxonomies)?
• How are they organized?

Six papers deal with these questions, ranging from the philosophical (why should a digital library be called a library?) to the practical (what architectures are most suitable for implementation?). Areas of research that need to be addressed are also discussed in these papers.

A second group of papers examines particular test-bed implementations of digital libraries such as in particular insti-

tutions or in particular topical areas. Nine papers deal with this aspect. Here too the papers are diverse. Some deal with scalability of the digital library in a global environment. Others look at implementation in particular, specialized areas such as forensic medicine and botanical hypermedia information systems. Yet others discuss support for manipulation of large quantities of statistical data and use of the digital library to support science teaching. It is clear from these papers that a great deal of work is being done in testing ideas and models in test-bed initiatives.

The issue of the human-machine interface for a digital library is addressed by four articles. Two deal with interface issues as they apply to the scalability of the digital libraries with very large collections. How can informational content be organized in large collections so that users can identify and select appropriate sources? Others deal more with issues from the user's perspectives—how should users best interact with the digital library?

Seven papers deal with issues of organization of information within digital libraries. Once again, the topics within this group are very diverse. They deal with data compression and indexing; storage and retrieval of videos; finding syntactic and semantic relationships in digital documents; using "community memory" to join large-scale digital libraries with the activities of community members; and using linguistic ontologies to enhance retrieval from large digital databases.

One of the thorny issues, of course, is the relationship between publishing and libraries in a digital environment. Many of the unsolved problems of implementing digital libraries lie in this area. Several of the papers presented deal with this in passing. However, one paper takes a more in-depth look at this future relationship through a description of Project ELVYN—a project that links the Institute of Physics Publishing with a number of academic libraries for the purpose of testing a new model of information delivery from publishers to libraries.

Finally, three papers look at the digital library within the context of intelligent agents of various sorts that will shape the digital library and will allow users unprecedented access to information. There is wide recognition that the digital environment both requires and is amenable to "intelligent" tools for information access. The research reported here looks at three very different projects—intelligent access in a K–12 environment, use of agents for retrieval of digital images, and knowledge-based retrieval from heterogeneous information sources.

The proceedings of this conference were a landmark in the sense that they brought together many of the major players and ideas in what is truly a multidisciplinary field. The list of both individual and institutional participants in this research is very impressive. However, the proceedings also highlight the enormous amount of work, both in research and implementation, that needs to be done before we can truly point to working models of the digital library. The very diversity of the papers indicates that the path to the digital library is a highly complex one. By bringing together so many researchers in so many different fields, the prospect of real progress has been increased considerably. These proceedings and those of the 1995 conference are essential introductions to current thought and research into the digital library of the future.—*Peter Liebscher, Palmer School of Library and Information Science, Long Island University*

***Format Integration and Its Effect on Cataloging, Training, and Systems: Papers Presented at the ALCTS Preconference, "Implementing US-MARC Format Integration," American Library Association Annual Conference, June 26, 1992, San Francisco, California.*** Ed. Karen Coyle. ALCTS Papers on Library Technical Services and Collections, no. 4. Chicago: ALA, 1993. 110p. (ISBN 0-8389-3432-3). LC 93-19721.

"The goal of Format Integration is the creation of a single USMARC bibliographic format that provides the complete range of content designation for all types of materials and in which all information of the same type is identified by the same