Serving the Blind and Physically Handicapped in the United States of America

Frank Kurt Cylke, Michael M. Moodie, and Robert E. Fistick

Abstract

Since the early 1930s federal legislation has enabled the Library of Congress to offer free library service to blind and physically handicapped individuals resident in the United States as well as to U.S. citizens overseas. Technological changes in the program have mirrored and sometimes anticipated transformations and developments in the world of consumer electronics. Braille is now accessible over the Internet by means of specialized keyboards; audiobooks, originally cut onto rigid shellac 78-rpm disks, have progressed to flexible discs and a refined analog cassette technology that will in turn soon be replaced by digital flash-memory cartridges playable on efficient, reliable, lightweight, and portable machines. The National Library Service for the Blind and Physically Handicapped looks forward to the inauguration of its new digital system in 2008.

Introduction

One of the hallmarks of a civilized, humane society is the extent to which it cares for its people who have disabilities. Today, an estimated two million Americans are so visually impaired that they cannot read standard print. Another one million Americans have a physical disability that prevents them from holding a book. Because people receive up to 90 percent of their information through sight, blindness can result in reduced mobility, diminished employment opportunities, problems in performing tasks associated with daily living, and a general sense of isolation from sighted people.

Digital technology, however, now helps many of these people living in the United States and abroad to enjoy books and magazines in their

LIBRARY TRENDS, Vol. 55, No. 4, Spring 2007 ("Library and Information Services for Visually Impaired People," edited by Helen Brazier and David Owen), pp. 796–808

own homes through a remarkable system that produces reading materials in braille or on audiocassettes (talking books) and distributes them at no charge to the user. The Library of Congress's National Library Service for the Blind and Physically Handicapped (NLS) has long produced full-length books and magazines in braille and recorded formats under a special provision of U.S. copyright law and with the permission of authors and publishers of works not covered by the provision. A network of regional and local libraries provides and distributes playback machines and reading materials by postage-free mail to eligible borrowers. In addition, braille books, magazines, and music materials are now available on the Internet through a system called Web-Braille.

Although the four-track cassette has been the accepted format for talking books (recorded to play at 15/16 inches per second [ips] for up to six hours of reading time per cassette), since the mid-1970s the increasing popularity and affordability of digital technology have spurred NLS to plan a digital alternative to cassettes that will greatly improve the sound quality of the narration and enable blind and physically handicapped readers to access reading materials in the same way as the sighted population. Many of the features of a printed book will be combined with the power of computers to give readers unprecedented flexibility and power. By 2008 thousands of titles will be available on digitally produced cartridges that are the size of a credit card and can hold a twelve-hour talking book.

The NLS program is available to a variety of users, from the mildly visually impaired to the totally blind, from children to the elderly (most patrons are over sixty-five), and from the physically able (though blind) to people dealing with multiple handicaps. In 2000 each user of the talking book program read an average of thirty to forty books and magazines per year, and many users read hundreds of titles. Total circulation exceeded twenty-three million books.

Working primarily with a specially created network of 134 cooperating libraries and the U.S. Postal Service, NLS quietly keeps nearly 750,000 current patrons supplied with a lifeline to the world of print information that they cannot otherwise access. NLS's share of the federal budget—$54 million in 2006—is more than matched in kind or direct expenditures by the U.S. Postal Service and cooperating libraries and augmented by $5 million in volunteer repair work annually. As a result, the program's reach is enormous. This article describes how this system evolved, now operates, and will continue pioneering new audio and braille technologies in the coming years.

History

Over the years a variety of private and public efforts have been made to help visually impaired people read. In the early nineteenth century in France, Louis Braille invented a forty-three-symbol system of touch read-

ing and writing for blind persons. In its simplest form, braille consists of arrangements of raised dots representing letters, numbers, and some punctuation marks, but most often today it includes contractions representing groups of letters or whole words. The use of contractions permits faster reading and reduces the size of braille books, making them somewhat less cumbersome. Historically, braille materials were produced by hand, using mechanical devices to press dots onto heavy paper.

Braille's invention was not the only embossed system of printing, and it was not instantly adopted. A greatly modified version of raised impressions of print letters made by a series of closely spaced dots or solid lines, called Moon type, continued into the twenty-first century.

As early as 1829, the Massachusetts legislature founded the organization that later became the Perkins Institute for the Blind, which taught blind people to read braille. The New York Institute for the Blind followed in 1831. By the end of the nineteenth century, all but a few states had established such schools.

The Library of Congress first recognized the need for special services for blind individuals in 1897 and opened a reading room for them. Initially, forty braille books, braille typewriters, and other devices were brought together in the room, and musical events, lectures, and literary sessions were arranged. Patrons who had graduated from schools for the blind were encouraged to transcribe embossed books from dictation. In 1904 Congress authorized the free mailing of books for the blind. In 1912 Congress funded a professional staff position at the Library of Congress to serve the blind, and a collection of 2,000 braille books was made available for regular use. By 1925 the reading room, by then designated the Library of Congress's Service for the Blind, was serving 2,400 readers across the nation. The collection had grown to 13,000 volumes, partly as a result of a 1913 act that required the American Printing House for the Blind (APH) to deposit with the Library of Congress a copy of every book for blind children produced by APH with federal funds. Commercial production of braille has never been feasible, and since 1879 APH had received an annual subsidy from Congress to serve as the official printer of textbooks for blind children.

Injuries to soldiers in World War I stimulated a greater responsiveness to blind adult readers' needs. The Evergreen School for the Blind near Baltimore was established to serve blinded veterans who required vocational rehabilitation, and hundreds of volunteers offered to transcribe reading matter for the soldiers using a manual prepared by the Library of Congress and the Red Cross. By the mid-1920s the Evergreen Braille collection and the volunteer transcription service had been moved to the Library of Congress. The Library of Congress assumed full responsibility for volunteer transcription in 1943.

Much of the impetus for expanded services to the blind came from

nongovernmental organizations. The American Library Association (ALA), which had long been raising funds for press-brailing books that were needed in multiple copies, asked the American Foundation for the Blind (AFB) to conduct a survey of facilities in the United States and Canada for use by visually handicapped people. The survey, completed in 1929, found that although 60 to 80 libraries had sections for embossed books, they were expensive to produce and clumsy to use. The survey identified fewer than 10,000 active users and only 15 libraries with full-time dedicated staff.

In 1930 AFB, APH, the Braille Institute in Los Angeles, and other organizations for the blind called for action on the national level. The federal government, they argued, should provide free books for blind people. Legislation sponsored by Representative Ruth Pratt of New York and Senator Reed Smoot of Utah established a coordinated, national library service for blind people and gave the Library of Congress its first funds for the purchase of books for the blind. President Hoover signed the Pratt-Smoot bill into law on March 3, 1931.

Two important developments in services to blind individuals occurred in 1932. In London a milestone conference of American and British organizations adopted Standard English Braille. While both countries evolved differences in their Braille rules over time, this form of braille was the basis for the braille used in all English-speaking countries for decades to come.

Equally important, AFB established a laboratory for the development of "talking books." Within a year, AFB had produced a long-playing (33-1/3 rpm) unbreakable phonograph record and a machine on which it could be played. The average book required eight or nine 12-inch records, and the needle on the playback machine had to be changed with each side of a record. In 1935 Congress raised its annual appropriation for the Library of Congress's services for the blind from $100,000 to $175,000, and the first 157 print volumes were selected for recording as talking books for blind readers. To mark the bicentennial of George Washington's birth, the first book ordered was Woodrow Wilson's biography of Washington. Among the other titles chosen were Chaucer's *Canterbury Tales,* Carl Sandburg's *Abraham Lincoln: The Prairie Years,* Victor Hugo's *Les Misérables,* and Pearl Buck's *The Good Earth.*

Free library service and equipment were part of the program from its beginning in the 1930s, following the model established by Benjamin Franklin in the eighteenth century. Use of talking-book record players and all successor playback machines has remained free ever since. The Library of Congress appointed AFB as its agent to supervise both the manufacture and the distribution of the machines, which were made by the Works Progress Administration (WPA). AFB also produced most of the records and founded *Talking Book Topics* to announce new titles.

NLS services, originally limited to providing the written word to blind adults, expanded in 1952 to include books for children, in 1962 to provide music materials, and in 1966 to include service to people with other physical impairments that prevent the reading of standard print. A $1.5 million supplemental appropriation from Congress in 1966 allowed NLS to increase the number of recorded titles produced by 25 percent and to increase the number of talking-book machines purchased from 20,000 to 40,800 that year. Over the next decade and a half the number of users more than tripled.

Meanwhile, the playback machinery for talking books was constantly evolving. In 1965 the AE-1 talking book machine with a three-speed motor was introduced. Three years later the first transistorized, lightweight talking book machine was introduced. Standard cassettes were first distributed in 1969, and the first 1-7/8 and 15/16 ips cassette machines began service in 1971. By 1973 all discs were recorded at 8-1/3 rpm, and a proprietary cassette machine prototype was developed and modified for distribution. In 1981 the first C-1 cassette player (15/16 ips, four-track format) was produced. A simplified machine appeared in 1986, and in 1992 a combination talking-book machine and cassette player was produced. Now, new digital equipment will improve sound quality, enable users to read an entire book without manipulating the equipment, and enhance users' ability to skim text and insert bookmarks.

NLS selects books for its program on the basis of their appeal to a broad audience, and all publications are produced in unabridged format. The objective is to provide material on a wide variety of subjects and at different reading levels, just as the typical public library does. Bestsellers, classics, biographies, fiction, mysteries, romances, westerns, and how-to books are in great demand. Each year approximately 2,000 titles are produced in quantities of 950 copies of each. Potential borrowers learn of these new materials through two bimonthly publications: *Braille Book Review* and *Talking Book Topics*. Through the International Union Catalog, now available on the Web, every user has access to more than 423,000 titles, incorporating the collections of NLS, six other cooperating countries, and five other U.S. agencies and foreign collections.

More than seventy magazines are now available on audiocassette and in braille. Among the more popular choices are *U.S. News and World Report, National Geographic, Consumer Reports, Good Housekeeping,* and *Sports Illustrated*. Issues of most magazines are mailed to readers at nearly the same time they appear on the newsstand. The NLS Music Section now offers the most comprehensive music collection in the world for blind and handicapped readers. It includes an extensive collection of music scores and textbooks in braille and large print, music appreciation cassettes, and instructional cassettes for numerous instruments.

The NLS network has fifty-seven regional libraries, at least one in every state except Wyoming and two each in some populous states. The District of Columbia, Puerto Rico, and the Virgin Islands also have regional libraries. Regional libraries may serve readers directly or through nearly eighty subregional (local) libraries. In March 2001 the regional library in Cincinnati celebrated 100 years of service. Libraries in Chicago, Philadelphia, and Pittsburgh, the Braille Institute in Los Angeles, the New York Public Library, and the Perkins School in Boston all have large, long-standing collections.

In addition, NLS has become a center for materials of all types relating to persons with disabilities and serves as a national clearinghouse for information regarding issues related to blindness and physical handicaps. Institutions and agencies whose clientele might be expected to include blind or physically handicapped persons—such as hospitals, retirement homes, nursing homes, and rehabilitation centers—also are eligible to use NLS services.

Readers borrow cassette playback equipment through the libraries, and over the years a variety of groups have kept the machines in good repair. Since 1960 the TelecomPioneers of America, a nationwide network of volunteers who are current and retired telephone employees, has repaired and adjusted talking-book machines and cassette players virtually free of charge. General Electric Elfun, a like-minded network of retired electrical workers, also has contributed immensely to keeping NLS machines running smoothly. In some communities the members have also delivered and demonstrated how to use machines to new readers.

Volunteers have long been an essential part of the services provided by NLS and the regional libraries. NLS provides technical training for volunteers and for network libraries. Today, some 4,500 volunteers are involved in the production of materials (tape narration, monitoring, reviewing, and duplicating) and the transcription, proofreading, and labeling of braille. Another 500 volunteers are involved in circulation and maintenance (including inspection to make sure patrons receive complete books in good condition). NLS offers correspondence courses leading to certification in braille transcription, music and mathematics braille, and braille proofreading.

A 1996 amendment to the copyright law, introduced by Senator John H. Chafee, provides that groups producing specialized formats for the blind no longer have to gain permission from the copyright holder to begin production of nondramatic literary works.

Web-Braille

Raised type has been a cornerstone of programs for blind people since the inauguration of such programs. Although the majority of NLS patrons

use talking books, there is a strong demand for materials in braille. An online system called Web-braille provides a new means of accessing NLS materials.

NLS staff first proposed the idea that led to the development of the Web-braille system in 1997, as many blind people were becoming familiar with the Internet. The advantages of offering braille material on the Internet are obvious: a user needing immediate access to specific information contained in an online braille book can obtain it in a matter of minutes, without waiting for the mail or dealing with bulky volumes. After a successful pilot test, NLS decided to make Web-Braille a permanent part of its program. Initially, Web-braille users could locate books only by searching a series of pages that simply listed the first 2,600 titles mounted on the system. Users can now consult the NLS online catalog to search by title, author, or other keywords among books available in Web-braille. More than 7,200 book titles were available as of 2005, and new titles are being added at the rate of about 40 per month. To access the latest titles, users can browse the online version of the bimonthly *Braille Book Review,* locate a title of interest, and select the volume they want to download. In May 2001 all NLS-produced braille magazines were added to Web-Braille.

Web-Braille represents another element in the overall movement toward enhancing braille literacy among blind persons—a movement that is endorsed by patrons and librarians alike. In particular, schools have applauded the new system because it allows everyone in a class to access the same book at the same time.

Talking Books

Most visually handicapped people lose their sight in middle age or later and comparatively few of them learn to read braille proficiently because the tactile sense diminishes with age. As a result, the talking book has overtaken braille in popularity. The talking book program was inaugurated in 1934, and within a year twenty-seven titles were being distributed through twenty-four regional libraries nationwide. Among the first talking books were the Bible, historical documents such as the Declaration of Independence and the Constitution, Shakespeare's plays, and a variety of fiction. Today, the collection boasts books in fifty-five languages. Registered borrowers learn of talking books newly added to the collection through the bimonthly *Talking Book Topics.* And of course the International Union Catalog, mentioned above, gives every network library online access to the entire NLS book collection and to the resources of other cooperating agencies in the United States and abroad.

From its beginnings in the 1930s, the talking-book program pioneered technological changes, from phonograph to open-reel tape, to cassette, and soon to digital format. At one time NLS developed a lightweight solar panel for use by patrons in areas without electricity.

Among the more frustrating features of early talking books was the fact that the normal recorded speech rate of 150 to 175 words a minute is too slow for many users because it is about half of the normal reading speed. In response, variable speed controls were developed to permit users to speed up discs and tapes without distorting the sound.

Today NLS produces approximately 2,000 talking books in 2 million copies and 45 audio magazines in 3 million copies a year on specially formatted cassette tapes. Both because of the cost of replacing some 750,000 cassette playback machines with digital players and of replacing some 20 million cassette book copies with the new technology, and because of a desire to cause minimal disruption to users, NLS assumes that the current four-track, 15/16 ips cassette system will continue in use for some time after the digital system is introduced.

Development of the DTB System

Development of the new digital talking-book (DTB) system has been constrained by the four core concepts that shape all planning at NLS. The core concepts are that the service must remain free for every eligible user: there must be a high degree of user involvement; access to NLS materials must be restricted to eligible users to protect copyrights; and the focus must remain on the users' reading needs. Consideration of users' needs, for example, has prevented NLS from embracing technology such as CDs, which are considered to be too fragile to hold up under continued use. Development of an acceptable DTB system for NLS has also posed a series of technical challenges, including establishing a standard, designing a player, and creating a digital collection.

Establishing a Standard

In the mid-1990s, NLS embarked on a program to design the most practical, cost-efficient digital talking book. The program involved twenty identifiable steps, including using a personal computer to simulate a DTB, developing a computer-based life-cycle cost analysis tool, developing relevant software, and constructing a prototype player. The first step was to define and prioritize DTB features and embody them in a standard.

After more than four years' work by a committee that included representatives of seven countries, the National Information Standards Organization (NISO) approved a standard for a digital talking book in December 2001. NLS chaired the committee, created and managed work groups, and wrote much of the final document. Blind and visually impaired users, who were heavily involved at every stage, also approved the standard.

The standard permits the creation of digital talking books that range from a novel to a complex reference work, and it gives users flexibility in how they use talking books. Most will want a recreational reading experi-

ence while others will require more sophisticated capabilities, including the ability to navigate rapidly and flexibly and to set bookmarks.

Designing a Digital Player

In 2001 NLS and the Industrial Designers Society of America (IDSA) sponsored a contest for the design of the exterior of a digital talking-book player. NLS provided a list of features sought in the player, and students at fifty-five IDSA-accredited schools were invited to participate for cash prizes. Entries were evaluated with respect to the principles of universal design and features specific to an effective digital player, such as accessible, distinctive controls and provision for a directional speaker. The design also had to be compatible with devices such as mouth sticks and remote controls that are used by some physically handicapped people. Entries were also judged in terms of creativity and ingenuity.

In June 2002, 6 judges met at NLS to evaluate 146 submissions from 28 schools around the country. The $5,000 first prize went to a senior at the University of Bridgeport, Lachezar Tsvetanov. His design and those of other top contestants included creative ideas that were considered for incorporation in the player that NLS is developing.

Creating a Digital Collection

Because NLS has been experimenting with digital recording systems for a number of years, the staff has come to understand the challenges of the digital domain. All three studios in the NLS complex have been outfitted with digital recording equipment, and staff members have been trained in digital technology. NLS contractors, who record 95 percent of the books produced annually, were required to record at least 10 percent of their output digitally in 2002, 50 percent in 2003, and 100 percent in 2004.

In 2001 NLS chose an initial group of 1,000 titles in the current collection to be transferred to digital format. These represented a broad literary cross-section, with genres selected in proportion to their representation in the cassette collection. This process has continued with the goal of identifying 10,000 titles for conversion. Contractors have begun converting these books to digital format, and by 2008 digital masters of converted titles plus the newly recorded digital titles are expected to total 20,000.

The Future

As mentioned earlier, NLS will begin to replace its existing cassette-based talking-book system with the new system based on digital audio technology in 2008. NLS has chosen flash-memory technology for the circulation of digital talking books. This type of memory can be read from and written to thousands of times, and it does not lose its data when power is removed.

Unlike CD-ROMs, flash-memory cartridges are sturdy and reusable. Their toughness is matched by the ease with which their content can be

changed. Because cartridges can be rewritten over and over, NLS can move copies of a book into and out of circulation to meet patron demand without wasting materials. The flash memory cartridge attaches, physically and electrically, via a Universal Serial Bus (USB) connector, which can be found on any computer built since 1997. The NLS DTB player will also have this kind of connection.

Developed by Toshiba in the 1980s, flash memory has many advantages over other carriers of digital media such as tape or disc, while retaining most of those formats' benefits. The use of flash memory as a DTB medium means that book players have no moving parts, so the machine will last longer. Also, the players will generate far less heat than a tape- or disc-based player and can get equivalent battery life from a smaller battery. Thus, flash-based players can be smaller, lighter, and faster to recharge.

Flash memory came into widespread use more than a decade ago and is found in electronic devices from microwave ovens to televisions and automobiles. The continuing drop in price of between 30 and 40 percent each year, driven by the popularity of digital cameras and portable digital audioplayers, promises to make the use of flash memory economical for NLS's purposes by 2008. Although they sound specialized, flash memory cartridges can be mass-duplicated just like any other product. A bank of writers can copy a DTB to multiple cartridges simultaneously, or, just as easily, write a different book to each cartridge. Books can also be duplicated as needed, one at a time, by libraries.

USB flash drives can be purchased off the shelf at any electronics or office supply store. In order to reduce cost, the units used by NLS will be largely the same as these commercial products, with two key differences. First, the shell will be customized to carry a large print and braille label and fit snugly into the NLS DTB player so that the drive will appear like a plug-in cartridge, such as the type used with video game systems; and, second, the controller chip will be modified to prevent the alteration of the data stored on the device except by authorized agencies.

In early 2005 NLS contracted with Battelle, a leading technology innovation firm, to design and develop its digital talking-book system—which includes the playback machine, flash memory cartridge, and mailing container. Three subcontractors that are experts in disability and technology issues are using NLS patrons, library staff, and repair technicians to test the system components to determine whether the prototypes function properly in many real world situations and are lightweight, portable, and durable enough to survive years of heavy use.

Creating a made-to-order digital talking-book machine is a tough job, and some trade-offs will be necessary in the final design. Because a majority of NLS patrons are over sixty-five and many are newly blind, most read books in a linear fashion and have limited need for a sophisticated navigation system. In fact, this group would find a complex player frustrating

and thus prefer a more basic player. At the same time, blind children and younger adults also use talking books and may wish to take advantage of more sophisticated navigation features. A user interface designed solely for one of these groups will not meet the wants and needs of all patrons. Hence the challenge is to design machines that a variety of patrons can operate, that librarians are able to clearly explain, and that repair personnel are able to service. The key characteristics are usability (accessible design), portability—because patrons prefer smaller, lighter machines with a built-in handle—and ease of maintenance.

There are a number of subcontractors with different tasks. The National Federation of the Blind, whose 50,000 members make it the largest organization of blind persons in the United States, developed procedures to test the system prototypes with patrons of all ages. HumanWare, formerly VisuAide, a leader in DTB technology, is managing the tests and will develop the software for the player. The Trace Research and Development Center at the University of Wisconsin at Madison, which makes information technology and telecommunications systems accessible by people with disabilities, is testing prototypes with people who have a range of physical handicaps.

Focus groups in Baltimore, Boston, Cleveland, Clearwater, Florida, Los Angeles, and Madison, Wisconsin, were tested on operating the controls, wrapping the power cord for storage, and opening and closing the mailing container. They reviewed player and cartridge shapes, insertion methods, and button shapes and layouts. Users demonstrated that buttons had to be accessible in shape and layout and that built-in audio prompts to guide usage also were essential. Librarians wanted a simple interface and cartridge and packaging design that would make the book return process more efficient.

Unlike audio players aimed at the general consumer, the NLS system will use tactile features, color differences, and large print labels to help readers with various kinds of visual impairments to operate the machine. The goal is to have 60,000 playback units ready for use by NLS patrons by 2008, with additional players available in each succeeding year. Meanwhile, NLS is analyzing its current audiobook distribution process to determine what adjustments will be needed to accommodate its new digital talking-book system. Three new models have been evaluated, and the best suited will be designed to integrate with the distribution systems of regional and subregional libraries in the NLS network.

The three models under consideration included the current system, in which mass quantities of book titles are stored locally for easy access by librarians as they fill loan requests. The other two options were on-demand distribution through a central facility, which would duplicate DTBs as patrons request them, and a hybrid model that combines mass production

and on-demand duplication in proportion to patron requirements. Each option was reviewed for compatibility and ease of adaptation to current library systems. The hybrid model was found to be the most economical for NLS and its network libraries; however, the complexity of the transition will require the continued use of the mass duplication system for the first year or two of digital operations. Modifications to other aspects such as shelving and circulation will be considered as libraries continue to distribute books from their own facilities.

The new distribution system will provide a combination of personal service for patrons, timely book delivery, and accurate tracking of materials to reduce loss rates. It is also important that materials are used efficiently and that inventory is adequate to meet patron demand. Some books do not circulate often but are still important to have in the program. Rather than having such books take up shelf space in libraries across the countries, flash technology will permit copies to be made quickly when needed.

The history of services to blind and physically handicapped readers in America reflects not only a growing recognition that such people have the same interests, intellectual capacity, and ambitions as other members of society but also a determination that they should enjoy the same benefits. Systems to assist blind people have made tremendous strides since Louis Braille devised his tactile code early in the nineteenth century. The digital talking book and the Web-Braille system are the latest steps to assure that all may read. The overall goal of all technological advances, of course, remains the same: to make the reading experience more enjoyable.

Frank Kurt Cylke has been the director of the National Library Service for the Blind and Physically Handicapped, Library of Congress, since 1973. He holds a B.A. from the University of Connecticut and an M.L.S. from the Pratt Institute. Since 1949 he has served in various public, academic, and school libraries. Among his many awards and citations for distinguished service are the 1982 Francis Joseph Campbell Citation and Medal and the 1994 Joseph W. Lippincott Award, both from the American Library Association.

Michael Moodie is the former deputy director of the National Library Service for the Blind and Physically Handicapped (NLS), Library of Congress. Appointed to the position in January 2004, he is primarily charged with directing the transition of the audio program from analog to digital format. He joined NLS in 1974, becoming research and development officer in 1990. In that role he chaired the development of the ANSI/NISO digital talking book standard and researched the application of solid-state memory technologies to the NLS program. He holds a B.A. from Syracuse University and an M.B.A. from the Johns Hopkins University.

Robert Fistick is the special assistant to the director, National Library Service for the Blind and Physically Handicapped (NLS), Library of Congress, and was for many years head of the Publications and Media Section. He joined NLS in 1980 after twenty years in journalism as a newspaper editor and publisher and has altogether more than forty-five years of experience in public relations, publicity, marketing, and publications management. He holds a B.S. in communications from Cornell University and has pursued graduate study at the College of William and Mary.