

Center for Research Libraries
Working Group on Cooperative Collection Development in Science and Technology
Report
July 2002

BACKGROUND AND CHARGE

The lively discussion and desire to *do* something about cooperative collection development that characterized the CRL/ARL Aberdeen Woods Conference of 1999 focused on materials in science and technology, among others. As a result the Working Group on Cooperative Collection Development in Science and Technology was formed to explore possible cooperative ventures.

The Working Group, comprised of Christian Filstrup, Julia Gelfand, Vernon Kisling, Jane Kleiner, Diane Perushek (chair), Chestalene Pintozzi, Melissa Trevvett (CRL liaison) and Kathleen Zar, wrote a charge to identify areas on which to concentrate any of the following activities: acquisition and deacquisition, archiving, preservation, assessment of current and previous cooperative projects, identification of granting agencies who may fund the Group's recommendations and partners who may wish to investigate archiving with a library organization. Appendix 3 lists the myriad databases and tools we consulted in fulfilling our charge.

Through a series of meetings and conference calls leading to a survey of global scholarly communication in the sci-tech field, the Group decided to break down its sizable charge into parts. Our desire was to capitalize on the noteworthy work already undertaken by such organizations as SPARC, Earthscape, BioOne and the Digital Library Federation, without duplicating their efforts. Realizing that we could not tackle all of the sciences, we decided that the geosciences offered unique opportunities. We also decided that archiving of materials, especially electronic but including print as well, was the most urgent need in this discipline.

Our reasons for choosing the geosciences are as follows: 1) The scope of the field is broad yet manageable for a project 2) Significant and groundbreaking research is carried on in all parts of the world, including developing countries 3) An analysis using ISI's Journal Citation Report yielded a finite number of titles that could be archived, published by both commercial and society publishers, and governmental organizations at all levels 4) Researchers value and routinely use older materials as well as newly published ones 5) Published materials include maps and other images that would offer challenges for electronic archiving 6) We believed that some publishers would be suitable partners for a project that sought to archive materials electronically 7) There was evidence that funding agencies might be found for such a project 8) Because many journals in the geosciences are published only in print, our recommendations could cover print and born-digital titles.

METHODOLOGY

Through a thorough review of the *GeoRef Priority Titles* and JCR impact factors and total citations, the Group initially selected eight titles to recommend for archiving. Of the eight,

two are published by commercial vendors, and the others by association or society publishers. Some of the publishers already are known to be committed to archiving their electronic titles and collaborating with libraries in this commitment, while others have less formulated approaches to perpetual access and archiving. Thus the level of challenge differs with the publisher as well as with the content.

In the realm of print archives, we did not want to overlook the importance of maintaining print collections though we see this as a second interest at this time because libraries have a long tradition of maintaining print repositories. However, we did note the precarious future of materials from developing countries in general and Russia and the former Soviet republics in particular. Because CRL has made concerted efforts over an extended period of time to collect Russian Academy of Sciences (RAS) materials, we offer a recommendation for ensuring the future collection and retention of RAS publications.

Over the months during which the Group deliberated about geosciences archives, a number of pertinent reports and programs appeared. Some of them may serve as background in carrying out the recommendations below, as is the case with the *E-Journal Archive DTD Feasibility Study* issued in December 2001 by the Harvard University Library Office for Information Systems E-Journal Archiving Project, reports of the LOCKSS Project, etc. The Working Group advises, for example, that the geosciences archiving project follow currently accepted standards for markup language, authentication, etc., rather than undertake to write proprietary standards for this project.

A RELATED PROJECT

One program caused us to change our project proposal in midstream. Previously unknown to the working group, a parallel initiative to form an online geosciences journal repository is being spearheaded by a group of important geosciences societies. Dr. Sharon Mosher, a geosciences faculty member at the University of Texas at Austin, is the Geological Society of America member on the multi-society organizing committee. She provided us with details about this new initiative. Other members of this alliance are the American Association of Petroleum Geologists (AAPG), the Geological Society of America (GSA), the Society for Exploration Geophysics (SEG), the Geological Society of London (GSL), the Mineralogical Society of American (MSA), the Society for Sedimentary Geology (SEPM), and, pending final board approval, the American Geological Institute (AGI). Eventually this organizing group hopes to include a significant number (30-40) of the world's geosciences societies achieving broad representation of all subjects in the geosciences.

The proposed multi-society geosciences electronic journal aggregate would consist of peer-reviewed, high-quality journals chosen from across all the earth and space sciences, and including non-U.S. based journals. Non-profit, professional societies and specialized publishers issue these journals. Several market surveys by the organizing group have led them to agree that such an aggregate is both financially and technically feasible. Our CRL Working Group fully supports this goal. We believe that it will be successful and result in significantly enhanced electronic, full text access and a secure archive for many core geosciences journals.

A POSSIBLE STATE GEOSCIENCES PUBLICATIONS ARCHIVE

Recognizing that the societies' efforts include journals that were originally targeted by our own CRL Working Group project, we decided to review other types of publications in the geosciences to determine which would complement the geosciences journals aggregate. Our decision is to re-focus our efforts on the digital conversion and archiving of the publications of selected state geological surveys. Dr. Mosher supports this direction, and we will explore ways in which the two projects might be linked.

State geological surveys engage in some of the most important and practical fieldwork undertaken by geologists. State geological surveys and maps have had a critical impact in the discovery, exploration, use and conservation of natural resources. State, territorial and federal geographical and geological resource surveys were established in the early days of the American republic to inventory and manage the natural wealth of the country. This mission for these state and federal agencies persists today, often with additional responsibilities to conserve land and water resources, to plan for environmentally sound land use, to assess changes in erosion, the impact of climate changes, and natural hazard risks. Most agencies are also charged with the role of informing and educating their citizenry about natural resources.

Scientists and researchers, students, policymakers, legislators and others in governmental agencies and commercial enterprises use the publications of these agencies. This primary geosciences source literature together with the theses and dissertations that cite these publications merit the attention that improvements in full-text access and preservation will deliver. Patterns of use indicate that earlier published materials retain their value as both historical benchmarks and sources of information for comparative studies of changes in resource availability and landscape use. A few preservation projects of this material have been undertaken for northern California, Florida and Texas. Information about state geological surveys is available from the agency and most importantly from GeoRef, the major indexing source for the geosciences.

RECOMMENDATIONS

In our accompanying proposal (Preliminary Proposal to Create a Persistent Archive of Geosciences Literature) we recommend the establishment of a pilot project to explore the feasibility of converting, archiving and delivering at cost serial publications of U.S. state geological surveys in digital form. This pilot will require the creation of new organizational and technical partnerships in order to master the complexities surrounding such a digital project. We also acknowledge that the library and research communities' confidence in digital reformatting and archiving programs depends as much on the existence of secure and redundant print archives as on the adherence to standards and best practices for digital archives. We believe that it will be important to identify and maintain one or more locations as dependable sources for access to and preservation of geological survey publications. There are a number of candidates for this role including the U.S. Geological Survey library, state geology agencies and the academic community. In the past, the Center for Research Libraries has played a strong role in the acquisition of and access to state publications. We believe that the Center could serve an important role as a trusted print archive for this particular digital project.

The recommendations in the proposal that follows this report are designed not expressly or exclusively for CRL to undertake, as they may or may not fit CRL's mission as a membership organization. They are offered as an emergent plan for any organization with an interest in the geosciences and an inclination to preserve and archive some of their most select materials.

PRELIMINARY PROPOSAL TO CREATE A PERSISTENT ARCHIVE OF GEOSCIENCES LITERATURE

Prepared by the Center for Research Libraries Working Group on Cooperative Collection
Development in Science and Technology

July 2002

EXECUTIVE SUMMARY

The proposed project seeks to form an electronic archive of geosciences materials published by four states spanning the U.S. The three major elements of the project are: 1) test the feasibility of digitizing print materials interspersed with maps, foldouts, charts, varied color, etc.; 2) create a trusted digital and print archive of materials vital to the geosciences which to now have not been so targeted; 3) create an accessible digital resource with appropriate interface and indexing that will be distributed at an affordable price.

CONTENT AND SCOPE

Currently there are many projects afoot that experiment with the establishment of a permanent on-line repository of research. From the many projects are evolving standards and guidelines that will shape the trusted electronic archives of the future. In addition, of vital importance to both scholars and libraries is the content made so readily available in the repositories. One area of science and technology offers unique challenges and global potential for archiving: the geosciences.

The geosciences as a discipline are only beginning to receive attention for archiving though there are thousands of active journals and other publications recording important geosciences research all over the world, issued by commercial publishers, governments, and societies. A collaboration of six or seven society publishers and university faculty in the U.S. and U.K. has recently announced a proposal to publish online and digitize archives of their publications that will be searchable through GeoRef. The idea in the current proposal is similar but not identical, as we propose to conduct a demonstration project that will speedily create an on-line persistent archive of state field trip guidebooks, conference proceedings, state survey publications, etc. from four states in distinct geographical regions of the United States. As some of the materials will be under copyright, the project will resolve copyright issues with the state agencies. Once digitized, these publications, which date from 1866 to 2001 will be made available at minimal cost to subscribers.

The partners in this demonstration project will be the state publishers, university libraries, scientists, and the Center for Research Libraries (CRL). The Working Group, commissioned in 2000 by CRL to design a program in cooperative collection development in the sciences, has already identified the states of Illinois, Pennsylvania, Texas and Wyoming as ideal samples for this project. Because of their contributions to geosciences, the quality of their publications and the impact of activities in each state on research, they make excellent candidates for materials to be digitally preserved and disseminated to scholars the world over. The objective of the project is to digitize at least one completed series for each of the four states in order to create sufficient digital content both to stand alone as a primary resource for scholars in the field, and also to form the base for a larger future project.

RATIONALE

Geosciences were chosen for a variety of reasons. It is a broad field of interest to scholars in a number of disciplines, to commercial enterprises and governments at all levels. Groundbreaking research is carried on throughout the world, including developing countries whose publications have not yet entered the digital age. Researchers use older materials as well as newly published ones; thus an archive will be of enduring interest. The plates, tables,

foldout maps, etc., found in these publications are still a challenge to digitize successfully. Finally, many periodicals in the geosciences are still available only in print format, thus presenting excellent examples for comparison and varied approaches to archiving. State materials were chosen because they constitute a sizable, important body of resources that have not yet been targeted for large-scale digital archiving. Moreover, the actual paper publications, once digitized, could become part of the Center for Research Libraries collection, which is a noted repository for state publications of various sorts. Thus, a paper backup would exist and be accessible to scholars and researchers.

Each of the chosen states offers unique research activities in the broad discipline of geosciences. The titles we propose to digitize will not overlap with other digital archive projects such as the one mentioned above (cited in the *Geoscience Information Society Newsletter* who will archive titles from AAPG, GSA and SEC [195, April 2002]). This U.S.-U.K. group is concentrating on journal archiving, and has expressed an interest in the current project as a complement to theirs. Should the proposed demonstration project be a success, a collaborative project with the U.S.-U.K. group to digitize books or other scholarly resources might ensue.

WORK PLAN

Project management, fiscal management and technological services will be overseen by CRL. Librarians and scientists from two universities in the Carnegie Foundation Doctoral/Research Universities--Extensive category, both known for their programs in geosciences and their library holdings in these areas, will conduct the actual work of the project including organizing, metadata, high-integrity caches, data format, user interface, copyright negotiating, standards, and marketing, taking into account both the problems common to all journal archives and those unique to materials in the geosciences, such as the large number of maps and foldouts. The actual digitization of the materials, which represent a wide range of resources from a score of selected bulletins, reports, guidebooks and circulars, will be carried on at the Center for Research Libraries or outsourced to a vendor such as Digital and Preservation Resources. By the end of the project, whose duration is estimated to be eighteen months, the partners will have produced an archive accessible to all, based the archive on accepted guidelines with broad application for similar projects, and planned the perpetuation of the initiative on a cost recovery basis. Negotiations with the state publishers will be critical, as this is an area where some potential archivers have failed in the past. The work of archiving the resulting database will be assumed by the project partners. Moreover, if the project is successful, issues relating to the maintenance of an expanded digital and print archive will be pursued in a future project.

CRL will appoint an advisory board made up of faculty who are editors of the selected journals, publishers, science librarians, including a liaison to the Geoscience Information Society, and CRL staff. The board will offer suggestions regarding interface, retrieval, pricing models, usage statistics, as well as provide a test group for the archive as it develops.

OUTCOMES

One important outcome of the project is the near-free delivery of data and research to students and researchers the world over. Another will be the development of a pricing model to recover the cost to continually add to the archive, maintaining, updating and refreshing the trusted archive, and responding to new formats as they arise. Finally, the project will introduce the Center for Research Libraries as a player in digital archiving. CRL, a massive print repository who counts 200 of America's most important research libraries among its members, has been the sponsor of a variety of area studies digitization projects over the past decade. With the proposed geosciences on-line state repository, CRL will branch into an area where

immediate access to information is essential and, for the first time, provide a permanent home to digitized data. It will provide an alternative to existing long-term archiving efforts such as LOCKSS (Lots of Copies Keep Stuff Safe) with its forty-six test sites. Currently sufficient experimentation has been carried on by such groups as BioOne, Earthscape, the Digital Library Federation and the Research Libraries Group that the demonstration project can adopt existing standards for mark-up language, authentication, etc.

BUDGET

Project management staff (\$50,000 per year)	\$ 75,000
Equipment (server, PCs, scanners, printers, software, disk storage)*	\$165,000
Digitization technician (\$30,000 per year to digitize approx. 134,000 pp. of state publications)*	\$ 45,000
Metadata creation, scanning check (\$40,000 per year)	\$ 40,000
Interface design	\$ 5,000
Travel to conferences (3 trips)	\$ 4,500
TOTAL	\$334,500

**If outsourcing digitization to a commercial vendor is more cost-effective, such will replace the equipment budget and on-site digitization technician*

TIMETABLE

Month 1-4

Hire staff, gather publications, purchase equipment, negotiate contract with publishers

Months 3-15

Digitization

Months 3-18

Create metadata, check accuracy of scanning

Quarterly beginning in Month 6

Disseminate information about project in newsletters, journals

Month 12

Design self-sustaining model for continuation program

Month 15-18

Evaluation

Submitted by the Center for Research Libraries
Working Group on Cooperative Collection
Development in Science and Technology

Appendices Relating to an Archive of State Geosciences Publications



Appendix 1

Center for Research Libraries Working Group on Cooperative Collection Development in Science and Technology

Proposed Project Titles

State	Series	Dates	# of Pubs	# of Pages (rounded or estimated)	Other Materials
Illinois	Bulletins	1906-2001	106	18,000	figures, maps, plates, tables
Illinois	Circulars	1906-2001	560	14,000	figures, maps, plates, sections, tables
Illinois	Reports of Investigations	1924-1968	221	9,300	charts, figures, maps, plates, tables
Illinois	Worthen Reports	1866-1882	11	6,200	figures, plates, maps
Pennsylvania	General Geology Reports	1931-1993	75	8,100	plates, maps
Pennsylvania	Mineral Resource Reports	1922-1996	98	13,800	plates, maps
Pennsylvania	Water Resource Reports	1933-1998	68	7,000	plates, maps
Texas	Guidebooks	1958-2001	28	2,917	figures, maps, plates, tables
Texas	Mineral Resource Circulars	1930-1994	85	1,900	figures, tables
Texas	Reports of Investigations	1946-2001	263	20,500	figures, plates, tables
Texas	UT Bulletins (geologic)	1915-1964	120	19,400	figures, maps, plates, tables
Wyoming	Bulletins	>1911-2000	71	7,920	figures, maps, tables
Wyoming	Memoirs	1968-1993	5	1,400	figures, maps
Wyoming	Reports of Investigations	1934-1998	53	3,600	color photographs, figures, maps
Totals			1764	134,037	

APPENDIX 2

Center for Research Libraries Working Group on Cooperative Collection Development in Science and Technology

Detailed Information on a Subset of State Geosciences Titles

ILLINOIS:

- Bulletin 100 - Structural Features in Illinois, W. John Nelson, 1995, 144 pages.
Bulletin 95 - Handbook Illinois Stratigraphy, H.B. Willman, et al., 1975, 261 pages.
Bulletin 10 - Mineral Content of Illinois Waters, Edward Bartow, et al., 1909, 192 pages.
Report of Investigations 220 - Chemistry, Uses, and Limitations of Coal Analyses, O.W. Rees, 1966, 55 pages.
Report of Investigations 184 - Illinois Building Stones, J.E. Lamar and H.B. Willmann, 1955, 25 pages.
Worthen Report - Economical Geology of Illinois, A.H. Worthen, 1882, 3 volumes, 1752 pages.

PENNSYLVANIA:

- Mineral Resource Report 50 - Atlas of Pennsylvania's Mineral Resources, 4 parts, 174 pages, loose-leaf folio with maps.
Mineral Resource Report 6 - Bituminous Coal Fields of Pennsylvania, George H. Ashley, James D. Sisler, and John F. Reese, 4 parts with maps
Water Resource Report 1 - Ground Water in Southwestern Pennsylvania, Arthur M. Piper, Margaret Dorothy Foster, and Charles Spaulding Howard, 1933, 406 pages.

TEXAS:

- Guidebook 5 - Geology of the Llano Region and Austin Area, Virgil E. Barnes, 1963, 73 pages.
Guidebook 24 - Tertiary and Quaternary Stratigraphy and Vertebrate Paleontology of Parts of Northwestern Texas and Eastern New Mexico, 1990, 128 pages.
Mineral Resource Circular 23 - Faulting in Northwestern Houston County, Texas, H. B. Stenzel, 1943, 9 pages.
Mineral Resource Circular 29 - Index to Mineral Resources of Texas by Counties, Elias Howard Sellards, 1944, 21 pages
UT Bulletin 1916, no. 44 - Review of the Geology of Texas, J.A. Udden, et al., 1916, 164 pages.
UT Bulletin 1869 - The Geology of East Texas, E.T. Dumble, 1920, 388 pages.

WYOMING:

- Bulletin 68 - The Geology of Wyoming's Precious Metal Lode and Placer Deposits, W.D. Hausel, 1997, 229 pages.
Memoir 5 - The Geology of Wyoming, A.W. Snoke, et al., 1993, 3 volumes, 937 pages.
Report of Investigations 20 - A Stratigraphic Evaluation of the Eocene Rocks of Southwestern Wyoming, Raymond Sullivan, 50 pages.
Report of Investigations 38 - Geothermal Resources of the Wind River Basin, Wyoming, B.S. Hinckley and H.P. Heasler, 1987, 30 pages.

Appendices Relating to Digital Archive of Geosciences Journals



APPENDIX 3

Center for Research Libraries Working Group on Cooperative Collection Development in Science and Technology

Data Collected for Journal Archive in the Geosciences

1. SUBJECT HEADINGS - GEOSCIENCES JOURNALS
2. JCR Year and Edition: 1999 Science
3. JCR Year and Edition: 2000 Science
4. 1999 and 2000 JCR Total: Publishers from Top 200 by Impact Factor and Top 200 by Total Cites for 1999 and 2000
5. 1999 and 2000 Unique Publishers: lists all publishers included in 1999 and 2000 JCR geosciences journals reports
6. GEOREF Priority Titles: lists journals given priority indexing by GeoRef
7. PUBSCIENCE: Primary GeoScience Related Titles
8. PUBSCIENCE: Index to 67 of 462 Related Geosciences Journals
9. ALL GEOSCIENCE JOURNALS: lists all geosciences journals from JCR 2000 with full titles, citation data, impact factors, immediacy indices, number of articles published, and cited half life
10. GeoScience Plan and Related Federally Funded Projects
11. Geosciences: Sources of Potential Funding
12. Selected Government Publications in Earth Sciences - North America, South America, Central America, Australia, and New Zealand: lists representative government publications in the geosciences
13. Print Archiving of Russian and Soviet Republic Publications
14. Geosciences and related fields librarians/bibliographers

APPENDIX 4

Center for Research Libraries Working Group on Cooperative Collection Development in Science and Technology

Literature Review

This literature review explores the themes that are central to our charge:

1. how geosciences is treated in the professional and scholarly how primary users of the geosciences literature use it
2. trends in the usage of that literature
3. key people, organizations and issues

According to the ISI Journal Citation Reports for 2000 in the subject categories "Geology and Geosciences, Interdisciplinary," there are 149 journals that are included in the data analysis. Those journals produced a total of 11,894 articles that year and 28 journals produced more than 100 articles each, with three titles producing more than 500 each. The average citation impact factor was .9519 with 14 journals having an impact factor of 2.0 or greater. Thus, one can conclude that a very few journals contain the most highly cited articles and they tend to be published by two major international professional societies.

Geosciences has both a very scholarly/research and a very active practice side with a significant number of publications issued by local, regional and national associations. With technology playing a greater role in both the research and practice side, it is clear that specialization contributes to the nature of publishing trends in recent years as does the increase in interdisciplinarity and relevance to many other interests and subjects. It is also very clear that dissertations and theses play a significant role in the literature of geosciences. Maps and other inserted items also are critical sources of information and are appended in various ways until digital formats can now incorporate it more successfully.

There is also an increase in interest to support women and promote diversity in the subject areas of geosciences and geography as documented in the literature. Preservation and archival work is an effort underway by many libraries and societies as the latter are releasing more of their content electronically and concerns associated with digital preservation grow. Lifespan of the geosciences literature indicates that older reports and data are very important to the geosciences as the primary study of comparing regions and specific interests over time is among the critical emphases.

Information literacy has a weaker tradition in the geosciences than in other science disciplines. The explanation of this is less clear, except to say that enrollment in both undergraduate and graduate courses in the geosciences is less than in the life sciences, physical sciences of chemistry, physics or mathematics and basic engineering and computer science. Since 1995, enrollments appear to be increasing. As one writer indicates, "Perhaps more than any other scientific discipline, the earth sciences require an extremely diverse array of material, including books, reports, journals, government documents, maps and other types of data from every country in the world." (Lamb)

Organizing that information and making it accessible via standard indexing and abstracting services is still not the most optimal for all topics. Still only two tools appear to cover the range of materials, and they are the Science Citation Index (including the Current Contents updates) and GeoRef. New spheres of interest incorporate new research methodologies, including spatial mapping and information technology, or GIS. The literature survey reveals that there are many challenges for geology librarians because the nature of their work changes as their users' dependence on information not only expands but is more universal, multidisciplinary and utilizes multiple formats. Citations noted reflect publications from the very late 1980s, but are more consistent for the past decade.

References:

Applegate, D., "Are the Geosciences Keeping Up?" *Geotimes*, Vol. 44, #2, February 1999, 13, 35.

Bichteler, Julie, "Geologists and Gray Literature: Access, Use and Problems," *Science and Technology Libraries*, Vol. 11, Spring 1991, 39-50.

Bichteler, Julie, "Geoscience Libraries of the Future: Predictions for the Next Decade," *Proceedings of the 24th Annual Meeting of the Geosciences Information Society*, 1990, 97-106.

Butkovich, Nancy J., "Discussion of the Use of Foreign Language Sources in Geological Journals," *Proceedings of the 25th Annual Meeting of the Geoscience Information Society, 1991*, 99-109.

Butler, J., "The Year 2000 Challenges: Special Issue for the Journal of Computers and Geosciences," *Computers & Geosciences*, Vol. 26 # 6, July 2000, 615-616.

Butler, J.C., "Internet Resources for the Geosciences," *Computers & Geosciences*, Vol. 21 #6, July 1995, 727-729.

DeFelice, Barbara, "Cooperative Collection Development and Preservation Projects in the Geosciences," *Proceedings of the 24th Geoscience Information Society Meeting* 1990, 57-63.

Derksen, Charlotte R., and O'Donnell, Jim, "What We Did/ What We Do/ What We'll Do: Geoscience Information Centers in a Time of Change, 1970-2000," *Proceedings of the 29th Meeting of the Geoscience Information Society*, 1995, 1-11.

Derksen, Charlotte R. and Noga, Michael M., "The World of Geoscience Serials: Comparative Use Patterns (at Stanford and UCLA)" in *Proceedings of the 26th Annual Meeting of the Geoscience Information Society, 1992*, 15-62.

Geitgey, Judy A., "Government Documents in the Geosciences: An Annotated Bibliography," *PNLA Quarterly*, Vol. 50, Spring 1986, 28-31.

Haner, Barbara E. and O'Donnell, Jim, "Changing Gateways: The Impact of Technology on Geoscience Information Exchange," *Proceedings of the 29th Meeting of the Geoscience Information Society*, 1994.

Haner, Barbara E., "Government Information Recorded in Core Serials of the Geological Sciences," *Government Publications Review*, Vol. 17, August 1990, 341-355.

Haner, Barbara E., Guidebook Citation Patterns in the Geologic Journal Literature: A Comparison Between 1985 and 1967, "*Proceedings of the 24th Annual Meeting of the Geoscience Information Society*, 1990, 159-169.

Hanson, Dena F., "International Initiatives in Geoscience Information: A Global Perspective," *Proceedings of the 26th Annual Meeting of the Geoscience Information Society*, 1992.

Hauck, Roslin V., et al., "Concept-Based Searching and Browsing: A Geoscience Experiment," *Journal of Information Science*, Vol. 27 # 4, 2001, 199-201.

Holoviak, Judy C., "Publishers' Decisions in the Field Trip Guidebook Business," *Proceedings of the 24th Annual Meeting of the Geoscience Information Society*, 1990, 199-203.

Kidd, Claren M., "Schemes for Redistributing Geological Literature," *Proceedings of the 26th Annual Meeting of the Geosciences Information Society*, 1992, 75-87.

Lamb, Melisa, A., "Geoscience Information Needs of the Researcher and Educator," Presented at the Geological Society of America 1998 annual meeting. Noted in *Abstracts with Programs, Geological Society of America*, Vol. 30 #7, 1998, 197-98.

Lamont, Melissa, "Managing Geospatial Data and Services," *Journal of Academic Librarianship*, Vol. 23 #6, November 1997, 469-473.

Larocque, A.C.L., "Challenges and Rewards of Graduate Studies in the Geosciences: A Woman's Perspective," *Geoscience Canada*, Vol. 21 #3, September 1994, 129-132.

Lerud, Joanne, "The Geoscience Information Professional in the Brave New Information World," *Proceedings of the 30th Annual Meeting of Geoscience Information Society*, 1996, 1-4.

Li, Yuwei, "Development of Spatial Information Technology and Methods of Geology," *Earth Science Frontiers*, Vol. 5, #2, 1998, 335-341.

Manson, Connie J., "How Long is Long? A Statistical Analysis of the Longevity of Geoscience Information," Presented at the Geological Society of America, 1999 annual meeting. Noted in *Abstracts with Programs of Geological Society of America*, Vol. 31, #7, 1999, 163.

Manson, Connie, J., "Types and Uses of Geologic Literature: A Statistical Analysis of 100 Years of Citations on the Geology of Washington State," *Proceedings of the 26th Annual Meeting of the Geosciences International Society*, 1992, 175-193.

Muhongo, D., et al., "Perspectives for Geosciences in the 21st Century," *Episodes*, Vol. 24 #1, March 2001, 3-8.

Musser, Linda R., "Earth System Science: The Real Environmental Science," *Proceedings of the 31st Meeting of the Geoscience Information Society*, 1997, 1-3.

Newman, Linda P., and Pausch, Lois, M., "Written in the Stones: Expanding the Boundaries of Geoscience Literature," *Proceedings of the 31st Meeting of the Geoscience Information Society* 1997, 45-54.

Payne, Kathryn and Merriam, Daniel Francis, "Impact of Geoscience Specialist Journals: A Study in Use Patterns." *Proceedings of the 17th Annual Meeting of the Geoscience Information Society*, 1993, 57-63.

Payne, Kathryn and Merriam, Daniel Francis, "Use of the Proceedings of International Conferences and Symposia in Geology as Determined by Citation Analysis," *Proceedings of the 26th Annual Meeting of the Geoscience Information Society*, 1992, 165-173.

Schejbal, Ciirad, "How to Estimate Costs of Geoscience Information: Either Based on Calculated Expenses or on Final Users Demand," *Proceedings of the 5th International Conference on Geoscience Information Society*, 1996, 80-88.

Scott, Sally J., "Interdisciplinary Use of Science Information Science by Geology Faculty and Graduate Students: Implications for Library Services (at the University of Wyoming)," *Proceedings of the 31st Meeting of the Geoscience Information Society*, 1997, 5-15.

Scott, Sally J., "Method for Evaluating Preservation Needs of Oversized Illustrations in Geology Theses (at UCLA)," *Proceedings of the 25th Annual Meeting of the Geoscience Information Society*, 1991, 137-146.

Smith, James G., "Future Publication Plans of the U.S. Geological Survey: Paper Plans, Electronic Dreams," *Proceedings of the 31st Meeting of the Geoscience Information Society*, 1997, 37-44.

Walker, Richard D., "The Geoscience Journal: Its Role, Past, Present and Future," *Proceedings of the 24th Annual Meeting of the Geoscience Information Society*, 1990, 87-95.

Wick, Constance S., "Preservation of Geoscience Library Collections: Current Conditions and Future Trends," *Proceedings of the 25th Annual Meeting of the Geoscience Information Society*, 1991, 147-155.

Wimberly, Mary Kate, "Supporting Women in the Geosciences," Paper Presented at the Geological Society of America, South Central Section, 34th Annual Meeting, and noted in Abstracts with Programs of Geological Society of America, 32, #3, March 2000, 45.

Wishard, Lisa, "Activities of the Geoscience Information Society Preservation Committee," in Science Editing and Information Management; Proceedings of the Second International AESE/CBE/EASE Joint Meeting, Sixth International Conference on Geoscience Information and 32d Annual Meeting of the Association of Earth Science Editors. *Proceedings of the International Conference on Geoscience Information*, Vol. 6, 1999, 43-49.

Yocum, Patricia B. and Almy, Gretchen S., "Information Literacy in the Geosciences: Instructional Methods and Basic Competencies," Presented at Geological Society of America

1999 annual meeting. Noted in abstracts with Programs of Geological Society of America, Vol. 31, #7, 1999, 197.

Zipp, Louise, S., "Identifying Core Geologic Research Journals: A Model for Interlibrary Cooperative Collection Development (in Iowa)," *Proceedings of the 29th Meeting of the Geological Information Society, 1995*, 59-65.

APPENDIX 5

Center for Research Libraries Working Group on Cooperative Collection Development in Science and Technology

JCR DATA ANALYSIS OF 8 SELECTED GEOSCIENCES JOURNALS

AMERICAN MINERALOGIST ISSN: 0003-004X				
	# of Articles by Year ¹	Total Cites ²	Cited Journal ³	Impact Factor ⁵
All Years			8058 ⁴	
2001	169	8058	55	1.806
2000	222	7345	319	1.862
1999	216	7066	472	1.842
1998			442	2.124
1997			358	1.888
1996			431	
1995			307	
1994			281	
1993			260	
Rest of Years (prior to 1990)			4861	

¹ Total number of articles in all issues for volume year.

² Number of times article cited from all years in given year.

³ Number of times articles published in given year(s) cited articles in given journal.

⁴ Total for all years available- recorded from latest (2001) data available

⁵ A measure of the frequency with which the "average article" in a given journal has been cited in each year.

Helps to evaluate a journal's relative importance.

GEOPHYSICAL RESEARCH LETTERS				
ISSN: 0094-8276				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			21309	
2001	1151	21309	385	2.516
2000	1016	19940	1945	2.719
1999	915	17980	2913	2.306
1998			3146	2.290
1997			2013	2.180
1996			1912	
1995			1624	
1994			1256	
1993			969	
Rest of Years			4324	

JOURNAL OF GEOPHYSICAL RESEARCH				
ISSN: 0148-0227				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			84449	
2001	2105	84449	620	2.609
2000	2045	80663	4253	2.600
1999	2178	77792	6764	2.701
1998			7614	2.577
1997			7178	2.416
1996			6143	
1995			5075	
1994			4923	
1993			4113	
Rest of Years			34042	

METEORITICS & PLANETARY SCIENCE				
ISSN: 0026-1114				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			1244	
2001	117	1244	87	2.559
2000	120	1206	313	3.168
1999	91	550	227	1.879
1998			301	3.690
1997			177	2.301
1996			135	
1995			1	
1994			0	
1993			0	
Rest of Years			3	

PALAEOGEOGRAPHY PALAEOCLIMATOLOGY PALAEOECOLOGY				
ISSN: 0031-0182				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			3861	
2001	193	3861	137	1.449
2000	183	3590	224	1.467
1999	180	3570	302	1.601
1998			252	1.150
1997			331	1.319
1996			272	
1995			248	
1994			296	
1993			152	
Rest of Years			1459	

PALAEONTOLOGY				
ISSN: 0031-0239				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			1333	
2001	57	1333	13	0.731
2000	52	1190	30	0.964
1999	52	1157	46	0.879
1998			71	0.908
1997			55	0.607
1996			47	
1995			48	
1994			45	
1993			52	
Rest of Years			872	

TECTONICS				
ISSN: 0278-7407				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			3343	
2001	56	3343	17	2.526
2000	63	3124	129	2.260
1999	72	2978	212	2.221
1998			188	2.444
1997			197	2.242
1996			326	
1995			267	
1994			235	
1993			221	
Rest of Years			1343	

WATER RESOURCES RESEARCH				
ISSN: 0043-1397				
	# of Articles by Year	Total Cites	Cited Journal	Impact Factor
All Years			12885	
2001	284	12885	82	1.757
2000	314	12051	400	1.640
1999	339	12511	747	2.061
1998			731	2.107
1997			744	1.648
1996			797	
1995			685	
1994			852	
1993			655	
Rest of Years			6485	

Appendices Relating to a Print Archive of Geosciences Publications



APPENDIX 6

Center for Research Libraries Working Group on Cooperative Collection Development in Science and Technology

Archiving Print Publications in the Digital Age

Vernon N. Kisling, Jr., Collection Management Coordinator, Marston Science Library
Stephanie Haas, Assistant Director, Digital Library & Paul Kirk, Geosciences Librarian, MSL
George A. Smathers Libraries, University of Florida / December 2001

Although the recent emphasis of sci-tech publishers and libraries, as well as this working group, has been on archiving publications digitally, we need to clarify exactly what that means and how it relates to the overwhelming amount of print material. Although it improves access, searching and distribution, for the foreseeable future, digital archiving will neglect a large portion of the existing print publications and will continue to be an ineffective preservation technique. Despite common belief, the virtual library is still a long way off, and the preservation aspects of digital formats will remain problematic for some time to come. Simply relying on the digitization of a small number of random publications is not a sufficient response to cooperative collection management of sci-tech publications. We need to provide a comprehensive and balanced approach to accessing, preserving and storing the sci-tech literature. As part of this overall effort, we need to deal with the enormous amount of print publications, especially now when libraries are shifting to digital formats and transforming shelving space to computer and patron space.

Libraries should continue their role as information repositories and should not rely on publishers to assure the long-term survival and usability of their publications. Valuable historic data is retained in today's ordinary print collections, which will become tomorrow's special collections. For as long as we can, we need to archive and preserve print publications for whatever purpose they may serve in the future, even after this material is eventually microfilmed or digitized. However, there is no need for every library to have copies of these publications and many libraries should have the option to withdraw titles in order to save space. This option to withdraw titles should not be made in isolation since the expedient, uncoordinated withdrawal of titles is not an acceptable solution.

A compromise to this all or nothing situation is to establish a system of regional depositories that would be responsible for archiving print publications in specific subjects or those that are of regional interest. These depositories could be existing libraries or they could be storage facilities supported by regional library consortia. The regions could be multi-national, national, multi-state, or statewide. While these efforts would be voluntary, coordination and a union catalog of titles archived would be needed to make the system effective. Each depository would be responsible for "last copies" of titles for their region (specialized titles may not be found in each region while other titles would be found at several regions for needed redundancy, for improved access at the local level, and interlibrary loans

services - this ILL service would insure that digital services maintain competitive pricing in their print and download costs). This arrangement should allow other libraries in the regions to remove archived titles from their shelves in an appropriate manner.

In the United States, this arrangement of archival depositories should be done through state or regional library partnerships such as the existing consortia. Academic research libraries in particular need to begin this process by deciding which subject areas and regional publications they feel responsible for. These many local efforts should be coordinated through the use of a union catalog maintained at a national institution such as CRL. For an international case study see this report's Appendix on *Print Archiving of Russian and Soviet Republic Publications*.

Through the use of regional ("last copy") depositories for archiving print publications, microfilming for preserving print publications, and digital formatting for easy access to print publications, libraries could provide a well-balanced, cooperative collection management of print publications. Eventually, only the most serious researchers may need the original paper formats of our print publications, but we are a long way from that, and until then we need to archive and preserve our scientific heritage (most of which is still in print) as best we can.

Archiving Print Publications in the Digital Age
APPENDIX : Print Archiving of Russian and Soviet Republic Publications

Vernon N. Kisling, Jr., Collection Management Coordinator, Marston Science Library
Paul Kirk, Geosciences Librarian, Marston Science Library
George A. Smathers Libraries, University of Florida / December 2001

Providing regional depositories for archiving print publications, microfilming for preserving print publications, and digital formatting for improved access to print publications work together to provide a well-balanced cooperative collection management of print sci-tech materials. As an example of how this might be done at the international level, one can consider archiving Russian and Soviet Republic print publications.

Russian and Soviet Republic sci-tech publications constitute an important body of literature, but one that has limited distribution and very few titles in digital format. In addition, these countries probably have little infrastructure support for archiving, preserving or digitizing their publications. Therefore, efforts should be made to assist these countries with these activities, especially archiving since it will take longer to microfilm and digitize these materials.

National / regional depositories should be established among these countries in a cooperative way with the Russian Academy of Sciences (RAS). Each depository, which would be located at existing libraries or at facilities supported through library consortia, should accept responsibility for archiving print publications in specific subject areas, as well as the depository's national / regional publications. In addition to these depositories, international depositories at major libraries in other countries could serve as secondary, or mirror, archives for the Russian - Soviet Republic publications. Coordination of the international depositories should be the responsibility of the Russian Academy of Sciences in cooperation with international institutions such as CRL.

To begin with, support for the RAS efforts to archive, preserve and digitize their print sci-tech publications should be done in partnership with CRL, which has already established ties with RAS. In addition, libraries such as the USGS library could serve as an international depository for their geosciences publications while other specialized libraries could serve as archival depositories for other subjects (such collections may already exist and could serve as the foundation of an international depository system). Having additional copies of Russian and Soviet sci-tech publications in the United States and Europe would ease the burden on the Russian - Soviet Republic libraries and would make international access easier.

As an initial step, on behalf of US researchers, CRL and/or ARL should inventory American collections to establish a union catalog of existing Russian - Soviet Republic journal and report holdings. There should also be an inventory of library collections with significant Russian / Soviet publication holdings in specific subjects. RAS should also establish a union list of published Russian / Soviet journals and reports. Then CRL could work with RAS to

develop a plan for establishing and coordinating a system of regional, national and international depositories. Included in this plan should be recommendations on how under-represented publications would be distributed among the depositories. Once this foundation of archival depositories is functional (or in the process of becoming functional), CRL and RAS should determine preservation and digitization needs, and develop a mechanism by which it would be possible for other libraries and funding agencies to help with these longer-term needs.