

COLLECTION OVERVIEW

LIFE SCIENCES, PHYSICAL SCIENCES, EARTH AND ENVIRONMENTAL SCIENCES

I. SCOPE

The life, physical, earth and environmental sciences collections include botany (LC Class QK), biology, natural history, ecology, genetics (LC Class QH), zoology (LC Class QL), human anatomy (LC Class QM), physiology (LC Class QP), microbiology (LC Class QR) astronomy (LC Class QB), physics (LC Class QC), paleontology (LC Class QE), geology (LC Class QE), oceanography (LC Class GC), environmental sciences (LC Class GE), agriculture (LC Class S), medicine (LC Class R), and associated materials classed in bibliography, indexes, and abstracting services (LC Class Z).

II. SIZE

The Library's collections in the life, physical, earth and environmental sciences number 2,145,294 titles. While the Library of Congress has deferred to the National Library of Medicine for the acquisition of clinical medicine since the early 1950s, its collection of medical journals, texts, and monographs exceeds 320,000 titles. For the same period of time, the Library has also deferred acquisition of technical agriculture and the veterinary sciences to the National Agricultural Library, yet the Library holds over 222,294 titles of importance to the Congress and its many constituencies in this subject area.

III. GENERAL RESEARCH STRENGTHS

The Library's collections in the life, physical, earth and environmental sciences are exceptional and, as in the case of the Library's general science and technology collections, have profited greatly from the materials generated by the Smithsonian and copyright deposits. These programs provided and still provide the Library with long, unbroken runs of proceedings, memoirs, monographic series, and journals in the life, physical, earth and environmental sciences. The Library's holdings of scientific publications generated by scientific societies and institutions are superior to most libraries in the United States and much of the world.

The Library also holds sets of the major abstracting and indexing services in the life, physical, earth and environmental sciences. Beginning with the last quarter of the 20th century, an aggregation of electronic resources have provided improved bibliographical access to many of the Library's materials in these sciences. Services such as *GeoRef*, *Biosis*, *Inspec*, *Environmental Sciences and Pollution Management*, and *Web of Science* helped researchers effectively mine the Library's collections for elusive facts held in arcane pamphlets, geological surveys, environmental impact statements and technical reports. Electronic journals, conference papers, born digital materials, web

sites, and other electronic resources in these sciences were also added to the Library's collections at the end of the century and provide new avenues of approach to those studying the earth's environment and its life and physical properties and processes. The Library's American Memory's American Immigration and Expansion highlights personal accounts of American Agriculture through diaries, notebooks, and pictures.

The Library's holdings in the environmental sciences date back to the mid-19th century when the "conservation movement" was formed. Collections that are especially heavily used include the complete works of Rachel Carson, the papers of Russell E. Train, Fairfield Osborn, Gifford Pinchot, and Russell W. Peterson, the big-game library and papers of President Theodore Roosevelt as well as thousands of technical reports, standards, surveys, maps, and environmental studies, generated by government agencies and organizations concerned with the environment and its protection. Its collections on angling and hunting are extensive and contain early editions of Jean de Clamorgan's *La Chasse du loup* (Paris, 1566) and the *Histoire of Fovre-footed Beastes* (London, 1608).

The Library's collections that support scientific research in the life, physical, earth and environmental fields are strong in their comprehensiveness, diversity, and depth. They are also noteworthy in number, language and scope. The biological collections are represented in the Library's collections by substantial bodies of literature on molecular, systematic, and evolutionary biology, population genetics, natural history, ecology, animal behavior, and microbiology. Botanical materials, including works on the taxonomy, morphology, physiology, and evolution of plants, are extensive as are the collections on the taxonomy, anatomy, physiology, ethology, and evolution of animals. Collections chronicling the paleontological record in plants, vertebrates, and invertebrates are encyclopedic, and both plant and animal collections are particularly rich in works emanating from the research facilities of botanical gardens, zoological parks, geological surveys, paleontological museums, and scientific expeditions. Also of great importance are the materials the Library collects in the field of agricultural and environmental sciences. These are shaped primarily by the research needs of Congress and other government agencies and notable for their broad appeal and usefulness. Emphasis has been placed on collecting materials that support research on current issues, legislation, and public policy. In recent years, materials on topics such as zoonoses and avian health, genetically modified crops, biodiversity, seed banks, heirloom varieties, sustainable food supplies, green roofs and land reclamation have been needed to meet the reference/research needs of staff, scholars, and to support the legislative work of Congress.

IV. AREAS OF DISTINCTION

The Library's collections on astronomy, physics, paleontology, geology, ecology, geography, biogeography, bioinformatics, bioethics, genomics, and molecular biology are also extensive and easily support the work of scientists and researchers in all areas of the life, physical, earth, and environmental sciences. Its resources include surveys, reports, and records from virtually every geological institute and every government agency or ministry responsible for water resources, geological exploration, mining, metallurgy, mapping, geodetic and environmental surveys or petroleum exploration throughout the world. Information drawn from data sets, remote sensing

mapping, core sampling, drilling, dredging, and digging are represented in the Library's extensive collections of papers, scientific investigations, bibliographic indexes, tracts, maps, charts, published descriptions of species, journals, and electronic resources.

Areas of distinction in the life, physical, earth and environmental sciences include the Library's collections of materials chronicling the botanical discovery of North America, its landmark works of Nicolaus Copernicus, Tycho Brahe, Johannes Kepler, Galileo Galilei, Isaac Newton, and James Clerk Maxwell, its holdings of materials devoted to polar research and cold regions science and technology, and the papers of biologist, ecologist, and environmental activist, Barry Commoner, known as the Paul Revere of the environment. The Library's psychoanalytic collections, which include the papers of Sigmund Freud and those of most of his European and American disciples, are the finest in the world. Its manuscript collections in astronomy and physics include the papers of Asaph Hall, astronomer at the U.S. Naval Observatory in Washington, D.C., who in 1877 made the spectacular discovery there of the two moons of Mars. Also in the Library's physics and astronomy collections are the manuscripts of A. D. Bache, Matthew Fontaine Maury, Simon Newcomb, I. I. Rabi, J. Robert Oppenheimer, and George Gamow. Through the years, its polar collections have supported the in-house compilation of a number of well-known bibliographies, including the *Arctic Bibliography*, the *Bibliography on Cold Regions Science and Technology*, and the *Antarctic Bibliography*. Their digital versions continue to be used by researchers and scientists throughout the world. However, based on language, inclusiveness, and format, there is no place better to study the world's life, climate, and physical properties than at the Library of Congress. Events, such as the International Geophysical Year and the Earth Decade, for which the Library issued special bibliographies, generated a flurry of research on the earth and the environment.

The history of plant exploration and taxonomic botany has been captured in the scientific tracts of the great exploring expeditions and the transactions of botanical societies, lyceums, and herbaria and is highlighted in color-plate volumes by Isaac Sprague, Titian Ramsay Peale, Pierre Joseph Redouté, and Mark Catesby. Discovering, naming, and learning the uses of the flora and fauna of America sparked an interest in economic botany that is reflected in the collections by an abundance of material on plant utilization in commerce and industry, biotechnology, and ethnobotany. The Library's collections on herbals, food plants, and medicinal plants are described in some length in Leonard Bruno's *The Tradition of Science: Landmarks of Western Science in the Collections of the Library of Congress* (Washington, 1987) and in James Reveal's *Gentle Conquest: the Botanical Discovery of North America with Illustrations from the Library of Congress* (Washington, Starwood Pub., c1992). The Library's Rare Book and Special Collection Division holds over 450 rare botanical books, many of them renowned for the beauty of their illustrations and its Prints and Photographs Division contains hundreds of botanical prints and pictures of herbaria and botanical gardens. The papers of E. O. Wilson, Gregory Pincus, Jacques Loeb, T. Swann Harding, William C. Gorgas, Luther Burbank, William T. Hornaday, Gifford Pinchot, G. Hart Merriam, Matthew Fontaine Maury, and President Thomas Jefferson add further flavor to the Library's ecological, environmental, and agricultural collections.

The Library's collections of illustrated paleontological and scientific publications contain many hand-colored plates of birds, fishes, insects, reptiles, and innumerable other orders of animals,

providing an exceptional record of various expeditions and voyages of discovery. Among these scientific collections are pictorial works by Louis Agassiz, John Gould, William Healey Dall, Alexander Wetmore, John J. Audubon, and Alexander Wilson. These treasures, along with the rich collections of correspondence, reminiscences, and biographical material from all periods, in many languages and in widely-ranging formats, from print to electronic, provide historians of science, scholars, biographers, and researchers with unparalleled resources in the life and earth sciences. Titles in the LC Science Tracer Bullet series highlight resources, both print and electronic, for the study of dinosaurs, human evolution, and the importance of the fossil record to the history of the world. Leonard Bruno's "Geology: The Secret in Stone" from his *The Tradition of Science: Landmarks of Western Science in the Collections of the Library of Congress* (Washington, Library of Congress, 1987) shows how a "cut in the earth is a slice of time, a map to the past, a story told with gravel and fossils." The Library's earth sciences collections tell this story.

V. ELECTRONIC RESOURCES

Electronic resources are an integral part of the life, physical, earth and environmental sciences collections of the Library of Congress. Many of these resources have been incorporated into the online catalog, while others are accessed through the Electronic Resources area of the Library of Congress web site. Programs such as *Find It! Open URL Resolver* continue to work toward a seamless interface between records for electronic and print collections by improving linkages between bibliographic citations and full text accessible to Library staff and patrons. Life, physical, earth and environmental sciences-related materials of all types, including electronic resources, can also be identified through Library of Congress finding aids and bibliographic guides, which themselves are collected on the Science Reference Section web pages.

As certain materials migrate from print to digital-only format, they are frequently collected into the Electronic Resources area of the Library, within the OPAC as an electronic link added through the TrackER system, or both. These sources may be freely available, or may require a subscription, as in the case of many electronic resources. Both are actively collected, and will continue to be collected in the future.

Digital format has increasingly blurred the line between databases of citations, abstracts and full text, so that a given database may provide what is essentially an electronic journal for one title, while providing a citation, with no text, for another journal. Differences in periods of coverage also contribute to making a precise assessment of the number and nature of available electronic resources somewhat difficult, but several reliably strong sources for electronic materials in the area of the life, physical, earth, and environmental sciences can be identified. The list titled E-Journals in Physical Sciences & Mathematics and E-Journals in Health and Biological Sciences (in Electronic Resources) can be helpful in identifying titles. Particularly useful titles include the subscription databases: *JSTOR*, *Academic Search Premier*, *Applied Science and Technology Full Text*, *Biological and Agricultural Index Plus*, *General Science Full Text*, *Biosis*, *GeoRef*, *Environmental Impact Statements Full-Text*, *ProQuest Databases*, *Readers' Guide Retrospective*, *Web of Science*, *Biological and Agricultural Index*, *Medline*, *HistSciMedTech*, and *Digital Dissertations*.

Freely available electronic resources collected by the Library, that often have materials of interest in the area of the life, physical, earth, and environmental sciences include *Agricola*, *Science.gov.*, *AmphibiaWeb*, *Avian Literature Database*, *Encyclopedia of Earth*, *Index to American Botanical Literature*, *EPA Science Inventory*, *Environmental History of Latin America*, etc. Freely available resources such as these sometimes demonstrate that the overlap between web sites and online databases can again blur distinctions. Maintaining functioning links becomes part of the process of collection development and maintenance, as issues related to the capture and archiving of web sites continue to be debated.

Since many books with CDs are received through copyright deposit, many are collected for the collections. Indeed, many of the standard reference tools in the sciences include a CD in a pocket. Because the technology for viewing these CDs is not generally supported in the Library's reading rooms, except in the Machine Readable Collections Reading Room (MRC), these materials must be requested and viewed in MRC. Podcasts and webcasts produced by the Library are currently collected on the Library of Congress web site. Increasingly, links to these materials at other web sites are being collected, and these materials can be expected to become more integral to the electronic resources collections in the future.

Many issues related to the collection of certain types of electronic resources remain to be resolved; for example, resolution of questions surrounding copyright deposit of electronic media will facilitate collection activities of these materials in the future. The collection of electronic materials necessarily raises other questions, including the perennial problems with which most libraries continue to deal, namely, how to provide enough space for the collections and how to maintain access to materials over the long term.

VI. WEAKNESSES/EXCLUSIONS

Although the Library does have access to environmental and agriculture-related journals through its subscriptions to aggregated databases, these resources can be limited by publisher embargo, vendor economics, and a "best edition" statement that does not favor electronic resources.

Our receipts of the publications of scientific institutions, which are distributed chiefly via exchange, have suffered since the cessation of the Smithsonian deposit, because of the difficulties in maintaining direct exchange relationships with so many organizations. Although the Library can offer many duplicate monographs and runs of transferred serials, some organizations want more and are reluctant to exchange materials with the Library.

The push to reduce the Library's arrearages has resulted in many publications on the flora and fauna of various countries, most especially Australia and New Zealand, as well as other foreign taxonomic, ethological and bio research studies, selected by recommending officers to strengthen our life sciences collections especially are being given minimum level cataloging.

The Library's apparent failure to claim missing issues of serials is a persistent problem. The enormous size of the Library's serials collections and the lack of an automatic claiming system works against the binding operation being able to fill monthly gaps before binding. The Library still depends upon its print collections in many areas of the sciences where electronic copies are not available.