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# History and Characteristics of Agricultural Libraries and Information in the United States

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## ABSTRACT

AGRICULTURE AND THE NEED for agricultural information have existed for thousands of years. In colonial America, the earliest agricultural information came from Europe, but by the time of the American Revolution domestic agricultural publications and agricultural libraries existed. The earliest U.S. agricultural libraries were those in professional associations and scholarly societies. Agricultural libraries have also been created to serve state and national government agencies. The most important government library is that of the U.S. Department of Agriculture (USDA), which dates from 1839. As the National Agricultural Library (NAL), it is today one of the most significant and comprehensive agricultural libraries in the world. Academic agricultural libraries, including those in experiment stations, have supported agricultural research and education in the United States since the mid-nineteenth century. In the twentieth century, corporate agricultural libraries have come into existence. The number and variety of agricultural libraries provide a wide variety of information and services.

## INTRODUCTION

Agriculture has been a part of human life for many thousands of years; the need for agricultural information is probably almost as old. Ancient Babylonian clay tablets have been found that contain agricultural information. Blanchard (1977) hypothesized that "the great library at Alexandria undoubtedly had many treatises on agriculture inscribed on papyrus" (p. 219). Throughout history, in many civilizations, there have been libraries that have included agricultural information, and

separate agricultural libraries were established in Europe in the mid-eighteenth century. The development and growth of agricultural libraries and agricultural information in the United States will be reviewed in this article.

### AGRICULTURAL INFORMATION

Agriculture, the science of raising crops and animals, began some 10,000 years ago in the Middle East when animals were first raised in captivity. Most agricultural information from that time until the mid-nineteenth century was passed from one farmer to another by word of mouth. Even during the early days of the Agricultural Revolution, when advances in crop rotation, animal breeding, and mechanical inventions led to increased productivity and the need for fewer agricultural workers, most individuals learned of these developments from other farmers.

Fusonie (1975) noted that, at the time of the American Revolution, 90 percent of the American people were farmers. During the years following the revolution: "New advances in agricultural technology and increased dissemination of knowledge through agricultural literature inclusive of monographs, published works of agricultural societies, and the growing number of periodicals finally culminated in what became known as the first Agricultural Revolution" (p. ii).

Before programs of agricultural education were established, scientific societies and agricultural fairs offered slightly more formal exchanges of information in the early nineteenth century. The first agricultural fairs in the United States were that of the Columbia Agricultural Society in the Washington, D.C. area in 1809 and that of the Berkshire County Agricultural Society held in Pittsfield, Massachusetts, in 1811. Marti (1986) noted that "agricultural fairs have always claimed to be educational. Their eighteenth-century founders believed that science could elevate farming . . . and they tried to diffuse its light among the folk who worked the land" (p. 1).

The first publications devoted to agriculture came to the United States from Europe. Prior to and following the American Revolution

gentlemen farmers in the colonies continued to communicate with leading agriculturalists across the Atlantic. These men kept themselves abreast of the latest advancements occurring in agriculture abroad, through correspondence as well as through the acquisition of outstanding books, treatises, and journals . . . (Fusonie, 1976, p. iii)

Private collections of some note were developed and "the greater part of the library work for agriculture in those early days was undoubtedly done in the private collections..." (Greathouse, 1899, p. 496). More than 50 of the 900 volumes in George Washington's collection were on agriculture, while Thomas Jefferson's large collection included 133 agricultural books which were part of the collection sold to the Library of Congress in 1815 (Blanchard, 1977, p. 220).

Some of the first English language works on agriculture were Blith's *English Improver, or a New Survey of Husbandry* (London, 1649), Worlidge's *Two Treatises on Husbandry, Cyder and the Cyder Mill* (London, 1694), and Jethro Tull's *The Horse-Hoeing Husbandry* published in 1731. Richard Weston's 1779 publication, *Tracts on Practical Agriculture and Gardening In Which the Advantage of Imitating the Garden Culture of the Field is Fully Proved, by a Seven-Years Course of Experiments. Particularly Addressed to the Gentlemen Farmers in Great Britain. With Observations Made in A Late Tour Through Parts of France, Flanders, and Holland. Also Several Useful Improvements in Stoves and Green-Houses To Which is Added A Complete Chronological Catalogue of English Authors on Agriculture, Gardening, etc.* was popular in North America (Moran, 1976). Among the earliest agricultural works published in the United States were the *Farmer's Assistant*, written by John Nicholson in 1814, and the *Farmer's Library* by Leonard E. Lathrop, published in 1826-27. Fusonie (1988) noted that "In 1828, Congress issued the first technical publication in the field of agriculture entitled *Manual on the Growth and Manufacture of Silk and Treatise on the Rearing of Silk-Worms* authored by Joseph Ritter Von Hazzi. The first U.S. agricultural periodicals included the *Agricultural Museum* in 1810 and the *American Farmer*, which began publication in 1819 (Thurber, 1945).

Although there were some significant agricultural publications at this time, Greathouse observed in 1899 that:

In those early days agricultural books were no more numerous in general libraries than at the colleges, and were probably not as much used. Everywhere theology first by far, then law, medicine, history, travels made up the great body of the books in the libraries outside of such as were devoted to mere amusement. The volumes on agriculture in the classic tongues were about as numerous as those in modern languages, and were generally better known. (p. 495)

A complete list of the early agricultural publications can be found in Fusonie's *Heritage of American Agriculture: A Bibliography of Pre-1860 Imprints* (1975).

The use of agricultural information is different from that of other disciplines in science and technology. There is a significant volume of scholarly publication based on agricultural research conducted in universities and government agencies, but, unlike the applied disciplines of medicine and engineering, the practitioner of agriculture—the farmer—may not utilize the research or even be aware of its existence. Lancaster and Beecher (1981) point out that: "The results of agricultural research must be presented in one form for the research community and in a completely different form for the farming community or for the extension agents who carry information to this community" (p. 199).

Blanchard (1977) identified three categories of agricultural literature. The most important was the research literature that is available in

scholarly journals, experiment station bulletins, and books. Farmers and agricultural extension service agents relied most on "extension type publications distributed by experiment stations and extension services" (p. 224). The third category was trade publications including journals for the farmer and the agricultural industry.

Lancaster and Beecher (1981) observed that "agriculture is perhaps the most interdisciplinary of all the spheres of human activity, drawing, as it does, from biology, medicine, chemistry, soil science, various branches of engineering, climatology, food technology, the environmental sciences, economics, management, and a whole host of other fields" (p. 197). This was equally true in the eighteenth and nineteenth centuries, and early agricultural libraries included many works on chemistry, engineering, and the weather.

### TYPES OF AGRICULTURAL LIBRARIES

Several types of agricultural libraries are found in government agencies, academic institutions, corporations, and trade and professional associations. Each type of library was developed to meet a different need and to serve a different group of users. The current characteristics and distribution of agricultural libraries will serve as an introduction to the history of such libraries.

The number of agricultural libraries in the United States has increased over the last two centuries although fairly slowly; Greathouse identified seventy-seven agricultural libraries in 1899. Blanchard (1977) noted that there were 125 agricultural libraries in the United States in 1934 and 215 in 1959 (p. 225).

The 227 agricultural libraries in the United States and Canada that are listed in the *Directory of Special Libraries and Information Centers* (1985) served as the population for an analysis of contemporary agricultural libraries. This is not a comprehensive list of agricultural libraries but does provide a variety of data to be analyzed.

As shown in Table 1, the majority of these libraries are located in either government agencies or academic institutions. The academic libraries are usually associated with large land-grant institutions. The government libraries range in size from small state agency libraries, such as that of the Minnesota State Board of Animal Health, to the extensive collections at the National Agricultural Library. The corporate libraries provide information for firms that specialize in farm equipment, agricultural chemicals, plant and animal genetics, agribusiness, or specific agricultural products such as tobacco, sugar, or livestock. Agricultural libraries in trade and professional associations include those of the American Seed Trade Association, the National Association of Animal Breeders, and the United Farm Workers of America.

Although many libraries in this directory did not report the year in which they were founded, at least seventeen of the agricultural libraries

TABLE 1  
TYPES OF AGRICULTURE LIBRARIES

<i>Types of Agriculture Libraries in the U.S. &amp; Canada</i>	<i>Number</i>	<i>Percentage</i>
Academic	71	31.3
Federal Government	75	33.0
State/Provincial Government	18	7.9
Trade/Professional Association	30	13.2
Corporation	28	12.4
Other	5	2.2
Total	227	100

Source: *Directory of special libraries and information centers*. (1985). 9th ed. Detroit, MI: Gale Research Co.

that are still in existence were founded before 1900. Another twenty-one were founded between 1900 and 1929, and twenty in the two decades between 1930 and 1949. The recent decades were especially fruitful times for library growth: twenty-nine libraries were founded during the 1950s, twenty in the 1960s, and eighteen in the 1970s. Blanchard (1977) notes that all of the corporate agricultural libraries have been established in the years since World War I.

Typical of special libraries, many of the agricultural libraries reported having small specialized collections. Thirty-three libraries (14.5 percent) have fewer than fifty serial subscriptions, and a total of ninety-eight (43.1 percent) have fewer than 250 subscriptions. Monographic collections are equally small with seventy-eight (34.4 percent) of the libraries reporting fewer than 2,000 titles. Of course, large agricultural collections do exist, notably those at the National Agricultural Library and some academic libraries. Thirty-five (15.4 percent) of the agricultural libraries have more than 1,000 subscriptions, and twenty (8.8 percent) have collections of more than 100,000 volumes.

The size of the staffs of the agricultural libraries is also varied. Thirty libraries (13.2 percent) reported no professional staff, and eighty-three (36.6 percent) had only one professional librarian. While fifty-seven (25.1 percent) of the libraries had one paraprofessional staff member, forty-three (18.9 percent) reported no such staff at all. Only 106 (46.7 percent) of the libraries reported that they were using computers at that time. One hundred fifty-nine libraries (70.1 percent) do offer interlibrary loan to their users, but only thirty (13.2 percent) have instituted current awareness services. The vast majority, 187 libraries or 82.4 percent, reported that the library is open to members of the public who may need to use the specialized collections.

#### LIBRARIES OF PROFESSIONAL ASSOCIATIONS AND SCHOLARLY SOCIETIES

Among the earliest libraries in the United States were the libraries

of scientific societies. The specialization and scientific developments of the latter part of the eighteenth century led to the formation of agricultural societies to further the interests of farmers. Similar societies had already proven to be successful in Europe. One of the first such organizations in the United States was the Philadelphia Society for the Promotion of Agriculture, founded in 1785. Philadelphia was then the capital of the new United States of America, and prominent leaders such as Thomas Jefferson, Benjamin Franklin, and George Washington were listed among the members of the society. The New York Society for the Promotion of Agriculture, Art and Manufactures was founded in 1791, and the Massachusetts Society for Promoting Agriculture was founded the following year.

As in other scientific societies of the time, library collections were a primary advantage of membership in agricultural societies. Not only were books, magazines, and newspapers collected, but members were often provided with lists of the items in the collection for their own reference. The founder of the New York society began its library the year the society was founded with copies of his book *Summary Views on the Course of Crops in Husbandry of England and Maryland* which had been published in 1784. George Washington contributed six volumes of the *Annals of Agriculture*. Fusonic (1988) noted that "the potential importance of agricultural society libraries was reflected in the 1794 proposal of the New York Society [that] . . . each County Society should be furnished with all the publications on agriculture in America . . ." (p.192). The Massachusetts Society began its library in 1797 and continued slowly to build the collection so that by 1815 it consisted of 125 volumes. Greathouse (1899) believed that these "probably included nearly all of the valuable books on agricultural knowledge in this country at that date" (p. 496).

In 1794, the Philadelphia Society discussed starting several additional agricultural libraries to be housed in schools in other parts of the state, but the plan was never implemented. The Massachusetts Society for Promoting Agriculture had a library by 1797. In 1793, the society had begun publishing information about agriculture in local journals, and an annual series of pamphlets was begun in 1795. These publications were exchanged with other societies in order to increase the size of the library collection (Greathouse, 1899).

Greathouse (1899) wrote that "In the South, the only agricultural society of this period...is that of the Winyah Indigo Society of Georgetown, South Carolina." Plantation owners founded the society in 1755 as a business and social organization, and a well-known library collection was provided for the members.

More specialized collections were begun in the next century. The Massachusetts Horticultural Society Library, which had been started in 1829, had an impressive collection of 10,000 volumes by the turn of the century. Today, its collection includes more than 29,000 books, 269

periodical subscriptions, and 24,000 prints (*American Library Directory*, 1988). Among its special collections are 35,000 trade nursery catalogs and a rare book collection that dates back to the fifteenth century. In 1963, G. K. Hall published a three-volume *Catalog of the Library of the Massachusetts Horticultural Society*. The library of the Pennsylvania Horticultural Society, founded in 1827, was smaller but still significant with more than 3,500 volumes by 1900. This library is still in existence. It includes volumes on eighteenth- and nineteenth-century horticulture among its special collections (*American Library Directory*, 1988).

In 1852, the United States Agricultural Society was founded. This group, in cooperation with various state societies, served as a lobby to encourage Congress to establish a department of agriculture. In addition to its lobbying activities, the society promoted the dissemination of agricultural information. Among its publications was a bibliography of the forty-five U. S. agricultural newspapers existing.

Blanchard (1977) noted that by the 1850s, in addition to libraries in agricultural societies, there were also libraries that had been started by the boards of agriculture of several states, including Massachusetts and Illinois. In the later years of the nineteenth century, farmers' reading clubs existed in Connecticut, Pennsylvania, Michigan, and New York. Greathouse (1899) noted that agricultural libraries for farmers also were sponsored by the granges and estimated that several hundred such libraries existed in 1899. Although their collections contained books of general interest in addition to those on agriculture, "they have proven effective in the promotion of scientific farming" (p. 511).

## THE DEPARTMENT OF AGRICULTURE LIBRARY

The Department of Agriculture Library originated with the Patent Act of 1790 which permitted the citizens of the new United States to protect their inventions. The Patent Office realized the need to refer to other patents as well as to scientific and technological literature, and a library was established. Henry L. Ellsworth, commissioner of the Patent Office, had urged that a library be authorized because "the necessity of a library of scientific works to facilitate the discharge of the duties of this office need only be mentioned to be duly appreciated (Fusonie, 1988, p. 194). Among the agricultural items housed in the Patent Office were seeds and specimen plants not found in the United States, and in 1831 the Patent Office began a seed distribution program. The need for agricultural information was so important in the Patent Office that a separate Agricultural Division was established in 1839 with its own library collection (Adkinson, 1978).

Although the collection of what is now the Department of Agriculture Library had its origins in the Agricultural Division of the Patent Office, the concept of such a library is even older. In 1796, while discussing the importance of agriculture, President George Washington proposed to Congress "the establishment of Boards, composed of

proper characters, charged with collecting and diffusing information... to encourage and assist a spirit of discovery and improvement" (*Writings of George Washington*, 1940, XXV, p. 315).

It was sixty-five years before Washington's ideas were implemented. As the bureaucracy of the new government grew and changed, and the importance of agriculture became more clear, a Committee on Agriculture was established in 1820 by the House of Representatives. The Senate created a similar committee five years later. Finally, in 1861, President Abraham Lincoln proposed the establishment of the Agricultural and Statistical Bureau. The United States Agricultural Society, a privately supported group, lobbied to have an Agriculture Department created instead. In 1862, in the Organic Act, Congress authorized a separate Department of Agriculture with a commissioner who would be appointed by the President (Fusonie, 1988).

One of the original responsibilities of the Department of Agriculture is:

to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word. . . . The Secretary of Agriculture shall procure and preserve all information concerning agriculture which he can obtain by means of books and correspondence . . . ." (Shaw, 1948, p. 133)

This charge led to the development of a library for the Department of Agriculture under the direction of the Commissioner of Agriculture.

During the first year of its existence, \$1,000 was authorized to buy books for the library. The collection of 1,000 volumes in the Agricultural Division of the Patent Office was transferred to the new Department of Agriculture library, and \$4,000 was allocated for the library in 1864. The library had published a catalog of the Department of Agriculture's publications and was able to use this in 1866 to facilitate exchange programs with other agricultural organizations throughout the world. The program was quite successful, and Fusonie (1988) noted that: "Under the publication exchange program, an additional 1,000 volumes of valuable books and periodicals in such languages as German, French, Italian, Spanish, Danish, and Swedish were added to the library's collection" (p. 196). The collection had grown to 8,000 volumes by 1871, and Mohrhardt (1957) noted that "by 1898 was considered the most complete agricultural library in the world" (p. 63).

The library's significant growth was not always without difficulty. In his excellent "History of the National Agricultural Library," Fusonie (1988) notes that as late as 1892 "the library still lacked adequate financial support, proper facilities and appropriate personnel" (p. 198). Julius Sterling Morton, secretary of agriculture, sought to remedy the situation and wrote to Melvil Dewey in June 1893 asking him to develop a list of criteria to be used in selecting the next librarian of the Department of Agriculture. The examination, which was developed with Dewey's input, included sections on "orthography, penmanship, letter

writing, elements of the English language, arithmetic, modern language, library economy, bibliography, and literature of agriculture” (Fusonie, 1988, p. 198).

William P. Cutter, who was selected to be librarian under the new criteria, made many changes to improve the library’s collection and the organization of information. At this time, the collection consisted of some 38,000 books, more than half of which were housed in divisional libraries. Under Cutter, most of the collection was consolidated in a central location. A dictionary catalog was begun, additional funds were used to complete serial runs, and a new reading room was opened. In the words of the Secretary of Agriculture, “the library has been made in this manner a working laboratory instead of a miscellaneous storehouse” (Fusonie, 1988, p. 199).

In spite of Cutter’s efforts to consolidate the collection, a number of independent agency libraries existed within the Department of Agriculture, beginning in 1920. More than forty bureau libraries included those of the Forest Service, the Weather Bureau, Agricultural Engineering, Biological Survey, and Chemistry and Soils. Their collections had been purchased and cataloged by the main library, but the staffs were paid by the bureaus. There was duplication of collections and services, as there often is in decentralized library services, but, in spite of this, many department employees in the field had no library service. The bureau libraries that had been established in the first years of the twentieth century were consolidated in 1942 during the first months of World War II. This was done in part to avoid further unnecessary duplication of services and in part because of space shortages in Washington during the war. Both staff and collections were transferred from the bureau libraries to the Department of Agriculture Library during the centralization.

Various directors of the library have been aware of the importance of cooperation with other libraries. As early as 1900 the library loaned its holdings to other libraries. Shaw (1948) observed that although the library had been authorized to sell catalog cards in 1899, it stopped offering this service in 1906 and instead provided cataloging copy to the Library of Congress. The library also cooperated with the Army Medical Library in collecting items of historical interest and relied upon them for medical information. In 1915, Library Director Claribel Barnett wrote that she wanted to expand the library’s services further by enhancing relations with academic and experiment station libraries. When funding has been available, such outreach services have been provided (Blanchard, 1977, p. 228). Thomas explained in 1989: “Informal networking has been a tradition in the agricultural information community. In the last five years, however, the National Agricultural Library (NAL) has worked assiduously to bring a formal organization into being” (p. 113). The United States Agricultural Information Network (USAIN), with representatives from all aspects of agricultural librarianship, provides a cooperative forum for discussion of agricultural information issues.

The library has also been involved in developing international cooperation among agricultural libraries. Director Foster Mohrhardt was one of the leaders who formed the International Association of Agricultural Librarians and Documentalists. The library has also worked with the Food and Agriculture Organization (FAO) of the United Nations to develop the International Information System for Agricultural Sciences and Technology (AGRIS). The FAO's David Lumin Memorial Library in Rome is the site for the Agricultural Libraries Network (AGLINET) which works with the National Agricultural Library and other major libraries to improve document delivery among agricultural libraries around the world. The librarian for the FAO Fisheries Branch Library, for example, has consulted with other libraries and has established exchange programs in Malaysia, Thailand, India, Pakistan, and the Philippines (Cuerden, 1988).

Bibliographies on specific subjects have been produced by the library for most of this century, but, in 1942, the comprehensive index, *Bibliography of Agriculture*, was begun to provide access to the journal literature. The *Dictionary Catalog of the National Agricultural Library, 1862-1965* and the *National Agricultural Library Catalog* provided information about the rest of the collection. The catalog was last published in December 1985, when users were encouraged to make use of online access to the library's holdings through the OCLC database instead of the printed catalog.

The Department of Agriculture Library has frequently been a leader in the application of technology to libraries. For example, in the late nineteenth century, William Cutter replaced the gas lamps in the library with incandescent lamps. In 1934, Claribel Barnett introduced the Bibliofilm Service, which provided microfilm copies instead of lending the original documents. The Bibliofilm Service was developed with the cooperation of the American Documentation Institute and Science Service and was an immediate success. In the first year, more than 300,000 pages of microfilm copy were distributed. A decade later, Ralph Shaw introduced inexpensive copies using a new photocopying machine that used a continuous roll of paper rather than single sheets. Further advances in the application of microfilm technology to libraries were also made under Shaw's direction.

In 1970, magnetic tape records were introduced to replace manual reproduction of the *Bibliography of Agriculture*. Online access to the *Bibliography of Agriculture* has been available through the AGRICOLA database. Compact Disc-Read Only Memory (CD-ROM) has been used at NAL since 1988 to provide alternative, faster, and less expensive access to the AGRICOLA database. In recent years, the library has become a leader in utilizing optical disc storage technology in libraries. Andre (1989) described the experimental projects to provide simultaneous access to both full text and graphics of the *Pork Industry Handbook* in 1985. Another project included visual materials from the Forest

Service Photographic Collection on video disc. Interactive laser disc technology has been used to produce an educational program on the AGRICOLA database. Software has been utilized to develop expert systems in specialty areas such as aquaculture information.

### THE NATIONAL AGRICULTURAL LIBRARY

In 1962, the 100th anniversary of the establishment of the U. S. Department of Agriculture, the library was designated the National Agricultural Library (NAL), one of three national libraries in the United States. The library, which had been located in Washington, D.C., moved to new facilities near the Agricultural Research Center in Beltsville, Maryland, in 1969. The location permitted the library to offer enhanced services to the researchers at the Agricultural Research Center, while maintaining services to the other staff of the department in the Washington area.

The library is fifteen stories tall and houses a collection of 2 million volumes including more than 25,000 journal titles. The NAL Collection Development Policy states that:

The focus of collection development at NAL is on acquiring information important for the advance of agriculture regardless of its source, language, medium or form. The Library is collecting machine-readable materials, audiovisual material, juvenile literature, and other sources of information relevant to agriculture.... (1988, preface)

One copy of each of the agriculture books received by the Copyright Office of the Library of Congress was sent to NAL in the past (Blanchard, 1977) although this is no longer the practice. In 1970, a law was passed which gave NAL "the authority to accept books, manuscripts, and other important agricultural memorabilia" (Fusonie, 1988, p. 206) to add to the collections.

Among the special collections that have been developed are an extensive historic collection which includes rare books, manuscripts, oral history transcripts, and trade catalogs. The Nursery and Seed Trade Catalogs Collection was begun in 1904 to "provide information regarding sources, prices, descriptions of plant material offered for sale" (*Our Agricultural Heritage*, p. 5) and includes some items that were published as early as 1771. The Forest Service collection of photographs is the largest collection of its kind in the world. More than 13,000 maps in another collection provide information about soil classification; national forests; land use; annual precipitation; vegetation; distribution of insects; plant, and animal diseases; and transportation. A collection of posters on special topics, such as the role of agriculture during the first World War or the development of insect control, are of value to historians.

The National Agricultural Library provides information to all sectors of the agricultural community. It receives more than 180,000 requests for documents every year with an additional 30,000 requests for

information. Information centers within NAL have been established to provide literature searches and specialized services in areas such as alternative farming, animal welfare, aquaculture, biotechnology, critical materials, food irradiation, and food and nutrition.

### THE LIBRARIANS OF THE DEPARTMENT OF AGRICULTURE

Aaron Burt Grosh, one of the founders of the National Grange and a clergyman, was the first librarian for the U.S. Department of Agriculture. He was followed by Stuart Eldridge (1869-71), John B. Russell (1871-77), and Ernestine H. Stevens (1877-93). William Parker Cutter (1893-1901), who was selected under Melvil Dewey's criteria, reorganized the library and introduced professional policies and procedures. He was followed by Josephine A. Clark (1901-07), a botanist who had served as Cutter's assistant librarian. Claribel R. Barnett (1907-40), introduced the Bibliofilm Service in 1934. Ralph R. Shaw (1940-54) introduced the technological advances of that time to the library. Under his direction, the library began publication of the *Bibliography of Agriculture* in 1942. Foster E. Mohrhardt (1954-68) was a founder of the International Association of Agricultural Librarians and Documentalists while he was librarian, and John Sherrod (1968-73) supervised the construction of the library's new facilities and the introduction of computers to the library (Moran, 1976; Bercow, 1962). Richard A. Farley served from 1974 to 1983. During these years the library "continued to make advances in size, research importance, and world-wide access to its collection" (Fusonie, 1988, p. 205). The present director, Joseph Howard, came to the National Agricultural Library in 1983 from the Library of Congress and has strengthened the library's national and international role with expanded services and the application of contemporary technology to both the management and the use of agricultural information.

### OTHER GOVERNMENT AGRICULTURAL LIBRARIES

In 1938, four regional research laboratories were established under the Secretary of Agriculture to develop new agricultural chemicals and products and to find new markets for agricultural commodities. The sites selected for these laboratories were Philadelphia, Pennsylvania; Peoria, Illinois; New Orleans, Louisiana; and Albany, California. Library services were included in the initial planning of these sites. Beckmeyer (1947) noted that, in addition to more traditional collections of monographs, pamphlets, and serials, the library at the Southern Regional Laboratory developed an index to agricultural patents. At the library of the Northern Regional Research Laboratory in Peoria, Illinois, Nellie Larson (1953) observed that she was "responsible for maintaining a working collection of currently useful publications only and no obsolete, superseded or little used materials are retained" (p. 453).

In 1942, the Department of Agriculture extended service into the field through regional libraries. Regional branch libraries were estab-

lished in Upper Darby, Pennsylvania; Little Rock, Arkansas; Atlanta, Georgia; Lincoln, Nebraska; Albuquerque, New Mexico; Fort Worth, Texas; San Francisco, California; and Portland, Oregon. The need for such libraries was explained by Mildred B. Williams (1941), chief, Division of Field Library Service: "Five out of every six Department employees are stationed in the field, the majority without library service through official channels" (p. 550). Core collections of standard reference sources were provided in all libraries, but each collection also was specialized to reflect the topics of interest to that region. Copies of the publications of the staff in that region, local farm journals, and experiment and extension publications were expected to be collected as well. Sub-branch libraries provided more limited services (Buhler, 1942; Mohrhardt, 1957).

The Forest Service, which had been the Bureau of Forestry, became a separate agency of the Department of Agriculture in 1905. Regional experiment stations in Utah, Minnesota, Pennsylvania, Arkansas, California, Colorado, and Louisiana each have libraries, some of which date from the 1920s. The library of the Pacific Southwest Forest and Range Experiment Station in Berkeley, California, has a staff of twelve including five professional librarians and a collection of more than 32,000 volumes. The Forest Products Laboratory Library in Madison, Wisconsin, was founded in 1910. Its current collection of more than 56,000 books and 30,000 technical reports includes a special collection on forest product utilization.

There are several libraries serving the U.S. Fish and Wildlife Service as well. The oldest is at the Abernathy Salmon Cultural Development Center in Longview, Washington, and was established in 1942. Its collection of 125 books and 175 periodical volumes focuses on fish culture, hatchery techniques, and water reuse. The Technical Information Services at the National Fisheries Center in Kearneysville, West Virginia, was started in 1959 and has more than 25,000 books and 790 periodical subscriptions with particular strengths in the area of aquaculture, chemotherapy, and freshwater biology. Special collections include 16,000 reprints on fish diseases and 8,000 reports on fish culture. The library serves as a clearinghouse for all Fish & Wildlife Service aquacultural materials (*Directory of Special Libraries*, 1985).

In addition to the many agricultural libraries that serve the U.S. government, there are also similar libraries at the state level. Greathouse wrote in 1899 that the library of the Massachusetts Board of Agriculture, which was started when the board was established in 1852, was considered by 1857 to be "the most extensive in the United States" (p. 504). The Illinois State Board of Agriculture library was started in 1853 and by 1899 had 5,000 volumes of which the livestock records were the most heavily used. Unfortunately, neither of these libraries seem to be in existence today.

Schmidt (1980) noted that special libraries are frequently started

because of an individual or event and describes the library of the Minnesota Department of Agriculture as an example. Materials that had been housed in several offices and other locations were brought together in 1980 when the department was relocated. A professional librarian was given ten weeks to centralize the collection and to train a secretary who would continue to manage the library. Like most such libraries, this collection is still very small with a concise reference collection. Minnesota contracted with the Professional Library of the State Department of Education to provide reference services including online searches, a service that has been appreciated by the users.

The Texas Department of Agriculture Library was started in 1974 as one shelf of press releases and clippings. As in Minnesota, it was when the department moved to a new building in 1975 that materials from several locations were brought together. Crosswell (1985) noted that the library now consists of more than 3,000 books and has been cataloged. An extensive vertical file and subscriptions to 130 newsletters augment the collection.

### ACADEMIC AGRICULTURAL LIBRARIES

Libraries in academic institutions were among the earliest to support collections of agricultural information. Greathouse (1899) listed the books included in the agricultural section of the Harvard library catalog in 1790. Although only sixteen titles are listed, Greathouse stated that "there were undoubtedly in the total of 12,000 volumes many treatises on botany, chemistry, entomology, and geography which were valuable to the occasional student of farm problems" (p. 495).

Agricultural education had been offered by New York state as early as 1819 at Ovid Academy, but it was not until 1857 that the first agricultural college was established in Michigan. This institution is now known as Michigan State University. Pennsylvania, Maryland, Iowa, and Minnesota also began agricultural colleges in the next two years. The demand for agricultural education throughout the United States increased, and, in 1857, Justin S. Morrill, representative from Vermont, introduced the Federal Land Grant Act. The measure, sometimes referred to as the Morrill Act, was finally passed in 1862. This legislation provided 30,000 acres of land to each state for each Senator and Congressman representing it. The state was to sell the land and use the income to establish an agricultural and mechanical college. The majority of states established new colleges while some states chose to use the funds for new departments of agriculture in existing colleges. In 1890 a second bill was passed which provided regular allotments of federal funds to each of the land-grant colleges and included funding for historically black colleges of agriculture.

Thurber (1945) observed that "the founders of the agricultural colleges considered books and libraries as indispensable requisites of an educational institution. It was their desire that the libraries be the chief

attraction for all the better class of students" (p. 347). Collections were to include classic works as well as contemporary writings, and the library was to provide appropriate facilities for study and writing. In spite of these plans, many libraries in land-grant institutions were underfunded. In order to stretch their limited budgets, the libraries became depositories of federal documents and established programs to exchange their own publications among themselves. The reports of the land-grant institutions in several states in the 1870s and 1880s included statements about the need for additional funds for collections and preservation of existing materials. Gifts, such as \$150,000 to the University of Vermont and \$50,000 to Rutgers College, permitted new libraries to be built.

Many of the land-grant college libraries in the eastern United States were helped in their early days by receiving sizable portions of the state agricultural society libraries. With this assistance and with other support, by 1899, Michigan Agricultural College had acquired more than 9,000 agricultural publications, and Rutgers College had more than 12,000. Not all libraries grew as quickly, especially in the west. The Utah Agricultural College had only 364 books on agriculture in 1899. Sometimes creative means were used to add to library collections. A professor at Cornell University arranged for an endowment funded by beekeepers who donated the revenue from one bee colony per year. "When contributions from one co-operator have reached \$50, each year thereafter one book will be purchased from the endowment fund and inscribed with the name of the donor" (Colcord, 1926, p. 139).

McCarthy (1948) surveyed the fifty-two land-grant colleges and universities and found that the agricultural college library was usually part of the main library. When there was a branch library for agriculture, as there were on twenty-five of the campuses, the main library was usually responsible for acquiring, binding, and cataloging the agricultural publications, and the holdings of the branch collection were then included in the main card catalog. McCarthy calculated library expenditures per student in land-grant institutions and found that they varied widely from campus to campus although there had been steady increases in the average expenditures during the previous two decades.

### EXPERIMENT STATION LIBRARIES

Overfield (1986) noted that prior to 1880 there was "little science that was directly applicable to agriculture" (p. 268), and the research efforts from 1880 to 1920 were successful in changing the nature of agriculture. The need for scientific research about agriculture led to the establishment of agricultural experiment stations in some states. In Europe, some experiment stations were established as early as 1834. In the United States, the first such facility was the Connecticut Agricultural Experiment Station in New Haven, which was founded in 1875. Unlike most later experiment stations, this facility is not part of a

college of agriculture. The original research was limited to plants and soils, and the original library collections reflected these topics. The Osborne Library, named for Thomas B. Osborne who donated his 3,500 volume collection of rare chemical journals to the library in 1925, now has a collection of more than 23,000 volumes. Giandonato (1947) described additional departmental libraries in the various buildings at the station where secretaries managed reprints and binding.

Other states followed Connecticut in establishing agricultural experiment stations and, subsequently, libraries. By 1882, North Carolina's station had a library with fifty volumes, while in the same year the station in Geneva, New York, cited twenty-three titles in its first annual report. Six years later the need for funds for a reference library at the Geneva experiment station was stated in the annual report, a need that was reiterated in 1899: "A good library is a most necessary part of experiment station equipment. Research can neither be entered upon safely nor its results discussed intelligently unless the investigator has access to the records of what has been learned previously concerning the subjects under consideration" (Giandonato, 1947, p. 354).

In 1887, the Hatch Act authorized federal funds for the establishment of agricultural experiment stations in conjunction with the land-grant institutions to conduct agricultural research. The \$15,000 that was provided annually by the federal government was used by those states that already had experiment stations to increase the amount of research that was supported. Other states, especially those in the west, used the funds to establish experiment stations for the first time, and, by 1900, there were experiment stations in all states and territories. The library collections that existed at experiment stations were often small. The funds for libraries in experiment stations were sometimes combined with the funds for academic libraries in land-grant institutions to provide a single, stronger collection (Overfield, 1986).

The value of agricultural experiment station libraries to the individual station was explained in 1911 by E. H. Jenkins, the second director of the Connecticut station, when he spoke to the Association of American Agricultural Colleges and Experiment Stations. Giandonato (1947) quotes Jenkins as noting that:

A station library, as distinct from a college or university, must chiefly contain strictly technical treatises and journals, because it should be solely for the use of persons engaged in agricultural research and experiment....We are not, therefore, likely to find any single station library which is equally full or equally well selected in all departments...nor shall we be likely to find any two libraries which are alike. (p. 357)

Towne (1933) surveyed agricultural experiment stations in 1932 to determine the status of their libraries. Of the forty-three stations that responded, thirty-seven were spending funds for books and/or periodicals, while only six included library services in their budgets. The majority of the experiment station libraries (twenty-five) were located

on a college campus but separate from the main library. Fourteen of the libraries were administratively independent of the academic library. Blanchard (1977) hypothesized that if a survey were conducted now "it would probably indicate an increase in centralization with much more service being provided exclusively by the main library or one of its branches" (p. 231).

### CORPORATE AGRICULTURAL LIBRARIES

While most other types of agricultural libraries can trace their histories to the nineteenth century, libraries in corporations dealing with agriculture are primarily an innovation of the mid-twentieth century. An article on "Agricultural Library Work," published in 1926, did not even mention corporate libraries. As an example, the J. W. Cummins Memorial Library of Farmland Industries, a manufacturing company in Kansas City, Missouri, was not begun until 1950, although the company was started in 1929. The main library collection at Farmland Industries consists of agriculture and economics, and also includes the history and records of the company. Branch libraries for technology and training are located at other corporate sites (Hudson, 1981).

The Illinois Agricultural Association library was not started until 1957. The staff of eight provides service to the almost 3,000 employees throughout the state. Although all employees may use the library, the staff in research, marketing, publications, and legislation are the most frequent users. FARMBLISS, an in-house computer system, is used for serials control and generation of routing slips (Olson, 1980).

### CONCLUSION

During the last two centuries, agricultural libraries in the United States have grown from comprehensive collections consisting of 125 volumes to comprehensive collections of more than 2 million volumes. The number of agricultural libraries has tripled in this century, and new libraries serving agricultural corporations have emerged. The efforts of generations of librarians have brought about bibliographic control of the literature, opportunities for resource sharing, and new applications of technology.

Ninety years ago, Charles H. Greathouse (1899) wrote about the development of agricultural libraries. He noted that "the farmer has constantly found himself wanting information on one subject and his book or paper offering him information on another....His need is a library within reach that will furnish in concise form the entire body of thoroughly proved agricultural science" (p. 491). Although very few libraries have approached Greathouse's ideal of a collection encompassing the entire body of agricultural information, the number and variety of agricultural libraries today are providing more information to more users than could have been imagined in the nineteenth century. Recent advances in applications of technology may actually put the ideal library within reach of the individual farmer of the twenty-first century.

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