General Resources

Resources listed in Chapter 2, "General Resources on Metadata," in the 2002 version of this report (*Library Technology Reports* 38:5) will not be duplicated here. This section will list major general resources that have appeared, or at least were not listed or did not exist three years ago.

Books and Significant Resources

Amy Brand, Frank Daly, and Barbara Meyers, *Metadata Demystified: A Guide for Publishers*. Bethesda, MD: National Information Standards Organization (NISO) Press & The Sheridan Press, 2003, www.niso.org/standards/resources/Metadata_Demystified.pdf (accessed September 27, 2005).

Metadata Demystified: A Guide for Publishers is a resource that provides an overview of metadata standards in publishing. Most librarians are familiar with descriptive metadata standards; this book discusses metadata standards that may be less familiar to librarians, such as ONIX, the JWP on the exchange of serials subscription information, and CrossRef, to name a few.

Priscilla Caplan, *Metadata Fundamentals for Librarians*. Chicago: American Library Association, 2003.

Metadata Fundamentals for All Librarians, by Priscilla Caplan, is a book intended to be an introduction to metadata for those working in the library environment. Although it's not meant to provide a comprehensive listing of metadata standards, it's a good general resource on metadata for librarians. Caplan's book is divided into two parts; one part tackles principles and practices, while the other part covers specific major metadata schemas.

Sheila S. Intner, Sally C. Tseng, and Mary Lynette Larsgaard, eds. *Electronic Cataloging: AACR2 and Metadata for Serials and Monographs.* Binghamton, NY: Haworth Press, 2003.

Electronic Cataloging: AACR2 and Metadata for Serials and Monographs is a republishing of two special issues from the journal *Cataloging & Classification Quarterly.* The work is divided into three parts: fundamentals; how librarians can employ metadata; and AACR2 and metadata. Of particular note in this excellent resource are Michael Gorman's and Brian Schottlaender's opening remarks on metadata, Grace Agnew's chapter on developing a local metadata strategy, and Barbara Tillet's comments on AACR2 and metadata.

Jane Greenberg, "Metadata and the World Wide Web" *Encyclopedia of Library and Information Science,* 2nd ed. Edited by Miriam A. Drake. New York: Marcel Dekker, 2003: 1876–88.

"Metadata and the World Wide Web" is an encyclopedia article that contains some very useful information and recent activity in the area of metadata. It has a well-rounded introduction to metadata, provides some definitions, and features a discussion of metadata generation and metadata-generation tools.

Jane Greenberg, "Understanding Metadata and Metadata Schemes," *Cataloging & Classification Quarterly* 40, no. 3 (2005): 17–36.

Richard Smiraglia, ed. *Metadata: A Cataloger's Primer.* Binghamton, NY: Haworth Press, 2005.

Jane Greenberg provides more outstanding coverage on metadata in the *Cataloging & Classification Quarterly*

article, "Understanding Metadata and Metadata Schemas." Copublished in the book *Metadata: A Cataloger's Primer*, this article is an excellent introduction to metadata schemes, metadata functions, and metadata typologies. A conceptualization for metadata schemes is presented, which emphasizes semantic container-like metadata schemes or data structures. In the last part, Greenberg introduces the Metadata Objectives and principles, Domains, and Architectural Layout (MODAL) framework for studying metadata schemes in the future.

Clare Beghtol and Nancy J. Williamson, eds. *Knowledge Organization and Classification in International Information Retrieval*. Binghamton, NY: Haworth Press, 2005.

The book *Knowledge Organization and Classification in International Information Retrieval* is also a republishing of two special-issues from the journal *Cataloging & Classification Quarterly.* This resource provides a more general, as well as an international, perspective, on information organization and classification. It is mentioned in this report only because metadata fits into these broader discussions. Of particular interest to the library field is Lynne Howarth's chapter on designing metadata-enabled knowledge repositories.

Wikipedia. "Metadata," http://en.wikipedia.org/wiki/Metadata (accessed September 27, 2005).

The definition of "metadata" in Wikipedia—"The Free Encyclopedia that anyone can edit"—and the information presented about metadata in the online encyclopedia's summary are more in line with what's happening with metadata outside of librarianship than within it. Discussions of data warehouse metadata, file system metadata, and program metadata from the corporate environment are the focus in Wikipedia's article. Links to various metadata standards not often discussed within librarianship are provided.

Diane I. Hillman and Elaine L. Westbrooks, eds. *Metadata in Practice.* Chicago: American Library Association, 2004.

Published by the American Library Association in 2004, the book *Metadata in Practice* contains chapters featuring case studies related to metadata implementation and practice. It also includes future-oriented chapters, which discuss the direction that metadata practice/standardization is headed (by providing some futuristic possibilities and forecasting regarding metadata use and practice). Especially worthy of note are: Rachel Heery's chapter on metadata futures; Thomas Bruce's and Diane Hillman's discussion of metadata quality in the future; and Caroline and William Arms's conversation on mixed content and mixed metadata.

Julie Desnoyers, Véronique Moal, and James M. Turner. *MetaMap.* 2004, http://mapageweb.umontreal.ca/turner/meta/english (accessed September 27, 2005).

MetaMap, an innovative, online map constructed to look like a subway map, is a pedagogical graphic to assist the information science community's understanding of metadata standards, sets, and initiatives of interest. (One needs to download the free Adobe SVG [Scalable Vector Graphics] Viewer plugin in order to view the map.) The map shows various relationships between and among numerous metadata standards. The Web site contains detailed information about the *MetaMap* interface as well as information about how and why it was created and assembled.

In this "map," the user can mouse over an acronym or abbreviation to find out what it stands for; to access definitions, the user can click on the acronym or the abbreviation. In addition, the map provides a link to the official Web site of the metadata standard. This online tool is a very detailed and visually exciting way to present current metadata standards and their relationships to one another.

Metadata Demystified: A Guide for Publishers
www.niso.org/standards/resources/Metadata_Demystified.pdf

Metadata: A Cataloger's Primer *Table of Contents*
www.haworthpress.com/store/toc/J104v40n03_TOC.pdf

Knowledge Organization and Classification in International Information Retrieval *Table of Contents*
www.haworthpress.com/store/toc/J104v37n01_TOC.pdf

"Metadata" at Wikipedia
http://en.wikipedia.org/wiki/Metadata

MetaMap
http://mapageweb.umontreal.ca/turner/meta/english

"Metadata and the Web," by Mehdi Safari
www.webology.ir/2004/v1n2/a7.html

TASI Links to Metadata Vocabularies
www.tasi.ac.uk/resources/vocabs.html

Understanding Metadata, *by NISO Press*
www.niso.org/standards/resources/UnderstandingMetadata.pdf

Jody Perkins, "Metadata: What's All the Fuss About?" *TechKnow* 11, no. 1 (March 2005): 4-5

In "Metadata: What's All the Fuss About?" Jody Perkins presents a short and sweet article on the basics of "the what and the why" of metadata.

Mehdi Safari, "Metadata and the Web," *Webology* 1, no. 2 (December 2004), www.webology.ir/2004/v1n2/a7.html (accessed September 27, 2005).

In an excellent *Webology* article, "Metadata and the Web," the author, Mehdi Safari, provides an overall introduction to metadata and its importance in organizing information. In the piece, Safari describes what "ontology" is, and he discusses its importance as an emerging discipline and how it will revolutionize semantic metadata on the Web. In the conclusion, the author states "the key enabler of this knowledgeable Web is nothing but metadata."

TASI (Technical Advisory Services for Images) Links to Metadata Vocabularies, a JISC (Joint Information Systems Committee)-funded service, 2005, www.tasi.ac.uk/resources/vocabs.html (accessed September 27, 2005).

TASI (Technical Advisory Services for Images) Links to Metadata Vocabularies is one of the few portals on the Web listing the major controlled vocabularies, classification systems, and authority lists currently available in multiple disciplines. It also links to a number of documents on metadata, as well as other controlled vocabulary portals.

National Information Standards Organization (NISO), *Understanding Metadata.* Bethesda, MD: NISO Press, 2004, www.niso.org/standards/resources/UnderstandingMetadata.pdf (accessed September 27, 2005).

The NISO online resource, *Understanding Metadata*—a revision and expansion of *Metadata Made Simpler: A Guide for Libraries*—is a very good primer on metadata. It discusses many of the major metadata standards, but it also mentions metadata creation tools and future directions. The bibliography is excellent, citing and linking to many up-to-date resources on metadata and metadata standards.

Journals

Inderscience Publishers, *International Journal of Metadata, Semantics, and Ontologies (IJMSO),* www.inderscience.com/browse/index.php?journalID=152 (accessed September 27, 2005).

The journal *International Journal of Metadata, Semantics and Ontologies* (*IJMSO*) has yet to publish its first issue, but it is the only journal that I know of so far devoted exclusively to metadata issues. It has an international editorial board, and its main objective is to provide an open forum for divergent disciplines to publish differing perspectives regarding metadata creation, use, and assessment. Disciplines initially identified are digital libraries, Semantic Web, library science, and knowledge management.

JMSO (ISSN Online: 1744-263X; ISSN Print: 1744-2621)
www.inderscience.com/browse/index.php?journalID=152

Dublin Core Metadata Initiative
http://dublincore.org/news/meetings.shtml

International Conference on Dublin Core and Metadata Applications 2005
http://dc2005.uc3m.es

Conferences

The yearly **International Conference on Dublin Core and Metadata Applications** originally focused, and still focuses, mainly on the Dublin Core Metadata Initiative (DCMI), but the organizers of it changed its name so discussion and presentation on various topics related to metadata interoperability and future applications can also be examined. The Web page (accessible at the URL http://dublincore.org/news/meetings.shtml) contains links to the various programs and presentations of past conferences, although it is not necessarily user friendly (as each conference has its own Web site and server location). The most recent conference was held in Madrid in September 2005, and the Web portal about this conference is accessible at http://dc2005.uc3m.es.

The International Open Forum on Metadata Registries annual conference, now in its eighth year, is hosted by the International Standards Organization (ISO) and a few other sponsors. Information about these conferences is also not located in one place online, as each host institution constructs its own conference site (which makes each conference hosted at a different server location). Clicking on "Meeting Schedule" on the left-hand gray bar will bring up some meeting Web sites, but the best way to locate them all is to search for the conferences in Google. The latest conference was held in Berlin, and the Web site location is www.berlinopenforum.de.

The Canadian Metadata Forum, sponsored by Library and Archives Canada, held a conference in 2003, and the

second one was held in September 2005. This particular conference focuses on Canadian applications of metadata and discussions on metadata implementation and policy in government. Information about the Canadian Metadata Forum is accessible via the URLs: www.collections canada.ca/metaforum/014005-03200-e.html and www .collectionscanada.ca/metaforum/index-e.html.

The Metadata and Semantics Research (MTSR) Conference is innovative, in that its organizers are offering the conference totally online. Over a ten-day period (November 21–30, 2005), various papers and discussions are scheduled to take place online on the topics of the Semantic Web, reusable learning objects, knowledge management, and cultural heritage.

Accessible at the URL www.metadata-semantics. org, the conference's online pre-proceedings and papers will maximize the virtual interaction and discussion, while post-proceedings papers will provide transcripts of the discussions as well as publication opportunities with an editor. Best papers will be selected for extended publication by various other journals.

Intl. Open Forum on Metadata Registries
http://metadata-standards.org

Open Forum 2005 on Metadata Registries
www.berlinopenforum.de

Canadian Metadata Forum
www.collectionscanada.ca/metaforum/014005-03200 -e.html
www.collectionscanada.ca/metaforum/index-e.html

Metadata and Semantics Research (MTSR) Conference
www.metadata-semantics.org

Metadata and Cataloging Online Resources
www.uwm.edu/~mll/resource.html

Audio Archiving Resources
www.eden.rutgers.edu/~vforrest/poets_house/Audio_ Archiving

Engaging in Metadata Initiatives
http://silver.ohiolink.edu/dms/metadataint.pdf

Research Libraries Group (RLG) Past Work and Current Projects
www.rlg.org/en/page.php?Page_ID=554
www.rlg.org/en/page.php?Page_ID=553

Portals

Although the **Metadata and Cataloging Online Resources** portal does not claim to be a comprehensive bibliography, it is a well-organized online venue that features links to the majority of online resources on metadata. The portal is accessible at: www.uwm.edu/~mll/resource.html. It also contains links to major articles and important resources, including *Understanding Metadata* from the National Information Standards Organization (NISO) and Murtha Baca's *Introduction to Metadata: Pathways to Digital Information* version 2.0.

The **Audio Archiving Resources** Webliography provides access to resources focused on the field of audio archiving. There is a very good section about indexing, cataloging, metadata, and database issues. Other sections of interest are on audio preservation and digitization, copyright/access, digital projects and collections, general resources, related articles, and related professional associations.

Engaging in Metadata Initiatives is a one-page PDF document, which can be viewed as HTML if desired, that provides links to various best practices and standards in metadata practice. The online PDF is accessible at http:// silver.ohiolink.edu/dms/metadataint.pdf.

RLG has completed and continues extensive work in a number of metadata standards, including METS, EAD, OAIS, and technical metadata. Web pages, accessible at www.rlg.org/en/page.php?Page_ID=554 and www.rlg. org/en/page.php?Page_ID=553, provide access to some of the group's projects.

Registries

Although there are no *comprehensive* metadata registries currently available, let alone useable ones, here are some current initiatives:

- **XML.ORG Registry,** accessible at www.xml.org/ xml/registry.jsp, is a central clearinghouse of XML schemas and documents related to metadata. It is supported by the Organization for the Advancement of Structured Information Standards (OASIS).
- **Open Metadata Registry,** accessible at http:// dublincore.org/groups/registry/index.shtml, contains information on registration, reuse, and navigation of metadata element semantics for RDF schemas used and developed by different RDF communities.
- **Schemas-Forum,** accessible at www.schemas-forum. org, is a European-based registry that assists with schema development.
- **Cores Registry,** accessible at www.cores-eu.net/ registry or at http://cores.dsd.sztaki.hu, currently

lists about forty schemes and supports searching and browsing by metadata scheme developer, maintenance agency, element sets, elements, encoding schemes, applications profiles, and element usages.

Rachel Heery, "A Metadata Registry for the Semantic Web," *D-Lib Magazine* 8, no. 5 (May 2002), www.dlib.org/dlib/may02/wagner/05wagner.html (accessed September 27, 2005).

Rachel Heery's article, "A Metadata Registry for the Semantic Web," explores the role of metadata registries and describes three prototypes developed within the Dublin Core Metadata Initiative. What has become of these prototypes since 2002 could not be determined.

Tools

MARC Specialized Tools, accessible at www.loc.gov/marc/marctools.html, is a one-stop clearinghouse for software tools that assist with maintenance and editing of MARC records as well as HTML, SGML, and XML applications having to do with the MARC format. The Library of Congress maintains this Web site. Links to information on MARCXML, MODS, and MADS can be found at www.loc.gov/marc, and information on MARC mappings/crosswalks to other metadata standards can be found at www.loc.gov/marc/marcdocz.html.

DescribeThis, accessible at www.describethis.com, is a tool developed by Dublin Core Services that turns the content of Internet resources into Dublin Core. This software tool has many features including: multilingual functionality; it has an RDF (Resource Description Framework) converter and generator; it has an editor for Dublin Core registers and collections; contains selected dictionaries and thesauri; and has a parser that can recognize and extract metadata for Creative Commons' licenses. It dynamically generates metadata information on the chosen Web site, and it supports the cataloging of online resources as well as automatic metadata management.

Fedora, accessible at www.fedora.org, is open source digital repository software. Currently on version 2.0, Fedora is maintained by the Fedora Project. It has the ability to represent and query relationships among digital objects; has enhanced ingest and export interfaces for interoperability with other repository systems; has enhanced administrative features and improved documentation; and has a simple XML encoding for Fedora digital objects. Version 2.0 also has a Resource Index, a module that allows viewing of objects as a graph of interrelated objects (using an RDF/XML format).

The **My Metamaker** tool, accessible at www.isn-oldenburg.de/services/mmm, assists researchers in physics to markup their online resources in Dublin Core. There is also a version for research groups and institutions. It looks like it is easily portable into other environments.

METALIS, accessible at http://metalis.cilea.it, is an open source service provider for the library and information science community that harvests metadata from institutions offering documents and LIS research. It harvests from a number of data providers, including ArXiv, Caltech Library System Papers and Publications, the Digital Library of Information Science and Technology, and the CNR Bologna Research Library, among others.

MarcXchange, accessible at www.bs.dk/marcxchange, is another MARC to XML tool not included on the Library of Congress Web site. It is hosted by the Danish Library Authority.

Metadata Tools

MARC Specialized Tools
www.loc.gov/marc/marctools.html

DescribeThis
www.describethis.com

Fedora
www.fedora.info

MyMetaMaker
www.isn-oldenburg.de/services/mmm/
www.isn-oldenburg.de/services/mmm-depart/
www.marenet.de/MareNet/tools.html

METALIS
http://metalis.cilea.it

MarcXchange
www.bs.dk/marcxchange

CARL Metadata Harvester
http://carl-abrc-oai.lib.sfu.ca

teiPublisher
http://teipublisher.sourceforge.net/docs/index.php

Tools for Using Dublin Core
http://dublincore.org/tools

MetaLite
http://edcnts11.cr.usgs.gov/metalite

Metabrowser Training Tutorial for Dublin Core
http://gils.utah.gov/dctutorial.htm

The **CARL Metadata Harvester,** accessible at http://carl-abrc-oai.lib.sfu.ca, has been implemented by the Canadian Association of Research Libraries (CARL) to assist in searching CARL's institutional repositories. This group also participates in international metadata harvesting initiatives such as OAIster.

The **teiPublisher** administrative tool, accessible at http://teipublisher.sourceforge.net/docs/index.php, is currently in beta testing. It helps repository administrators with limited technical knowledge manage their digital collections. It is built on the native XML database eXist and the text search engine Lucene. It is extensible, configurable, and modular as an XML-based repository.

A portal of tools and software for using **Dublin Core** metadata, accessible at http://dublincore.org/tools, includes some of the software listed previously as well as access to many others. It is divided into Utilities, Creating Metadata (Templates), Tools for the Creation/Change of Templates, Automatic Extraction/Gathering of Metadata, Automatic Production of Metadata, Conversion between Metadata Formats, Integrated (Tool) Environments, and Commercially Available Software.

MetaLite, accessible at http://edcnts11.cr.usgs.gov/metalite, is a PC-based metadata entry system designed by the United States Geological Survey and the United Nations Environment Programme. It is a simple tool for obtaining and validating Federal Geographic Data Committee (FGDC) compliant metadata.

There are probably many online tutorials for using metadata generation software products, but the **Metabrowser Training Tutorial for Dublin Core** (accessible at http://gils.utah.gov/dctutorial.htm) is a particularly good one. The Utah State Library Division, Metadata Services, has come up with this online tutorial for using the Metabrowser software product as well as learning Dublin Core elements and locally controlled subject vocabularies for GILS (Government Information Locator Service) metadata.

Metadata Registry Initiatives

XML.ORG Registry
www.xml.org/xml/registry.jsp

Open Metadata Registry
http://dublincore.org/groups/registry/index.shtml

Schemas-Forum
www.schemas-forum.org

Cores Registry
www.cores-eu.net/registry
http://cores.dsd.sztaki.hu

Rachel Heery's article: "A Metadata Registry for the Semantic Web"
www.dlib.org/dlib/may02/wagner/05wagner.html