PRODUCTION NOTE

University of Illinois at Urbana-Champaign Library
Library Trends

Editor
CHARLES H. DAVIS

Managing Editor
LINDA HOFFMAN

Assistant Editor
JAMES DOWLING

Publications Committee
HUGH ATKINSON
J.L. DIVILBISS
KATHLEEN HEIM
JEROME MILLER
SELMA RICHARDSON
LINDA C. SMITH

Library Trends, a quarterly journal of librarianship, provides a medium for evaluative recapitulation of current thought and practice, searching for those ideas and procedures which hold the greatest potentialities for the future.

Each issue is concerned with one aspect of librarianship. Each is planned with the assistance of an invited advisory editor. All articles are by invitation. Suggestions for future issues are welcomed and should be sent to the Managing Editor.

Published four times a year, in summer, fall, winter, and spring. Office of publication: University of Illinois Graduate School of Library and Information Science, 249 Armory Bldg., 505 E. Armory St., Champaign, IL 61820. Entered as second-class matter under the act of August 24, 1912. Copyright 1981 by The Board of Trustees of the University of Illinois. All rights reserved; nonprofit organizations may, however, quote from or reproduce material copyrighted here by The Board of Trustees of the University of Illinois for noncommercial, educational purposes. Full credit should be given to both the author and Library Trends.

Subscription price is $16.00 a year (plus $1.00 postage for overseas subscribers). Individual issues are priced at $5.00. All foreign subscriptions and orders should be accompanied by payment. Address orders to Journals Department, University of Illinois Press, 54 E. Gregory Drive, Box 5081, Station A, Champaign, IL 61820. Editorial correspondence should be sent to Publications Office—Library Trends, 249 Armory Bldg., 505 E. Armory St., Champaign, IL 61820.

Indexed in Current Contents, Current Index to Journals in Education, Library and Information Science Abstracts, Library Literature, PAIS, and Social Sciences Citation Index.

PRINTED IN THE U.S.A.
Map Librarianship and Map Collections

MARY Lynette Larsgaard
Issue Editor

CONTENTS

Mary Lynette Larsgaard  371 INTRODUCTION
Janet K. Rudd  375 TOPOGRAPHIC MAP ACQUISITION IN U.S. ACADEMIC LIBRARIES
Larry G. Carver
Larry Cruse  391 MICROCARTOGRAPHY AND CARTOGRAPHIC DATA BASES
J.B. Post  417 A MODERN MAP LIBRARIAN
John R. Schroeder  419 PERSPECTIVES ON MAP CATALOGING AND CLASSIFICATION
J.B. Post  439 HISTORICAL MAP RESEARCH
Mai Treude  453 MAP LIBRARY USERS IN AN ACADEMIC SETTING
Betty H. Kidd  473 THE ADMINISTRATION OF A LARGE MAP COLLECTION
Cynthia Ann Everitt  483 SECURITY IN MAP COLLECTIONS
Mary Lynette Larsgaard  499 EDUCATION FOR MAP LIBRARIANSHIP
Stanley D. Stevens  513 MAP AND AERIAL PHOTO COLLECTIONS IN THE UNITED STATES: SURVEY OF THE SEVENTY LARGEST COLLECTIONS
CONTENTS—Continued

P.L. Barton 537 MAP COLLECTIONS AND MAP
LIBRARIANSHIP IN NEW ZEALAND:
A SYNOPSIS

Dorothy F. Prescott 547 MAP COLLECTIONS AND MAP
LIBRARIANSHIP IN AUSTRALIA
Introduction

MARY LYNETTE LARSGAARD

Map librarianship is an intense and isolated occupation. Its adherents belong, in effect, to a relatively small, somewhat fluid group that meets at most a few times a year. There are few libraries that can afford or even justify employing more than one map librarian, so the map librarian at any one institution has only herself to talk to in situ, and may be the only one of her kind for a hundred miles. Perhaps it is the relief of finally being able to talk to others who understand the problems of map librarianship that leads to such fruitful camaraderie at conventions. But in the lengthy interims (at least six months) between these conventions, and the even more lengthy interims between meetings which any given map librarian can afford to attend, map librarians are linked together by the printed word in the form of the three basic journals in the field—the Special Libraries Association Geography and Map Division Bulletin, the Western Association of Map Libraries Bulletin, and the Association of Canadian Map Libraries Bulletin—and by acquisitions/news-and-notes publications. Thus it is that although the authors of the articles in this issue of Library Trends come from all over the United States and from foreign countries and therefore meet relatively seldom, there is a strong thread of commonality and understanding running throughout the issue.

An additional reason for this connecting thread is that the nature of map librarianship demands that the practitioner be capable of performing selection, classification, cataloging, administration, preservation,
and reference work for the collection. This engenders an awareness in the librarian of the connecting relationships among these various facets of library life, and tends in turn to cause papers to touch and overlap slightly.

We are in what some of us may be fond enough to consider the golden age of map librarianship, and what others of us, perhaps more realistically, consider to be the "interesting times" of the Chinese curse. Whichever is the case, it is evinced by an awareness among map librarians of the problems in the profession; almost every paper in this issue has some good news and some bad news, tending more toward the latter. There is also a considerable interest in the collection and analysis of basic statistics; not only is the field a long way from being analyzed into boredom (a state just west of tedium), it is not even completely comprehended, as evidenced by several authors pointing out the need for further research in specific areas.

An effort has been made to include topics concerning matters of current interest, with the basis for choice of topics being the amount of change in a specific area or the amount of literature already available; that is, if the proper descriptor in the first case were "considerable," or in the second case, "almost none," the topic was judged to be a proper one for inclusion. Thus there is, for example, nothing on map storage and preservation; no good new answers have appeared in the last few years. On the other hand, cataloging has changed more in the last three years than in the preceding seventy; there is no other literature on security in map collections; reference is seldom written about; and the acquisition of large foreign topographic series is considered to be so commonplace that little has been said about it. The articles were solicited—in some cases on bended knee—from map librarians at the top of their field, and in their own special areas of interest.

We begin with selection and acquisition—for it is extremely difficult to do anything with maps until you have them in hand—specifically, with a thorny problem of the present: acquisition of national survey topographic sheets, which constitute by far the vast majority of almost all map collections. We then move on to a thorny problem of the future: what to do about microcartography and cartographic data bases, and what to expect and beware of in those areas. A status report on cataloging and its directions for the future is followed by two papers on patrons: who they are and what they need. The basics of the administration of a map collection, security in map collections, and education for map librarianship are the next three topics in line. The issue finishes with a section on map collections generally, first in North
Introduction

America and then in New Zealand and Australia—an appropriate ending, considering that map librarianship has for so long been in the antipodes of library science. Several of the articles may well be considered a joint project of the North American map library world, since obviously anyone not actually writing an article filled out at least two questionnaires, and some did both.

The editor sighs with regret over the articles that got away—atlas cataloging, the state of cartobibliography, a study of Western European map collections—but is most pleased with the papers landed, and proffers her fervent thanks to all who participated in putting the issue together, be it by writing a paper or by filling out a questionnaire.

Here, then, is map librarianship.
This Page Intentionally Left Blank
Topographic Map Acquisition in U.S. Academic Libraries

JANET K. RUDD
LARRY G. CARVER

Acquisition of current topographic mapping of adequate detail is essential in order to retain the viability of any map collection. The purpose of this paper is to evaluate the efforts of U.S. academic libraries to acquire information in the form of topographic maps. Both published and unpublished data, as well as the results of a questionnaire, will be used to show that the scope of topographic mapping being collected by academic libraries has decreased due to a number of factors. This decrease is seriously affecting the widespread availability of valuable information. Some of the problems which exist can be solved by the library community. Methods can also be employed to bring about better utilization of available funding and resources.

For decades, topographic maps have been recognized by their users as a fundamental research tool; however, this tool often has not been given the same consideration or status in libraries as other basic reference works.1 It may be that topographic mapping is not appreciated by library administrators because its usefulness is spread among many disciplines. As collection officers know, it is difficult to justify an item if the specific user cannot be identified. Another reason may be a lack of educational emphasis in this country, as opposed to many foreign countries, on the use of mapping as a basic research tool and as a method

Janet K. Rudd is former Map Librarian, General Library, University of California, Berkeley; and Larry G. Carver is Head, Map and Imagery Library, University of California, Santa Barbara.
of information display. Since World War II, the United States has supported the production and acquisition of topographic maps for military purposes, but our current emphasis on energy, environmental and sociological issues has given the public a greater awareness of the usefulness of topographic maps. Now in the United States, as in many foreign countries, topographic maps are considered an important research tool in evaluating and solving national problems. This is evidenced by increased allocations to U.S. governmental mapping agencies to hasten completion of the initial topographic mapping of this country and to develop a new national map series.\(^2\) International agencies have also recommended that worldwide production of topographic maps be doubled, which will necessitate expenditures of over $7 billion a year.\(^3\)

Topographic mapping is a primary general reference tool used in conducting geographic investigations. It is also a fundamental support base for the study and evaluation of thematic and remotely sensed data. It can be used as the general framework for the portrayal of geographic information, whether it be abstract, intuitive or spatial. These geodetic materials are the encyclopedias of the mapping world and are among the most fundamental research tools for academic libraries.

Mapping has always been important to certain governmental agencies and private industries, but the academic community has not always recognized this medium as a creditable research tool. Traditionally, topographic maps were used by geographers, geologists, historians, political scientists, engineers, and others interested in area and location studies. However, the geographer, who was once considered to be the primary user, is today only one among many. New emphasis on interdisciplinary research, such as environmental studies, ecology, renewable/nonrenewable resource management, and urban planning, has contributed to the rise in map usage in academic libraries.\(^4\) These disciplines and others use topographic mapping as a basic tool for measuring and monitoring how man is using and interacting with his most valuable asset—the land. The topographic map is now utilized for research in many fields, including agricultural economics, archaeology, botany, and transportation studies, to name but a few.

Topographic mapping is “reality transformed.”\(^5\) It offers perhaps our best insight into how an area has and will be transformed by nature and man’s propensity for change. Researchers are increasingly treating this medium as a source of information for the formulation and depiction of abstract ideas, as well as for the location of places. The global problems which face us require thoughtful action based on new ideas.
Topographic Map Acquisition

and research which must be carried out with the most accurate information available. Topographic mapping is a valuable tool facilitating understanding of these issues. It is important that academic libraries recognize the value of this resource and that they actively support the acquisition of mapping which meets the research needs of their institutions.

Status of and Trends in Collecting

The precise status of topographic map acquisition programs in academic libraries is difficult to determine. There is a lack of hard data concerning this subject both in the literature and in map libraries. A search of the recent literature of map librarianship revealed little analysis of this subject. For this reason, we used a questionnaire to collect current data. The questionnaire was designed to gather three types of information: general facts describing the collection; data concerning collection development methods, priorities and funding; and data relating to the problems of acquiring topographic maps.

The questionnaire was sent to academic map libraries known to have medium-sized or large research collections. The third edition of Map Collections in the United States and Canada was used to identify libraries for inclusion in the survey. Questionnaires were sent to the seventy-one academic map libraries reporting holdings of 80,000 sheets or more. Additional questionnaires were sent to the fourteen libraries reporting holdings of 50,000 to 80,000 sheets and annual accession rates of 4000 sheets or more. This second group was included in order to gain additional information concerning the purchase of materials. A total of forty-nine responses were received from the eighty-five libraries queried, a rate of 58 percent. Based on the collection size criteria of the survey, data were received from 71 percent of the 50,000-80,000 sheet group, 57 percent of those with 80,000-150,000 sheets, and 52 percent of those with 150,000 or more sheets. The sample therefore represents a good cross section of collections in each category.

The returned questionnaires contain a large quantity of information concerning the current status of topographic map acquisition programs. However, it is apparent that most map libraries have little hard data concerning their collections. Part of the information sought was understandably unknown for most collections, and therefore rough estimates were supplied. In other cases, few statistics were available, some of which had originally been based on educated guesses and conjecture. Though these data do not lend themselves to many hard
statistical comparisons, they are useful in supporting a number of generalizations concerning the status, trends and difficulties of collecting topographic maps.

The average map collection in the sample has 158,000 sheets. Approximately 65 percent of the collection consists of topographic maps. The average accession rate is 5700 sheets per year, of which 75 percent are topographic maps. Most libraries report that selection is accomplished through use of a current written collection development policy, with consideration also given to specific academic programs and personal requests. Nearly all written policies contain specific references to topographic sets by country and scale. All reporting libraries rely heavily on participation in depository programs for receipt of topographic sets. Occasionally other programs are used. The remaining sets are obtained by purchase, with most libraries utilizing the services of a map dealer, usually the GeoCenter Internationales Landkartenhaus (GeoCenter), located in Stuttgart, West Germany. Most map collections are assigned a specific budget for the purchase of materials. The budget allocations vary tremendously, but the average was about $3200 for the 1979/80 fiscal year.

Comparisons with previously reported data can be made in the areas of size, accession rate and depository membership (see tables 1 and 2). Information published in the second and third editions of *Map Collections in the United States and Canada* was used to make the comparisons. Data for these editions were collected in 1968 and 1975. During these years, participation in the three major depository programs increased slightly. The steady growth rate and the increased accession rate suggest that map libraries have been able to maintain viable collection development programs. However, there is much evidence to show that this is not the case.

### TABLE 1
**Comparison of Sample with Previously Reported Data, 1968-80**

<table>
<thead>
<tr>
<th></th>
<th>1968</th>
<th>1975</th>
<th>Percentage Change</th>
<th>1980</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average size of collections</td>
<td>83,650</td>
<td>113,816</td>
<td>+36.0</td>
<td>157,696</td>
<td>+38.6</td>
</tr>
<tr>
<td>Average annual accession rate</td>
<td>4,654</td>
<td>5,565</td>
<td>+19.6</td>
<td>5,734</td>
<td>+3.0</td>
</tr>
</tbody>
</table>
Topographic Map Acquisition

TABLE 2
PERCENTAGE OF LIBRARIES REPORTING DEPOSITORY MEMBERSHIP

<table>
<thead>
<tr>
<th>Program</th>
<th>1968</th>
<th>1975</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States Geological Survey</td>
<td>77</td>
<td>94</td>
<td>96</td>
</tr>
<tr>
<td>Defense Mapping Agency</td>
<td>84</td>
<td>86</td>
<td>88</td>
</tr>
<tr>
<td>National Ocean Survey</td>
<td>13</td>
<td>27</td>
<td>49</td>
</tr>
</tbody>
</table>

Information obtained from respondents supports a comment often made by map librarians, namely, that they are increasingly unable to collect important materials needed to satisfy the research needs of their clientele. Map librarians point to the acquisition of current detailed foreign topographic sets as a particularly critical problem. All libraries report that they are relying on some material that is twenty to thirty years old and/or are using mapping which is too general for their needs. This problem is a complex one. The major contributing factors are undesirable policy changes in depository programs, inadequate administrative support, inflation in map pricing, increased map production, and restrictions on the sale of material. The problem has been compounded by the inability of the library community to take action to improve the situation.

For purposes of analysis it is useful to divide topographic sets into two categories: those covering the United States and its possessions and those covering foreign countries. Mapping of the United States is easily obtainable by purchase, though academic institutions have traditionally relied on receipts from the U.S. Geological Survey depository program. Most map collections, and all of those in this study, receive U.S. topographic maps by this means. “Full” depositories annually receive approximately 4000 sheets within the topographic series; this number should rise as a result of increased funding for map production. The depository program has always been an extremely valuable source of materials. However, in recent years new products such as orthophotoquads, microcopy and metric series were not reviewed for inclusion in the program, necessitating purchase of these materials. (As this issue goes to press, however, some depository libraries report receipt of some of these materials.) This problem and others are currently under discussion by the Geological Survey. A status report presented by the Cartographic Users Advisory Committee at the Special Libraries Asso-
ciation annual meeting in June 1979 indicated that a complete review of the depository program would follow reorganization of the Geological Survey.9

The status of foreign topographic map acquisition is a far more serious problem. Undesirable policy changes in the Defense Mapping Agency (DMA) depository program have had a negative effect on the availability of foreign mapping in this country. The DMA depository and its predecessors once supplied selected academic institutions with large- and medium-scale materials of many foreign countries. These U.S.-produced maps were particularly valuable because they were unavailable by other means, and foreign-produced materials were often subject to restriction. Many libraries relied on the 26,000 sheets distributed between 1950 and 1970 to provide their primary coverage of foreign areas.10 A policy change in the late 1960s restricted shipments to about 200 maps per year, all of which were small-scale and readily available on the open market. The loss was both monetary and intellectual. Purchase of alternative maps is expensive and often impossible. To replace an annual shipment of 1000 sheets with foreign-produced materials would cost about $5000 at today's prices. However, alternative mapping of restricted areas is not available from any source at any price. Due to inadequate funding and restrictions on sale, academic libraries cannot make up for the loss of this information.11

Some foreign topographic data are also acquired through other government programs. Of these, the annual Map Processing Project sponsored by the Library of Congress Geography and Map Division provides the most significant amount of large- and medium-scale material. Each year, 30,000-60,000 maps are made available for selection by representatives of ten to fifteen libraries.12 Libraries that have participated in this program rate it as an important source of mapping which they cannot afford to purchase. However, they criticize the fact that topographic sets often become split between selectors.13 The foreign field offices maintained by the Library of Congress also occasionally supply maps; generally, these are small-scale. No libraries in the survey reported receipts from this source, though it is known that some do, in fact, receive materials. The lack of reporting is testimony to the ineffectiveness of the program. Aeronautical charts supplied through the National Ocean Survey depository program are an additional source of small-scale maps for one-half of the reporting libraries. The charts are useful in providing current small-scale topography to supplement that received from the DMA. Some foreign map-producing agencies also maintain depository or exchange programs which include topographic
maps. This practice is limited to five or six countries, and the number of libraries allowed to participate is quite small. In general, these other programs do not supply significant quantities of material.

The map library is left with one alternative: purchase. Until recently, purchase was not the primary method of acquiring maps. This was especially true in earlier years, when depository programs supplied the core needs of most collections. Now, we find that the ability to purchase materials is the most critical factor in meeting collection development goals for foreign mapping. Most of the collections queried cannot purchase many of the materials they need. They cite two reasons for this failure: lack of adequate support, and increased restrictions on the sale of some map sets.

Map libraries in general have never enjoyed generous support. There are no published figures regarding yearly funding for collection development, but numerous references in the literature and complaints made by most map librarians point to a chronic lack of sufficient acquisitions money. Data collected from the respondents support this claim.

Funds assigned for collection development vary radically (see table 3). Several libraries report that they receive no money, while others spend in excess of $50,000 a year. We found that the average budget of the respondents for fiscal 1979/80 was $3200. However, the average was closer to $6000 among large collections. The average allocation has increased by only $500 in the last three years. These averages were so much lower than expected that the validity of the sample was questioned. However, data collected by Stevens show a similar distribution of funding by size of collection. Not all of this money is spent on maps. Most collections report that these funds are assigned for the purchase of atlases, reference works and aerial photography, in addition to maps. It is obvious that the amount of money available for the acquisition of topographic mapping is quite limited.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Budget of Respondents</th>
<th>Percentage Reporting Budgets under $3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>$2730</td>
<td>74</td>
</tr>
<tr>
<td>1979</td>
<td>2783</td>
<td>77</td>
</tr>
<tr>
<td>1980</td>
<td>3153</td>
<td>66</td>
</tr>
</tbody>
</table>

TABLE 3
Collection Development Funding for Map Libraries, 1978-80 (Budget Range: $0—$45,000)
Inflation of map prices over the past ten years has greatly diminished the buying power of all collections. Higher prices result from the devaluation of the dollar against some foreign currencies, the rise in map production costs, and the desire of some countries to obtain more hard currency.

Extraordinary "overnight" price increases of 400 to 500 percent have been seen in the catalogs of some Third World agencies. As the only sources of detailed mapping for their countries, they evidently see outsiders as a captive audience. However, few map library budgets can accommodate these prices.

The devaluation of the dollar has had an adverse impact on the purchase of foreign topographic maps. The upward revaluation of European currencies has been especially important. Most map libraries report acquisition of detailed mapping of Europe and Latin America as their highest foreign priority. European nations map their territories at comparably large scales and at frequent intervals, which necessitates large purchases to provide good coverage. Devaluation of the dollar over the past ten years has caused many of these European maps to double or triple in price.

The location of the world's major map dealer adds to the problem. The GeoCenter, in West Germany, is considered to be the most comprehensive source of topographic maps. Ninety percent of the map libraries reported using the GeoCenter for the purchase of some of their foreign acquisitions. Regardless of the initial source of the maps, payment must be made in German currency. Since 1970 the value of the Deutsche mark has increased 115 percent relative to the dollar. The few topographic map dealers which compete with the GeoCenter have been unable to provide the quality of service and range of materials. The only other alternative is direct purchase. Though this is cheaper on a per-sheet basis, it is discouraged by many libraries due to the increased time spent ordering and the difficulties encountered in billing and receipt of materials.

The overall worldwide inflation rate in map pricing is unknown. The rates presented in table 4 are for detailed topography of Europe and Latin America purchased through the GeoCenter. The figures were calculated using prices published in the two volumes of the Geo-Katalog.15 Currency conversion rates were taken from the World Tables 1976 and information used by the University of California—Santa Barbara Library.16 It was found that the price of both Latin American and European topography has tripled in the last ten years. The average price per sheet today is $5.59, as compared to $1.56 in 1970. The GeoCen-
Topographic Map Acquisition

ter averages may seem too high to use in general. However, analysis of the 1979/80 expenditures of the University of California—Santa Barbara Map and Imagery Library shows that the library paid an average price of $4.91 per sheet for foreign topographic maps purchased from a variety of sources.

A worldwide increase in topographic map production has also contributed to the need for augmented collection development funds. Between 1970 and 1974, an additional 14 percent of the world’s land area was mapped at large scales. This increase is due to government support for completion of mapping underway and initiation of mapping at larger scales. Sheet production also rose, because rapid cultural change has necessitated more frequent revision, and technological advances have allowed the generation of new products. Much of this mapping falls within the stated needs of academic libraries.

The problems surrounding the acquisition of foreign topography are not limited to lack of money. Restrictions placed on the sale of maps adversely affect the availability of important research materials. Obtaining maps of “sensitive” areas has always been difficult, but the magnitude of the problem seems to be increasing. In the past decade more governments have come to fear both internal and external conflict and are refusing to release detailed mapping. It is difficult to determine how many series are actually unavailable, because agencies often list them in catalogs but then refuse to supply. There are several reports stating that some established series are no longer available. Libraries which do not have funds to purchase materials before they are restricted find these resources permanently removed from their reach.

As we have shown, map libraries face a number of problems in acquiring topographic mapping. Depository losses, inflated prices, increased production, and restrictions have all affected their ability to obtain materials. Given the situation, it would seem simple to provide ample justification for large increases in collection development funds. We question why this has not occurred in most map libraries. A large number of collections report that they are denied funds specifically because they lack adequate space and equipment to store the materials. They are unable to persuade administrators to allocate increased support in any of these areas. Space and equipment are important, but these factors should not be regarded as appropriate criteria for assigning collection money. Ideally, the research requirements of the institution are analyzed and money apportioned to satisfy these needs. The fact that map collections are denied funding leads us to agree with many of the questionnaire respondents when they say that library decision-makers
TABLE 4
INFLATION FACTORS FOR SELECTED FOREIGN TOPOGRAPHIC SERIES
FOR SALE BY GEOCENTER, 1970-80

<table>
<thead>
<tr>
<th>Area Surveyed and Year</th>
<th>Large-scale</th>
<th>Medium-scale</th>
<th>Average of Both Series</th>
<th>Period</th>
<th>Percentage Increase</th>
<th>Avg. Percentage Increase Per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin America³</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>1.73</td>
<td>2.02</td>
<td>1.88</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>3.45</td>
<td>3.85</td>
<td>3.65</td>
<td>1970-75</td>
<td>94.5</td>
<td>18.9</td>
</tr>
<tr>
<td>1980</td>
<td>5.87</td>
<td>7.13</td>
<td>6.50</td>
<td>1975-80</td>
<td>78.1</td>
<td>15.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1970-80</td>
<td>245.7</td>
<td>24.6</td>
</tr>
<tr>
<td>Europe⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>1.22</td>
<td>1.26</td>
<td>1.24</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>2.40</td>
<td>2.47</td>
<td>2.44</td>
<td>1970-75</td>
<td>96.8</td>
<td>19.4</td>
</tr>
<tr>
<td>1980</td>
<td>4.59</td>
<td>4.76</td>
<td>4.68</td>
<td>1975-80</td>
<td>91.8</td>
<td>18.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1970-80</td>
<td>277.4</td>
<td>27.8</td>
</tr>
</tbody>
</table>

¹:50,000 only
²:100,000—1:250,000
³Survey includes 21 countries
⁴Survey includes 25 countries
Topographic Map Acquisition

do not recognize the research value of maps.

We believe there are methods available to solve some of the problems that have been identified. Through creative management, the allocations and resources available to libraries can be better utilized.

Solutions for the 1980s

He who only jumps up and down and screams will accomplish nothing but acquiring sore feet and a hoarse voice. From the research associated with this paper, it is evident that many of the difficulties relating to the maintenance and growth of map libraries are the result of the librarian not having the attention of the administrators in a way that solves more problems than it creates. Lack of money and space are the most common complaints received from map librarians. Administrators are up to their bookmarks in what they cannot provide because of money and space constraints; however, not one time in a hundred will you hear the excuse that a book cannot be bought because there is not quite enough space or money for that particular purchase. Why, then, is the mapping world, for the most part, suffering from money and space malnutrition, even though library budgets continue to grow at a rate that almost equals the book inflation rate? The answer often is that library decision-makers do not listen to map librarians. Perhaps a new approach is needed. Some people will say they have exercised all of their options to no avail. At this point it is worthwhile to examine the critical planning components used to develop a viable map library.

Politics play a major role in any research library. The way in which politics can be used is determined by the administrative environment and usually must be assessed from within. Political influence is often directly proportional to the planner's ability and marketing techniques. Political judgment is one of the most perplexing issues facing the map librarian. Whether it is an innate talent or something one learns through experience is difficult to assess. Librarians who are apolitical or nonpolitical, for whatever reason, will lose what measurable amount of influence they may have. They will hand, gift-wrapped, those elements of power they could exercise to the library decision-makers.\textsuperscript{18} Political influence is often dependent on how well the librarian has planned his campaign and sold his product.

How do you go about doing this within a library environment? Identify present and potential clientele, even those on the fringes. Address a wide variety of constituents, not just the geography department. Determine what will sell each type of user on the materials collected. Find things that will grab their imagination and inform them
how to obtain better research results by using your products. Demonstrate what can be gained by utilizing mapping information, and show what will be lacking in their study if these materials are not used as one of their research tools. Once the client has been identified, it becomes necessary to develop a plan.

Most administrators do not have a feeling for the magnitude of map library resource needs. They will respond best to a well-defined, articulate, limited-growth plan, a plan that is actively supported by users and thoroughly documented. In the plan, it is important not to limit your vision or imagination. Be creative; however, try not to overjustify the relevance of your product. A well-publicized, useful product will justify itself.

Documented justification must be reinforced by hard statistical data. Our research has shown that there is a serious lack of this type of information in map libraries. The importance of maintaining and collecting topographic mapping is self-evident in some large research institutions; however, most administrators and those persons who have historically used only traditional book materials must be educated in the applicability of this research medium. In part, this responsibility rests with the map librarian. Keep in mind that those who have not been trained in map use might be embarrassed to admit their lack of knowledge.

Of course, the map librarian might accomplish this goal by default, that is, by waiting for the user to confront the administration over the lack of materials. The librarian can then say, "I told you so." However, by that time most of the materials the map collection and its patrons need will be out of reach due either to an inordinate financial investment or to governmental restrictions. The final result will be the same: administrative officers may hold the map librarian responsible for not having planned ahead and anticipated the "newly identified" needs. It also follows that an administrator might find that the same argument applies to him. Decision by default is not a responsible approach at any level.

How does one market a product? How does user demand affect the generating of credibility with those who control library resources? To market a library product, the librarian must show the potential users that if they do not have access to this resource, they will not be recognized as having exhausted the research materials available for their field. It is important that a false situation not be presented to the user. The product must be kept in its proper perspective in relation to the many other research tools available to the user. Mapping, regardless of how it
Topographic Map Acquisition

is supported, is no more and no less useful than the patron's needs dictate. It is important to show how mapping can add depth and understanding to research endeavors. Administrators and patrons must be made to realize that these materials, while not a panacea, are as valuable as any other research source and worthy of priority consideration. The librarian must know the problems and anxieties of both patron and library official and have a well-considered sales plan. Otherwise, only a minimal amount of success will be evident in the map collection and patrons of the library are thereby denied one of its most valuable assets—topographic mapping. Demand for the materials will come only from actively selling the information potential of your product judiciously and with tact; "don't wait to be discovered." Go to your constituents with a plan that illustrates your concern for their needs and demonstrates the usefulness of the product. Without political credibility and demand for the products, the map librarian will always live in the shadow of discontinued administrative support.

Some of the problems identified here can be resolved through concerted group effort. Though map librarians have traditionally been active in professional organizations, their participation has been directed toward the sharing of information. They have not effectively lobbied to support the needs of map libraries or map librarianship. The desire to use professional organizations as a means of effecting change is recent, as reflected in the current focus within the profession on choosing the most appropriate organization. We are not advocating a particular organization. However, group action is needed in order to improve the collection development capability of map libraries and the variety of materials available for research. The following steps could be taken to resolve some of the problems.

An attempt should be made to regain access to the materials once freely distributed through the DMA depository program. In this age of freedom of information and critical evaluation of government agencies, it is possible that a well-documented case presented to congressional leaders by a recognized body would bring the release of some of these materials.

It is necessary to educate library administrators in order to effect change at all levels. Depending on the library, the impact of a single map librarian operating within a large bureaucracy can be quite small. The credibility of the map librarian could be enhanced among administrators if he or she were effectively supported by a recognized professional organization. Such a group must take the initiative to inform library leaders of the value of map collections and the need for increased support.
Justification for map library support can be improved with more extensive research. Given the present work loads in most map collections, the librarian cannot take the time to conduct adequate in-depth studies. Libraries need to encourage basic research by allotting time for this specific endeavor. However, library schools where this would ordinarily occur do not hire full-time faculty interested in map librarianship. They need to recognize their responsibility to advance this aspect of librarianship.

The Library of Congress should be encouraged to make better use of its field offices. Their offices, which exist in several foreign countries, were established to procure and catalog materials of that area. They have not been responsive to the needs of map libraries. They are in a position to obtain topographic sets being published, and should be encouraged to provide maps on a standing-order basis. This would lessen the time and money that individual libraries spend on acquisitions.

A combination of microcopy, deselection and cooperation should be used to provide better utilization of the map resources and funding currently available. This could be done to maximize the variety of topographic sets in this country. Many librarians report that they are unable to increase map acquisitions due to shortages in space and equipment; yet, few of them rely on interlibrary loan as a source of materials. The responses received indicate that many libraries are collecting essentially the same sets. It would seem prudent to diversify the sets being acquired.

We suggest that libraries begin by reviewing their needs and resources and those of neighboring institutions. By establishing cooperative collecting policies and interlibrary loan arrangements, some of the duplicate mapping could be weeded or retained in the form of microcopy. Needed original copies could be spread among the participating institutions or stored in regional centers. Purchase of new materials would follow these same policies. Libraries would thus gain needed space and equipment to support their local needs while having access to a greater range of maps.

Conclusion

We have used published and unpublished data, as well as the results of a questionnaire, to study the current status and trends in the topographic map acquisition programs of academic libraries. Evidence shows that the level of acquisition of this mapping is remarkably low.
Topographic Map Acquisition

compared to the stated need for it. The situation regarding foreign materials is especially critical. The major collecting problems can be identified as loss of depository receipts, inadequate funding support, inflated map prices, increased production, and government restrictions. We suggest resolving these problems by obtaining better internal and external support through planning, organized action and cooperative efforts. We foresee that the 1980s will be a time of stringent funding as academic institutions face declining enrollments. It is imperative that library administrators recognize the resource value of topographic mapping and aggressively support acquisition of this medium.

References

5. Ibid., p. 18.
10. Sivers, op. cit.
17. Brandenberger, op. cit.
Microcartography and Cartographic Data Bases

LARRY CRUSE

In map collections,* the past few years have seen a shifting of concentration from acquisitions matters to those of collection management. Acquisitions procedures are now fairly well fixed and results are in almost direct proportion to effort and money expended. In the past, great amounts of money and effort could not accomplish the same end; in most instances, maps were simply not available. Now, internationally, fallout from the large-scale, high-speed remote-sensing and map-making technological revolution is increasingly available, and concern for managing this ever-expanding information store has risen accordingly. The increased availability of products is placing particular pressure on manpower and storage resources, forcing administrators to explore alternatives to traditional management methods.

The most promising of these alternatives appear to be computers and microfilms, both separately and together. Separately, microfilm offers a better than 90 percent increase in map storage efficiency, with commensurate labor savings; computerization promises absolute information control and revolutionary capabilities in information restructuring. Together, microcartography (i.e., microfilm technology applied to the field of cartography) and computer processing offer capabilities greater than a mere sum of the parts.

*In the current context, map includes aerial photographs, space platform remote sensing, Polynesian stick charts, physical relief models, and an ever-expanding panoply of materials in addition to traditional "maps"; map collections are where these artifacts are classified, housed, preserved, and utilized.

Larry Cruse is Library Assistant in charge of the Map Section, Central University Library, University of California at San Diego, La Jolla.
The current trend objective is to rationalize this synergy using paper where necessary (because it is “humane” and preferable for many applications), microfilm (because it is small, cheap and versatile), and computers (because they are very fast). The result—depending on the degree of application—will gradually transform the traditional map collection from a static, passive repository to a cartographic assembly point (i.e., memory bank), the last or next-to-last link in the map production chain, and just one element in a more general geographic information system (GIS), itself mergeable with parallel collections from other information systems.

Present Constraints

Elsewhere in this issue of *Library Trends* will be found discussion of the rate of increase of map collections, in both number and size. Even the largest of these public collections—the Geography and Map Division of the Library of Congress, with about 3.6 million maps and an accession rate of nearly 60,000 maps in 1979—does not pretend to be absolutely comprehensive; there is neither money nor manpower enough to collect all maps being published. While LC G&M now has adequate space—about 93,000 square feet—the largest academic map collection (UCLA’s, with close to 500,000 maps) has storage cabinets stacked ten feet high and split between two locations. Yet another instance is the long-standing policy of the Detroit Public Library to retain only the most recent editions of domestic series maps in most instances. While their circumstances are unique to each of them, LC G&M, UCLA and Detroit Public are typical of the limitations prevalent today: every library cartographic collection is on a trajectory to the same end, no matter how far away such curbs may appear at the moment. Thus, as important a trend as it is, the growth of map collections is being held back by secondary restraints. In the face of innovative products and user expectations which transcend traditional collection guidelines, and even within them, pressure continues to accumulate, causing displacement of maps and de facto guideline shrinkage, until a steady state becomes almost inevitable, in which any acquisition displaces something already held. And still maps become available at an increasing rate.

To improve information delivery within these financial and physical constraints, both map producers (led by the military/intelligence establishment) and map librarians (led by archivists and local governments) have turned to microfilm to reduce the costs and sizes of maps,
Microcartography

increase storage efficiency and reduce unit labor. Since the storage savings are so great, microforms would allow for virtually open-end collections, which eventually aggravates a further set of problems: how is a ninefold increase in collection size and accession rate managed within current manpower budgets? Computers are the obvious hope. It is little wonder, then, that those who can afford to are already exploiting this space/time savings to obtain the dual benefits of high-density storage and high-speed automatic retrieval. In the future, the same will hold true for those who cannot afford to do otherwise.

Fortunately, in contending with the general onslaught of information, libraries have already begun acquiring those management technologies and forming those structural regroupings which provide the very capabilities needed to handle huge cartographic data bases with limited personnel, and the means for integrating them with other spatial information. Data bases are no longer limited to already digitized information, but include those information bases eminently digitizable, as is the case with maps; if transaction times are equal, the distinction between analog and digital data bases becomes moot.

Library Data Management

Library data management has taken a number of radially adaptive approaches, all of which can be distilled into three functional groupings: cataloging, bibliographic searching, and nonbibliographic data base management, all of them overlapping to some extent.

Cataloging

The on-line cataloging data base and its variants, internal creations or parts of cooperative networks, ubiquitously tie together all types of libraries and all levels of personnel, either directly through networks or indirectly through similarity of experience. It is, or probably will be, the point of introduction for map librarians to computerized data bases, representing the basic management tool necessary for identification and control of the very large cartographic collections now accruing. At the center of these developments, internationally, is LC's MARC-Map cataloging system, used to catalog individual maps and entire series. Supplementing it in the United States is the U.S. Geological Survey's Map and Chart Information System (MCIS), used to analyze maps within series (or sets); microfilms of these maps are made available through the National Cartographic Information Center (NCIC). Assuming current efforts to mesh MARC-Map and MCIS are
LARRY CRUSE

successful—and there is no reason to assume they will not be—the domestic on-line map citations will expand significantly, providing impetus to collect the cited material when searching the data base, and the capability of managing it once acquired. (It will be as easy to acquire a reel of 500+ maps in microform, and only slightly more expensive, than ordering a single cited sheet on paper: $10.) When mature, this data base will include geographic coordinate search subroutines for actual map reference work, where area searches are more productive than citation searches in most cases, although author, title, format, or subject delimiters will be available, too. Coordinate searches—equivalent in many ways to relational searches of books—will be provided by one of the on-line cataloging service bureaus, such as the Research Libraries Information Network (RLIN), the OCLC, Inc., MCIC (which is programmed around this capability), or some complex, local routine. Presently under investigation are the protocols necessary to add digital data bases and computer programs to this cataloging data base as well.

MARC-Map/MCIS also represents a fundamental tie between standard library cataloging and the national mapping agency, an essential link in progressing to some of the other cooperative possibilities considered below. It is hoped that this will be followed by equivalent cataloging records from other countries as their national map agencies apply computerized information management technologies to their burgeoning output.

The second class of data base and access includes the approximately 450 bibliographic data bases available on-line through more than sixty proprietary services. These services are tapped by libraries through dedicated communications networks and can, increasingly, respond with full text—either on-line or by mail—in addition to their normal abstracting capabilities. These data bases already include a great deal of cartographic or cartography-related material, including research and development, geography, history, education, geology, and maps in periodicals.

Unfortunately for patrons, the skills needed for effective searching come only with practice and are improved only through continual application; and libraries are only gradually committing personnel to such work, usually starting with general reference librarians. These skills are, therefore, dependent on volume and technology—not subject. For the same reasons, strictly cartographic data bases such as MCIS may not be picked up by the commercial services for some time, and when they are it will probably be general reference librarians with data base search skills, rather than map librarians, who will utilize them. This is
Microcartography

ture except for the largest and busiest map collections, such as the University of California at Santa Barbara's Map and Imagery Collection, which is already on-line with MCIS.\textsuperscript{9} Since it is now necessary to establish a separate billing account for such service, it will probably be some time before market resistance overcomes the inconvenience; lining up behind MCIS are a number of other U.S. Geological Survey data bases of special utility.\textsuperscript{10}

Digital Data Bases

The third type of computer-dependent library data management is that of the nonbibliographic data base manager/librarian, whose duties include ordering, storing, assessing, converting, and maintaining actual data tapes, their documentation and supporting literature collections, as well as arranging for the use of such tapes with central processing unit (CPU) personnel.\textsuperscript{11}

Just as large research libraries are fragmented along disciplinary lines, so too, usually, are these library and library-like extensions. Thus, while a social science data base manager will probably be conversant with demographic data, the same manager may well have little idea of developments in the earth or engineering sciences, a circumstance reciprocally honored by counterparts in those fields. Unfortunately (in some respects) for map librarians, pure cartographic data bases—those not integral with some other information base—may tend to fall between such disciplinary alignments, being in no one's exclusive domain.\textsuperscript{12}

Naturally, data base managers also tend to cooperate along disciplinary lines, pooling their resources in such associations as the Inter-University Consortium for Political and Social Research,\textsuperscript{13} which acts as a national clearinghouse for social science data tapes and such program packages as the Statistical Package for the Social Sciences; and the International Association for Social Science Service and Technology (IASSIST), which sponsors various action groups concerned with the "nuts and bolts" issues of data base management. At least tangentially, these concerns include interest in such activities as the International Federation of Data Organizations' "Symposium on Joint Data Bases for Regional Analysis and Computer Cartography," one of whose aims is the creation of a catalog of European cartographic data bases.\textsuperscript{14}

Institutionally, social science data base librarians show some other signs of commonality with map librarians: UCLA's Institute for Social Science Research is well represented with geographers, and the map collection at San Diego State University was integral with SDSU's Social Science Research Laboratory for a number of years.\textsuperscript{15} The insti-
tute and the laboratory are typical in that they are cross-disciplinary, fully computer-capable—verging on computer-dependent—research alignments centered on a technology rather than a strict field of study. It remains to be seen whether such nonbibliographic data base groups will access “pure” topographic, geodetic, geologic, and remote-sensing information such as is generated by cartographers and earth scientists. Indicative of the current state of flux is the fact that SDSU’s map collection recently returned to the general library as a subunit of the documents department.16

Ultimately, some of the technical developments discussed later may tend to supersede the need for specialized digital data base departments of this first-generation type. But such evolution is at least partly dependent on a number of extrinsic factors, including library capability, data base availability, and its format suitability to map collections, any of which can accelerate or retard implementation.

Capability: Libraries and Data Bases

In spite (or because?) of what they have already accomplished, libraries are still confronting some very general issues regarding digitized data bases. If no provision is made for absorbing these data bases internally, libraries may be sidestepped as handlers of such information, a contingency being actively investigated. This assessment is based perhaps on sketchy extrapolation of promised communications breakthroughs, which have led some to the conclusion that unless libraries participate fully and immediately in the computer revolution, they will atrophy as information centers.17 Such logic overlooks the organic relationship of libraries to the culture which created them, overlooks what has already transpired, and is oblivious to the perspicacity of the library community. From the library point of view, it is essentially a matter of when and how, not whether, to set up an internal or dedicated external processing system, and of how earnestly to pursue a central information delivery role in the light of general priorities.

Sophisticated processing units are shrinking in both size and cost, as their capabilities increase to the point that for many applications, it is becoming more expedient to purchase rather than connect with a remote unit. (If a $20-per-hour-programmer spends one hour per day commuting to a remote processor, it will not be long before a small processor can be paid for with the savings of keeping him/her within the library.) However, there remains some question as to the cost/benefit of such services (not equipment) when contrasted with present gen-
Microcartography

eral patron needs, although the cost and benefit lines will no doubt cross soon and the equipment/service will be implemented gradually.

The alternative would be to stand idly by as federal, state and local agencies—the principal sources of data—or factional academic departments install their own data bases in regional, state, local, or academic service outlets with on-line capabilities. These same government agencies would continue to supply libraries with the traditional off-line printed equivalents, which are often inferior in content, not to mention more difficult to use.

A typical case in point is the U.S. Census Bureau, whose Geographic Base File/Dual Independent Map Encoding (GBF/DIME) files are used heavily by digital data base organizations of every persuasion and have multiple applicability in map libraries. Each decade the GBF/DIME-population census—only one of a number of topical censuses, and itself now scheduled to appear every five years—becomes more grandiose. Current estimates place its printed version for 1980 at roughly 300,000 pages; the microform version on 40,000 fiche (containing 30,000 maps) will be greater in content but still fourteen times more compact. However, neither will contain all of the statistics available on the digital tapes.18 These tapes will be available at regional or state data centers, and at least some of them will be picked up by academic social science data base libraries, such as those at UCLA and San Diego State University. But how long will it be possible for the Census Bureau to supply 300,000 printed pages every five or ten years to each library requesting them, and for how long will libraries find even the microform version tenable when (and if) the digitized version becomes easier to use?

It may well be that 1980 represents a significant transitional date: it marks the beginning of the “Worldwide Census Programs.”19 By 1985 or 1990, full printed censuses may be a rarity—unless everyone simply balks at the prospect of another census entirely—and the microform version may be at the end of its tether unless it is constructed and delivered with an integral semiautomatic or automatic information retrieval unit.

Map librarians will certainly have to think twice about accessing relevant parts of the microform version if they are seriously interested in the map content, or somehow manage to utilize the digital version. As to their inherent utility, census-produced maps such as the metropolitan map series of the 1970 census—pocketed in many census reports—have proven a boon for the past ten years and are looked forward to as at least a decennial update of accurate street maps of many U.S. cities.20
Another example of regional and state data outlets familiar to map librarians involves NCIC’s plan to establish state-sponsored cooperative centers for cartographic information, perhaps with the tacit assumption that the state would act as an intermediate node to libraries. Currently, this plan is operational to some degree in twenty-three states, the same number of affiliates as in the Census Bureau’s program.\textsuperscript{21}

NCIC, which is responsible for distribution of the Geological Survey’s information systems (including its digitized map files) is now approaching libraries experimentally as formal partners, to provide its computer output microform (COM) equivalents of MCIS, APSRS (Aerial Photography Summary Record System), and forthcoming graphic microindexes to remote sensing.\textsuperscript{22} If successful during its test phase at Seattle Public Library, this cooperative distribution program could evolve into one of the first nonbibliographic data bases networked directly to libraries by a federal agency, in which the library—which provides personnel and expertise—is utilized as an active partner and quasi-official representative of the agency itself, making explicit what has been implicit in patron’s eyes all along.

The evolution of these relationships will depend heavily on library administrative willingness to budget the personnel and equipment (mainly microform readers and reader/printers at present), the evolution of hardware, and the successful “marketing” of library capabilities to public agencies and the user public. Its future growth will also depend on the willingness of data base generators to increase the utility of and public exposure to information programs whose costs are already being carried, as NCIC is trying to do.

Since the ultimate role of the federal government is not clearly established, it seems probable that depth of information supply will somehow be tied to library use patterns and capabilities; in other words, it will likely be volume- and technology-dependent. This will favor large city and research libraries, which are already staffed with the internal expertise (including computer programmers and technicians) to provide the very support needed for data distribution, and which also have the specialized staff already familiar with the data base content—a fact overlooked by some in their assessments of state and local processing capabilities.\textsuperscript{23}

If the trend of agencies such as the Geological Survey should mature in libraries, not only would users benefit directly from a multiplicity of data centers, but a critical momentum could develop which would tend to attract other federal agencies, many of whose data bases are areal in nature; state and local agencies can be expected to follow
suit, provided they have not already anticipated this advantage. It seems obvious that cooperative placement of these data bases in libraries would be a service to all: the agencies are spared a number of heavy overhead expenses; libraries retain their traditional function of information distribution; and users gain access to additional resources at the traditional place. But its obviousness will not necessarily insure its adoption; for that, we are at least partly dependent on the actions of legislative intermediaries.

Many of these and related information distribution issues were topics of concern at the 1979 White House Conference on Libraries and Information Services; the consensus resolutions were then forwarded to the president of the United States. These same issues are also of continuing concern to the National Commission on Libraries and Information Science (NCLIS), which was established by Congress to study the overall problems of libraries and information distribution. Finally, Congress’s own Joint Committee on Printing, which has revised the “Depository Distribution Act,” was on a parallel course.

Depending on numerous imponderables, the White House conference resolutions, the NCLIS recommendations and the committee’s decisions will have fundamental impacts on the financial and technical problems of data distribution, but perhaps more significantly, they may collectively reassert as national policy the function of libraries in their traditional role as conduits for public domain information, possibly going so far as to supply the hardware necessary to make even the microform and digital information intelligible.

Availability: Federal, State and Local Data Base Development

Like other local, state and federal agencies converting to digital data bases, the U.S. Geological Survey retains three media types of data base products: the traditional paper version, an equivalent microform version (as well as COM indexes), and refined digitized data; for USGS, the last category includes such “pure” cartography as terrain profiles and digitized color/feature separations of map content. In regard to digitized data, USGS has initiated development of a national cartographic data bank comprising at least eleven discrete map elements, all (except such cultural factors as names and boundaries) encoded or encodable directly from aerial photographs. These data can then be analyzed separately or collectively, or combined with other spatially

*Title 44, U.S. Code. The bulk of USGS maps are distributed under Title 43, Section 42, which is also in need of revision.
dependent information to generate either maps or data tables. This will be the core of earth-related information at the national level, and has the dual advantages of centrality and uniformity—real problems with all data bases, but especially severe with cartography, which is currently in transition from point/line/area encoding to raster ("pixel") encoding.29 Supplementing this data base, which is still in its initial stages, will be more detailed surveys by state and local governments. Many of these surveys are in the formative stages, and some are already operational.30 Potentially, other supplements will be combinable with these core data to yield a myriad of graphic, areal intelligence.

In regard to cartography, there is no comprehensive index, directory or catalog of these developments, so potential users must depend on irregular books, symposia and articles, or must resort to tribal communication networks to keep informed—such is life in the global village!31 However, the recent emergence of a dedicated literature forum, including the Harvard Newsletter on Computer Graphics and Geo-Processing (both appearing first in 1979), to supplement the traditional sources is indicative of the emergence of computer-assisted cartography as an independent field and should aid greatly in resolving the problem of keeping current. Since surveys are already underway at the international level, and provision has been made to add data bases to the MARC catalog, a good, universal directory could be available shortly. In the meantime, it is safe to assume that all industrialized countries are presently developing such digitized cartographic data bases—implementing them piecemeal in slightly varying ways and at varying rates—and that nonindustrialized countries are actively considering them, but confront both economic and cultural obstacles, obstacles from which no one is immune.32

Suitability: Map Libraries as Mass Memories

Implementing the traditional functions of the map library using conventional digital information may be difficult because of the sheer magnitude of the task: to a computer, the basic difference between a linear stream of words or statistics and the graphic content of a map or air photo is the density of information involved. Size for size, a topographic map on paper requires about 10,000 times the data storage needed for text. This printed page, for instance, requires less than 34,560 data bits; an equivalent air photo is on the order of 100 million bits.* as

*These are maps and air photos which have had their information compressed; in raw form, the figure can exceed 1 billion bits per image/map.

LIBRARY TRENDS
Microcartography

is a standard quadrangle map. The United States alone requires about 63,000 such maps for complete coverage, each quadrangle preempting two reels of data tape. Held in this fashion, the map collection of the Library of Congress would consist of 7 million reels of tape and would grow by about 120,000 reels per year. With all of the attendant service requirements, including periodic "refreshing" of the data, replacement of the tapes as they age, lengthy setup time, unpredictable hardware problems, and in short, a general lack of suitability in a map library environment (where demand for any given map is measured on a less than yearly basis), such an arrangement is clearly impractical. Such a store also assumes that the maps are available free on tape (the current cost for a federally produced data tape is $80); it would be prohibitively expensive for a map library to add wholesale digital conversion to the current work load: "Thus far the experience of the National Archives is that it costs approximately $360 in staff time, computer time, and supplies to accession a single reel of tape and prepare it for dissemination when it is software independent, is in a standard code, and requires no data compaction....[And,] the long-term preservation costs using existing storage technology over the next twenty-five years would be about $5 per year for each reel of tape." Given this dismal prospect, it is fortunate for map librarians that alternatives are available.

Videodiscs

One proposal for mass storage which transcends the weaknesses of digital tape is the videodisc. Each disc can hold up to 54,000 color images, including air photos or maps; they are relatively inexpensive to emboss ($5 to $25 each); they have archival attributes (if laser-compatible); they are integrable with computers; their images can be accessed randomly; and blank discs, produced in quantity for both the audio and video industries, will make hardware plentiful and cheap. Because they have so many attributes, such discs are bound to find applications in libraries generally (perhaps replacing microfilm in many cases, such as serials), but they do have limitations which make them problematical for map collections. Making the initial recording and just a few copies* is expensive because it requires special equipment and a special environment; information cannot be updated or interfiled on the same disc once it has been "mastered" and distributed; and finally, the technology is inherently hardware-dependent. Thus, imple-

*It could well be that demand for maps in this format could mushroom beyond all reason if they somehow appealed to all libraries and to home users.
mentation and use will have to be on an all-or-nothing basis, a bridge to be crossed wholesale—with some trepidation.

Still, even with these limitations, there are certain cartographic applications which could be ideally served, especially those projects impossible now because of their sheer magnitude. For instance, discs would be a great way to distribute large sets of remotely sensed images, including complete national, state, county, and city coverage in ascending detail on a cyclical basis (in effect, an aerial census). The main limitation now is the price of the photographic medium, not the data. Thus, where 54,000 nine-by-nine inch photographic transparencies now cost from $150,000 to $1,350,000, are difficult to sort, and are expensive to store properly, videodiscs would make it possible to supply the same imagery for a fraction of the cost, especially if initial recording were underwritten as a necessary overhead expense by the agencies concerned.\(^{38}\)

Since the medium is permanent, it is of obvious interest to archivists, who, given their need for a master disc, could underwrite their recording expenses by selling pressings to map libraries. Canada's National Map Collection—always a leader in applying technology to information storage—is already at work testing the feasibility of recording its map holdings this way; their results may well change the rules by which the map library game is played.\(^{39}\)

Consider then the resultant possibility: 2 discs per 100,000 maps/air photos; 20 discs per 1 million; 200 discs per 1 billion. It seems doubtful that a billion cartographic items have been produced worldwide up to now, but the capability of doing so, on an annual basis, is not far off, especially if the information can be rapidly and inexpensively recorded outside traditional photographic technologies, perhaps through real-time recording on a temporary, recyclable holographic medium and then off-line batch-recorded on videodiscs.\(^{40}\)

In addition to their other persuasive merits, the fact that videodiscs are integral with a cathode ray tube (CRT) may mean as much as anything else in the long run. First, this package of memory and display comprises two essential ingredients of a digital cartographic system. Second, this combination will be useful to the library in other ways, making the components attractive to administration. Third, the playback unit can be attached to any television receiver. Fourth, the CRT can be used for receiving remote transmissions—these transmissions can always be videotaped. Fifth, there are simple CRTs, such as those used at home, and there are laboratory models with integral software capable of virtually all the computer-assisted cartography tricks,
Microcartography

including: high-density scans—there is an obvious advantage to closely spaced lines if the picture is to be enlarged significantly; manipulation of each picture element or “pixel” (a function of beam size multiplied by the number of scan lines); color and density manipulation in 1056 steps; interactive user addition or deletion of information; accumulation of multiple, registered images; and, as if that were not enough, special cameras have been developed to intercept the image and create undistorted prints or transparencies.41

A greedy, ideal scenario for map librarians would have such disc collections completely sealed and self-service, using the equivalent of a jukebox (with the system at rest displaying a map of the world surrounded by alphabetical rows and numerical columns), or perhaps using a “joy stick” to control a location light. By pushing appropriate scale-change buttons, the image area would expand to fill the screen with a more (or less) detailed map and/or air photo; this process could be repeated to enlarge any portion of the earth to the desired size on the screen. Assume that the jukebox would hold 200 such discs, and further, that logic and memory chips could be added to expand the unit’s capacities incrementally—for instance, a television camera could input images of paper maps, microforms or the like; the scene could be synthesized or rotated; elements could be emphasized (by color or intensity)—and you have some idea of what is technically feasible now, and implementable over the next twenty years. In fact, viewed from the unaccomplished side of such an endeavor, the main delaying factor in this scenario is the time required to overcome present organizational inertia (which exists for some worthwhile reasons).

Microfilm

The second alternative to digital tape storage is microfilm. As useful as videodiscs portend to be as visual and mass-memory devices, microfilm offers even more current capability. Its litany of attributes includes the facts that it is inexpensive in large or small volume; it can be generated by almost anyone, anytime, under almost any circumstances; it is part of an evolving technology; it is inherently graphic in nature but is equally useful for digital storage; it can be updated, interfiled, erased, automatically retrieved, random-filed; it can be viewed, enhanced and manipulated on the same CRTs used for videodiscs, as well as a multitude of other viewing devices; it is portable and permanent (or permanent enough); it has been around for more than a century—and has been of interest to cartographers the entire time.42 It
also has a certain practical momentum of development and use which may continue for the foreseeable future to make it the storage medium most appropriate to the map library, and libraries generally, because it is the broadest-based, least common denominator for all applications, is already used extensively, and requires minimal cultural adjustments. It also shows great potential for symbiotic development with electronic technologies such as electron beam recorders (EBRs), lasers, solid-state optical arrays, and computer integration in a context where maps are simply another type of information using a universal medium.43

Although certain fundamental issues regarding the format of cartographic microforms are still debated, there is little doubt that they should conform to standard industry practice where possible, using the international 105x149mm microfiche as the base filing unit.44 Film production considerations will favor adherence to this standard, even though the carrying capacity of film per unit area may increase dramatically. In the future, the additional space gained can be used either for innovative information packing, or for different optical approaches to using the content.45

The sum of possible results is clear: many more maps producable, in greater detail, at a fraction of current paper map costs; allowance for superimposition of multiple images on the same film base; the sandwiching of several very thin films—in register—to build up maps on a custom basis; and the synthetic generation of color information from essentially black-and-white transparencies—using colored diazo films, zero-order diffraction (ZOD) microforms, color filters, synthetic color (based on gray-tone spectromatic signatures); or straightforward, long-life color transparencies.46 Yet, actual implementation remains tenuous, largely because sophistication of high-volume viewing equipment has lagged so far behind that of recording instruments: library demand for first-rate readers and reader/printers has been misanthropically absent, so they are not manufactured in quantity and their prices remain absurdly high (basically, only a light source, a lens, and a carriage to hold them are necessary). EBRs, for instance, are capable of addressing 1 billion points on a microfiche (the data bits required for storing an air photograph or map), and are used right now for computer-generated mapping,47 but microform readers capable of exploiting this imaging density start at $10,000 because the market for them is so limited. (A third generation of reader equipment is on the horizon, however, characterized by solid-state electronics.48)

Read/write lasers expand all capabilities even further: they are not limited by vacuum-tube technology as are EBRs and CRTs, and like
videodiscs, they both record and extract color information. They, too, are computer-compatible and high-resolution, but also can produce incoherent or coherent (holographic) light-readable microforms, or pack multiple images on the same area of film, potentially raising packing densities by a factor of eight (no mean accomplishment, when millions of cartographic microforms are being considered). And, they operate in the micro- to milli-amperage range, which makes them magnitudes more energy-efficient than conventional microfilm equipment. These lasers have the additional advantage of having a very wide critical focus, which allows them to read a stack of registered microforms simultaneously (before a map is printed, it exists as a series of color or feature separations); and they can read or project at long distances with equal facility, making it feasible for them to go to the microform and retrieve the information while leaving the microform itself in place.

NASA, the U.S. Air Force, U.S. Army, and U.S. Navy are all presently exploring this technology to create cartographic mass memories—in effect, map libraries—roughly equivalent in size to the map collection of the Library of Congress, all to be available on-line or in near real-time storage, and housed in as little as 1000 square feet (versus, for example, LC GMD’s 93,000 square feet). While the maps in these systems are digitally encoded on film—partly out of habit, partly to increase their fidelity, and partly to reduce their size maximally—there is no technical reason that the maps could not remain in the graphic state other than that it might require slightly more response time and slightly more space. Given the scaler reductions already possible with conventional graphic microforms, the cataloging platform being constructed for them, the advantage of gradually working up to such sophistication, the more relaxed time demands of a library environment, and the intrinsic graphic capabilities retained, the trade-off of graphic for digital seems definitely to favor the graphic format. Also, while the digital mass memory is absolutely hardware-dependent, graphic memories are not, and they have already proved themselves in cartographic computer-input microfilm (CIM) applications which include textual information in the same system.

Implicit in these developments are size, sophistication, and compatibility with mixed-media data bases—incentives of major proportions. But from the standpoint of all libraries, the most compelling incentive by far is the fact that as state-of-the-art map libraries gain enormous content, they shrink in size, making quantum jumps in utility with the addition of each piece of multi-use hardware, all of it capable of translating freely from analog to digital and back again.
Patrons using such collections will probably like their rapid response time best—virtually instantaneous compared to paper map collections; and a future which promises to provide us with computer-/micro-/paper-compatible color photocopies cannot be all bad. While the end product—a colored map on paper—may still be the object of preference, such maps need not be arbitrary, either in terms of content or area displayed. (While the four-color map problem has amused mathematicians for years, the four-corner map problem has an equally honorable history among map librarians; as J.B. Post of the Free Library of Philadelphia expressed it, "Why do important battles always occur where the corners of four sheets meet?"

Given appropriate hardware, a completely tailored map can be generated on the spot, drawing from a very large store of microform map color/feature separations, registered satellite images (for large areas) or aerial photographs (for small areas). Given such capabilities, off-line microform storage may well provide the optimum solution to current problems of space and labor.

Financing such developments will require a complete rethinking of the current ratio of expenditures for collection development and the equipment to exploit its content, perhaps best effected through budgetary incentives. That is also why the actions of government data base suppliers, the White House Conference on Libraries and Information Services, the Joint Committee on Printing, the National Commission on Libraries and Information Science, and local library administrations are so important: in concert, they can realign and finance the needed priorities. But finally, it is up to map librarians to convince first themselves and then library administrations that they need to trade floor space for hardware. For instance, a moderate collection of about 100,000 maps is currently allowed about 5000 square feet, which represents roughly $500,000 worth of building space. If this can be reduced by half, there is in effect a $250,000 capital gain in equivalent value to be bargained with. The difficulty is to translate this capital gain into a liquid asset, freeing the money for reapplication where it is needed most: the equipment which will save the space and provide superior service within current manpower budgets. (These can be kept level through resulting increased productivity.) In an earlier paper, the author attempted to show that the microform information base needed to bring about such an accomplishment is already available or could be generated readily.
Microcartography

Sources

While the sources for cartographic and other data bases will remain the same, the agencies supplying them will be in a position to respond with appropriate formats—paper, microform or digital—because they, too, are already or soon will be using the same multiple technologies for internal purposes, and will in a sense simply be relaxing the artificial barriers which now separate them from libraries. Where such data stores are purely digital, at least for maps, they can be generated graphically on COM fiche.63

Orchestrating these data bases within and across governments continually becomes more fluid, but each level of government has a finite jurisdiction; only a few intelligence and military agencies will ever have the overall international needs or responsibilities for data acquisition to be found in the most rudimentary map library. Thus, it is the responsibility of map librarians, and it is in their self-interest, to implement or support appropriate technical developments at the international level, just as they have so successfully done with map cataloging. This is usually best effected by purchase decisions based on long-term needs, not just current availability. It is also dependent on a broader point of view than just the immediate collection; it encompasses all map collections everywhere. Thus, rather than just considering a map a map, if it is considered a portion of a growing mass memory for subsequent use in a library which has, or will have, the vast majority of its holdings on microfilm and (probably) videodiscs, then the format of the map becomes an important issue, divorced completely from the issue of its content; the content is, at worst simply maintained, but if its utility can be enhanced, to that degree it is a more valuable resource.

Programs

Completely separate from the mass-memory considerations of information storage are those of information manipulation. Sophisticated computer programs are already available in solid-state devices, and such built-ins are growing at a phenomenal rate. There is no reason that “smart” typewriters and video terminals with their own memories will not be followed by “intelligent” cars and “smart” microfilm readers (already available with index sensors). To be anticipated are automatic density control—contrast is the most important visual factor in readers—and readers able to manipulate an image before projecting it.
onto a (perhaps remote) screen. But for the present, it will be programs such as the Jet Propulsion Laboratory’s LUMIS (Land Use Management Information System)—capable of handling mixed-source inputs—which will fulfill the most needs. Unfortunately, there is no comprehensive directory to all such programs—many outside the cartographic field are relevant and useful—so conversance with the standard sources will become necessary, starting with directories of the host central processing unit and moving through the various government and commercial directories now in print. These include NASA’s COSMIC (Computer Software Management and Information Center) catalog; the National Technical Information Service’s (NTIS) Directory of Computerized Data Files, Software & Related Technical Reports; the Geological Survey’s growing list of software, available through NCIC; the Department of Transportation’s comprehensive (but somewhat outdated) National Geocoding Systems, which includes a number of private sector programs; the Department of Commerce’s Federal Software Exchange Catalog; the Census Bureau catalog; and commercially available programs from specialist computer laboratories, such as the Harvard Laboratory for Computer Graphics. In short, there must be countless programs available, many arranged in hierarchical management routines. However, what will be needed by map librarians—based on the experience of data base librarians—is something akin to the Statistical Package for the Social Sciences, that is, a core set of standard algorithms which serve the integrative information needs of the general library on the one hand and the specific needs of the map library on the other. Such a package will have certain predictable attributes: common program language, provision for reassembly of data into a useful structure, browse capability, and a very simple, interactive personality. Such an overall library management program is frequently discussed in computer, information science, and library literature, but to my knowledge has not yet surfaced in practice, although many of the building blocks are already in place.

In the meantime, it is far more productive to concentrate on satisfying the minimum machine and human requirements, working up a body of expertise which will satisfy the requirements of both current and future users. Eventually, the programs—as well as the digital data bases—will be cataloged into the MARC on-line data base, will probably be available as plug-in modules, and will present no more difficulty than is inherent in video games.
Microcartography

Computers and Map Librarians

Once a map collection passes the 100,000-sheet mark—and we are considering near-term collections orders of magnitude larger—some, but not necessarily all, aspects of information management can be better handled by computers, which do not get tired (although their breakdowns are notorious), seldom forget, and only have to be trained once per hardware generation (typically eight to ten years). But there are intermediate structural information arrangements not requiring computers, especially those which take advantage of the locational peculiarities of geographic information. As the librarians at Princeton University discovered, computers may not be as appropriate as manual or hybrid approaches in all cases; perhaps it is just another instance of having to crawl before you can walk, but hybrid computer/microform approaches seem to offer the best return at present.

In regard to actual information use, on-line computers again have not proven themselves more versatile than many manual or hybrid COM approaches to information restructuring, manipulation and use, especially when cost/benefit is considered. There is still plenty of room for the ingenious to improve on current optical capabilities—in fact, although they have been something of a silent partner over the past decade, current optical processes can do most of the things computerized picture processing can do, and in most cases more easily, more quietly and more reliably. Computer intervention has a great deal further to come toward the user before it displaces or supersedes optical-mechanical manipulation in map libraries. In fact, a very good Homeric argument could be made for not adopting the change to computers at all, but there is no way around the fact that only computers can make the digital-to-analog conversion, and only they exhibit the requisite speed necessary for assembling and synthesizing large volumes of disparate material or laborious calculations into a useful amalgam. Optical process cannot, for instance, transform data tables into their graphic equivalents, as does the government's Domestic Information Display System (DIDS).

The Future Role of Map Librarians

Translating all of the “can do” technologies into “will do” map collections is the predictable challenge and opportunity with which the profession will occupy itself in the foreseeable future. Trying to exploit
systematically all of the seemingly incoherent practices, politics, concerns, and capabilities now before us, and doing it on an evolving foundation, will be the functional fate of all librarians. As the spectrum of (map) producer and (map) user sophistication continues to broaden, (map) librarians will be forced to expend more attention on information theory, on technical delivery, and on human factors influencing aspects of cartography and information science. As the nexus of many prevailing forces, they will have to act as intermediaries, advocates and reality contacts for the multivariate clientele to be served, whose needs still range from the unilateral requirement for good street maps, through sophisticated planning analyses, to such exotica as trans-topographical comparisons of reality with completely synthetic worlds.76

Serving this clientele will transgress many of the traditional barriers separating discipline-related library groupings, as map librarians share technological commonality with other information specialists. This will mean sometimes turning over functional responsibility for cartographic research, sometimes applying completely noncartographic expertise to answering patently cartographic questions (as in the comparative aspects of Brownian motion factual studies and the real world, or the impingement of catastrophe theory on areal dynamics).77 Maps then become only another discrete ingredient in the information soup, not an end in themselves. Thus, map librarians will tend to become integral and integrating specialists within libraries, gradually arming themselves with capabilities to deliver need-specific information built up from lesser components rather than to provide random, partial or encyclopedic catchalls from which relevance must be extracted. Such work may involve the integration of partial information from a number of maps of different scales and eras, from different agencies designed for different purposes, coalescing them into a unique product which may never need to be reassembled in that particular way again, but whose components will be free for rearrangement into a multitude of other combinations at any time. To accomplish this, map librarians must move one step closer to cartographers, intercepting maps at the prelithographed separation stage (preferably in microform or COM), and one step closer to the user, offering a unique and relevant map, on paper (if needed), and in color. This prospect places us in a position to begin considering the assembly of holistic, synthetic historical environments, projectable into the future and using the present as a reality test, where map librarians provide the physical environment information and other specialists people it.78
Microcartography

References

9. Larry Carver, Head, Map and Imagery Collection, University Library, University of California—Santa Barbara, to Cruse, April 28, 1980.


Microcartography


32. Ibid.


34. Seavey, Charles A. "Mapnews," Documents to the People 7:15, Jan. 1979; and Thompson, op. cit., p. 8.


54. Wherry, David B., and Friedman, Steven Z. "Cartographic Applications of an Image Based Information System." In American Congress on Surveying and Mapping,
Microcartography


61. Ibid.


63. German Democratic Republic, op. cit.; Cruse, "Microcartography," op. cit.; and Worth, op. cit.


A Modern Map Librarian
(with apologies to Gilbert and Sullivan)

J.B. POST

I AM THE VERY MODEL of a modern map librarian:
I deal with no maps anyone could label antiquarian.
I've microfiche and printout maps and data digitizable,
And a CRT-linked plotter to make it realizable.
I've cartographic data banks just full of information,
All instantly accessible through modern automation.
Census tract or ward division, it makes no difference here,
We manipulate our data differently—always in high gear.
I've everything my heart could want that's bright and clean and new,
And of the maps I deal with—why, they must be modern, too.
And, so, I deal with no maps even faintly antiquarian,
For I am the very model of a modern map librarian.

J.B. Post is Cartographic Information and Format Specialist, Free Library of Philadelphia.

This poem also appeared in Special Libraries Association Geography & Map Division Bulletin, no. 121, September 1980.
Perspectives on Map Cataloging and Classification

JOHN R. SCHROEDER

Map Cataloging in the United States: Current Status

Despite a rapid increase in the level of automated bibliographic control of the map during the past ten years, the current level and extent of control for cartographic materials in the United States is not adequate in providing access to the nation's resources in this area. This assessment is based on the following premises:

1. The retrospective collections of the major U.S. government map libraries, including those in the Library of Congress (LC), the National Archives and the U.S. Geological Survey, have not been cataloged. Although the contents of these collections have been partially covered by bibliographies and other finding aids, the lack of cataloging means that most of the maps in these collections are, in effect, "lost" to all users who do not have direct access to the respective collections.

2. Although some small, specialized map libraries have cataloged their collections, e.g., the University of Illinois Geology Library,1 the cataloging information is not directly available to reference librarians or researchers in other institutions.

3. Except for a brief period from 1953 to 1955, maps have never been included, on a systematic basis, in the LC-produced National Union Catalog.

---

John R. Schroeder is Head, Cataloging Unit, Geography and Map Division, Library of Congress.
JOHN SCHROEDER

4. The coverage of the automated systems active in controlling bibliographic information for cartographic materials is not comprehensive for either current or retrospective maps. Also, the automated systems are not designed to include "union catalog" information indicating alternative locations or availability.

5. Maps published in, or collected with, monographs and journals remain an underused, often unavailable resource in the map library environment. Maps in journals are often completely inaccessible, while maps in monographs are usually available only in an indirect manner through the collation of a monograph record.

The primary reason the map format has received inadequate and unequal levels of bibliographic control in both general and specialized library environments seems to have been "that librarians have...too little understanding of maps to give them the attention they deserve as sources of information...." Because librarians have not recognized the research value of the map, they have not owned up to their "responsibility to acquire, control and provide access" to information, regardless of format.

Libraries are service institutions which throughout their history have had problems in obtaining adequate funding. As book-oriented institutions, libraries naturally enough have given the book priority in the allocation of their financial resources. In addition, the map has inherent physical and bibliographic characteristics which have made it a long-standing problem for book-oriented librarians. Maps are difficult to acquire, as they are frequently printed in limited quantities for a specific purpose, are usually not well publicized, and may be available only for a relatively short period of time. Maps are expensive to store, maintain and preserve, and because of their size and fragility, require special storage facilities. Maps are also cumbersome to retrieve, circulate and refile.

The map format is somewhat more difficult to catalog than books, partly because of problems intrinsic to the process of describing a graphic format in words, but also because of a lack of a supportive bibliographic system for use during cataloging. In the United States there is no National Union Catalog for maps, no Publishers Weekly for maps, no comprehensive, current Maps in Print, etc. Until recently the rules and guidelines for cataloging maps were inadequate and did not permit precise, accurate and consistent cataloging. All this has meant that there has been a lack of uniformity in the way major research libraries have treated maps. Many of these have chosen not to acquire...
maps on a large scale, or have decided not to provide formal bibliographic control for maps in their collection.

Because librarians have not provided general library users with access to cartographic information on an equal basis with books, many users have been unable to obtain information relevant to their needs. Other potential library users have resorted to other channels and sources to obtain cartographic information, and a few have even gone to the expense of creating their own maps.5

Although the map presents librarians with unique problems in acquisition, storage, bibliographic organization, etc., it is a basic premise that the map format is of research value, and that this value is great enough to warrant full bibliographic control on an equal basis with other formats. Maps are information display systems which are unique in their capability for showing locations, spatial distributions, and correlation between subjects. Even though the direct economic, scientific and historical value of maps is enough to warrant cataloging and control of the format, their worth for reasons of rarity and aesthetics should not be underestimated. Unfortunately, the cost of complete, equal bibliographic control of discrete map-format bibliographic entries is just as high as the cost for equivalent control of discrete bibliographic entries in other formats (books, films, etc.). This is true because the basic elements of description and requirements for authority control are directly comparable between the map and book formats. If bibliographic control of the map is to be achieved in the library environment, library management must accept the cost-benefit ratio for cataloging the map as being positive. If librarians are to provide a level of bibliographic control for maps equivalent to that provided for books, they must expect an analogous ratio in the expenditure of fiscal and staff resources. It is the professional responsibility of all librarians to provide the best possible service to researchers and other users of their collections. Map libraries will not reach their full potential for service until all extant cartographic materials have been cataloged and incorporated into a library-based, automated, on-line, international information network. Such a network would make maps available to users through multiple access points, including author, title, series, topical subjects, geographic coordinates, and projection.

Although the single most important objective of every map librarian should be to achieve complete bibliographic control of his or her own collection, it should also be every map librarian’s responsibility to ensure that bibliographic control of maps be compatible with similar efforts in other map libraries. Such compatibility would contribute to
progress toward the greater objective of universal bibliographic control of all extant cartographic material. In addition, map librarians should support uniformity of access to information in all formats. Information, regardless of the format in which it is presented, should be made as widely available as possible.

**Progress Toward Effective Bibliographic Control of the Map**

*Library Systems Developments*

In the not-too-distant past, the objectives cited above could easily have been dismissed as unrealistic. However, general progress in the development of library-based information systems and, more recently, the adaptation and application of such general library systems to the requirements of the map format have made such goals realistic, if not immediately attainable.

The landmark events in progress toward the control of maps in the library environment have been: (1) development and implementation of the MARC Map format at LC and its Geography and Map Division; and (2) the implementation of a MARC Map format-compatible, on-line, automated cooperative map cataloging network by OCLC, Inc. Obviously, these events have been revolutionary in their impact on map libraries in the United States. The first event, the development and implementation of the MARC Map format as an operational system at the LC Geography and Map Division, is significant because it became the basis for later automated MARC format-compatible map cataloging systems. The MARC Map format assured maps of a place in the current trend toward universal access to library information. Authorship of the *Data Preparation Manual for the Conversion of Map Cataloging Records to Machine Readable Form* by David Carrington and Elizabeth Mangan, and its subsequent publication by LC in 1971, is the major turning point in the development of the MARC Map format.

Continued evolution and improvement of the MARC Map format through empirical use by more and more map libraries is inevitable. However, the *Data Prep Manual* is a milestone in that it represents the first published example of the operational compatibility between the basic MARC Monographic format and the other special MARC formats. The trend toward compatibility among MARC communications formats is being continued at the international level through progress toward UNIMARC. Thomas Parr's article "Automation of Cartobibliography" provided a cogent explanation of the significance of the MARC format to automated bibliographic control of cartographic
American Author's Viewpoint

quantity.” Richard Lingeman, a book editor, magazine contributor and assistant managing editor of The Nation, says the success of a few best sellers may actually harm the health of the whole industry. “The block-busters siphon money away from the smaller paperback sales,” he explains. He also worries about the vertical integration that has combined paperback and hardcover publishing operations and dried up separate bidding for paperback rights.

Nonetheless, not all American writers would be likely supporters of a PLR campaign. PLR has little appeal to writers who aim at the mass market and who enjoy few library sales. The science fiction writers, riding the crest of a sales wave that rises far above the rest of the fiction market, are one such group. Norman Spinrad, president of Science Fiction Writers of America and a successful science fiction novelist who has published with Doubleday, Avon and others, notes with satisfaction that royalties in his field are way up in the past half-dozen years, and that “something like half” of the fiction now published is science fiction. He also notes that the paperback author has a “built-in inflation edge” because royalties rise as book prices rise. Spinrad’s blunt assessment is that much of the grumbling about writers’ incomes stems from: “all kinds of people writing things that nobody wants to read. These are the people who are starving, the kind of people who are forever living off grants. They are all poverty-stricken.” Spinrad underscores the kinds of differences among writers that might cripple any authors’ campaign for PLR when he wryly adds, “The same people have a snotty attitude toward science fiction.”

One answer to Spinrad is that PLR could free writers from dependence on government grants as a source of alternative financial support. Simpson, the Australian PLR activist, endorses the scheme precisely because of its foundation in the public’s reading tastes, determined by what is checked out of libraries. In his crusty fashion, Simpson uses that rationale to dismiss the argument presented by librarians opposed to the Australian PLR plan, i.e., “that governments should give authors more literary grants; then they wouldn’t need PLR.” He says: “Do I have to spell out...how dim-witted and short-sighted that ‘alternative’ is? Most books don’t and are not intended to qualify as ‘literature.’ Grants are payments that have no long-term effect in making authorship a way of earning a living.”

Several American authors agree that government grants have not been effective in supporting the literary arts and look to PLR as a more effective alternative. Cather says writers have gotten a fair shake from neither government nor the private foundations: “There just isn’t any
JOHN SCHROEDER

access for the user to more maps in more places;
7. specialized user services (such as on-demand bibliographies, automated subject searches, etc.); and
8. the provision of statistics at the local level to aid map collection management and planning.\textsuperscript{11}

In the same article, Mr. Daehn also emphasized the importance of standardization of cataloging rules, classification, area-subject access, and machine communications format to the success and workability of cooperative cataloging systems.

\textit{Map Classification}

OCLC's Map Cataloging Sub-System allows each participating library unlimited freedom in the selection of a classification system for its collection. This flexibility ensures that each library is able to use the classification system that is most responsive to its specific functional requirements. However, because of the cost effectiveness and other advantages of standardized classification, map libraries participating in OCLC, RLIN or analogous systems should view map classification as an area in which special cooperation could promote effective, efficient use of the general systems.

Every librarian should use the classification system that best meets his or her total classification requirements. However, map librarians participating in or changing to automated cooperative map cataloging programs should consciously reevaluate the effectiveness of their classification system, taking into account two major criteria: (1) cost effectiveness and other advantages of classification standardization, and (2) their own specific functional classification requirements. Aspects of standardization include:

1. \textit{Lower processing costs.} Acceptance of a standardized classification system saves the repetitive costs of reclassifying each record. In the interest of cost savings, the Ontario Universities Library Cooperative System Map Project requires all participating map collections to use the same classification system.\textsuperscript{12}

2. \textit{Potential for cooperative collection and acquisitions management.} Uniform, common classification in support of consistent access to a union shelflist\textsuperscript{13} is essential to cooperative collection and acquisitions management and to almost any other resource-sharing program.

3. \textit{Improved efficiency in administering interlibrary loans.} Uniform classification provides improved accuracy and efficiency in the iden-
Cataloging and Classification

tification and retrieval of maps requested on interlibrary loan.
4. *Automated subject search capabilities.* Standardized classification facilitates automated subject access through the classification number with consequent improvement in reference efficiency.

Points to consider in specific functional classification requirements include:

1. The physical arrangement of the collections and its subsidiary effect on:
   a. retrieval of maps;
   b. general collection maintenance and map preservation;
   c. collection accessibility (open access versus closed); and
   d. space, equipment, or other limitations
2. User familiarity with an existing system
3. Compatibility of subject and area elements between the library's book classification system and its map classification system: this factor should not be overemphasized. Maps and books have different classification requirements. All major map classification schemes emphasize the area covered by the map, while all major book classification schemes emphasize the subject of the work. This difference in emphasis segregates maps and books in most libraries. Also, as maps require special filing equipment, a device for differentiating between bookshelves and map drawers would segregate maps and books even if both classification systems emphasized an areal approach through compatible numbers.
4. Cost of conversion from an existing map classification system to a standardized system. Even if an existing map classification system has to be converted, the long-term benefits of automated, compatible access to a predominate, standardized classification would, in the cooperative environment, outweigh the immediate cost of conversion. In any event, to attain full reference value, any records cataloged under a previous manual system would have to be input into the cooperative system.

As the final part of the reevaluation process, each librarian should assess applicability of potential standardized classification systems to specific functional requirements.

As a result of their analysis and reevaluation, some map librarians may choose to be completely independent in their selection and use of a classification system. For those librarians choosing to cooperate in the standardization of map classification, the options for cooperation range from de facto, informal standardization (resulting from unplanned use
of the same map classification system by two or more map librarians participating in a common on-line network) to formal adoption of a single standard map classification system at a national or international level. Formal cooperation and the designation of a single preferred map classification system have greater potential for increasing the extent of standardization, with a corresponding increase in benefits for those who adhere to the standard.

It has been recommended that the LC "G" classification system be used as the standard classification system for map records input into MARC format-compatible systems. In North America, it is almost certain the LC map classification system will become the predominant map classification system for automated programs. There is an excellent chance that it will become the standard classification system for the continent. There are many reasons for this, including: LC's book classification predominates at research libraries in the United States and Canada; the LC "G" Schedule for maps is the system most frequently associated with the MARC Map format; the LC MARC Map data base contains over 60,000 records; and, the LC "G" Schedule is by far the most widely used classification system in map libraries in the United States and Canada.

The LC "G" Schedule has many intrinsic advantages. The first of these is its suitability for automation. The LC "G" Schedule has a proven capability for area-subject automated searches through the call number and in the form of the map classification code. The LC classification system has been cited as "the strongest and most modern general library classification in existence today, with the greatest long-range potential for automation." It is also easy to use; and it has recently been revised and updated. Furthermore, publication of a separate microform edition of the official LC "G" shelflist by University Microfilms International can be viewed as a de facto expansion of the map and atlas portions of the "G" Schedule (as routine expansions of map and atlas portions of the "G" Schedule are incorporated into the respective official shelflists). Future publication of LC Geography and Map Division cutter lists for American cities and towns will enable cooperating map libraries to improve the compatibility of locally produced classification numbers with those assigned by the LC Geography and Map Division. And finally, the area and subject access points of the "G" Schedule are detailed, precise, and complete enough to meet the requirements of any large general map collection; yet the basic system is flexible enough to accommodate change or expansion if required by specialized libraries.
Cataloging and Classification

The LC "G" Schedule is essentially strong in its capability for serving subject-oriented users. The major disadvantage for open access map libraries is that its inherent emphasis on subarea over subject has the net effect of scattering subject maps within each of four separate files under each numbered base area. This affects the physical accessibility of the collection for purposes of subject-oriented "browsing." However, browsing is much less important in a cataloged, controlled collection which has subject and area access by computer. As single copies of maps can only be filed in one place under a given classification system, emphasis of one theoretical aspect is perforce at the expense of another theoretical aspect. If the LC map classification system emphasized subject under base areas, it would scatter subareas—to the detriment of researchers interested in all thematic aspects of a given subarea.

Descriptive Cataloging

Daehn's article emphasized the importance of descriptive cataloging standards to the efficient use of cooperative map cataloging systems.\(^\text{16}\) He recommended that *Anglo-American Cataloguing Rules* (AACR) be used as the basis for standardized cataloging rules on the grounds of user familiarity, widespread use in the library environment, and compatibility with catalog records for other types of material.

Although examination of the content of MARC Map format reveals a basic similarity to MARC Monograph format records, and although direct analogies can frequently be made between techniques used in the cataloging of maps and monographs, maps do in fact have unique bibliographic characteristics which often present unique cataloging problems or unique combinations of traditional cataloging techniques. These must be accommodated in the standardization of cataloging and bibliographic control of the format. Among these characteristics are: (1) maps are a graphic format, while cataloging records are restricted to a written description; (2) the arrangement of bibliographic information on maps is frequently inconsistent; and (3) concepts and terms used by cartographers on maps are sometimes different from those used by catalogers.

The map cataloging rules in AACR-1 were essentially inadequate in accommodating unique characteristics of the format.\(^\text{17}\) AACR-2 (as interpreted by the Anglo-American Cataloguing Committee for Cartographic Materials\(^\text{18}\)) will be much more effective in standardizing the description of cartographic material. AACR-2 contains several general features which will improve the bibliographic description of cartographic material, improve access to cartographic information, and
facilitate cooperative cataloging. With the specific intent of supporting cooperative cataloging, the national libraries of Australia, Canada and Great Britain and the Library of Congress have agreed to a common policy for adoption and application of AACR-2. Other general advantages or strengths of AACR-2 include: (1) compatibility with the International Federation of Library Associations' international standards for bibliographic description, (2) compatibility with developments in the machine processing of bibliographic records, (3) expansion of coverage of nonbook material, (4) internal consistency of rules for different formats with mnemonic rule numbering, (5) improved capabilities for analytical and multilevel description, and (6) greater emphasis on access points to "increase retrievability in the catalog." Although the concept, general principles, and much of the specific content of AACR-2 are advantageous for cataloging cartographic materials, chapter 3 of AACR-2 was inadequate and unworkable for cataloging maps.

In response to this situation, an international meeting called by Canada's National Map Collection was held in Ottawa in October 1979. At the meeting, representatives of the Public Archives of Canada, the Library of Congress, the British Library, and the map library associations of the respective countries formed the Anglo-American Cataloguing Committee for Cartographic Materials (AACCCM). Formation of this committee, and its subsequent activities in the production of a map cataloging manual to interpret and explain AACR-2 as it pertains to the cataloging of cartographic material, represents an important step toward practical, effective international cooperation. In producing its map cataloging manual, the committee will attempt to adhere to the following objectives and guidelines:

1. the general principle of maximum uniformity of description and access to information, regardless of format;
2. maximum compatibility of bibliographic description between cartographic and other materials;
3. support for the concepts, general principles and much of the specific content of AACR-2;
4. maximum conformity with AACR-2, while at the same time ensuring responsiveness to the unique physical and bibliographic requirements of cartographic materials;
5. the expansion and interpretation of AACR-2, particularly chapter 3, in order to achieve standardization, consistency and precision in cataloging cartographic materials; and
6. the resolution of some basic problems in cataloging cartographic
Cataloging and Classification

materials, particularly main entry, title, collation, and collective treatment and multilevel cataloging.

Authority control for access points (main and added entries) is essential for improving access to cartographic information and facilitating standardization of the bibliographic description of maps. In early 1980, the major networks loaded LC's Automated Names Authority File (ANAF) records on their data bases. This extension of on-line access to LC’s authority control system will be a major factor in improving the uniformity and consistency of authority systems used by cooperating libraries.

Subject Access

Almost all users and map librarians are aware of the inherent area focus of the map format. Every thematic map of a place is a graphic portrayal of the subject as it applies to that place. Such maps have an automatic and definite connotation of both place and subject, and contribute to the body of knowledge on a given subject, but do not constitute a purely theoretical contribution to the subject discipline. Nevertheless, the importance of area and subject as "distinct yet inseparable concepts" has not been widely accepted by map librarians. As users of a library catalog, geologists and geographers are often interested in specific subjects on a worldwide basis. The primary LC subject pattern (subject-area) accommodates this interest. However, geoscientists also employ an areal and regionally-oriented methodology concerned with multiple subject aspects of a specific area or region. Additional subject access under area-subject is needed to accommodate this approach. If both subject access requirements are to be accommodated within a formalized map cataloging program, it follows that both approaches must be emphasized within the system. A double-entry concept for resolving the dichotomy between two necessary approaches to area-oriented thematic material is not really new. Double entries under subject and area were used in general research libraries before 1900, and are currently being used in a few special, area-oriented libraries.

Although the concept of double entry was, and is, valid for all place-oriented materials, research libraries in the United States, including LC, discontinued or did not adopt the double-entry concept for economic reasons (at that time, unit card sets had to be typed or set in type for printing). This meant that the standard LC subject cataloging practices as described in the LC "Red Book" (Library of Congress Subject Headings) have been inadequate and inconsistent in terms of
providing access to area-oriented material, including maps. Until recently, all LC subjects were treated in one of the following patterns: (1) subject (undivided), (2) subject—base area—subarea (indirect), (3) subject—local area (direct), (4) subject—subarea—subject subdivision, (5) local area—subject (applied to local history material and recently to maps), or (6) area—certain specified subjects. Although the prevalent LC Subject Cataloging Division pattern for the division of area-oriented subject headings ("indirect," subject—base area—subarea) is basically responsive to researcher needs, fragmentation within the total system and inconsistencies in the application of place to subject headings meant that neither area nor topical subjects were accessible uniformly or consistently. The LC treatment of subject headings for area-oriented material simply has not met the information retrieval requirements of geoscience researchers.

The LC Subject Cataloging Division is well aware of the inadequacies of its subject treatment as it pertains to place-oriented material, and has previously proposed changes in the system. Unfortunately, the internal expense of changing existing cards in LC catalogs has prevented changes which would have made their subject heading system more responsive to map users. Recently, the Subject Cataloging Division has made several innovations, such as dividing previously-undivided subject headings "indirect" and converting headings which were divided "direct" to "indirect." These changes were made in preparation for implementation of fully automated, on-line access to subject headings at LC. LC’s automated, on-line "component word" searching capability provides an inherent capability for area-subject permutation (or rotation).

Through its catalog card sales and distribution system, and through publication of Library of Congress Subject Headings (the "Red Book"), LC has been a major force in determining the style and content of subject card catalogs in the research libraries of the United States. In the interest of uniform access to information, the style, form, arrangement, and content of subject headings assigned to MARC Map records produced in the LC Geography and Map Division have been compatible with the standard LC subject heading system.

RLIN, OCLC and analogous systems provide participating map libraries with options and alternatives for improving the subject control of their collections. Although OCLC currently does not have an on-line subject search subroutine, they are cooperating with Battelle Institute in the evaluation and testing of a subject search capability through the use of minicomputers. OCLC’s Map Cataloging Sub-System allows input
Cataloging and Classification

of two elements which provides a direct potential for automated, on-line searching of data bases by area and subject. Entry of geographic coordinates in MARC Map format records provides positive identification of the area covered on the map; but more importantly, it offers the potential for retrieving map coverage by area and scale parameters. Geographic coordinate retrieval techniques for searching on automated systems are already being used in the United States and the Netherlands. Entry of the LC "G" Schedule derived map classification codes in MARC Map format Field 052 provides OCLC with the immediate potential for area-subject retrieval from map records. Although not yet activated by OCLC and RLIN, this capability has been used extensively by LC for searching its MARC Map data base. In serving the more traditional subject catalogs, the OCLC Map Cataloging Sub-System provides options for the entry and production of either: (1) subject headings completely compatible with LC practice; or (2) local subject heading options, either free text or modified LC subject headings. Cooperating map libraries have the option of manipulating and partially permuting standard LC subject headings, thereby providing comprehensive, uniform access to both area and topical subject, and improving the effectiveness of traditional subject card catalogs, bibliographies, etc.

At present, such permutations can be made by explicit entry of each form of the heading on the OCLC work screen. However, LC's increased use of the indirect approach to subject headings and the MARC format's requirement for machine-identifiable x,y,z delimitation of area, time, and topical elements create the potential for automated manipulation of the subject heading from a single explicit form of the subject heading entry. In order to permutate from a single form for specific applications, networks would have to develop the programming for manipulation of subject heading elements within their system, or, alternatively, individual institutions could use their archival tapes on minicomputers to produce catalog cards, book catalogs, or COM display systems emphasizing uniform, comprehensive access to both area and topical subjects.

The following "semi-permutative" system of rotating subject headings is proposed as a subject heading option for cooperating map libraries:

1. General maps of base areas would receive:
   
   Base areas—Maps

2. Thematic maps of entire base areas would receive, for each subject:
   
   Base area—Subject—Maps
   Subject—Base area—Maps
3. Thematic maps of portions of the base area would receive for each subject:
   Base area—Subject—Subarea—Maps
   Base area—Subarea—Subject—Maps
   Subject—Base area—Subarea—Maps

4. General maps of portions of the base area would receive:
   Base area—Subarea—Maps

5. Unlocalized maps or schematics would receive:
   Subject—Maps

In order for the permutative system to be effective in providing associated access in all area-subject related subject headings, such headings would have to be rotated comprehensively and completely in accordance with pre-established guidelines.

The permutated subject headings could be arranged in discrete files or categories, as shown in the following patterns:

1. Base area—Subject—Subarea—Maps
   Example: California—Geology—Imperial Co.—Maps. This pattern of subject heading elements would answer the associative question: What geological maps covering California (or any other area preselected as a base area) do you have in your library? If the pattern were applied consistently to all subjects reflected by maps contained in a map collection, a broader associative question could be answered, i.e., What is your thematic map coverage of California (or any other base area)?

2. Subject—Base area—Subarea—Maps
   Example: Geology—California—Imperial Co.—Maps. Although this approach has been the predominant LC pattern for map materials, it has never been applied consistently and comprehensively to all subjects. The associative value of this file is that it would provide the researcher with ready-made comprehensive subject bibliographies for the content of the map collections.

3. Base area—Subarea—Subject—Maps
   Example: California—Imperial Co.—Geology—Maps. This associative pattern collects subareas under major base areas. It provides a focused approach for those who are interested in the thematic map coverage of a specific subarea. If the user needed to know the complete library coverage for a local area such as Imperial County, the file would immediately reveal all thematic maps of the county as a whole and would provide a relatively focused approach for locating regional maps encompassing the county, as well as part or quadrar-
Cataloging and Classification

gle maps included within the county boundaries.

4. Specific area—Subject—Maps

If desired, the subject headings could be rotated to provide direct access to specific places of interest. Alternatively, local areas could be brought out through consistent tracing of specific areas in map titles.

The map format can usually be served by the same topical subject headings that are applied to books. However, as the map format provides a graphic representation, generalization, or interpretation of reality in the form of geographic distributions or subject correlations, some LC subject headings (those reflecting theory or methodology) may be insufficient or inapplicable for use as subject headings for maps. Cooperating map libraries in the United States should forward requests for LC subject heading modifications to the LC Subject Cataloging Division if they feel pertinent subject headings do not meet the requirements of the map format or its users. The concept of "cartographic material scope notes" to explain and elaborate on the usage of subject headings for cartographic material may be useful in resolving this problem. The area or geographic name element of subject headings should, if at all possible, be compatible with LC subject heading usage. If this is not possible, geographic names should be verified in standard reference sources and established in the LC subject heading style.

Even though automated access to map records through "component word" or other on-line machine search techniques provides excellent service to users, the concept of direct display of the written form of subject elements in discrete hierarchical files is valid for display in computer-output microform (COM) subject catalogs, book catalogs, current-awareness printouts, bibliographies, or even in card form for distribution to researchers or small branch libraries which do not have ready access to computer search systems.

The permutative subject heading approach is more feasible economically on COM or other computer-access systems than in the traditional library card catalog. However, as each of the superficially repetitive subject heading patterns contributes a unique reference function or associative capability, the additional access provided by the system should be useful enough to make it cost effective for display on catalog cards, especially if the catalog cards are produced by a computer on an automated system. The approach will not reach its full potential for service until all maps (or other place-oriented material) in the library's collection have been cataloged in accordance with the permutative system.
Subject cataloging is the key element in developing a service-oriented, user-responsive map collection. Trained, alert, professionally involved reference librarians are, in the final analysis, the single most important element in providing excellent library service, but such people need the working tools of excellent cataloging and strong collection development programs to be able to provide optimal reference service. If a reference staff is to reach its full potential for service, processing units must offer improved levels of service in terms of "associative"- or "bibliography"-oriented information and reference capabilities, whether through terminal searches or separate visual display systems.

**Communication and Coordination**

Although the current capabilities of the general library cooperative systems, such as OCLC and RLIN, are relevant to the map cataloging requirements of individual participating libraries, development and support of formal channels of communication and coordination within the map library community could be used by map librarians participating in OCLC and other similar networks to maximize the efficiency and utility of such networks for the cataloging and bibliographic control of cartographic materials. Once the basic standards of the general system are met, multiple levels of additional cooperation among specialized users with common interests become possible. Options for special cooperation range from informal communication between two specialized users of the same system to membership in formally organized cooperative groups such as the Map On-line Users Group (formed in June 1980 by the merger of the OCLC and RLIN map user groups). Obviously, the latter option would be preferable, as it has the potential of maximizing the cost effectiveness of the cooperative approach for all participants. However, any level of extra cooperation would be beneficial to the individual participants in such an effort.

Development of a map library parastructure for coordinating or assigning cataloging priorities to individual institutions on the basis of the strengths of respective cataloging staff, acquisitions, or collections could be used as a technique for increasing efficient use of the existing cooperative system. This approach would result in higher-quality, more consistent cataloging, as well as making specific categories of map records available more quickly. Priority assignments could be made on the basis of strengths in areal coverage, subject coverage, language expertise of cataloging staff, or even on the basis of a library's relationship with a map-producing agency. A library which is part of a map-producing agency could catalog maps produced by the parent agency.
Cataloging and Classification

more easily, quickly and accurately than an outside library, as it would have earlier access to the maps and increased availability of cataloging information on authors, intent, etc.

**Improvement of Network Capabilities**

The most effective approach which cooperating map libraries could take to improving the technical capabilities of networks would be advising or lobbying the individual networks and the national bibliographic agencies to accelerate implementation of those specific planned or projected technical capabilities which would be most responsive to the map cataloging requirements of the cartographic community. Implementation of a geographic coordinate search capability would be extremely valuable for accessing cartographic information contained in map records. This is a proven technique which could be implemented by networks with relatively little software modification. All that stands in the way of networks’ implementation of such a capability is the lack of a user mandate. The reasoning is also applicable to implementation of a map classification code area-subject search capability. This technique is already operational at LC for information retrieval from the MARC Map data base.

Development and implementation of MARC format analytical and multilevel capabilities, including activation of the linking numbers concept for tying records together, would improve map librarians’ capabilities for cataloging related texts and maps, sheets of multisheet works, maps in monographs or journals, etc. These capabilities are highly important, if not essential, in improving user access to cartographic information. Full implementation of the multilevel cataloging provisions of AACR-2 depends on development and implementation of analytical and multilevel capabilities of the MARC format. The lack of these capabilities has been a serious deterrent to the timely development of bibliographic control of the map format. In supporting cooperative cataloging and standardization of bibliographic description, classification, subject headings, etc., participants should encourage network flexibility in allowing local deviations from standards. This will enable catalogers in individual libraries to meet specific institutional reference and service requirements.

**Conclusion**

Several major factors are contributing to increased demand for maps, information about maps, and improved bibliographic control of
maps. As the world grows smaller and international concerns over political, social and economic problems intensify, the importance and direct economic value of maps to planning, legislation, and so on is increasingly evident to persons who are not map librarians or earth scientists.

The increased automation of cartographic information by map libraries and other information specialists is reinforcing the demands for access to maps. The demand for automated information of practical value grows as the information is supplied. Concurrent with the increased demand for maps is a trend toward increased production of maps. This trend is reinforced by growing demand for geoscience information and by increased automation within the field of cartography. The net result is a potential flood of cartographic information, which will in turn generate demand for the genre.

The challenge to map librarians is clear. They must implement a system of comprehensive, automated bibliographic control of maps and other cartographic material, or be overwhelmed by requests for maps. Increased demand for and increased production of maps can only serve to create greater pressures for increased map library services by map users. Such pressures will be intolerable for those map librarians who are unprepared or isolated from cooperative automated programs for attaining bibliographic control.

Map librarians now have access to cost-effective, on-line, cooperative cataloging systems, which have the potential for meeting the challenge through their “union catalog” content, acquisitions information content, interlibrary loan communications capability, and automated area and subject access capabilities. However, to assure the success of the cooperative automated programs for bibliographic control of maps, librarians must:

1. Be more aggressive in obtaining financial support for cooperative efforts. Given the traditional low levels of financial support received by map libraries, even an efficient cooperative approach can not be truly successful in meeting the evolving requirements for cartographic information;
2. Offer improved library service through imaginative use of automated access to map records. Libraries must emphasize “associative” and “bibliography-oriented” information display systems to reach general users and to attain the widest possible dissemination of their services;
3. Extend the cooperative approach for exchanging cartographic information to an international level as rapidly as possible, to ensure that
universal bibliographic control of current and retrospective thematic mapping becomes an attainable objective; and

4. View other automated systems for retrieval of cartographic information as complementary to map library efforts. If at all possible, map librarians should gain access to such systems in order to improve their own reference and acquisitions capabilities. However, because of the increased demands on library resources created by such systems, libraries must also use the existence of these systems to justify improvement of library information and bibliographic control capabilities.

As information is a form of power, map librarians must learn to accept and even seek out the responsibility for controlling information about the maps in their care, as well as preserving and maintaining the maps as physical items.

References

7. Parr, op. cit., p. 43.
8. Ibid., p. 38.
12. Ibid., p. 76.
15. Ibid.
Historical Map Research

J.B. POST

The field of historical map research is as varied as most other human endeavors. Since the fine points of a definition will vary with almost each practitioner, perhaps we should start by defining each of the three items. The reader will by now have become aware of maps as a distinct format. Again, definitions vary, but for our purposes, a map is "a symbolic graphic representation of a planetary body or portion thereof"—a definition which will permit the greatest latitude in discussing the cartographic format without violating any commonsense feelings about what a map is. The other definitions can be taken from regular dictionaries: research is "careful, systematic study and investigation in some field of knowledge," and historical means "based on people or events of the past."

In the strictest sense, all maps are historical because history encompasses events of even an instant ago. While admitting this, we must also admit that it is often convenient to break a field down into periods, perhaps by arbitrary time periods (e.g., pre-1700 maps, nineteenth-century maps) or by production technique (e.g., engraved maps, lithographed maps). This is perfectly legitimate as long as these categories of convenience are not considered cosmic law. As Crone, Thrower, Woodward, and others have pointed out, there are few sudden extinctions of one mode of production with instant replacement by another, but rather more or less gradual replacements over a period of time in a geographically widespread industry.

---

J.B. Post is Cartographic Information and Format Specialist, Free Library of Philadelphia.
For purposes of this article, then, all maps are historical. If the maps of the last few years have not received the attention given to maps produced two hundred years ago, we merely have to wait two hundred years. The ephemeral maps of today will become the sought-after rarities of the future. The well-reasoned arguments over what constitutes “modern” cartography are superfluous to our purposes—indeed, it is conceivable that someday the term modern cartography may only refer to computer cartography.

Historical map research may be divided into intrinsic research and extrinsic research. This is roughly equivalent to “pure” and “applied” research in the sciences. Intrinsic map research is concerned with the map itself as the object of study. Such study has a long and mostly honorable history. This history need not be detailed here because R.A. Skelton has done it so concisely, but some highlights and prominent names should be noted. Since anything less than a complete history must be very subjective, I express the traditional mea culpa if I slight anyone’s favorite historian of cartography.

No field of scholarship springs full-blown like Minerva from the brow of Jove, but rather depends upon a string of researchers reaching back into the mists of antiquity. We may decide upon symbolic moments of birth but, as in human birth, there is always a period of gestation. Contributions to the study of maps were made from the Renaissance to the present by collectors of maps. In the early to mid-nineteenth century, the names of E.F. Jomard, the Viscount of Santarem and J.G. Kohl stand out as scholars who brought together important collections of early maps in both original and facsimile. Joachim Lelewel stands as a harbinger of things to come with his five-volume Géographie du Moyen Âge, which was profusely illustrated with facsimiles of important maps. The “birth” of the modern study of the history of cartography can be said to begin with the publication of A.E. Nordenskiöld’s Facsimile-Atlas to the Early History of Cartography in 1889. Nordenskiöld brought to the study of early maps a mind trained in the sciences and a zeal to organize the field. Nordenskiöld stands as the watershed and, for some, the patron saint of historical map research. At this writing, the five-volume catalog of Nordenskiöld’s library is being published by the Helsinki University Library, with U.S. distribution by Humanities Press.

The twentieth century has witnessed an increase in map researchers and in published findings. Monumental studies of maps of Michigan and the Great Lakes by Louis Karpinski, of maps of the southeastern United States by William Cumming, and of Portuguese cartography by Armando Cortesão are just a few of the highlights. Leo Bagrow has not
Historical Map Research

only written one of the important histories of cartography, but also founded *Imago Mundi* in 1935, one of the most important journals for publishing the results of historical map research. Coolie Verner has written on descriptive cartobibliography with emphasis on copperplate variations. Subtly dominating this century is R.V. Tooley, whose researches have touched on many of the major topics currently fashionable, and who has encouraged others by founding *The Map Collectors’ Circle* (sometimes also known as *Map Collectors’ Series*), a publication now unfortunately defunct, and *The Map Collector*. Perhaps Tooley’s greatest personal contribution is his *Dictionary of Mapmakers*.

While many map collections in libraries and other institutions are quite good and may even publish important works, and while lately there have sprung up a few centers for map studies, two institutions dominate the field not only because of the fineness of their collections, but because they sponsor publication of the findings of researchers. The Herman Dunlap Smith Center for the History of Cartography at the Newberry Library in Chicago has, under the direction of David Woodward, programs for publication of research results, public lectures and continuing education in the map field. The Geography and Map Division of the Library of Congress encourages both its staff and outside scholars to make use of its resources.

Having noted some of those engaged in map research, we still must address ourselves to the question of what it is. Treating a map as an artifact in intrinsic map research means more than looking at it as a physical object. It is a physical object created by a particular technology in a particular cultural milieu. The material of the map, traditionally paper or parchment, can be examined physically for watermarks and fibers or other physical characteristics, as well as chemically. The inks and coloring materials can be analyzed. The technology of reproduction—from calligraphy on manuscript maps, through wood and metal engraving, to lithography—can be studied. Maps, unless created by governments for high state purposes, are objects of commerce, and their manufacture reflects the economic climate of the times as well as the structure of the map business. How the information to be symbolized on the map was gathered and compiled, as well as the study of the development and use of the symbols used, might be termed the “intellectual history” of the map. All maps can be examined in these various ways: as single maps, as groups of related maps, maps depicting a particular area, maps produced in a particular place, maps produced by a particular map maker, maps produced by a given technique.

The world of map research is more extensive than some may think. A sense of the size and diversity can be gained by looking at an issue or
two of *International Directory of Current Research in the History of Cartography and in Carto-Bibliography*, issued to coincide with the biennial meetings of the International Conference on the History of Cartography. Research ranges from the atlases lithographed by Frederick Borquin to maps of the Dutch Polders, from early maps of Russia to wax engraving. There is a sizable international community of map researchers.

The fruits of these labors are published not only in the aforementioned *Imago Mundi* and *The Map Collector*, as well as in such specialized journals as *The American Cartographer* and *The Canadian Cartographer*, but also in more general publications. Local history publications often have map articles; genealogical magazines cite maps; map articles have appeared in all of the major historical journals; even the three journals of map librarianship in North America—*Special Libraries Association Geography and Map Division Bulletin*, *Western Association of Map Libraries Information Bulletin*, and the *Association of Canadian Map Libraries/Association des Cartothèques Canadiennes Bulletin*—publish the results of scholarly research as well as more mundane matters. Both *The Quarterly Journal of the Library of Congress* and *Prologue* (issued by the National Archives) are replete with articles on maps. Maps are relevant to so many facets of our existence that it is only fitting that journals devoted to these facets mention maps.

When studying maps, it is helpful to know where the maps under consideration are located. Unfortunately, there is at this time no map resource equivalent to the *National Union Catalog*. The catalogs of some individual collections have been published, frequently by G.K. Hall, and the newly received maps in several libraries are already going on-line on OCLC, but even some of the cartobibliographies which attempt to list locations are far from complete. After checking the printed sources, it is still advisable to go through the "Old Boys' Club" of map librarians to track down copies of maps.

But research goes beyond just fondling the map. One must read as much relevant, published research as one can find. Here we are more fortunate. The map library, cartographic and geographical journals frequently list monographs, collections, facsimiles, and articles which have been published elsewhere. The Library of Congress Geography and Map Division has over the years developed a card file, *The Bibliography of Cartography*, published in book form by G.K. Hall, which lists a large amount of scholarship in the map field. While the subject of the antiquarian map trade deserves its own article to do it justice, I would be remiss if I didn't mention at this point that catalogs from the major dealers often become important reference works in themselves, though
the research involved in producing them may be considered extrinsic because the purpose is to sell maps.

It is often difficult superficially to distinguish intrinsic and extrinsic map research. We can glibly say that intrinsic map research is concerned with understanding the cartographic artifact and how it came to be, while extrinsic map research is concerned with the cartographic artifact as a carrier of information. This information can vary from the comparatively simple spelling of place names at a given time to the results of a chemical analysis of the ink on a map. The distinguishing feature is intent. It may seem that the antiquarian map dealer is researching the map for itself, but what is really sought is information about the uniqueness or rarity of the map so that an appropriate amount can be charged for it; I would call that motivation ulterior. It may seem that the historian of technology is concerned with dating a given map, yet the real purpose is not to date the map but to use this information in studying the printing technology. The two aspects of map research are mutually supportive, and one should not be considered less worthy than the other.

Maps are and were designed to be carriers of information. To use this intended information in a cursory fashion is reference rather than research. Information may age and even become incorrect, but rarely becomes useless. Many of the county atlases of the nineteenth century contain paid advertisements for various firms and enterprises in the county. Not only can something of the economic and social climate of the county at the time of publication be determined by such advertising matter, genealogists find it a gold mine of information on ancestors and their activities.

Even with intrinsic map research, it is wise to go beyond the artifact itself if at all possible; with extrinsic research, it is mandatory. With additional outside documentation, maps can be valuable corroborative evidence, but alone they can be misleading if interpreted incorrectly. An eighteenth-century map may indicate a structure approximately where a current building is located, but it can never alone prove that the buildings are identical; an actual site survey, combined with a knowledge of architectural styles, is needed along with other textual evidence. The indication on a county plat map* of an extensive farm owned by someone with the sought-after ancestral name is no proof that the farm really was owned by the desired ancestor without other linking documentation. Two funeral parlors in a town can indicate either a thriving

---

*A plat map is one primarily concerned with showing property lines, and includes physical or other features as they relate to ownership.
death business or a religious (or social or ethnic) division in the town which requires two marginally successful funeral parlors—or it may mean something else entirely. The cast of mind of a Sherlock Holmes is most useful in any research.

Elsewhere in this issue, Mai Treude discusses map users, and an earlier issue of *Library Trends* contains David Cobb’s article of “Maps and Scholars”; both of these are informative. An entire book could be written on how maps can be used by different researchers. Avoiding that temptation, I shall very briefly note some generalities on the matter. In what follows, I do not consider students as a separate category, because I presume—or hope—that students of architecture, landscape design, or whatever are using (or learning to use) map materials in the same manner as established professionals.

As a group, genealogists are one of the most troublesome in libraries, because the levels of research sophistication range from barely perceptible to quite advanced. Because of this, they are one of the hardest groups to categorize. What they all share is intent: finding their ancestors. They may come armed with impressive and extensive documentation, or they may come with garbled oral family tradition. They may have sprung from the first European settlers in North America, or may have ancestral antecedents from the backwaters of the Russian Empire two generations ago—or both. With genealogical research we can clearly see the inadequacies of maps as the single source of information.

Most of us ultimately spring from the nameless and faceless peasantry of some country, perhaps salted with relationships with a few prominent lines “from the wrong side of the blanket.” Only prominent names of individuals appeared on the maps of cities and their environs in the eighteenth century. In some instances, these names change from variant to variant of a map as the patron changes. Until we reach the county atlases of the later nineteenth century, personal names are generally not successfully found on early maps. What the genealogist often seeks is confirmation of place names. Foiling this search are name changes, incorporation of smaller places into larger ones, extinction of communities, and starting with incorrect names. Older maps may help, and in this regard such searches are a bit easier when dealing with North America and western Europe, if for no other reason than that libraries in North America are more likely to have maps and gazetteers showing an earlier time for these areas than for eastern Europe and other parts of the world. Names in these areas also have been somewhat more stable and boundaries, while not absolute, have changed less in the last two centuries than in eastern Europe. In eastern Europe there can be towns with
Historical Map Research

three (or more) names in different languages, some of which are not in the Latin alphabet. Such place names have a very good chance of becoming garbled in the retelling of family histories; Gaelic names in Wales and Ireland can also be troublesome. Here the librarian may have to engage in Socratic questioning of the library user to try to find other names mentioned in the family saga, and whether grandfather ever mentioned the sun being in his eyes when he walked to the larger market town. Sometimes, with luck, using modern maps (say, those produced by the Defense Mapping Agency at a scale of 1:250,000) with older maps can get good results. Ritters Geographisches-Statistisches Lexikon and Stieler's Atlas of Modern Geography can be useful for tracing German names in eastern Europe.14

The second half of the nineteenth century saw the rise and full flowering of the county atlas in North America. These works indicated the major land owners, which is not very useful if the ancestors were tenant farmers; still, a picture of the county can be gained and the family history may contain a mention of the landlord, so occasionally they can be useful. The value of maps for the genealogist depends very heavily on how much information is brought to the maps.

Paralleling the county atlases were the city ward atlases, created primarily for insurance companies. Again, only owners of large tracts are mentioned by name, but a picture of a neighborhood can be had by combining the census data with the map information. Street names change as rapidly as those of towns and villages, often changing the house-numbering scheme, so early maps and atlases of cities frequently must be consulted to find out where grandfather lived. These atlases will show all the structures at the time of survey. Now-vanished churches with their graveyards, as well as the factory where grandfather may have worked, may be seen in their spatial relation to the row house where he lived.

As map users, architects and planners can be lumped together. Very generally, architects are concerned with a site, while planners (called variously "city planners," "urban designers," "landscape architects," and a host of other euphemisms) are concerned with a larger area. Both will use older cartographic materials to spy out the earlier lay of the land. They will use prints and photographs, older business directories, and guide books to get a picture of the site or area. If they are concerned with restoring or recreating a particular period, the fire insurance atlases, because they were concerned with structures, often indicate the outlines of a building, the building materials, the existence of outbuildings, and sometimes within a few years, when additions to buildings were constructed. Once the architects and planners dream their grand
schemes, it is up to the engineer to realize them. The builder’s concern for historical information is quite pragmatic: how extensive are the old foundations on the building site (that no one ever told him about), and where did the now-buried stream run which is giving him water in the basement?

At one time it might have been appropriate to make a distinction among historical geographers, social historians, economic historians, transportation historians, and the like, but in a period seeing increasing integration of hitherto-disparate studies, it is better to consider them all historical researchers of various persuasions. More accurate pictures of a specific area in a particular time period can only be gained by integrating the findings of researchers in several fields. Such a picture would include how and where people lived, how and where they earned their livelihood, how and where they amused themselves, and how they moved about from place to place. In both rural and urban settings, maps in conjunction with other records can help discover these things. County maps may show the major roads and rail heads (as well as ownership); city maps may show the street trolley lines; even maps from eastern Europe in the sixteenth century may indicate the spatial relationship of the major towns and the roads and navigable rivers connecting them. This list could go on, but I trust the examples given throughout this paper are beginning to coalesce into a picture of how maps can be used by different groups with different needs. The examples may relate mainly to North America, but the principles are universal.

One group of researchers presents a problem in terms of whether they are engaged in intrinsic or extrinsic map research: the print/graphics scholars. Prints and drawings are studies in themselves. Many print researchers are believers in the print heresy (sometimes called less charitably the “print perversion”), the view which sees maps as a special kind of print. Maps and prints are obviously of the same family and may even be of the same genus, but are decidedly distinct species. There can be fruitful collaborations between the two fields, but only if there is a mutual respect for the individual integrity and distinctness of each. When maps contain views and drawings, as has often been the case throughout the entire history of map making, or when accompanied by views and drawings, as was common in the county atlases of the nineteenth century, the cartographic item is the proper study of both map researchers and print researchers. That most vexing of hybrids, the bird’s-eye view, is the proper object of study for both. I place print researchers in the category of extrinsic researchers, because while they may look at the map as a thing to be studied for its own sake, they view it
Historical Map Research

as a pictographic artifact rather than a cartographic one.

Having very briefly, and very incompletely, noted how some researchers can use maps, let us now turn attention to where they find maps. Earlier it was noted that there is no single source to track down locations of any given map. There are, however, other ways to skin the cat. For the intrinsic map researcher, it is usually the case that only one version of a map can serve his needs. With extrinsic map researchers, the chances are somewhat better that a wider variety of cartographic materials may suit their needs and answer their questions; what they need may not change from edition to edition of a given map. Of the many map repositories which exist, only a comparative few have published catalogs; however, most of the major collections are listed in Map Collections in the United States and Canada or, on an international level, in World Directory of Map Collections, with a note of the particular collection's specialization. If, for instance, one needs a map of a certain county in Kansas in a given year, knowing which map collections specialize in that area can be a starting point.

Map collections are found not only in libraries, but in historical societies and archives. Legislative, judicial and executive bodies at the national, state (or provincial) and local levels produce a prodigious amount of records, many of which contain maps. These can range from rather simple and general maps merely indicating locations to detailed site studies. Unfortunately, much of this material is buried in textual records, but the diligent sorting through of official records can be rewarding, as, for instance, when records of litigation over boundary lines contain maps and lists of owners. An additional problem with archives is the changing boundaries of regions and territories. For example, at one time Denver was the westernmost city in the Kansas Territory, and the area north of the Ohio River before the various states came into being was, at one time or another, a U.S. territory, part of British Canada (Quebec Province), and part of French North America. These factors lead to the question of which archives one should consult. Historical societies (sometimes acting in lieu of officially constituted archives) may have manuscript maps buried in their manuscript collections, which can aid various map researchers as well as printed maps. Planning agencies, while concerned with the present and future, may well have collections of copies of older maps, because their studies and suggestions often contain a description of the historical development of an area.

Sheet for sheet, government agencies of one sort or another are the major producers of maps in the world today. By no means will all such
maps find their way into map collections, but a great many, either as single-sheet maps or as maps accompanying textual matter, will be found in government publications collections in libraries. As with archival collections, one may have to rummage a bit, but the rewards can be great. Governmental agencies have been churning out reports for enough years to be significant in all manner of research endeavors. As one example, the U.S. Army Corps of Engineers has changed the face of the land; their records may show the terrain before and after. As another example, nautical charts, almost always a government product, can show the changes in the coastline over the years, changes which can affect not only the permanent residents, but those using the shore for recreational purposes. The greatest grab-bag of all is the Congressional Serial Set, a multivolume set containing every report and document relevant to Congress's deliberations; some volumes are nothing but maps. There have been a series of maps of the various naval bases, of the harbors dredged by the engineers, of Indian reservations, of mining activity, of railroads, of lands available for homesteading...you name it and the chances are rather good it has been included sometime. When you consider that the Smithsonian Institution with its worldwide activities is a government agency, you begin to be staggered at the thematic scope of the mapping possibilities. Not only the Smithsonian and the military services, but other civilian agencies as well are engaged in worldwide activities; the U.S. Geological Survey and the National Weather Service are only the most obvious. The cartographic products of all this governmental activity can be viewed both as maps and as government documents.

Since this is a library publication, it is only appropriate to conclude this article by taking a look at the place of libraries and librarians in historical map research. On the most basic level, libraries are storehouses and librarians are custodians. I don't say "mere" custodians, because the custodial and warehouse functions are most important: if we have not stored the maps and atlases, we will not have them to do anything else with. Included in the custodial function is the hope (but not the absolute requirement) that the materials are stored in some sort of order and can be retrieved when needed.

Beyond simple custody is map librarianship. While this entire issue of Library Trends is devoted to the subject, the best beginning book on map librarianship is Mary Larsgaard's Map Librarianship: An Introduction; it is the book on the subject for beginners. Map librarianship, like other kinds of librarianship, involves selecting material, cataloging and classifying it in some manner, storing it (including preservation
Historical Map Research

and restoration), and servicing it. This last, the reference/research function of librarianship, is the only justification for libraries and librarians. Reference and research, however, cannot exist without all the prior processing of the library materials: reference work may be the ultimate fruit of librarianship, but the fruit must be supported by the far less glamorous trunk of processing.

Perhaps in some libraries reference work may end with giving the user a book which contains the needed information. In the specialized forms of librarianship, this is rarely the end of the matter. Beyond just finding the map the user needs, there is often the additional obligation of interpreting the map or other material. An unexplained map is almost worthless if the user doesn’t know the meaning of colors and symbols on the map. And there is more to reference than finding the map the user wants. Quite often, the user has a desire to see a map which will do the user no good. The librarian must be prepared to provide not what the user wants, but what the user needs. It is a hackneyed phrase, “the reference interview,” yet it still expresses a valid concept. The librarian must understand the problem and use familiarity with the collection to produce useful material which may in part answer questions raised. Because map collections have not been using uniform procedures, even the most sophisticated of users must depend on the local map librarian or map custodian to unravel the local idiosyncrasies of each collection. The map librarian may seem to become a partner in the user’s research. Map librarians, often in pursuit of cataloging information, have usually engaged in some sort of research themselves and may understand what is involved. Some few map librarians have even gone beyond the usual cartobibliographic endeavors and are accounted scholars in the field. This expertise which the map librarian may have developed can be as important a library resource as any item in the collection.

In looking for trends in research, the safest answer is certainly “more.” There is a slowly increasing awareness of maps on the part of the general public, brought about partially by the rising prices of antiquarian maps. While much of this awareness may be reflected in increased numbers of reference questions rather than in research projects relating to maps, the awareness is there. In my own experience I have seen during the last few years an increase in the number of people searching out their ancestors.\textsuperscript{18} Ten years ago most high school students used maps for recreational information (where to bike, hike, camp), but recently, seventh- and eighth-grade students have come to the library with assignments requiring them to use older maps and atlases to
reconstruct how their neighborhood looked in earlier times. Students even younger are routinely brought through for quick orientations on maps.

The neighborhood history projects will probably increase, as will the number of amateur genealogists, but there will be no lessening in other areas. We will see intrinsic map research become more refined (and perhaps more specialized). As production techniques are more thoroughly studied, research will turn increasingly to firms and individual map makers in addition to specific maps and map series. We will see an increase in general courses in map librarianship, as well as programs in rare map curatorship (emulating the present program at the Newberry Library). Learned collections similar to My Head is a Map and The Compleat Plattmaker will continue to be published, but as the earlier years are worked over there will be increasing emphasis on the nineteenth and early twentieth centuries. The coming years may not be easy ones for any human endeavor, as the Chinese curse overtakes us and times become very interesting, but for all the perils and pitfalls which may beset it, historical map research has an exciting future.

References

1. Webster's New World Dictionary of the American Language, pocket ed. 1959, s.v. “research” and “historical.”
Historical Map Research


This Page Intentionally Left Blank
Map Library Users in an Academic Setting

MAI TREUDE

Map librarians have traditionally been most concerned with their materials. In recent years, however, this has begun to change. The user and the user’s needs are receiving increased attention. This paper will review the literature concerning map library users and present profiles of map library users in an academic setting. The profiles are based on a recent survey of map library users at the University of Minnesota and on methodological assumptions about user groups. In an academic setting, the four main groups of users are: students, faculty, other institutions (business and government), and the general public.

It has been widely accepted that an item’s use is the most valid measure of its worth to a library. However, opinions vary as to whether studies of use should focus on the materials—on circulation, for example—or on the user and his or her behavior and needs. Critics of use studies (those that focus on materials) maintain that those studies tend to be largely quantitative, thereby ignoring important qualitative aspects of library use.

According to one theory, studies of library users examine four basic components: (1) the person in need of information, (2) a set of problems dealing with the needs, (3) the ways in which the user meets these needs, and (4) the items of information that satisfy these needs. These components can be applied in studying the user in a map library. The third component in particular, the way in which the user meets his needs, suggests the provision of reference service activities by the map librarian. Providing reference service to the user is a legitimate function of a

Mai Treude is Map Librarian, University of Minnesota, Minneapolis.
map library. Throughout the history of libraries, efforts to assist users have had to compete with technical service functions for the librarian’s time. This is equally true in map libraries. Few are staffed by more than one librarian, who may or may not be assisted by support personnel, and this situation will probably not change within the next decade. Thus, the amount of time spent in assisting a user must be determined by the individual situation.

The Map User in Library Literature

Until the 1970s, map library literature reflected the profession’s concern with technical service functions. The problems of organization, classification and cataloging received abundant coverage that provided much needed assistance to those looking for the best system of organization. Although references to the map user have not been absent in the literature, separate publications devoted to the map user and to map reference functions are a relatively recent phenomenon. It appears that the profession can now begin to ask: Who uses maps? How are maps used? The time has come for the map reference function to move from the periphery and become a central activity in a map library.

The literature shows that map librarians are aware of the great diversity of users and of their expectations and needs. Librarians realistically acknowledge that map libraries are used by a small percentage of the academic community. Yet the greatest growth in map libraries has been in academic systems—an increase from 162 map libraries in 1954 to 297 in 1970. Writers of articles about users fully acknowledge the need to promote effective use of cartographic materials and to educate users. They also lament the user’s map illiteracy and general cartographic ethnocentricity.

Published surveys about map users are still scarce. Those that do exist, together with articles on reference service, shed some light on the typical map user—or at least on the user as perceived by the map librarian. Most published surveys and articles are concerned with the user in an academic setting. One of the best documented recent surveys was conducted at Southern Illinois University by Jean Ray. It is a quantitative survey based on circulation records which were analyzed for: the department affiliation and academic status of the borrower; the purpose for borrowing; and the area, subject matter and form of the items borrowed. Although use of a college or university map library depends on many variables, such as its proximity to the geography department, the projects students are involved in, and the time of year,
this survey provides interesting insights into map use. Ray, like others, found that map borrowers belong to a wide range of campus groups. The heaviest recorded use was by graduate students for research purposes; the heaviest geographical emphasis was on the local area; and the most frequently borrowed materials were aerial photographs and topographic maps.8

Ray does not indicate how the survey information will be further evaluated and implemented for the users' benefit, but she did point out that the low percentage of faculty use suggests the need for more effective public relations and improved liaison with the faculty.9 Having determined who uses the map library and who doesn't, one then has the information needed to promote use where necessary, while continuing to give the best service to established users.

The Map User in Cartography Literature

The map is considered the ultimate objective of the cartographer's activity;10 but cartographers are also concerned with the user. During the past decade numerous articles on cartographic communication have appeared in professional journals of cartography. They differ from articles by map librarians in that they emphasize efficiency of map design, the cartographer's perceptions, and the design's impact on the map user. Map librarians and cartographers have similar basic concerns about the map user. Both recognize a wide variety of users with a considerable range of needs and competence in using maps. Both affirm that the cartographic information obtained from a map enriches the knowledge of the user, whether it is put into practical activity or processed into an idea.11

According to Hsu, the transmission of cartographic information has four elements: the real world, the cartographer's conception, the map, and the reader's perception.12 Cartographers have designed innumerable models of communications systems depicting the relationships of those elements,13 the least complicated of which is a model by Hsu depicting the four elements mentioned above. Hsu's model is shown in figure 1 and suggests the interfaces where the librarian may act as catalyst in the system.

![Figure 1. A Scheme of the Cartographic Communication System](image-url)
Both cartographers and map publishers recognize the importance of the user’s role in cartographic communication.\textsuperscript{14} Surveys have been conducted to find out what the maps are used for and what opinions people have about them.\textsuperscript{15}

The user’s expectations, needs and map-reading skills are important considerations in map design. But despite efforts at all levels—in design, production and interpretation—the user’s needs may still not be met. This idea, expressed many times in the literature, is summarized by Lloyd and Yehl: "A map reader obtains information from a map, organizes the information through his cognitive processes, and draws conclusions about the map’s message, but he might not receive the exact message the cartographer intended to communicate."\textsuperscript{16} Map librarians are well aware of this possibility as they bring to the user’s attention a great assortment of maps on a particular topic. But not all map users are lucky enough to have the services of a map librarian—truly the missing link in the communication model for transmitting cartographic information.

With one exception, there is no mention in the cartographic literature of map libraries or librarians as possible links between the cartographer’s conception and the user’s expectations. The exception is L.M. Sebert, whose views on the importance of map libraries in atlas production are as follows:

Examples of the best in modern cartography should be available for study in our cartographic offices.... The acquisition of such maps should not be haphazard but should be organized by a competent person whose job it is to keep in touch with cartographic progress on a worldwide basis....

Map librarians are a tremendous help in assisting in cartographic research. They are an excellent source of information on the use of maps—both in the quantitative sense of what maps are being used by the public, and the qualitative sense of how the maps are being used and what problems or difficulties the users are having with their maps.\textsuperscript{17}

Map librarians are users themselves and represent many user groups as well. Through an awareness of their patrons’ needs, they possess information of value to the map publisher and the cartographer. At this time, only a few government mapping agencies have recognized the collective voice and knowledge of map librarians, and even that is a fairly recent development.
Users

The Map Librarian's Role in Providing Reference Service

Rauchle characterizes the map library as follows: (1) an archive and repository, (2) a means of education, and (3) an instrument of research.\(^{18}\) The academic map library serves all three of these functions; a sufficiently large research collection, all of it not in constant use, is an archive and an instrument of research. And, certainly, education is a primary activity of an academic map library.

The map librarian's role in this setting is to promote effective use of the materials in order to increase existing knowledge.\(^{19}\) This means that the map librarian is instrumental in communicating cartographic knowledge. Winearls has outlined the steps in map reference service from the initial question to methods of assistance, including educating users to the services that a map librarian can and should offer.\(^{20}\) In this procedure the map librarian must find out not only what the user needs, but also how well the user is able to interpret the materials.\(^{21}\) The general opinion of those writing about map reference work is that the map librarian assists the user in reading, interpreting and creating maps.\(^{22}\)

Map librarians speaking from experience with a variety of users acknowledge users' lack of map literacy. General observations indicate that the user frequently does not know which specific map he wants, nor is he aware of what materials exist. Since inquiries may range over all imaginable subjects on which maps provide information, it is extremely important to identify what the user is looking for.\(^{23}\) Throughout the search process the librarian serves as a catalyst.

Map Users in an Academic Setting

The primary function of the map library at the University of Minnesota is to support the instructional and research needs of the university's academic community. However, the library's collection and its services are also open to the general public. The function of the library suggests a grouping of users as faculty, student and nonuniversity users. The nonuniversity users are perceived as general public and personnel from businesses and government offices. The needs of both faculty and student groups are further seen as originating from the geography department, in contrast to needs from all other disciplines.

Actually, several possibilities exist for classifying library users. For example, comparisons could be made between the academic and the nonacademic or student and nonstudent users. Or, users could be typed
according to their need, for example, by required use and use by choice, in-room use and borrowing, and so forth. Users could also be typed according to observable levels of "map literacy": as layman; student or businessman; academic; and the knowledgeable user, as was demonstrated at the University of Toronto.24

A profile of map users in an academic setting is not difficult to develop. Certainly, most librarians can easily construct such profiles in their minds. Survey statistics only back up the assumptions in order to carry weight in administrative decisions. University of Minnesota map library users have been surveyed four times, in 1961, 1968, 1970, and 1980. Because these studies permit insight into patterns of use, they have been influential in collection development, aided in the organization of materials for more effective access, and led to improved handling of course assignments and reserves.

A survey of 500 voluntary participants (61 of whom were studying their own materials) was conducted for eight weeks during the 1980 winter quarter. All references to percentages of users and use in the following delineation are derived from this survey (see table 1). It was already known who the main user groups were and what category of materials were used. The survey's purpose was to reveal the ratio of student use to nonstudent use (and its subgroups), and to determine how the needs of these groups are currently met. In discussing map library users, it must be remembered that the term map encompasses different formats of cartographic materials—maps, atlases and aerial photographs.

As anticipated, the survey showed heavy student use (82 percent) of the map library, but use by faculty, business and government agencies was lower than anticipated. One likely explanation for the low figure for these groups is that these patrons, the faculty in particular, are reluctant to fill out survey forms. Also, as expected, a class assignment was the reason most frequently listed for using the map library (43 percent). Slightly over one-half of the participants indicated that the materials they used were maps, of which 57 percent were topographic maps of the United States. That the U.S. Geological Survey topographic maps constitute the highest proportion of total map use in the nation's map libraries is widely known.

Cartographic concepts, such as scale, coordinates, relief, contours, and projection, do not seem to occupy the patron's mind when in search of map information. The survey's attempt to probe users' awareness of these concepts in their search for maps resulted in the following: the most important concept was scale (45 percent of responses), followed by
TABLE 1

MAP LIBRARY USE BASED ON A UNIVERSITY OF MINNESOTA SURVEY

<table>
<thead>
<tr>
<th>Percentage Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Users</strong></td>
</tr>
<tr>
<td>University</td>
</tr>
<tr>
<td>Graduate students</td>
</tr>
<tr>
<td>Undergraduate students</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Faculty</td>
</tr>
<tr>
<td>Staff</td>
</tr>
<tr>
<td>Nonuniversity</td>
</tr>
<tr>
<td>General public</td>
</tr>
<tr>
<td>Businesses</td>
</tr>
<tr>
<td>Govt. agencies</td>
</tr>
<tr>
<td>Students</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td><strong>Reasons for Use</strong></td>
</tr>
<tr>
<td>Class assignments</td>
</tr>
<tr>
<td>Research</td>
</tr>
<tr>
<td>Curiosity</td>
</tr>
<tr>
<td>Business/Govt.</td>
</tr>
<tr>
<td>Prep. for instruction</td>
</tr>
<tr>
<td>Other (recreation, genealogy)</td>
</tr>
<tr>
<td><strong>Materials Used</strong></td>
</tr>
<tr>
<td>Maps</td>
</tr>
<tr>
<td>USGS topographic</td>
</tr>
<tr>
<td>Thematic</td>
</tr>
<tr>
<td>Foreign topographic</td>
</tr>
<tr>
<td>Monographs</td>
</tr>
<tr>
<td>Atlases</td>
</tr>
<tr>
<td>Gazetteers</td>
</tr>
<tr>
<td>Periodicals</td>
</tr>
<tr>
<td>Other (books, vert. file)</td>
</tr>
<tr>
<td>Aerial photographs</td>
</tr>
<tr>
<td><strong>Frequency of Use</strong></td>
</tr>
<tr>
<td>First visit</td>
</tr>
<tr>
<td>Less than monthly</td>
</tr>
<tr>
<td>Monthly</td>
</tr>
<tr>
<td>Weekly</td>
</tr>
<tr>
<td><strong>Locating Method</strong></td>
</tr>
<tr>
<td>Staff assistance</td>
</tr>
<tr>
<td>Browsing</td>
</tr>
<tr>
<td>Card catalog</td>
</tr>
<tr>
<td>Previous knowledge</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>
MAI TREUDE

contours (32 percent), and then relief (24 percent); projection (13 percent) and latitude and longitude (11 percent) were judged least important. (Since more than one category was checked by some respondents, the percentages total over 100.)

According to the survey, the primary users are undergraduate students (68 percent) working on course assignments, using primarily topographic maps of the United States and Minnesota. These students are probably visiting the map library for the first time (32 percent of all users), and were informed about the library by instructors (48 percent). Only a few of the students have received prior map library orientation (20 percent), and many of them rely on the library staff for assistance in locating materials (38 percent of all users).

This profile of the largest user group is fairly representative of the academic year; however, the percentages represent only a specific moment in time and should not be taken as true of the entire year. A weakness of this survey is that it measures limited activities. The map's impact on the user, and the extent of knowledge gained from a single map, remains a matter between the user and the map.

The Student Map User

The university's Twin Cities campus had the highest enrollment of any single campus in the nation during the 1979 fall quarter, when 63,715 students were registered. Undergraduates formed the largest group of students and also constituted the greatest proportion (68 percent) of map library users in the winter quarter of 1980. This is higher than in other large campus map libraries. The high percentage of undergraduate users may be explained by high enrollment figures in the introductory geography courses, which are traditionally taught with maps and with map assignments in the map library (see table 2). In the introductory course, basic map use and map-reading skills are introduced. These courses are by no means the only ones utilizing maps; however, other courses are taught less frequently during the academic year and have lower enrollments. It must be remembered that despite the high percentage of map needs generated by the geography courses, the users are not all geographers. Actually, the geography undergraduate majors constitute a minority (129) of a total of 2100 enrolled in the seven basic courses. The majority of the students come from a great variety of disciplines.

In using the map library, students either refer to specifically assigned maps and materials that have been placed on reserve, or select
Users

**TABLE 2**
Geography Courses with more than fifty students enrolled in 1979-80, University of Minnesota

<table>
<thead>
<tr>
<th>Name of Course</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td>567</td>
</tr>
<tr>
<td>Physical</td>
<td>552</td>
</tr>
<tr>
<td>U.S. and Canada</td>
<td>466</td>
</tr>
<tr>
<td>Twin Cities</td>
<td>217</td>
</tr>
<tr>
<td>Cartography</td>
<td>114</td>
</tr>
<tr>
<td>Minnesota</td>
<td>109</td>
</tr>
<tr>
<td>American cities</td>
<td>75</td>
</tr>
<tr>
<td>Total</td>
<td>2100</td>
</tr>
</tbody>
</table>

Source: Department of Geography, University of Minnesota.

maps for a geographical area of their choosing. Usually, students must go beyond the assigned maps and find other information that will enable them to complete the assignment successfully. This is an effective way of teaching the use of maps together with atlases, books and government documents in an attempt to break down the barriers between different formats of information, especially between book and nonbook materials. A typical assignment requires the use of U.S. Geological Survey (USGS) topographic quadrangles, from which the student must extract information. The cartographic symbols of the map must provide data about the natural features of the land and the cultural features upon it.

Through various map assignments in physical and human geography, the student is introduced to the symbolism of maps and to the concepts of latitude, longitude, scale, and contours. The objectives are to learn that maps may be richer in information than natural landscape, and that a wealth of information is communicated via various methods of symbolization. Map evaluation remains the specialty of the cartography student, who is urged to look critically at maps as objects of study, with emphasis on the use of areal symbols or any features of the design that are used to communicate a specific message to the reader. In disciplines other than geography, cartographic materials are used as support materials. The use of maps is usually taught by area, and the emphasis is on successful synthesis of information in different formats into a whole package of knowledge. Graduate students constitute 11 percent of users surveyed, and their use is perhaps the most difficult to describe. This group of map users comes from many disciplines,
although the geography graduate students dominate. They use maps much as professional geographers do (or the knowledgeable user, for that matter). Maps are used: (1) as direct means of communication, or (2) as illustrations that support verbal or written communication.

The student's learning experience includes information from many sources, ranging from such basic tools as printed explanations of map symbols to frequent reference questions directed to the library staff. These range from questions about hachure marks representing elevations and depressions to inquiries about the "white areas" on topographic maps. The student also depends heavily on the librarian's suggestions for other sources of information, recommendations of other maps, and explanations of why there is no vegetation map of one state when one exists for another. During the intense search for information to complete the assignment, the student may not be aware of the cartographic excellence of the maps used.

Students' needs may be met with the minimal basic collection of materials. Their needs are not as influential in collection development as they are in the organization, location and accessibility of materials. Their needs also influence library hours and require staff time. Their special needs require availability of copy service, light tables, special map interpretive tools and handouts, the setting aside of reserve areas, the provision of signs, and so forth. Special aid is also given to the student user on an individual as well as a group basis in the form of map library orientation, particularly to students in the introductory geography courses. Generally, the bulk of reference work with students is routine and the librarian's attitude and helpfulness are more important than a depth of specialized knowledge. At this level the librarian plays an important role in the primary purpose of the institution: education.

The Faculty Map User

Overall, the faculty constituted 2 percent of map library users at the time of the survey. Preparation for instruction accounts for 3 percent of the stated purpose for use reported. The geography faculty places an equal emphasis on visiting the map library for research and preparation for instruction. In comparison to undergraduate users, the geography faculty (twenty) and the small number of geography graduate students (seventy) go practically unnoticed in their use of the map library. One-third of the faculty use the library periodically, averaging three times a month. These faculty are usually involved in teaching the seven introductory courses mentioned before, in addition to teaching courses
Users

in their area or subject specialization. The geography faculty's use of the map library is closely related to the mission of student instruction. Maps, when used in teaching, are part of broader concepts and ideas and are seldom the sole objects of study. Materials used by the geography faculty are primarily U.S. topographic maps and, secondly, thematic and state atlases.

Faculty members' use of maps fluctuates greatly with the projects they are engaged in. Some projects have spanned years, even a decade, during which the map facilities are used intensely, especially when the objective of research is atlas and map production. Among faculty members' contributions to the growth of cartographic knowledge are the following publications: Joseph E. Schwartzenburg's *A Historical Atlas of South Asia* (University of Chicago Press, 1978); Ki-Suk Lee's *A Comparative Atlas of America's Great Cities: Twenty Metropolitan Regions* (Association of American Geographers, 1976); and John R. Borchert and Donald P. Yaeger's *An Atlas of Minnesota Resources and Settlement* (St. Paul, 1969). At times, the faculty coordinates a project for other agencies, e.g., one done jointly with the National Aeronautics and Space Administration and the Minnesota Department of Natural Resources, in which remote-sensing technology was applied to surface water hydrologic problems in Minnesota. The research results were used to map seasonal changes in open water.

Much of the typical map use by other faculty relates to specific countries or continents. A frequent request is for a large map or a wall map which is current, which has effective coloring for physical features, and, occasionally, which will include areas adjacent to the primary country. There seems to be a need for maps showing topical regions that extend across political boundaries. These maps are frequently needed for presentations in classrooms and conferences, for special television lectures, and for other occasions. Other types of faculty requests are for maps which can be used as bases of information and which can be added to from the faculty member's own research.

Frequent use, especially browsing, diminished when the map library was moved from its location adjacent to the geography department. At that time it also ceased being a geography library. Even now, twelve years later, faculty members cite the "new location" as a reason for their infrequent visits to the map library. In addition, the majority of the geography faculty have their own map collections, just as they have issues of journals and books on topics of interest to them and in their areas of specialization. The department itself owns teaching sets, wall maps, and whatever is of continual usefulness in classroom instruction.
The "central location" theory as applied to the map library on the campus adversely affects departmental use in terms of unplanned visits and browsing. This also applies to other departments, such as geology, architecture, forestry, and agriculture, all of which are widely dispersed over the Twin Cities campuses. Since they are located considerable distances from the main library (and the map library), potential users from diverse disciplines are not as numerous as they may be on more compact campuses.

Faculty and graduate students alike come for a specific purpose, rather than to browse. Geologists, for example, frequently use the aerial photographs in the map library. Their use of the map collection is not noticeable, since the geology department has its own library which contains a map collection.

The faculty who do not use maps indicate that their interests are such that maps are not essential, but assert that this does not mean they do not like maps! The geography faculty's perception of the map library is that its collections are comprehensive and definitely research-oriented. They affirm its value in the instructional programs, and have also expressed satisfaction with the existing public service to a diverse clientele. An outreach policy is seen as an extension of the teaching mission of the university. The overall consensus is that cartographic materials should be collected, no matter how often the faculty make use of them. It's like money in the bank, as one geographer put it, saying that he feels secure because it is there and he may use it anytime he wants to. He stated he would never teach anywhere without a good map collection. However, a library does not exist by assurances alone. While the potential academic patrons have not yet discovered the map library resources, the nonuniversity people have.

The User from Outside the University Community

A research library usually collects a large amount of material that is not directly required in teaching. The practice of acquisition of extracurricular materials creates a diverse clientele and makes for a more interesting map library. These materials, whatever they may be—foreign topographic maps, supplementary materials, foreign gazetteers, area studies specialization—attract a small percentage of nonstudent, nonuniversity users. Their needs vary greatly, and their levels of map literacy and prior knowledge range from ignorance to expertise. These factors determine the amount of assistance and knowledge required from the library staff. The nonuniversity user group is highly hetero-
Users

geneous and, indeed, the most challenging. Nonuniversity users constituted 14 percent of the users surveyed. One percent of users were from businesses, 1 percent were from governmental agencies, and 7 percent were public. These three groups were chosen for special scrutiny because they had been previously identified as users of telephone reference service.

A unique resource in the state of Minnesota, the map library collections and services are used freely by the community. The nonuniversity community is served by both telephone and in-library service. Measurement of telephone reference service over several years has indicated a high use of the map library from outside the university community—an indication in disagreement with the findings of the in-library survey. The 1978-79 telephone reference survey showed that 67 percent of service was conducted for the nonuniversity community. Of these calls, 45 percent were from the general public; 15 percent from businesses and government agencies; 7 percent were others (see table 3). In other words, the off-campus user telephones first to find out if the library has what is needed. An estimated 50 percent of telephone inquiries can be answered satisfactorily by telephone. These queries concern locations and distances of places—in fact, any statistical type of information. In contrast, a significant number of requests are impossible to handle over the telephone, and the patron must come in to follow up an inquiry. Into this category fall the questions that require looking at a map (either for information or for the actual visual experience), lengthy research questions, matters relating to the selection of the right kind of map, interpretation of a map legend, and numerous other inquiries.

A closer look at public, business and government use is provided by the following examples. At this time, the most easily identifiable map library use by the general public pertains to genealogy research. Genealogists use maps to gain a mental picture of the area from which their ancestors came. Genealogy research—in the form of telephone inquiries or personal visits—is reflected in the amount of use of the foreign gazetteers and the topographic maps of foreign countries. These tools are used for the purposes of determining the latitude and longitude of a place (if it is listed), and then pinpointing it on the topographic map. This procedure may lead to a number of surprises, such as the initial verification of the ancestral country when it was not known before, or changes in what was formerly assumed. Among the surprises adding to the difficulty of genealogy work could be several occurrences of a place name within a country, in which case the user must find more information from his original sources.
TABLE 3
SURVEY OF MAP LIBRARY USE BASED ON TELEPHONE REFERENCE SERVICE
UNIVERSITY OF MINNESOTA, 1978-79

<table>
<thead>
<tr>
<th>Users</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>26</td>
</tr>
<tr>
<td>Students</td>
<td>11</td>
</tr>
<tr>
<td>Staff and faculty</td>
<td>10</td>
</tr>
<tr>
<td>Campus libraries</td>
<td>5</td>
</tr>
<tr>
<td>Nonuniversity</td>
<td>67</td>
</tr>
<tr>
<td>General public</td>
<td>45</td>
</tr>
<tr>
<td>Businesses and agencies</td>
<td>15</td>
</tr>
<tr>
<td>Libraries</td>
<td>7</td>
</tr>
<tr>
<td>Unidentified</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Requested</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maps</td>
<td>38</td>
</tr>
<tr>
<td>Atlases and books</td>
<td>13</td>
</tr>
<tr>
<td>Aerial photographs</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Location, distance</td>
<td>21</td>
</tr>
<tr>
<td>Ordering</td>
<td>8</td>
</tr>
<tr>
<td>Genealogy</td>
<td>4</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maps, atlases, dictionaries</td>
<td>26</td>
</tr>
<tr>
<td>Card catalog</td>
<td>19</td>
</tr>
<tr>
<td>Gazetteers</td>
<td>16</td>
</tr>
<tr>
<td>Map library catalogs</td>
<td>16</td>
</tr>
<tr>
<td>Staff knowledge</td>
<td>16</td>
</tr>
<tr>
<td>Referrals</td>
<td>7</td>
</tr>
</tbody>
</table>

The requests for map information in genealogy research are mainly for place. Consequently, the assistance offered to the users in this group emphasizes the materials available for a particular area. Reference assistance and user education are intertwined in an effort to inform the user and to create user self-reliance as much as possible. The user is taken step by step from the use of gazetteers to the location of maps, utilization of map indexes, retrieval of maps, and, finally, to the location of photocopiers. (All genealogy map use seems to end in photocopying!)

Among the special services to the genealogists are the individual instruction, group instruction (often through the local genealogical society), and telephone service of locating places (if easily found). This group's needs have definitely been determining factors in the organiza-
tion of materials within the library, and the ethnic backgrounds of the state's citizens have influenced collection development in a certain direction. Annual attempts have been made to back-order topographic map sheets for incomplete series of European countries that are in demand, such as Norway, Sweden, Finland, Germany, and Poland.

Businesses that use the map library repeatedly are aerial survey, consulting, and business development firms. These types of business rely on cartographic materials to provide some answers in their research or business undertakings. Others—local businesses, architectural firms, law firms, or realtors—occasionally check the spelling of a foreign place name or the location of a place in relation to another place, request the latitude and longitude of a place, ask for a recommendation of a map dealer, etc. These questions can be easily answered from gazetteers, map dealers' catalogs, and maps and atlases. Work with the frequent and regular users is interesting, because it is easy to become involved with their research needs. It is a pleasure to put one's knowledge—and most of all, the library's resources—to work and to have a chance to suggest materials for use, make referrals to outside sources, and thus help someone else do a good job. For example, a consulting firm which does urban planning, environmental studies and impact statements, waste disposal studies, and flood insurance research was contracted by the U.S. Army Corps of Engineers to do a study of the locks on the Mississippi River. However, this firm had not been informed of the river navigation maps prepared and published by the contracting agency!

Study of land use—past, present and future—is very popular, and is entirely interdisciplinary and interdepartmental in government agencies. This is true of research on the state's natural resources, as well. Cartographic materials play a very important and useful role in these studies. In order to manage land resources effectively, vast amounts of information on land resources must be collected. Throughout the 1960s various studies on lake shore development, state land holdings, and land use were begun. Later, the Minnesota Land Management Information System (MLMIS) was developed under the auspices of the State Planning Agency and the University of Minnesota Center for Urban and Regional Affairs. The purpose of the MLMIS was to provide extensive information to officials, planners and researchers in decision-making and policy formulation concerning the state's land and water.27 The Minnesota Department of Natural Resources is an agency closely connected to these studies.

The needs of various agencies—federal, state and local—are met in varying degrees by the topographic maps and aerial photographs of
Minnesota, the latter promoted through a catalog of map library holdings jointly produced by the map library and the State Planning Agency. In a variety of local agencies, maps are important in public policy-making. Map librarians are well aware of the scarcity of thematic maps and atlases that cover individual states. Fortunately, in the last decade there have been great cartographic accomplishments on the state level.

Government agencies are important to the map library as users of its facilities and services, as well as producers of maps. Similar relationships exist with a variety of city and county planning departments, regional commissions, and nature conservancies which use materials about the state or any part of it. The interaction between the library and the agencies is further enhanced because the agencies are located in the Twin Cities metropolitan area in close proximity to the campus.

Conclusion

The available evidence about map users in the academic library makes it possible to generalize by broadly classifying them as student, faculty and nonuniversity users. However, comparative utilization of surveys that go beyond these broad groups seem to have their limitations in interpretation. User profiles are dependent on a number of variables, and will be different in different libraries. An incompatibility of survey results is evident from the comparative study of map library use based on the University of Minnesota survey and estimates from eight other academic map libraries.

A summary of findings about the map user in an academic setting may be discussed within the framework of Burns's four basic components introduced earlier. These components help to define the user and the needs, solutions, and items of information that meet those needs:

1. There is diversity among the clientele, but the main person in need of information is the student, specifically, one enrolled in an introductory geography course. Other users are faculty, principally from the geography department. A third group of users comes from outside the university community and is identified as businesses, government agencies and the general public.

2. The problems relating to user needs stem mainly from the teaching mission of the university. The needs are related to learning experience and, specifically, to completion of assignments. Other needs pertain to research, instruction preparation, formulation of public policy, location of places, and map appreciation.
3. The user meets his or her needs in a number of ways: (1) by telephoning the map library for information, or (2) by personal visits to the library, where further steps lead the user closer to the desired information. These steps may be direct (the card catalog, special catalogs and indexes, or reserve sections), or they may require the librarian to act as catalyst in the search process. Collection development, organization of materials, user education, preparation of special access tools—all are part of services that help the user better meet his or her needs.

4. The cartographic materials and items of information that satisfy the needs are mainly topographic maps of the United States and materials of local and regional interest. Foreign topographic maps of selected countries are of interest to a small percentage of users, as are aerial photographs. The importance of these materials to the users, however, cannot be minimized.

Map reference service to the user at the University of Minnesota is difficult to measure in comparison to loan activities. Moreover, users' evaluation of the quality of library service is lacking. The survey, however, revealed satisfaction with the collection of materials: 75 percent were able to obtain materials or information they needed; 7 percent indicated that the materials were not collected or not found by the user; 18 percent did not respond.

That the map library was able to satisfy the needs of 75 percent of users speaks positively for the collection development policy—even though a librarian knows well that a small percentage of holdings account for a major share of the use. Nevertheless, feedback from the diverse users from the academic and nonacademic communities does not suggest any major problems in the present operation of the map library. Regardless of where or how information is obtained, it must be remembered that the library staff is an important resource in itself, and serves as a catalyst in the transfer of cartographic information.

References

13. See Guelke, Leonard, ed. The Nature of Cartographic Communication (Cartographica Monograph No. 19). Toronto, B.V. Gutsell, 1977. (The whole issue is devoted to discussions of models of communication, including numerous schemes.)
19. Ibid., p. 95.
24. Winearls, op. cit., p. 15.
Users

This Page Intentionally Left Blank
The Administration of a Large Map Collection

BETTY H. KIDD

An administrative framework is essential in a large map collection to ensure the effective and efficient operation of the collection's ongoing programs and activities. The administrators must also be continuously planning, developing and reviewing programs and policies to ensure the acquisition of, the control of, and the access to those cartographic records for which the collection is responsible, according to legislation and/or established acquisition policy.

Many of the same problems are faced in the administration of a map collection of any size. In a large collection, however, the problems are maximized by interpersonal relationships and the distance of the collection's administrators from day-to-day activities. This necessitates an organizational structure which identifies not only the place of the map collection within the controlling or parent body, but also the role of individual staff members within the collection. Within this structure, work units should be small, preferably of a size such that the unit's head can be an active participant in the daily work load.

The relationship of the large collection to its controlling body—library, archives, university department of geography, etc.—and that body's connection to the higher level of bureaucracy—government, university, etc.—will determine the extent of the collection's autonomy and type of administrative responsibilities. The parent body of the map collection which I direct is the Public Archives of Canada, an institution

Betty H. Kidd is Director, National Map Collection, Public Archives of Canada, Ottawa.
which has always allowed a generous amount of autonomy to its component media divisions. This, incidentally, ensures a heavy administrative work load to be carried by divisional management. The Public Archives is one of many departments within the Canadian federal public service; thus, there are decisions made at the political level—the Public Archives reports to the Secretary of State*—and in the central agencies of the federal service—Treasury Board, Public Service Commission, Department of Public Works—which influence and, in many cases, dictate the administrative activities within the department and its component divisions.

The large map collection is only one constituent part, and often a small one, of the organization. Thus, it must foster and maintain good working relationships with its sister divisions, as well as open communication to the higher levels of management. Planning which will increase or decrease the work load of other areas must involve consultation with the administrators of these areas at an early stage. It is unfair to others to expect immediate reaction to unexpected demands and spur-of-the-moment decisions. For example, a decision to microfilm 20,000 maps within six months may seem practical to the map collection, but may be impossible for the service division responsible for processing the negatives. Similarly, the map collection should expect the same courtesy from other areas. A unilateral decision to change the method of financial control at the divisional level, which will greatly increase the work load within the collection, will result certainly in resentment and possibly in a situation in which the new system cannot be implemented.

The person heading a large map collection probably falls into the category of middle (or less often, senior) management in the controlling body. As such, he represents not only the map collection, but also the larger institution, and thus needs to be thoroughly knowledgeable of the institution as a whole and its legislation, policies and practices. He is responsible for interpreting these and for ensuring adherence to them within the map collection. In publicly expressing opinions or in making statements for public consumption, he must act as the representative of the larger body.

No map collection can work in isolation, either within the organization of which it is a component or within the field of map curatorship. Every map collection, large or small, must make an effort to keep up to date with developments in its professional and related fields. For this

*At the time this article was prepared, the Public Archives reported to the Secretary of State; however, a recent political decision has resulted in a change, and the Public Archives now reports to the Minister of Communications.
Administration

reason, collections should have membership and active participation in various associations. Because of size and relative importance, the large map collection will naturally be expected to assume a leadership role in the field of map curatorship. This is a responsibility which the collection's administrators should recognize and include in planning and budgeting exercises.

A characteristic seemingly shared by almost all map collections, no matter what their location or size, is a chronic shortage of necessities—money, staff and space. The key to effective administration often seems to be the optimal and most imaginative use of existing resources, and success in begging, borrowing or stealing additional resources. There is a continuing need to recognize potential problem areas, to generate alternative solutions, and to make fast but informed decisions to ensure that day-to-day activities do not get bogged down. In addition, it is essential to have long-term, as well as short-term, objectives and to be actively planning for five years and a decade into the future. In such planning, the administrators of the large map collection must constantly consider all four interrelated resources for which they are responsible: holdings, finances, staff, and space.

The holdings of a large map collection will range from several hundred thousand to millions of items. As might be expected, the administrative load multiplies rapidly with the size of the collection. There are many factors influencing the extent of a collection's holdings, the principal ones being the controlling body's legislation and the collection's history. Every map collection needs to have a clear-cut but flexible acquisition policy and, if it is not a historical or archival collection, a policy on the weeding of superseded materials. Recognition of the primary purpose for existence of the map collection is essential; although this may seem so obvious as to be superfluous, it is always amazing to learn that some map curators try to introduce measures for their collections that are contrary to the collection's raison d'être. To a large extent, the type of collection will determine methods of controlling the holdings. The need for controlled environmental and lighting conditions, the type of compactness of storage facilities, the level of cartobibliographical description, the requirement for related and reference materials, the type of conservation practices and facilities, and the extent of reference facilities should be influenced by the collection's purpose. For example, a collection within a map-producing agency should be encouraging the active use of its holdings, both within and outside the collection; that maps are worn out by extensive use should be recognized as a measure of the effectiveness of this type of collection, whereas to an archival collection this would be disastrous.

Winter 1981
No map collection (of which I am aware) has an unlimited budget. The financial resources of most map collections are usually less than required for operational purposes, and in some cases, are partially controlled by other administrative levels. The larger map collection is more likely to control most financial expenditures, including salaries, capital expenditures and map acquisition, and to be actively involved in the preparation of budget forecasts and submissions. The one major expenditure, usually hidden in all estimates, is the rental and upkeep cost: for the space assigned to the map collection by the parent body. In a large map collection, where a number of personnel must be employed to acquire and care for the holdings, the largest percentage of available financial resources will be for staff salaries and benefits; 70-75 percent of the total budget will be allocated for this purpose. In the map collections where salary increases are at least partially settled by union-management contracts, the administrators may obtain some relief by automatic adjustments to their salary budgets. Operating expenditures—including stationery, telephone service, travel costs, temporary help, hospitality, map folders, etc.—will be the second most costly area—approximately 15 percent of financial resource allocation. Associated with this are capital costs for map cabinets, microfilm equipment, etc., which tend to average 3-5 percent of allocated funds. Money for acquisition purposes—10 percent, on the average—should be protected, and unexpected expenses met from operating funds.

In a large map collection, the budget forecasting exercise should commence at the lowest administrative level, and expenses being planned for the period should be estimated by the head of the work unit. These estimates should be based on past expenditures, and known expenses—for example, a planned publication or travel costs for a conference at which a staff member has been asked to participate—should be identified. Whether or not the administrators responsible for submitting the budget forecast will be able to utilize all of this information is dependent on instructions provided by higher levels of administration. If instructions are to reduce the budget by 5 percent or to allow only a 2 percent increase, and the identified expenses plus the expenses known to the administrators do not fall within these limits, adjustments must be made. Changes to the collection’s forecast may take place at various levels of administration within the parent body. Most such exercises, in these times of economic restraint, allow only for continuation of existing programs. Fortunate is the collection which can prepare, with hope of serious consideration, a budget forecast for new or greatly expanded programs.
Administration

The budgeting cycle in almost all institutions is long-term. The forecast will take place many months before the collection actually learns what financial resources will be available for the coming fiscal year. With knowledge of actual resources, the map collection takes the second step in the budget cycle and identifies actual expenses and allocation of available funds. The administrators, at this point, may be requested to provide a monthly breakdown of expenses, which allows the planning of manpower resources in the service areas. Whether the large map collection requires a simple or complex written record of financial commitments and expenditures will depend on the type of record quickly available from the service areas.

Managing the human resources of a large map collection, and planning for those needed, is the most complex aspect of collection administration. Unlike other resources at the disposal of administrators, employees have minds and wills of their own. Each staff member needs to have a clear concept of the duties for which he or she is responsible. In a large collection, these duties should be written and subject to annual review, preferably at the same time that the employee's performance is evaluated. The responsible employee should not be subject to the close, interfering type of supervision which hampers initiative but instead should be allowed considerable freedom. However, to ensure effective performance, the administrators must be sure that he or she is fully aware of all policies and procedures, and any changes in these. To keep staff up to date, regular staff meetings should be held where staff are encouraged to participate and ideas expressed will be considered in future decision-making. Other ideas which can be effectively used are staff meetings within the smaller work units, circulation of the minutes or decisions of the regular management meetings, and an “open-door” policy to those administratively responsible for the collection.

Simply to hire and train persons to perform specific duties within the collection is insufficient. Potential for personal growth and professional development must be encouraged in each staff member if the collection is to develop and retain the expertise it requires. Although it must be recognized that potential lies within a person, the collection is responsible for providing opportunity by budgeting for and encouraging attendance at conferences, workshops and courses. If it is possible, a collection should allow personnel a reasonable amount of time for outside committee work, writing articles, etc., if these are related to the collection's purposes and functions. This will not only help individual staff members to develop in their selected field, but will also contribute to the collection's reputation for leadership and excellence.
In large collections, the importance of delegation to subordinates cannot be underestimated. Success of delegation is, of course, dependent on the amount of trust established between the individuals involved. Without a doubt, the management staff members of a large collection do not have sufficient time or the specialized expertise to implement and to carry out everything themselves. In a large collection, it is essential to have a reasonable ratio of nonprofessional or support staff to professional map curators. Professional positions, excluding management, probably should not amount to more than one-third of the total staff allotment. If the number of support staff is insufficient, it will be necessary for the professional map curators to perform tasks best completed by support staff. This can create an unhealthy situation in which there is active resentment, both among the professional staff and among the support staff who consider themselves underpaid for performing the same duties as professionals. Related to such factors is the necessity for administrators to be knowledgeable of the various benefits, guaranteed in collective agreements with staff associations and unions, in order to prevent union-management confrontations where possible.

It appears to be an unwritten rule that work increases at a more rapid rate than additional staff are authorized. To compensate, the administrators of a map collection must imaginatively consider other options of having work completed. These options can range from encouragement of voluntary contributions to contracting work out to temporary help agencies, organizations and individuals. In addition, timesaving procedures should be encouraged and staff compensated for ideas which can save the collection time or other resources. Developments in map curatorship and in related fields which may result in reduction of time required for certain necessary tasks should be monitored. For example, automated cataloging programs (where, with conversion of computer systems, data can be extracted) will obviate the necessity of repeating the description of parts of a collection’s holdings, and will reduce the necessary time for cartobibliographical description.

Since space is equivalent to money, it is not surprising that it, like other resources, is in short supply in most map collections. For the map collection, the largest portion of available space will be allocated for storage of the collection’s holdings. However, large working areas are required for sorting, accessioning, cataloging, reference, etc. The person working with cartographic material needs space because many maps are large. The ordinary office desk is unsuitable for any staff member involved in the processing of the collection’s holdings or acquisitions. In the reference area, a number of large tables are required.
so that several users can consult the map collection at the same time. It is essential that space be economically used, and in many map collections, storage is being continually compacted—cabinets are piled higher, aisles become narrower, experiments with compactus shelving for rolled maps are carried out, etc. Unfortunately, a common method of compacting storage is to file more and more maps in already overcrowded drawers. Alternate methods to using original material in certain collections—for example, the 105mm microfilm program in the National Map Collection—allow materials to be further compacted and/or stored in areas removed from the main part of the collection.

The very nature of a map collection precludes the utilization of ordinary office space. The weight of the maps, combined with the weight of traditional metal cabinets and shelving, means that the stress factor is higher than what ordinary office flooring can handle, which is approximately sixty to eighty pounds per square foot. The older storage cabinets used in the National Map Collection are usually either four or six sections high, with an associated stress of 207 pounds or 310 pounds per square foot. The more modern horizontal storage equipment at waist level still averages over 100 pounds per square foot, and it is difficult to believe that it will be a long time before the height is at least doubled. Moreover, acceptable space is further limited for certain collections in that special environment controls for temperature, humidity and lighting are required. For collections with monetarily and/or strategically valuable holdings, security conditions are a further consideration. Fire and smoke protection methods are required for all collections.

The successful administration of the four interrelated resources described above can best be accomplished in a large map collection within an effective administrative or structural organization. Responsibilities, and staff associated with these, are divided and assigned to various work units. The most common methods of organizing map collections are: (1) by function—that is, acquisition, cataloging, reference; (2) by type of holdings; and (3) by a combination. In deciding upon such a framework, the administrator in charge of the collection must be thoroughly familiar with the collection’s policies and holdings, as well as with management styles and types of organizational structure. Even after consultation with staff, he should recognize that the system introduced will, in the initial stage, be highly unpopular with those who would have preferred another option. When the National Map Collection was reorganized several years ago, three “collection” sections and two “service” or functional sections were established. The collection sections are Early Canadian Cartography, Modern Cartography,
Government Cartographical and Architectural Records. The service sections are Documentation Control and External and Internal Services. The heads or "chiefs" of these sections and the collection's director form the divisional management committee, which is responsible for the management and administration of the National Map Collection. The type of administrative organization varies tremendously from one large collection to another; because a certain structure works well in one institution does not guarantee success in any other. Actually, it is the people who make an organization work: without cooperation among the staff of a large collection, any administrative framework is automatically doomed.

As a map curator advances up the administrative career ladder in a large collection, the fact that he or she has been a good, or even outstanding, map curator tends to become less important. More relevant are the managerial skills and knowledge or interpersonal relationships which the map collection administrator requires and should be developing. On-the-job experience is irreplaceable, but the new administrator should be willing to pursue further studies to provide the basic knowledge required.

Too often, map curators-administrators have accepted the administrative position for career advancement and/or monetary gain. They have not considered that such career changes necessitate the end of an active role in certain professional tasks and that they must be willing to develop themselves in their new role as administrators. Without this recognition, resentment grows and the map curator-administrator continues to spend time on acquisitions, custodial work and public service duties at the expense of administrative priorities. Fighting the system in this way may cost both the individual and the collection a high price in the long term. The collection may simply be sidelined in the ongoing struggle which the administrator should be carrying on to obtain an equitable share of limited resources within the controlling body.

The administrator of a large map collection would nevertheless be at a severe disadvantage not to have had experience as a professional map curator. A career administrator would not be sufficiently knowledgeable of the specialized problems of map collections, nor appreciate the cartographical record from earliest times to the present day. All administrators of large map collections should jealously guard at least a small portion of their time to continue with professional duties; normally, the administrator finds acquisition and public service duties the easiest to continue because of ongoing contacts and budgetary considerations. The administrator should also be sure to keep abreast of develop-
Administration

ments in the map custodial and cartographical fields—by reading, attending conferences, visiting other collections, etc.—and to consider personal growth and development of his or her own potential.

The administrator is the steward of the large collection, responsible for all the resources and possessions entrusted to his or her care. As such, this person is held accountable both for the progressive steps and for the errors made within the collection throughout the period of stewardship. The administrator's contribution to the map collection is often not as visible as that of certain specialists within the collection, but it may be the most significant contribution over a long period of time. Without effective administration, a map collection is stifled and there will be few, if any, contributions to the field of map curatorship from the collection.
Security in Map Collections

CYNTHIA ANN EVERITT

Maps are a cultural reflection on the environment and technology of a particular time. As communicators of information, maps graphically mirror the nature of their topics at a given point in history. On a single topographic map, there are 100-200 million computer bits of information. With increasing awareness of maps as information tools, particularly evident in such fields as environmental data handling and measurement, city planning, population studies, architecture, and anthropology, the present and future goals of map librarianship are becoming clearer. There is "a significant increase...in the number of libraries with separately administrated map collections...[and] in the number and variety of map users." As of 1978 there were 743 major map collections in the United States and Canada.

Related to this awareness of maps and stimulated growth of map collections, administrative decisions concerning staffing, budgeting and priority allotments must be considered. The economics of acquisition, access, retrieval, and control of maps are important areas of concern. As Walker has stated:

The importance of maps in the library has often been underestimated. Contrary to popular belief, their usage is not restricted to geographers and historians. In this complex and interesting world, almost every field of human enterprise and activity has problems which are best solved by information presented on maps. And, like other library holdings, they are being consulted more and more by library users today. Librarians, too, have finally realized the importance of maps

Cynthia Ann Everitt is a free-lance librarian in Salt Lake City, and former Map Librarian, University of Texas at El Paso.

Winter 1981
and are relying on them more heavily in their search for additional sources of information. They are discovering that maps are as necessary for reference purposes as the books: They clarify and supplement the written word, graphically illustrate the trend of current events, and by employing combinations of diverse symbols, also visualize many other important topics such as ethnic relationships; physical, social, and economic conditions; and historical, artistic, and literary development.

Historically, maps have been rejected or jealously guarded. One example of map rejection stemmed from the influential Roman Catholic church of the Middle Ages. It was believed sinful to seek answers to questions about the universe and lands beyond the horizon. Since maps were often an excellent means of answering many exploratory questions, they were shunned by all but a few, who doubted the Church’s teachings. The military became associated with maps at a later date. These organizations felt it unwise to plot strategic military locations, targets or routes on maps, lest they fall into enemy hands. Thus, the leaders were afraid to make maps and even more wary of collecting and preserving them. Early sea charts to newly discovered areas were jealously guarded and often deliberately altered to lead others astray. Well into the nineteenth century, it was considered high treason to reveal information from official maps.

Maps have also been a neglected part of the general library collection. Traditionally, maps have been regarded and handled as minor publications, being dealt with after all other materials have been considered. Dorothy Cornwell Lewis stated, “From the several viewpoints of medium, reproduction process, and subject matter, the colored map printed on paper is only one of many formats extant.” Maps differ greatly from books, largely in physical makeup. This alone is probably one of the greatest reasons maps are “the poor stepchildren of libraries.” They do not lend themselves to display on open shelves; and the types of paper used for maps, their size, and their overall format add to preservation and security problems. Robert C. White wrote, “When standardized schemes for classifying books were adopted, little consideration was given to maps because map collections were small and presented no major problem, [but]...the physical form of a map and the nature of its information create special problems.” Maps have been considered a unique problem in libraries for so long that agreement over book or nonbook treatment of them has taken precedence over such matters as security measures for them.
Security

Literature on General Library Security Systems

A search of the literature revealed little information on the subject of map library security and the problems involved. No sources mentioned map security specifically. Archival literature has briefly noted concern over loss of rare maps, but possibly this concern related to atlases (the bound volume again). A myriad of materials exists discussing general library security for books and bound periodicals, but there was scant mention of nonbook security. The literature on general library security falls into four major categories: the rise in library losses, libraries' experiences with theft, commercial security systems available, and appraisal of systems currently installed.

Library thefts are acknowledged to be on the upswing. For example, Alice Bahr wrote:

In the United States, where the nation's libraries contain an estimated 1.5 billion volumes, a loss of even 1% annually amounts to some 15 million books. Again, using an average cost of $15 to replace a missing book, the total annual replacement cost would be $225 million. This is more than 10% of what libraries spend annually. The 15 million volumes are almost 16% of the 95 million volumes added annually by the nation's libraries.

And many of the items stolen from libraries are worth far more than $15. Rare books and manuscripts present an especially inviting target.

Whether spurred on by love or greed, book theft has become a serious, costly problem and one that is not easily solved.

To the author's knowledge, no published numerical reports or financial estimates of map loss have appeared.

Individual libraries have reported their experiences with theft in the literature. Also to be found are library evaluations of commercial systems, and reports on final selection of a system, usually with an update and further justification for purchasing the system chosen.

Reviews of commercial systems currently on the market make up the third and largest area of literature. The number of different security systems being sold to libraries has actually diminished in the last four years. However, the total number of installations in libraries has increased. Presently, six companies are actively selling theft-detection systems to libraries: Checkpoint Systems, Inc.; Gaylord Brothers; General Nucleonics, Inc.; Knogo Corporation; Library Bureau; and 3M.

The final category is overall surveys or appraisals of the extent to which these security systems deter theft of library materials. Evaluation of theft-control programs is still in a state of flux. It was hoped, by
reviewing these systems, that exploitation of a present security method or technique could be developed by map librarians. However, the author discovered no such possibilities. In general, libraries that have invested in security systems have been satisfied with the results. Many found that the system paid for itself within a couple of years as a result of loss reduction. Appraisals of the effectiveness of commercial security systems have been mixed. Bahr says:

Current users are aware—and future users should be alerted to the fact—that none of the commercially available systems is foolproof. With every system, patrons can locate and remove the sensitized tag from a book, thus preventing an alarm from being triggered. Patrons can also foil most systems by carrying out a magnet near the book, thus interfering with the proper reception of a signal by the sensing screens. Some librarians undoubtedly feel that even with these shortcomings, the electronic systems create a psychological deterrent to theft and show patrons the library is intent on reducing losses....Additionally, electronic surveillance equipment is not a feasible means of protection for special collections such as rare books, manuscripts, maps and some archives.\(^{15}\)

The most surprising omission on the topic of security occurred in the field of map librarianship itself. There is no mention of security by Drazniowsky, Larsgaard, Nichols, or Post, considered authorities in map librarianship.\(^ {16}\) When pressed for the reason for this omission, Mary Larsgaard stated her opinion to be that no one knows how widespread the problem of map security is, all the factors involved, or how to cope with it on a librarywide, much less universal, basis.\(^ {17}\)

**Purpose of the Study**

For this survey, the word *map* is defined as: "a graphic representation, usually on a plane surface and at an established scale, of natural and artificial features on the surface of a part or the whole of the earth or other planetary body.\(^ {18}\) The term *security* refers to measures taken to guard against theft or mutilation.

This survey of map library security and its unique problems evolved from personal observation, experience and concern. This topic has been raised by several map librarians in personal interchange as well as at meetings. Unique security characteristics, dilemmas and procedures facing map librarians throughout the United States and Canada were revealed through the survey.

The increase of all types of library losses is more apparent today than ever before. The rise of map usage and the attitude of the map
librarian to patron access and satisfaction is vital in light of budget cuts and high replacement costs. Since maps physically differ from books in size, durability and format, protection of these valuable nonbook reference tools is not the same as that for regular library materials. However, library security systems have traditionally been based on the bound volume. Because of maps' physical differences and the number of maps in university collections, the design of present security systems does not serve flat maps well. Thus, there arise particular problems of map security not found in the regular library setting. This study attempted to pinpoint these problems and discover how map librarians deal with them. Of basic concern were specialized procedures devised to give flat maps adequate protection within the environment of the university map collection.

Three basic assumptions by the author led to this investigation: (1) although a majority of university libraries have commercial general security systems, these systems do not protect flat maps adequately; (2) methods to curtail map loss in various university libraries have been attempted; and (3) map library security is neglected under current procedures, circulation policies, and functions of the university map library housing more than 50,000 maps.

The study investigated: (1) commercially designed security systems developed for books, and the extent of successful modification of these systems to protect flat maps; (2) map collections in open or closed stack areas; (3) the effect of a written circulation policy on map loss; (4) limitations of staffing and hours of service for the protection of maps; and (5) location of map collections in relation to campus and/or library security points. Flat sheet maps, in single, series, multiple, or set format, were the only type of map considered in this survey. The primary purpose of this study was to determine the attitudes, opinions and perceptions of map librarians regarding unique security problems; the study did not include other library materials.

For this study, the author identified approximately 230 collections that house over 50,000 maps. These were selected from a larger list of 743 map collections listed in the third edition of Map Collections in the United States and Canada. A further reduction to sixty-three university map libraries was then made, and a copy of the questionnaire sent to each (see Appendix A). A cover letter was sent with the questionnaire to each librarian. A list of the libraries surveyed appears in Appendix B.

This investigation was not a random sample; rather, the author attempted to poll opinions, experiences and reactions to sheet map loss in the university library situation from map librarians thought most
likely to be knowledgeable in this area. Questions also covered: length and type of training of the map librarian; how map loss is deterred in individual collections; staffing; service hours; physical floor plan of the collection; whether a commercial general library security system is in operation; and librarians’ personal perceptions concerning flat map loss. Many questions were open-ended and required detailed responses about the present situation of map security in each library.

Collected information was coded and compared with the other questionnaires in the survey. Frequencies of certain answers, librarians’ opinions, and emerging patterns were used to interpret the data.

Analysis of the Data

There were thirty-seven responses to the sixty-three questionnaires mailed—59 percent of the total. Twenty-six out of these (or 70 percent) replied that their library had a general security system installed. Of those twenty-six, eight librarians reported they had modified the general system to protect maps. The only method of security attempted was placement of magnetic strips somewhere on the flat map, sometimes disguised. One librarian reported that his institution was experimenting with a new, spray-on coating that will trigger an alarm, but results will not be available for another year.

Opinions concerning the degree of map loss ranged from “negligible” to “a severe problem,” with 68 percent feeling that map loss in their particular collection was “not a great problem.” Table 1 groups the responses according to degree of loss. A number of librarians mentioned that local topographic and geologic maps were their greatest loss by theft. Twenty-nine reported that U.S. or Canadian topographic quadrangle maps from official national series were lost more than other types of maps. Following closely was loss of general geologic and road maps.

In regard to circulation and map loss, nineteen respondents (51 percent) reported they have and enforce a written circulation policy at this time, but seven of those claiming to have a written policy failed to enclose them for review. Four other libraries reported their map circulation policy was part of “general library regulations.” The most noticeable similarities among the twelve available policies were: fines ranging from twenty-five cents a day to five dollars a week or more for overdue maps; a replacement fee required in case of map loss or poor condition upon return to the map room; local topographic maps not being loaned; and use of photocopying services offered in lieu of outside circulation. Thirty-three libraries allow maps to circulate outside the
Security

library; however, this includes "selected" or "restricted" conditions regarding what type of map leaves the room, who the borrower is, and length of loan period.

TABLE 1
SERIOUSNESS OF MAP LOSS

<table>
<thead>
<tr>
<th>Extent of Problem</th>
<th>Descriptive Terms Used</th>
<th>Percentage Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insignificant</td>
<td>negligible</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>not significant</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>not a problem</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>not serious</td>
<td></td>
</tr>
<tr>
<td></td>
<td>very few lost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>almost nil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>low but increasing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>very little theft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>low rate of loss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>minimal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>not very</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>less than before</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>moderately serious</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 sheets per year</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>a severe problem</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>relatively high</td>
<td></td>
</tr>
<tr>
<td></td>
<td>great loss of very</td>
<td></td>
</tr>
<tr>
<td></td>
<td>serious nature</td>
<td></td>
</tr>
</tbody>
</table>

The question concerning just how and to what extent the circulation policy affects map loss brought a flood of mixed responses. Two schools of thought on this topic are: (1) if maps are allowed to circulate, temptation to steal them is lowered; and (2) a noncirculating policy does much to control and protect the collection. Opinions of fifteen librarians on the subject are given in Appendix C.

On the subject of floor plan and map loss, 54 percent felt the floor plan affects map loss; and 27 percent felt it had a negative effect, citing open stacks and browsing through map cases as an invitation to map loss. On the positive side, 27 percent of the librarians felt that controlled access to both the map room and storage cases was a great deterrent to map theft. Seventeen (46 percent) saw no effect of their floor plan on map loss whatsoever. Seventy-two percent felt that staffing and hours the map area was open to the public influenced not only degree of loss, but also public relations and patron attitudes toward the map room,
service and attempts to provide materials requested.

On the question of alternative protection activities other than a general library security system, fifteen (40 percent) of the librarians polled attempted to protect map collections in other ways. They reported locking up high-risk maps and offering photocopying services for geological, recreational, travel, and topographic maps of local interest. Nineteen librarians (51 percent) indicated that no steps were taken to deter theft, but gave no explanation. Cataloging the collection to obtain some control, providing more photocopying machines, and adding more staff to improve control of traffic and access to the collection were some of the suggestions mentioned for security improvements.

In regard to the librarian's length of employment in the map library, 29 percent surveyed had worked six to ten years at their particular institutions, with over-ten-year veterans following with 24 percent. The next largest group were those who had been at the same location less than one year; they made up 18 percent of those surveyed. Eleven percent represented the three- to five-year employment group. Table 2 compares librarians' judgment of loss seriousness with years of service. The lack of correlation between job experience and judgment of the seriousness of map loss indicated that these two factors are independent variables. Table 3 illustrates the overall responses to the various questions.

**TABLE 2**

**LIBRARIAN'S JUDGMENT OF LOSS SERIOUSNESS IN RELATION TO YEARS EmployED**

<table>
<thead>
<tr>
<th>Years Employed</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>Insignificant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>—</td>
</tr>
<tr>
<td>1- 2</td>
<td></td>
<td>1</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>3- 5</td>
<td>1</td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6-10</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>—</td>
</tr>
<tr>
<td>over 10</td>
<td></td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

**Conclusions and Recommendations**

Although a majority of the libraries reporting have commercial security systems, little attention has been given to modify or exploit that system to serve maps more adequately. Methods such as photocopying
TABLE 3

RESPONSES TO QUESTIONNAIRE

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency of response (% total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library has a commercial security system</td>
<td>70</td>
</tr>
<tr>
<td>Seriousness of map loss &quot;not a great problem&quot;</td>
<td>19</td>
</tr>
<tr>
<td>There is loss of topographic quadrangle maps of a local area</td>
<td>39</td>
</tr>
<tr>
<td>A written circulation policy is used</td>
<td>51</td>
</tr>
<tr>
<td>Floor plan affects loss:</td>
<td></td>
</tr>
<tr>
<td>negatively</td>
<td>27</td>
</tr>
<tr>
<td>positively</td>
<td>27</td>
</tr>
<tr>
<td>no effect</td>
<td>17</td>
</tr>
<tr>
<td>Staffing and hours of service affect loss</td>
<td>72</td>
</tr>
<tr>
<td>Other ways used to protect maps aside from general library security system</td>
<td>40</td>
</tr>
<tr>
<td>Number of years employed at present institution:</td>
<td></td>
</tr>
<tr>
<td>more than 10</td>
<td>24</td>
</tr>
<tr>
<td>6-10</td>
<td>29</td>
</tr>
<tr>
<td>3-5</td>
<td>11</td>
</tr>
<tr>
<td>less than 1</td>
<td>18</td>
</tr>
</tbody>
</table>

Number of questionnaires mailed: 63
Number of questionnaires returned: 37
Overall response rate: 59

services, tighter control and liberal circulation policies are frequently used in an attempt to curtail theft of flat maps. Map library security may not be greatly neglected under current library procedures and functions; however, this study indicated that more attention and interchange between libraries is needed to explore and expose the topic completely. Unless a periodic, accurate inventory is taken of a collection, control and knowledge of map loss is impossible. Control must be established, and map loss estimates made on sound, factual judgment rather than intuition. Estimates based on guesswork, work experience and/or intuition have been proved to be 7-10 percent below actual figures. Map librarians need far better control and more accurate statistics of map loss before the problem can be solved. Before the ramifications of map loss on budget, administration and public relations can be dealt with, the extent of overall collection loss must be realized. Related to this is the area of location of uncataloged maps and maps in storage areas. These materials often disappear without a trace, much less a record of their existence. For some reason, the cataloging time gap for maps is much
longer than for books and uncataloged materials have usually not yet been inventoried.

Related to estimation of loss and its curtailment is the dilemma of protection of library materials versus patrons' needs. At the heart of the matter are the two opposing philosophies of open versus closed access to maps. Overall, the data analyzed in the survey reflected a concern by map librarians that locking maps up did not attract or satisfy patrons. Service to the university community seemed to be the paramount issue. If a few maps were lost in the process of browsing or outside circulation, they were apparently expendable, and some map loss was considered a "necessary evil." Once again, the map library community is urged to keep track of replacement figures and costs.

There is great potential in the area of map security, an area that has been neglected not only by library administrators and planners, but by map librarians themselves. We need to address such topics as: map security directly related to map loss in various library settings; methods and techniques for flat map inventory; more efficient ways to catalog and describe maps; statistical studies in areas of specific types of map loss; open versus closed access to maps; education of the patron in map preservation and use; investigation into ways to curtail topographic map loss; circulation or noncirculation of maps; and patron satisfaction in obtaining and using maps. Results of the new "spray-on alarm" method should be followed up. Studies, investigations, and exchanges between map librarians are badly needed. Consideration of those topics will greatly assist in narrowing the gap between available information on security and losses and its applications to the map library situation.

References

1. For their help and guidance in this project, acknowledgment is made to Dr. Maurice P. Marchant, Brigham Young University School of Library and Information Sciences; Barbara Cox, Dr. Donald Curry and Dr. Richard Travis, University of Utah; Susan Mortensen, Utah State Historical Society; Dr. Benjamin Laning Everitt; and M.L. Larsgaard.


3. Ibid., p. 819.


Security

7. Ibid., p. 7.
17. Larsgaard to Evrett, Jan. 9, 1979.

Additional References


The purpose of this survey is to investigate map library security and the unique difficulties faced in dealing with security in map libraries. The topic concerns only flat sheet maps, not atlases or bound volumes.

1. Does your university library have a commercialized security system? 
   _____ Yes   _____ No If the answer is yes, have you attempted to use it to protect maps? _____ Yes   _____ No If Yes, please explain what you have done. If not, why not?

2. How serious is map loss in your library? (Use the back if necessary)

3. Are any particular geographic areas or types of maps reported lost more than others? If so, please explain which ones.
   _____ Topographic   _____ Geologic   _____ Thematic   _____ Road
   _____ Rare   _____ Other (Which ones?)

4. Does your library have a written circulation policy for maps? 
   _____ Yes   _____ No If yes, please enclose a copy.

5. Do you circulate maps outside of the map library? _____ Yes   _____ No
   In your estimation, how (if at all) does your circulation policy affect the loss of maps?

6. Do you feel the floor plan of your department affects map loss? 
   _____ Yes   _____ No In what ways?

7. Do you feel map loss is curtailed by staffing patterns and hours of service? 
   _____ Yes   _____ No Please explain.

8. Have special methods or techniques been undertaken to protect your map collection besides those used for protecting the library collection in general? 
   _____ Yes   _____ No If so, please explain.

9. What, in your opinion, would improve your present system of map library security?

10. How long have you been employed as head map librarian at your particular institution? _____ Less than 1 year   _____ 1-2 years   _____ 3-5 years 
    _____ 6-10 years   _____ over 10 years

11. Have you received any specific training in working with maps? _____ Yes   _____ No Please explain what type of training.

12. May I quote you in this study? _____ Yes   _____ No

13. Do you wish the results of this study mailed to you for $1.00? (covers cost of copying and postage) _____ Yes   _____ No
    name: ________________________________
    address: ________________________________

Thank you for your time and consideration.
Appendix B
Libraries Receiving Questionnaire

Arizona State University Library, Tempe
University of Arizona Library, Tucson
Map Collection
University of California—Berkeley
General Library—Map Room
University of California—San Diego
Documents, Maps and Microform Dept.
Business, Economics Reference Dept.
California State University Library, Long Beach
Map Library
University of California—Los Angeles
Map Library
California State University—Northridge
Geography Dept.—Map Library
San Diego State University
McHenry Library, Map Collection
University of California—Santa Cruz
Map Library
University of Colorado—Boulder
Arthur Lakes Library
Colorado School of Mines, Golden
Geology Library
Yale University, New Haven, Conn.
Map Library
University of Florida Library, Gainesville
Map Library
P. Gilbert Memorial Library
Georgia Institute of Technology, Atlanta
Map Collection—University of Hawaii Library, Honolulu
Map Library, Social Science Section
University of Idaho Library, Moscow
Boise State University—Map Section
Boise, Ida.
Morris Library, Science Division Map Library
Southern Illinois University, Carbondale
Library—Map Section
University of Illinois at Chicago Circle
Map Collection
Northwestern University Library
Evanston, Ill.
Geography and Map Library
Western Illinois University, Macomb
Map and Geography Library
University of Illinois Library, Urbana-Champaign
Map Collection
University of Iowa Library, Iowa City
Kenneth R. Spencer Research Library
University of Kansas—Map Library
Lawrence
Audio-Visual and Map Room
Milton S. Eisenhower Library
Johns Hopkins University, Baltimore
Harlan Hatcher Graduate Library—Map Room
University of Michigan, Ann Arbor
O.M. Wilson Library—Map Division
University of Minnesota, Minneapolis
Documents Division—Library
University of Montana, Missoula
Map Library, Geology Library
Princeton University
Princeton, N.J.
Maps Library
University of Nevada—Reno
### Appendix B—Continued

<table>
<thead>
<tr>
<th>Institution</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map Collection—Special Collections Dept.—Zimmerman Library</td>
<td>University of New Mexico, Albuquerque</td>
</tr>
<tr>
<td>Science Library Map Room</td>
<td>State University of New York—Binghamton</td>
</tr>
<tr>
<td>Map Room—Columbia University, New York</td>
<td>Library</td>
</tr>
<tr>
<td>Science Division Map Library</td>
<td>North Dakota State University, Fargo</td>
</tr>
<tr>
<td>Geology Branch Library</td>
<td>University of North Dakota, Grand Forks</td>
</tr>
<tr>
<td>Map Library</td>
<td>University of Oregon—Eugene</td>
</tr>
<tr>
<td>Science Library, Map Room</td>
<td>Joint University Libraries, Nashville</td>
</tr>
<tr>
<td>Geology Library</td>
<td>University of Texas—Austin</td>
</tr>
<tr>
<td>Map Room</td>
<td>Texas A &amp; M University Library, College Station</td>
</tr>
<tr>
<td>Maps Section—Library Annex</td>
<td>University of Texas at El Paso</td>
</tr>
<tr>
<td>Maps Section</td>
<td>Harold B. Lee Library</td>
</tr>
<tr>
<td>Brigham Young University, Provo, Utah</td>
<td>Map Collection—Marriott Library University of Utah, Salt Lake City</td>
</tr>
<tr>
<td>Map Library</td>
<td>Western Washington State College, Bellingham</td>
</tr>
<tr>
<td>Map Center</td>
<td>University of Washington Libraries, Seattle</td>
</tr>
<tr>
<td>Simpson Geography Research Center</td>
<td>University of Wisconsin—Eau Claire</td>
</tr>
<tr>
<td>Map and Air Photo Library</td>
<td>University of Wisconsin—Madison</td>
</tr>
<tr>
<td>Maps Library</td>
<td>University of Calgary</td>
</tr>
<tr>
<td>University Map Collection</td>
<td>Calgary, Alberta</td>
</tr>
<tr>
<td>University of Alberta—Edmonton</td>
<td>Map Collection—Library of Social Sciences Simons Frazer University, Burnaby, B.C. Library—Map Division University of British Columbia, Vancouver</td>
</tr>
<tr>
<td>University Map Collection</td>
<td>McPherson Library</td>
</tr>
<tr>
<td>University of Victoria, B.C.</td>
<td>Map and Atlas Collection—Library University of Manitoba, Winnipeg</td>
</tr>
<tr>
<td>Map Library, McMaster University Hamilton, Ont.</td>
<td>Mackintosh-Corey Hall Library Queen's University, Kingston, Ont.</td>
</tr>
<tr>
<td>Dept. of Geography, Map Library</td>
<td>University of Western Ontario, London</td>
</tr>
<tr>
<td>Geography Dept. Map Library</td>
<td>Carleton University, Ottawa, Ont.</td>
</tr>
<tr>
<td>Map Library—Morisset Library</td>
<td>University of Ottawa, Ont.</td>
</tr>
<tr>
<td>Map Library—J.P. Roberts Library</td>
<td>University of Toronto</td>
</tr>
<tr>
<td>La Bibliothèque, C.P. École Polytechnique</td>
<td>University Map Collection, Dept. of Geography McGill University, Montreal</td>
</tr>
<tr>
<td>Bibliothèque, C.P. École Polytechnique</td>
<td>Bib. Général Cartothèque</td>
</tr>
<tr>
<td>University of Regina, Sask.</td>
<td>Université Laval, Quebec</td>
</tr>
<tr>
<td>Map Library, Division of Social Sciences</td>
<td>University of Toronto</td>
</tr>
</tbody>
</table>

**Winter 1981**
Appendix C
Comments Concerning Circulation

<table>
<thead>
<tr>
<th>Librarian's Comment</th>
<th>Years Employed</th>
<th>Map Loss Judgment</th>
<th>Collection Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>circulation cuts down loss</td>
<td>3-5</td>
<td>very little</td>
<td>93,154 maps</td>
</tr>
<tr>
<td>restricted circulation keeps loss low</td>
<td>less than 1</td>
<td>not a problem</td>
<td>60,000</td>
</tr>
<tr>
<td>no circulation of maps would increase theft</td>
<td>over 10</td>
<td>not very serious</td>
<td>116,596</td>
</tr>
<tr>
<td>making maps available decreases theft and/or loss</td>
<td>6-10</td>
<td>very low rate</td>
<td>71,000</td>
</tr>
<tr>
<td>no outside circulation definitely cuts down our loss</td>
<td>3-5</td>
<td>not serious</td>
<td>163,000</td>
</tr>
<tr>
<td>if maps were noncirculating, even more would be stolen</td>
<td>6-10</td>
<td>severe problem</td>
<td>71,000</td>
</tr>
<tr>
<td>noncirculation saves our maps from loss and abuse</td>
<td>over 10</td>
<td>very low</td>
<td>176,245</td>
</tr>
<tr>
<td>keeps our loss below others, with their noncirculating policies</td>
<td>over 10</td>
<td>not very serious</td>
<td>150,000</td>
</tr>
<tr>
<td>no outside circulation greatly cuts down on loss</td>
<td>1-2</td>
<td>less now than when we did circulate outside the building</td>
<td>110,000</td>
</tr>
<tr>
<td>circulation policy cuts down our loss</td>
<td>6-10</td>
<td>very little</td>
<td>55,000</td>
</tr>
<tr>
<td>only the noncirculating maps disappear</td>
<td>less than 1</td>
<td>relatively high</td>
<td>55,000</td>
</tr>
<tr>
<td>our system of restricted circulation does much to protect the collection</td>
<td>less than 1</td>
<td>not very serious</td>
<td>80,000</td>
</tr>
<tr>
<td>our circulation policy makes theft less necessary</td>
<td>less than 1</td>
<td>not very serious</td>
<td>72,000</td>
</tr>
<tr>
<td>our liberal circulation policy helps to inhibit map loss</td>
<td>less than 1</td>
<td>not very serious</td>
<td>56,000</td>
</tr>
<tr>
<td>if maps can be borrowed legitimately, temptation to steal is reduced</td>
<td>1-2</td>
<td>not serious</td>
<td>152,000</td>
</tr>
</tbody>
</table>
The History of Map Librarianship Education

In the early 1900s, most map libraries were administered by persons with varied academic and professional backgrounds, few of whom had any professional training in library science. As interest in geography grew in the United States and its colleges during and between World War I and World War II, an increasing number of professionally trained geographers with, by definition, undergraduate or graduate degrees in geography, but woefully lacking in library science skills, found employment as map librarians. The only kind of education for map librarians until the 1950s and the 1960s was the kind that is still considered by some to be the best—on-the-job training. Persons became caretakers of maps generally by accident while on their way to somewhere else, and frequently under protest. Maps are traditionally the stepchildren of any library; they and their fellow cartographic materials, with the exception of atlases, are in nonbook format, and are therefore awkward at best and suspect at worst, as far as the rest of the library world is concerned. So the person in any library “stuck with the maps” (and so it was expressed) was either the lowest on the totem pole or had made the fatal mistake of not being at the meeting at which the issue of map caretaking was decided. Fairly often, those persons who originally found themselves in a dark, dusty room (probably below ground level), staring with dismay and perhaps even horror and dislike at a stack of dark, dusty maps, later discovered they had become fond of these bulky, beautiful, supremely
useful objects, in spite of the latters' supposed crotchets and actual caretaking problems. The few who had volunteered to take on the maps, either because no one else would or because they liked maps in the first place, were quickly or already won over to the side of truth, beauty, and the right.

But it was not until after 1950 that some interest was shown in the revolutionary idea of training persons for map librarianship before, not after, they became map librarians. “In 1950 Professor Joseph A. Russell, Chairman of the Geography Department, University of Illinois, recognized the need for a map course to improve the skills of geography students.”2 The resulting course, intended for geographers and librarians, was taught from 1950 to 1958 by Bill M. Woods, and in succeeding years by Robert White and David Cobb. William Easton of Illinois State University, Normal, also taught the course, which for many years remained “the only accredited course in map librarianship available anywhere in the world.”3

Mercifully for the researcher, the written history of map librarianship education begins relatively recently, just after 1950, with Woods’s seminal article in *Special Libraries*, in which he noted that library schools were finally offering courses in special librarianship.4 Woods also made recommendations for the curriculum for map librarianship, which still hold up well thirty years later—introduction to maps and map libraries; cartobibliography (catalogs, periodicals, atlases, geography generally); care and preservation; classification and cataloging; old and rare maps; use of maps; and cartography.

Silence settled once again, until Woods’s next article in 1956, in which he extended his recommendations to include an undergraduate major of thirty to thirty-two semester hours in geography with special attention to cartography and research, a minor in geology or history, and a foreign language. He closed with recommendations to the aspirant to consider graduate work in geography, and to obtain an internship in a map library.5

It was not until the late 1960s that articles on map librarianship education became frequent, when a veritable gaggle turned up in *Library Literature*, dominated by Walter Ristow’s survey articles of 1967 and 1976.6 From the reports made by Woods and Ristow over the 25-year period from 1952 to 1976, it is apparent that art followed life: the frequency of articles on map librarianship education did indeed reflect the frequency of such education.

In 1967 specialized training in map librarianship in the United States was still offered at only one school, the University of Illinois,
Education for Map Librarianship

although some slight attention was given to maps in cataloging and technical processing courses at other schools, and several library schools made provision for directed specialized studies, including map interest. Little seemed to be happening on the international scene until the International Federation of Library Associations' Section of Geography and Map Libraries formed in 1973 a working group on training for map librarianship to investigate the current situation in retraining, to make recommendations, to prepare practical guidelines for map librarians, and to promote and organize seminars. In 1976 Ristow recommended that, because of the heavy concentration of map libraries in the northeastern United States and on the Pacific Coast, library schools in those areas consider introducing map librarianship into their course catalog. Map librarianship need not have felt discriminated against because of this lack of mention in university catalogs; while in 1975 over 80 percent of accredited library school programs offered one or more special librarianship courses, half of the programs of specialization were offered by a little over one-quarter of the schools, and specialization by type of special library was offered at only 66 percent of the schools. Subspecialization was most often seen where "a defined body of literature and a distinct professional orientation among users" existed, and was perhaps most developed in those areas "where the end use of academic training can be predicted with some certainty." At this time (1975) four library schools were offering a course in map librarianship. By 1976, the number had grown to five—University of Illinois, University of Toronto, Columbia University, Western Michigan University, and Catholic University of America—and directed studies and specialized reading courses were available at a number of schools. The West Coast had at that time no course offered through the library schools, but the University of Oregon and Southern Oregon College both offered map librarianship courses, taught by resident map librarians. By 1978 the number of accredited North American library schools offering at least one course in map librarianship still stood at five (the same five), there were still possibilities for practica and independent studies, the University of Oregon still offered a course (generally taught in the summer), and one course had been taught at the University of British Columbia. In 1980 matters were much the same, having remained at a plateau for more than ten years, with five schools offering at least one course in map librarianship, although the University of Illinois is considering expanding its course to an integrated program, and the University of Wisconsin—Milwaukee now has a map librarianship curriculum.
The State of Library Science Education

Before any person goes into map librarianship, he had best take a good hard look at library science generally. Library science education has moved from pre-Dui times, with apprenticeship and in-service library training classes, to the Columbia School of Library Training in 1887, to accreditation of schools in 1923, to the conferring of master’s degrees in 1947-48, to the 1970s. The latter has rung with calls for change, a trend toward tailoring each student’s program, the integration of two or more course areas, and a vague feeling that a big shakeup is needed, that if we do not take hold and make the necessary changes, someone else will. All of these attitudes may be classed as the few good things that came out of the 1970s employment crash.

Library schools are changing their names to schools of library and information science, and with good reason: something called an information manager is on the scene. What do information managers do? Well, they do what librarians have done for years, except information managers are paid considerably more than librarians, they never do clerical work, and they never call themselves librarians, probably because the persons they supervise are called librarians. Other agencies of modern-day life have tumbled to the ancient fact that knowledge is power, and have eagerly translated it to mean that the management of knowledge is thus extremely important work. Robert Taylor, dean of Syracuse University’s School of Information Studies, certainly makes this clear:

It is my contention that the profession of librarianship—or, if you will, the information profession—is the most exciting, challenging, and necessary profession in the latter quarter of this century. This depends, however, on two things—first, the profession must cut its umbilical cord to the library. Only when that cord is cut will we become a true profession. In its best sense, librarianship is too important a profession to be tied to the fate of a single institution.

And secondly, the schools must themselves graduate professionals who feel comfortable working throughout the information environment.

We live in a world where information grows exponentially, doubling every ten years, and where information services employees form slightly over half of the work force of the United States. And ironical as it may seem in such a world, this bonanza is in the main blithely passing us by—us, the people who knew information before it was a star. Businesses have seen the light, and they feel no qualms whatsoever about not only generally ignoring the library world, but, worse, using that world...
Education for Map Librarianship

to get what and where they want, while we mumble, "Service to the public," and retreat yet one more ditch.

Another reason the library schools are in a process of change is the student. Soon after the bottom dropped out of the library employment market in 1970, students began to realize that library science was one of the few professions or occupations where the practitioner had to work an extra year and obtain a master's degree in order to be paid considerably less than did most mediocre business administration students after obtaining a mere bachelor's degree—if the prospective librarian could find work in the first place (a problem that the business student most likely did not face). Of 4971 1978 U.S. graduates in library science, 3064 were employed as librarians (but only 2756 in permanent positions) by the spring of 1979; the average salary was $12,281; the median salary was $11,804; and only 996 men had been sufficiently sanguine to believe that they could support a family by becoming a librarian. In 1976 the estimate was that "only"(!) 16 percent of library school graduates were unplaced six months after graduation, and the evidence was that persistence, mobility, flexibility, and capability were traits that the graduate desirous of gainful toil in the fields of library service needed. The result of these disastrous tidings? "A recent study disclosed that, of a sample of 198,641 students enrolling for the first time at 374 colleges and universities, 0.0 percent declared geography as their major field. Of 78 fields identified, library (or archival science) and statistics were the only other disciplines having 0.0 percent intended majors." Not necessarily strange but certainly unhappy bedfellows.

Why has this occurred? This paper is allotted too short a length, and the author is not sufficiently knowledgeable, to do other than suggest a few possible answers. The first, and it is fairly obvious, is that the library schools continued to turn out more students than were needed, perhaps mostly because such a complicated and expensive procedure as a graduate program is hard to slow down, but certainly not because the signs of disinterest by the market were unclear. On the contrary: the supply-and-demand situation was extremely clear. For example, the best-paying positions in the library world, namely those in universities, now frequently require a double master's degree (one in library science and one in another subject area), and the field is so glutted that the employers pay for these two degrees as if they were one. When prestigious university libraries in the New York City conurbation (an expensive place to live) have the gall to advertise for a full-time music cataloger, requiring virtually two master's degrees (one in library science and one in music history), reading knowledge of three lan-
MARY LARSGAARD

guages, and a little experience would be nice, and the salary offered is under $10,000, nonnegotiable, the time is long past to call a halt. Ditch-diggers—of whom no education is required—let alone those in the trades, not to mention the other professions, would refuse to work for such a ridiculously low sum. Yet that position was in all likelihood filled, because a faculty wife with a library degree decided to go back to work, or because someone fresh out of library school needed a job immediately just to keep eating. It is indeed a shameful exhibition, and a sign that either library schools need to change radically (among other things, monitoring the job market carefully and at least attempting to reach a reasonable match between number of persons trained and number of positions available) or that said schools should be required, perhaps under something similar to the Truth in Advertising Act, to tell persons about to enter through the schools’ fair portals that when they graduate they will be fully qualified to earn less than they could have by obtaining almost any work the moment they left their undergraduate schools. We all realize that we did not go into library science to get rich, but this is ridiculous.

Make no mistake about it: I love my work as a map librarian in a university, and I have a deep loyalty to the discipline and its concepts. It is for these reasons that it so angers me to see us groveling in the street for crumbs. I adhere to the old-fashioned idea that pay for work should be based on how much formal preparation the work requires, that is, how much the individual must invest (or gamble) before he receives a payback. In library science the relationship is inverse, not direct—which leads to the next point.

Perhaps pay for librarians is so notoriously low and out of scale with the education required because we simply aren’t worth any more. Perhaps this whole matter of having a library science degree as a graduate degree is just a fond illusion on our parts, and the degree should be an undergraduate one, or perhaps even a two-year, community college certificate. Perhaps what is needed is an honest reappraisal by libraries of professional positions; any position involving more than one-quarter time clerical work such as typing and filing should be considered for reclassification. Perhaps this woeful pay situation exists because, for whatever reason (probably because of the amount of clerical work presently involved in many positions), librarianship is traditionally a woman’s profession with the result—or is it the cause?—that salaries are relatively low, making “Been Down So Long It Looks Like Up to Me” an excellent title not just for Richard Farina’s novel, but for a course on women in library science. Interestingly enough, in library

504

LIBRARY TRENDS
Education for Map Librarianship

positions that pay well—administrative positions with little or no clerical work, and, relatively speaking, many university positions—we find men in the majority.

A final suggestion on this matter. Perhaps it is because library science is in the main taught as a technique, not as a philosophy, and, for a final kiss of death, taught not by practitioners of that technique, but preferably by persons who have either never worked in a library or have not done so for fifteen years. The highly predictable results are that in the eyes of the rest of the world, an MLS is just barely above a Ph.D. in physical education, and that *soi-disant* information management has completely outdistanced librarianship. Why else would the U.S. National Cartographic Information Center until very recently not even consider hiring a librarian to dispense information, but instead hire persons trained in cartography? William F. Poole may have been right when he said, "The information cannot be imparted by lectures; and who that is competent has the time to do the lecturing?" Nonetheless, if library science is to be taught as a technique, practitioners should teach it. How many of us working in libraries with a resident library school have had a library science instructor refer students to reference works that were outdated ten years before?

The sad truth is that what was perhaps initially seen as a practical way to teach library science, that is, as a technique, ends up being not practical at all, for persons who do not know why they are doing something (for example, cataloging) cannot deal with the inevitable changes. If indeed library science is a science, it should be taught as such, with class hours for philosophy and theory—including such elementary points as why libraries (call them what you will) are of value to society—and laboratory hours for application and internship. Quite possibly, since library science has for its ambitious, even awesome, goal the organization and dissemination of all recorded knowledge as requested and required, library schools might even learn from other disciplines—by setting up cooperative agreements with the business school to teach a management course, with the computer science department to teach a computer applications course, and so forth. After all, if we are not particularly enthusiastic about other departments teaching research methods and bibliography in their subject, we should not expect to be able to teach their subjects either.

Looking through the recent literature of library science education does allow the searcher to garner some encouraging signs. Courses in on-line bibliographic instruction are being taught, but only recently (though, in a classic understatement, it is recognized that "such systems
have clearly become a permanent part of the library profession" (22). There is an increased emphasis on networking, computer technology, and managerial training in library school curricula, and on the need to develop skills for use of print and nonprint, nontraditional media.

Admittedly, education is always a difficult, expensive procedure, constituting as it does "a kind of alchemy, the creative function of transmuting knowledge into wisdom." (24) It is also a very important process, and until such time as library schools not only reach an awareness of the current situation and probable future but make changes as needed, it is definitely a time of *caveat emptor* for the person interested in working in libraries. Library school students must be informed consumers, and must know that in today's competitive market many universities use an applicant's possession of a degree from an accredited school as a primary winnowing factor. While it is difficult to assess the training you are receiving before you have been out in the field, that is exactly what the library student must do, most logically by checking with practicing librarians. For example, we in map librarianship are a friendly crew, and are more than happy to talk to newcomers about new ideas and trends in the field. In addition, and perhaps primarily, library schools should take it upon themselves to predict market trends.

**Specific Requirements for Map Librarianship Education**

Supposing optimistically that after reading the preceding diatribe someone may still want to become any sort of librarian, let alone a map librarian, let us now move to specific requirements and recommendations for the education of the map librarian. For those who plan that far ahead, in undergraduate work the student should major in geography or geology, taking as many courses in cartography and map and aerial photograph interpretation as are offered; regional geography courses may be of assistance. This would also be an excellent time for the student to take courses in management and computer programming, and as many courses in reading knowledge of foreign languages as possible. In times past, library schools told prospective students to take whatever they wanted in their undergraduate work; let us hope those times are long gone, for management courses and computer programming courses should be demanded by all library schools of their students.

Once in library school, there are two checklists for the student to keep in mind, one relating to general library science courses, the other to map librarianship coursework. For the first, the student should take
management courses, either extensions of courses taken in undergraduate school or courses relating specifically to library management. In either case, budgeting must be included in the studies. Map libraries are especially prone to being mini-businesses, with the map librarian who runs a collection being responsible for managing the collection, its personnel and its budget effectively. Fair warning is hereby given: any map librarian who did not take management courses in graduate school or earlier will suffer for it financially (as, of course, will the collection he overseas) either by virtue of a lower salary or by having to take one of those expensive management workshops (which the librarian will probably have to pay for himself). If the library school does not offer management courses, and perhaps even if it does, the student should take basic courses offered by the business administration department of the university. Other courses that the student would do well to take as an undergraduate, and, again, may do well to take outside the library science department if such courses are taken in graduate school, are computer basics and computer programming. Computer use is going to become more and more dominant in libraries—consider that today $250,000 will buy the same computer power as the entire world possessed in 1960— and the librarian not fully cognizant of what computers can do will pay heavily for such ignorance. The student is well advised to consider computer programming to be no more nor less than the new lingua franca, easily as universal as English.

Another course that the student needs unfortunately seems not yet to exist, that is, a course in reading foreign languages for cataloging and general reference purposes. Maps in Sanskrit are, fortunately for most map catalogers, not very common. But maps in Japanese are as common as maps in German; both nations’ citizens seem to be map lovers and cartographers at heart, and while the Japanese generally and very kindly translate basic terms into English, the Germans are more inclined to leave the non-German-reading person to the mercies of the dictionary. Even though library users are in the main conversant with only one language, their native tongue (as any university reference librarian or even a shelver could bear witness), maps with information in a foreign language may still be relatively readily used by most patrons. Therefore, the map librarian will purchase them, and the map cataloger (who is usually the same person) will need to catalog them. Most foreign-language courses are much more detailed than the sort of course needed, not to mention having the wrong focus for the library student. It is a bit overdone to take an entire semester of Italian just to learn how to translate needed elements on a map, when it is rare that the cataloger
will need to translate more than 100 words, and the acquisitions librarian will probably not need to understand many more. Map catalogers should be able to catalog German, French, Russian, Japanese, Italian, Spanish, and Portuguese foreign-language maps at the least, and, of course, English maps—which means that any prospective map librarian had best take both beginning and advanced cataloging, since if any maps are to be cataloged, the map librarian frequently must do them, and generally map cataloging is discussed only in advanced cataloging classes.

The second major focus of study comprises courses relating to map libraries and map librarianship. However, such courses are structured, they should include study about maps—their history, how to interpret them, how they are made, and how to care for and provide service for them—selection, acquisition, classification, cataloging, storage, reference, promotion (both of the maps and for the librarian!), preservation, restoration, and cartobibliography.

The practicalities of the matter are that there are, and will probably continue to be, few classic classroom possibilities for the prospective map librarian to learn about maps, given the relatively few library schools with map librarianship courses. Thus, the student will be involved mainly in standard courses, nonbook media courses and independent studies. This is probably just as well, since although there does seem to be a shift to more full-time positions, the vast majority of map librarian positions are part time, and the student would be well advised to learn how to handle government documents and general reference duties, as the map collection is most often linked with one of these departments. One possibility for the future is that the map library professional organizations might put together learning packages, composed of videotapes, slides, text, syllabus and reading list, that would either be purchased or rented by the library school, and that might also be used for continuing education.

The student is advised to try for an internship in a map collection, if for no other reason than to find out if he likes the work or not. All the student need do is to look in the most recent directory of map collections of North America (which at the time of writing is the third edition of Map Collections in the United States and Canada26) to locate the nearest collection.

Fortunately, there is an awareness among many library school faculty that “non-book media are assuming an increasingly important role in library collections, and the teaching of the organization of these materials has become more and more significant for the curriculum of
library education," so the prospective, persistent map librarian should be able to receive some training previous to his immersion in the map cases.

Post-degree, the most valuable learning experience the map librarian may have is the work itself, closely followed by convention attendance and workshops. Workshops on map collecting, map libraries and map librarianship are proliferating all over the United States, proof that there is indeed professional life after library school. And there is always (we hope) the Library of Congress’s Geography and Map Division Summer Map Project, which has come to be an unofficial training ground for the neophyte map librarian. As for conventions, those sponsored by the Special Library Association’s Geography and Map Division, by the Map and Geography Round Table of the American Library Association, by the Western Association of Map Libraries, by the Association of Canadian Map Libraries, and, for the working rich, by the International Cartographic Association’s International Conference on Cartography and by the International Federation of Library Associations’ Section for Geography and Map Libraries, are all and always informative and enjoyable. Recently, state map interest societies, such as the Michigan Map Society, the California Map Society and the British Columbia Map Society, are springing up all over North America.

Continuing education in maps for the non-map librarian is also extremely important. Maps are of value to almost all libraries, so to the hardened map librarian it logically follows that all librarians should know something about maps. Learning packages and workshops, sponsored either by library schools or by the relevant professional associations, seem to be the most promising. It is very true that "as the half-life of professional knowledge steadily declines, continuing education enables one to keep a step ahead of professional obsolescence." 

Conclusion

Education for map librarians encompasses the following:

1. specialization in map librarianship for librarians;
2. elementary introduction for non-map librarians; and
3. continuing training for map librarians in order to keep up with new developments and to fill in gaps in knowledge.

A few points, some expressed earlier, deserve emphasis. The major point is that all librarians must pay attention to how the world around us...
changes. It is all too easy, in the calm and serenity of a library, to ignore what goes on outside the window. It is also professionally fatal, for what happens outside will soon slouch through the doors of even the most chryselephantined of ivory towers. The rest of the world is now talking about each individual having to train for four or five jobs in a lifetime, so we librarians who want to stay in the field should plan on having that many drastic changes in the library world in our lifetime. We must stay awake and alive to change.

We are all going to have to be better managers, and we will have to know more about and do more in public relations work and in understanding our public. If the White House Conference on Library and Information Services did nothing more, it showed the horrifying gap between what librarians think needs to be done and what our best patrons think we should be doing. A large part of our management will be of automated machinery, as the computer becomes more and more the benevolent monster that runs the library.

Another major, in fact crucial, point is that the job outlook for map librarianship is not notable for its fulsomeness, and that it is immoral to educate persons for positions that do not exist. The number of map librarian positions opening up in any given year is relatively small, perhaps five or ten. It is therefore sensible to have as a goal in map librarianship to keep non-map librarians informed, beginning in library schools with the inclusion of map library information in both classic and nonbook media courses, and extending through workshops and papers at general conventions. Whatever we war-horses of the field do should work toward recognition of the importance of maps and the appreciation of cartographic materials not only by patrons but also by our fellow librarians, who, through no fault of their own, have not been fortunate enough to work with that compact, beautiful, functional medium, the map.

References

2. Ibid.
3. Ibid.
Education for Map Librarianship


10. Ibid., p. 509.

11. Ibid., p. 506.


14. Ibid.


29. Zögner, p. 121.
This Page Intentionally Left Blank
Map and Aerial Photo Collections in the United States: Survey of the Seventy Largest Collections

STANLEY D. STEVENS

Collections of cartographic materials may be grouped into three categories for statistical purposes: large (250,000 items or more); medium (100,000 to 250,000 items); and small (up to 100,000 items). More than five years have elapsed since data were collected for compilation of the third edition of Map Collections in the United States and Canada. An analysis of the 744 collections reported therein reveals that there are 70 in the United States that hold 100,000 or more maps, aerial photos and other cartographical items. The purpose of the present survey is to bring up to date the data for those seventy largest collections, and to determine the trends and conditions of map librarianship by determining growth of the collections, the physical facilities and equipment, promotion and use of the collections, quantity of support for acquisitions and equipment, the status of the head of the collection, and activities of the heads of collections in map librarianship associations.

Equal attention has been given to collections of aerial photos, since they are the original source material for the compilation of all modern maps, but included in the data are counts of atlases, globes, relief models, reference books and gazetteers, serials, and maps on microform. The last is a critical factor. If one examines the ranking tables carefully, he will notice that the first-ranked collection, that of the National Capital Planning Commission, reports 250,000 maps and only 600 aerial photos, but 35 million maps on microform—almost all of which have been added to the collection during the past five years. Cartograph-

Stanley D. Stevens is Map Librarian, University of California at Santa Cruz.

WINTER 1981
STANLEY STEVENS

ical items, therefore, encompass all items in the collection—not just map sheets—and emphasis is placed on units of geographical information regardless of format.

Methodology

In an earlier review of *Map Collections in the United States and Canada*, I had ranked the collections according to size. Since I had previously sorted out all large and medium collections in the United States and Canada, it was easy to identify the seventy largest in the United States. A questionnaire (see Appendix B) was designed to elicit data that would be comparable to those reported in the third edition. Several questions were designed that would also provide some personal information about the head of the collection. I was sensitive to the possibility that no information would be given if the question were too personal, so it was indicated that the “information will be used only for tabulation, and no individual name will be disclosed.” Questions were designed to ask respondents to reveal their salaries and pay raises in comparative terms, so that specific amounts would not have to be revealed. The favorable comments received about the questionnaire, as well as the high response rate to these questions, indicate that the design was successful.

Of the seventy questionnaires mailed (with return envelope and postage added), fifty-six were returned—an 80 percent overall response. Table 1 shows the returns by number in each category.

<table>
<thead>
<tr>
<th>Category of Collection</th>
<th>Number of Responses</th>
<th>No Response</th>
<th>Percentage Returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>State agencies/departments</td>
<td>4</td>
<td>0</td>
<td>100.00</td>
</tr>
<tr>
<td>University libraries</td>
<td>29</td>
<td>5</td>
<td>85.29</td>
</tr>
<tr>
<td>College/University depts.</td>
<td>13</td>
<td>4</td>
<td>76.47</td>
</tr>
<tr>
<td>geology or geography</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal agencies</td>
<td>6</td>
<td>3</td>
<td>66.66</td>
</tr>
<tr>
<td>Public libraries</td>
<td>4</td>
<td>2</td>
<td>66.66</td>
</tr>
</tbody>
</table>
The 70 Largest Collections

If there is any weakness in the sampling strategy, it is that the number of collections surveyed in some categories is insufficient to determine accurate trends and conditions for those categories. For example, it might be presumed that trends and conditions revealed by the data collected for the largest collections could be utilized as representative for the entire field, regardless of the size of the individual collection. However, the difficulty with this presumption is that there are too few of the seventy in certain categories, e.g., four public libraries, six federal agencies and four state agencies. Therefore, it might be argued that the trends and conditions reported for these groups are not representative for all other collections within the respective group. Future surveys, perhaps, could reveal the validity of any extrapolation of the present data—especially for small collections.

Anomalies

In my earlier review, cited previously, I overlooked the Cartographic Information Division of the Library, Air University, Maxwell Air Force Base, Alabama. According to the third edition of Map Collections, the Air University holds 500,000 maps, 4 globes, and 100 gazetteers—placing it in tenth position in the ranking table. However, this error was discovered too late, and the Air University was neither sent a questionnaire nor included in the rankings.

It should further be noted that the original tabulation was based on the aggregate number of cartographic items in the collection, and the cutoff figure was 100,000. This excluded some collections that hold aerial photos in greater quantity than some of those in the largest seventy; for example, the Pacific Scientific Information Center at the Bernice P. Bishop Museum in Honolulu has a significant collection of 70,000 aerial photos of the Pacific Islands. If a ranking of aerial photos alone were to be made, the Bishop Museum collection would outweigh several of the collections, and would rank seventeenth largest. However, the total number of cartographic items held is 88,053, and so the library is automatically excluded from the parameters of this survey.

Other omissions do occur, not by design but due to lack of information. For example, no aerial photos are reported in the third edition among the holdings of the Defense Mapping Agency Topographic Center's library. An agency that produces maps must have aerial photos, so the fact that the DMATC library cites none among its holdings indicates that another unit within DMATC must hold them.
The Collections

Appendix A indicates the relative position of all seventy collections, including those which did not respond. Several of the respondents corrected the data reported in the third edition, and two collections now fall below the 100,000-item level—outside the parameter of this survey, but these data are nevertheless reported here.

I am sensitive to the possible inequity of ranking dissimilar types of collections in the same table. While Appendix A ranks all collections together according to size and growth, the balance of the survey data is presented by category, such as those used in table 1. The funding conditions and clientele served are often different between categories, and statistical comparisons should recognize this by making a separation. Sometimes it is difficult to determine from the title and mailing address of a collection whether, for example, the collection is a unit of the university or college library, or whether it might be a departmental collection supported by funding by the geology or geography department. Future surveys would be well served to include a checkoff question that would categorize each collection.

Growth of collections (compared to data reported in the third edition) is not a measure of quality. No attempt has been made, nor is intent implied, to measure this important factor. Perhaps an enterprising student of library science will choose from these seventy a group of similar collections and attempt to create a model of quality.

Collection size and growth are an indication of: (1) the basic nature and purpose of the collection, (2) the needs of the clientele served, (3) the economic conditions within society and the institution, (4) location and proximity to other collections, and (5) political conditions within the institution, including the vigor by which the head of the collection takes advantage of an opportunity presented. Depository agreements, which frequently are a major cause of growth, are an integral part of these factors. The agreements exist, it must be presumed, to fulfill the purpose and needs of the collection.

Personnel

Federal agencies employ a larger number of full-time professional and nonprofessional persons than part-time employees. Six agencies report staffing as follows: professional/full-time, fifty; nonprofessional/full-time, forty-five; professional/part-time, eleven; nonprofessional/part-time, eight. The total aggregate number of hours per week for all employees in these six agencies is 4300, for an average of 717 hours per week.
University libraries employ about an equal number of professionals and nonprofessionals on a full-time basis, but as one might expect, a much larger number of nonprofessionals are employed part-time—typically student assistants. For the twenty-nine libraries reporting, twenty-seven professionals are employed full-time, twenty-four nonprofessionals full-time, six professionals part-time, and eighty-one nonprofessionals part-time. The total aggregate number of hours per week for all employees is 3760, for an average of 130. College and university departmental collections also have a larger number of student assistants, an equal number of full-time and part-time professionals, and an average of seventy-one hours per week for all employees.

Public libraries employ persons for an aggregate average of eighty hours per week, employ about as many professionals full-time as part-time, but employ one-third that number of nonprofessionals full- and part-time.

State agencies fare better than departmental and public library collections, with an average of 116 hours per week reported for all employees. They employ a higher percentage on a full-time basis: of the four responses, nine professionals were employed full-time and six nonprofessionals full-time; this is compared with one part-time professional, and two part-time nonprofessionals.

Optimism is a typical characteristic of persons in map libraries. In response to Question 8, fifteen indicated that they anticipate an increase in the number of employees during the next two years. Thirty-eight indicated that the number of employees would probably remain the same; no one expected a decrease in staff.

Patrons

All collections serve the general public, with the exception of the Defense Mapping Agency (DMA) Aerospace Center. The level of service does vary according to the situation, however; one of the saddest situations, which may be more typical than the results of the survey reveal, is reported in the following comment: "While the library is indeed open 7 A.M.—2 A.M., the map room itself is always locked and users must request the key from the circulation desk and leave some identification in exchange for the key. While any one...as well as the general public may use the map collection, the only service provided is a small amount of aid in finding a particular map."

The number of patrons served is, of course, a factor of the size of the community or institution in which the collection is located. The survey averages are reported for comparison, but the type of institution may be
a stronger factor in the number served. Because of the variables and complexity of this subject, "patron use" is an area that should receive further study. Table 2 presents the compilation of responses to Question 10. The number of hours of service during the past two years has increased for seventeen collections, decreased for six, and remained the same for twenty-seven.

**TABLE 2**
**PATRONS SERVED ANNUALLY**

<table>
<thead>
<tr>
<th>Category of Collection</th>
<th>High</th>
<th>Low</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>State agencies/departments</td>
<td>11,000</td>
<td>993</td>
<td>4,178</td>
</tr>
<tr>
<td>University libraries</td>
<td>19,840</td>
<td>500</td>
<td>6,168</td>
</tr>
<tr>
<td>College/University depts. geology or geography</td>
<td>7,857</td>
<td>100</td>
<td>2,658</td>
</tr>
<tr>
<td>Federal agencies</td>
<td>24,864</td>
<td>4,000</td>
<td>13,621</td>
</tr>
<tr>
<td>Public libraries</td>
<td>9,000</td>
<td>200</td>
<td>5,991</td>
</tr>
</tbody>
</table>

**Equipment**

The number of collections that have a separate budget for equipment is almost nil. Woods Hole Oceanographic Institution had $3000; the University of Wyoming had $4600; Detroit Public Library had $2478; the National Capital Planning Commission had $3000; and the Department of Geography, Western Illinois University, Macomb, had $500. Certainly atypical of the annual situation, but interesting, is the amount that the University of Wisconsin—Milwaukee allocated for the American Geographical Society Collection: $279,369.54.

The ability to interpret, copy and transfer cartographic information to another medium is essential for adequate service to clientele. Table 3 reports the equipment available within the facilities of map collections, with an indication of plans to add any equipment in the next two years. The survey also asked what kinds of equipment would be added if circumstances were favorable, even if no plans have been made to add equipment.

**Acquisitions Program**

Question 15 solicited information about the acquisitions budget. A checkoff question in increments of $5000, from "less than $1000" to "more than $30,000," produced responses displayed in table 4.
amounts reported are total dollars in all categories: serials, standing orders and other discretionary amounts, but not the value of depository receipts.

### TABLE 3
**In-house Equipment**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Microfilm reader</td>
<td>3</td>
<td>5 (2) [1]</td>
<td>5 (1)</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Microfiche reader</td>
<td>2</td>
<td>15 (2) [1]</td>
<td>5 (2)</td>
<td>5</td>
<td>2 [2]</td>
</tr>
<tr>
<td>Microfilm reader/printer</td>
<td>3</td>
<td>1</td>
<td>2 [1]</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Microfiche reader/printer</td>
<td>1</td>
<td>4 (1) [2]</td>
<td>2</td>
<td>3 (1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Aerial photo &amp; other image-viewing equipment</td>
<td>1</td>
<td>14 (1) [1]</td>
<td>4</td>
<td>3 (1)</td>
<td>1</td>
</tr>
<tr>
<td>Terminal with printer</td>
<td>1</td>
<td>2 [3]</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Map drafting equipment</td>
<td>10</td>
<td>[2]</td>
<td>4 [1]</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Map or image enlarging or reducing equipment</td>
<td>1</td>
<td>4 (1) [4]</td>
<td>4 [2]</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Laminator</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo lab for processing original &amp; copy work</td>
<td>1</td>
<td>[1]</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Number of collections planning to add equipment within two years indicated in parentheses; number of collections desiring to add equipment, but with no plans to do so, indicated in brackets.

Table 5 reflects the replies to Questions 16 and 17. Public libraries appear to face rougher financial years ahead, while federal agencies anticipate no decrease in budget. The questions stipulated that responses were to ignore the value of the dollar and report change in actual dollars; however, it is well understood that increases, if any, are very probably just enough to accommodate inflated purchasing prices.
### TABLE 4
**Annual Budget for Acquisitions (in thousands)**

<table>
<thead>
<tr>
<th>Category of Collection</th>
<th>Less than $1</th>
<th>Less than $5</th>
<th>Less than $10</th>
<th>Less than $15</th>
<th>Less than $20</th>
<th>Less than $30</th>
<th>Over $30</th>
</tr>
</thead>
<tbody>
<tr>
<td>State dept.</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Univ. lib.</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Coll./univ. dept.</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Federal agencies</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public libraries</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 5
**Increase/Decrease in Acquisitions Budget**

<table>
<thead>
<tr>
<th>Category of Collection</th>
<th>Anticipate Increase</th>
<th>Anticipate Decrease</th>
<th>Anticipate No Change</th>
<th>Increased Last 2 yrs.</th>
<th>Decreased Last 2 yrs</th>
<th>No Change Last 2 yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>State dept.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Univ. lib.</td>
<td>13</td>
<td>4</td>
<td>9</td>
<td>17</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Coll./Univ. dept.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Federal agencies</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Public libraries</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
The survey attempted to determine whether there was any significant trend in cartographic format acquisition. Nearly 60 percent of the collections will continue with no special emphasis in format. Atlases will be emphasized by five collections; aerial photos and orthophotoquads by five; microforms by four; globes by one; and seven responded by citing particular content rather than format. No geographic area emerged as one receiving special emphasis during the past two years, although the local region within which the collection resides continues to dominate the interest of most collections.

The percentage of increase or decrease in cartographic items (see Appendix A) is a measure of the dynamics of collection development, and should not be viewed as prejudicial to the performance of the head of the collection. In fact, a negative change may be as healthy as an increase in the collection size. The measurement may reflect any, or a combination, of the following: (1) acquisition of a new depository collection; (2) a vigorous effort to bolster areas that were weak in coverage; (3) an effort to consolidate materials from, or to, another unit of the institution; (4) a new weeding program; (5) a new inventory with more accurate reporting of data; or (6) technological developments, especially in microcartography, that permit the acquisition of a large collection of maps and images on microform—including the discarding of the paper copy.

Depository Collections

Thirty-eight collections did not add a depository collection within the last five years, sixteen did, and two did not respond to this question. Nearly one-third of the university libraries reported acquisition of a new depository collection. The agencies that have granted depository collections are at federal and state levels, both foreign and domestic.

Space

The amount of floor space allocated to the collections varies considerably. The Library of Congress Geography and Map Division is in a class by itself, in more ways than one, but it definitely takes first place in the space category with 93,000 square feet. Table 6 summarizes the highs, lows and averages of space allocation for each type of collection.

The Head of the Collection

Table 7 gives the responses to Question 21 with degrees in a subject field being differentiated from degrees in librarianship. Table 8 presents the responses to Questions 22-27 related to the number of years of
service, the annual salary relative to a base of $19,300, and the amount of time the head of the collection spends on the collection as compared to other duties.

### TABLE 6
**Square Feet of Floor Space**

<table>
<thead>
<tr>
<th>Category of Collection</th>
<th>High</th>
<th>Low</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>State agencies/departments</td>
<td>5,000</td>
<td>2,500</td>
<td>4,133</td>
</tr>
<tr>
<td>University libraries</td>
<td>35,000</td>
<td>1,150</td>
<td>5,448</td>
</tr>
<tr>
<td>College/University depts. geology or geography</td>
<td>4,500</td>
<td>375</td>
<td>2,149</td>
</tr>
<tr>
<td>Federal agencies</td>
<td>93,000</td>
<td>300</td>
<td>22,671</td>
</tr>
<tr>
<td>Public libraries</td>
<td>10,000</td>
<td>350</td>
<td>3,750</td>
</tr>
</tbody>
</table>

### TABLE 7
**Education of Head of the Collection**

<table>
<thead>
<tr>
<th>Category of Collection</th>
<th>No College</th>
<th>No Degree</th>
<th>Associate</th>
<th>BA</th>
<th>MA</th>
<th>Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>State dept.</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Univ. lib.</td>
<td>12</td>
<td>11</td>
<td>8</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coll./Univ. dept.</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal agencies</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public libraries</td>
<td>1</td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Subject field appears above dotted line. Library/information science field appears below dotted line.

**Participation in Map Librarianship Organizations**

One of the realities of map librarianship is that continuing education takes place at meetings of organizations such as the Geography and Map Division of the Special Libraries Association, the Western Association of Map Libraries, or ALA's Map and Geography Round Table. Several survey questions were included in an effort to determine the
The 70 Largest Collections

degree of participation by heads of the seventy largest map collections in the United States. Table 9 reflects the responses to Questions 28, 30, 31, and 34. Responses to Question 29 (Are your dues paid by your employer?) are as might be expected; 75 percent of the respondents pay their own dues to professional organizations. Twelve did not respond to the question. Two that did respond are not personal members of an organization, as qualified by Question 28.

### TABLE 8
**Personal Data: Head of the Collection**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Years prior experience before maps</td>
<td>2.0</td>
<td>7.60</td>
<td>4.3</td>
<td>2.0</td>
<td>1.50</td>
</tr>
<tr>
<td>Years in map work</td>
<td>8.0</td>
<td>11.20</td>
<td>7.3</td>
<td>12.8</td>
<td>14.00</td>
</tr>
<tr>
<td>Years as head of collection</td>
<td>8.0</td>
<td>9.50</td>
<td>8.0</td>
<td>7.4</td>
<td>11.25</td>
</tr>
<tr>
<td>Salary below $19,300</td>
<td>3.0</td>
<td>18.00</td>
<td>8.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Salary same as $19,300</td>
<td>0.0</td>
<td>4.00</td>
<td>0.0</td>
<td>0.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Salary above $19,300</td>
<td>0.0</td>
<td>6.00</td>
<td>3.0</td>
<td>3.0</td>
<td>2.00</td>
</tr>
<tr>
<td>Percent salary increase</td>
<td>5.5</td>
<td>10.86</td>
<td>10.0</td>
<td>6.0</td>
<td>7.50</td>
</tr>
<tr>
<td>Percent time on maps</td>
<td>20.0</td>
<td>69.50</td>
<td>27.5</td>
<td>35.0</td>
<td>45.00</td>
</tr>
</tbody>
</table>

Question 35 asked whether respondents were aware that income tax deductions for educational expenses may be made each year; only one person did not know this, although six indicated that they are now aware, and forty-four were already aware of the provision. The question on financial support for attendance at meetings drew a mixed response, with the greatest number of respondents (fourteen) receiving partial support some years, and six respondents receiving full support some years. Fourteen indicated that they do not get all they ask, but do not hesitate to apply for funding. Eleven get time off only, seven get transportation only, and only six had received 100 percent support in the past year.
Question 32 was designed to elicit the primary reasons that persons attend meetings of map librarianship organizations. The respondents ranked their primary objectives in the following order: first is a desire to learn some practical or theoretical information that will help them in the job; second is to make a contribution to map librarianship by participating in the organization's activities; and third is to engage in social activities with colleagues.

**Computer-Readable Data Bases**

The use of computers for bibliographical control, cataloging, patron reference service, acquisitions, and interlibrary loan is becoming a necessary and cost-effective tool for map libraries. The use of the computer in libraries generally developed in the early 1960s and has more recently spread to map libraries through the development of OCLC and RLIN (Research Libraries Information Network). The Library of Congress MARC-Map data base, containing 60,000 or more cataloging records, has been supplemented by input into the OCLC and RLIN systems of cataloging contributed by participating libraries. The utilization of and contribution to these data bases is an increasing trend, for which no data have heretofore been collected. The present survey shows that 43 percent of the fifty-six respondents use a computer-readable data base. Of the thirty that do not, 43 percent indicated that they have plans to utilize one in the next two years. Two-thirds of the federal libraries responding indicate use of a data base, and 50 percent of public libraries, 41 percent of university libraries, 38 percent of college/university departments, and 25 percent of state departments also utilize computers.

OCLC is used by 96 percent of the twenty-four data base users, while one federal agency, the DMA Aerospace Center, uses its own
The 70 Largest Collections

system. Some libraries use more than one utility, e.g., four respondents use RLIN in addition to OCLC. There is scattered use of other data bases, such as GeoRef, GeoArchive, MARVAL, EROS Data Center, NCIC, SCORPIO, etc.

The greatest use made of the data bases by twenty-two of the respondents is for on-line searching for cataloging copy; sixteen use data bases as an acquisitions tool; eleven use them for patron reference work; and seven use computer-readable data bases for interlibrary loan transactions. Eleven respondents contribute cataloging on-line.

Conservation/Preservation Programs

The questionnaire asked whether map collections have a conservation/preservation plan. Seventy percent of those responding do have a plan, including all four of the public libraries, twenty-two of twenty-nine university libraries, seven of thirteen college/university departments, four of six federal agencies, and two of four state agencies.

The use of acid-free folders was reported by 52 percent, while 41 percent use polyester-film encapsulation, 25 percent use lamination, and only 20 percent use deacidification. Humidity and temperature controls are used by only 30 percent of the libraries. A variety of other techniques are used, including thymol crystals, dust filters, varnish removal, microfilming, patching and paper repair, mounting, edging of maps with tape, and fireproof vaults. Some use standards for types of map cases and for the number of maps filed in each drawer; some separate older maps into a protected area; and one restricts access to the collection as a preservation measure.

Promotion of Use

The survey included questions to determine the types of efforts which map libraries undertake to promote use of the collection. The responses confirm the presumption that map librarians/curators are good advocates of the use of the cartographic materials entrusted to their care. Activity in the nation’s seventy largest map collections is quite vigorous (see table 10). Other techniques of promotion included: eight respondents taught adult education classes in which the use of maps was stressed; two encouraged faculty to use and assign maps to their students; other respondents gave lectures and conducted workshops, published book catalogs of the collection, held annual map sales, gave slide-tape tours. One respondent provided air photos and LANDSAT imagery for a magazine feature that led to a television interview and the use of pictures of the map library in two television news broadcasts.
Another respondent is planning to develop better signs that will direct potential users to the map collection.

**TABLE 10**

**PROMOTION OF USE OF CARTOGRAPHIC MATERIALS**

<table>
<thead>
<tr>
<th>Activity</th>
<th>No. of Collections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promoted and/or wrote one or more news articles about some aspect of the collection for release to local media</td>
<td>29</td>
</tr>
<tr>
<td>Conducted tours of the collection as part of the library's program</td>
<td>41</td>
</tr>
<tr>
<td>Gave lectures to one or more audiences in which the use of the collection was encouraged</td>
<td>37</td>
</tr>
<tr>
<td>Wrote a guide to the collection that describes its contents, etc.</td>
<td>23</td>
</tr>
<tr>
<td>Compiled (perhaps on a regular basis) an acquisitions list or newsletter for distribution to on-campus and/or off-campus potential users</td>
<td>22</td>
</tr>
<tr>
<td>Selected and arranged an exhibition of cartographic materials for a location where the general audience of library users would see it</td>
<td>31</td>
</tr>
</tbody>
</table>

**Summary, Comments, and Recommendations**

The trends and conditions found among the seventy largest U.S. collections of cartographic materials have been presented, based on a survey conducted for this issue of *Library Trends*. The 80 percent response to the survey has been divided according to the categories of institutions in which the collections are located: state agencies/departments, university libraries, college/university departments (geology or geography), federal agencies, and public libraries.

A total of 77,339,385 cartographic items are held by these seventy collections. This total represents an increase of 49,635,316 items (or 179 percent) over the total for these collections as reported in the third edition of *Map Collections in the United States and Canada*. This is a tremendous growth in the five years since data were collected for the third edition. The seventy collections are ranked according to size, with an indication of total number of cartographic items held, total maps, total aerial photos, and the percentage increase or decrease as compared with the data reported in the third edition. Although fourteen collections were not represented in the questionnaire replies, they are included in the ranking by use of the earlier data.
Equal emphasis is given to aerial photos as to maps, because aerial photos are the original source material for all modern maps. The trend indicates that most of those collections that have previously collected aerial photos continue to add to their collections: twenty-eight of fifty-six show an increase, fourteen reported no change, three had a decrease; eleven do not collect aerial photos.

Based on the experiences gained from conducting this survey and analysis, it is recommended that future surveys include a question to categorize the collections by type of institution. This would help make the analysis easier, and the conclusions more valid. I have noted that comparing the conditions of dissimilar institutions is not valid. The clientele served, the funding source, and the purpose of the collection vary for each type of institution.

As mentioned earlier, no uniform method of counting cartographic items has been established, which raises serious questions about the validity of some of the data reported. One collection—and there appear to be others—increased its holdings by one-third without also showing some other data which might indicate how this occurred. Some reported data may have simply been guesses, rather than actual counts.

The map librarianship profession needs to take a serious look at the methods of statistical reporting. There are, for example, problem areas that became obvious in the collecting of data: does one report rolls of microfilm, or the number of maps reproduced on the rolls? (I prefer to count the latter, because it indicates the number of cartographic sources available for reference.)

It is hoped that this survey has answered some questions; it undoubtedly will raise others. It may also present some ideas for others to use in future studies.

References

3. Reference to Appendix B for specific context of the questions will be necessary to interpret the tabular data fully.
# Appendix A

## Ranking of the Seventy Largest Map and Aerial Photo Collections

<table>
<thead>
<tr>
<th>Name and Location of Institution</th>
<th>All Items</th>
<th>Rank</th>
<th>Maps</th>
<th>Rank</th>
<th>Photos</th>
<th>Rank</th>
<th>% Change</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Capital Planning Commission, Washington, D.C.</td>
<td>35,250,656</td>
<td>1</td>
<td>250,000</td>
<td>16</td>
<td>600</td>
<td>41</td>
<td>125</td>
<td>2</td>
</tr>
<tr>
<td>U.S. Geological Survey, National Cartographic Information Center, Reston, Va.</td>
<td>15,120,000</td>
<td>2</td>
<td>120,000</td>
<td>56</td>
<td>15,000,000</td>
<td>1</td>
<td>329</td>
<td>1</td>
</tr>
<tr>
<td>U.S. National Archives, Washington, D.C.</td>
<td>4,050,000</td>
<td>3</td>
<td>1,800,000</td>
<td>2</td>
<td>2,250,000</td>
<td>2</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>U.S. Library of Congress, Washington, D.C.</td>
<td>3,978,050</td>
<td>4</td>
<td>3,700,000</td>
<td>1</td>
<td>none</td>
<td>0</td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>U.S. Defense Mapping Agency, Topographic Center, Wash., D.C.</td>
<td>1,766,917</td>
<td>5</td>
<td>1,608,260</td>
<td>3</td>
<td>none</td>
<td>0</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Woods Hole Oceanographic Inst., Woods Hole, Mass.</td>
<td>1,533,488</td>
<td>6</td>
<td>29,000</td>
<td>67</td>
<td>1,500,500</td>
<td>3</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>Tennessee Valley Authority, Chattanooga, Tenn.</td>
<td>863,076</td>
<td>7</td>
<td>12,950*</td>
<td>68</td>
<td>850,000</td>
<td>4</td>
<td>29</td>
<td>16</td>
</tr>
<tr>
<td>*Cornell U. Center for Aerial Photographic Studies, Ithaca, N.Y.</td>
<td>700,000</td>
<td>8</td>
<td>none</td>
<td>69</td>
<td>700,000</td>
<td>5</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>U. of Oregon Map Library, Eugene</td>
<td>502,152</td>
<td>9</td>
<td>200,000</td>
<td>30</td>
<td>300,000</td>
<td>7</td>
<td>43</td>
<td>8</td>
</tr>
<tr>
<td>Louisiana State U., School of Geoscience Map Lib., Baton Rouge</td>
<td>460,167</td>
<td>10</td>
<td>325,000</td>
<td>4</td>
<td>60,000</td>
<td>18</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>U. of California, Map &amp; Imagery Library, Santa Barbara</td>
<td>454,584</td>
<td>11</td>
<td>254,424</td>
<td>14</td>
<td>193,584</td>
<td>8</td>
<td>114</td>
<td>3</td>
</tr>
<tr>
<td>U. of Georgia, Science Library, Map Collection, Athens</td>
<td>446,138</td>
<td>12</td>
<td>254,423</td>
<td>15</td>
<td>167,845</td>
<td>9</td>
<td>33</td>
<td>12</td>
</tr>
<tr>
<td>U. of Illinois, Library, Map &amp; Geography Library, Urbana</td>
<td>442,585</td>
<td>13</td>
<td>301,913</td>
<td>10</td>
<td>121,242</td>
<td>14</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>Whittier College, Geology Dept., Whittier, Calif.</td>
<td>401,500</td>
<td>15</td>
<td>none</td>
<td>70</td>
<td>401,500</td>
<td>6</td>
<td>34</td>
<td>11</td>
</tr>
<tr>
<td>New York Public Library, Map Division, New York</td>
<td>369,351</td>
<td>16</td>
<td>350,000</td>
<td>6</td>
<td>88</td>
<td>50</td>
<td>9</td>
<td>37</td>
</tr>
<tr>
<td>U. of Wisconsin, American Geographical Society Collection, Milwaukee</td>
<td>357,071</td>
<td>17</td>
<td>350,000</td>
<td>5</td>
<td>none</td>
<td>0</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>U. of Washington Libraries, Map Section, Seattle</td>
<td>344,347</td>
<td>18</td>
<td>325,000</td>
<td>8</td>
<td>18,000</td>
<td>23</td>
<td>88</td>
<td>6</td>
</tr>
<tr>
<td>U. of Minnesota, Map Division, Minneapolis</td>
<td>334,166</td>
<td>19</td>
<td>200,338</td>
<td>25</td>
<td>150,000</td>
<td>11</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>
The 70 Largest Collections

Appendix A—Continued

<table>
<thead>
<tr>
<th>Name and Location of Institution</th>
<th>All Items</th>
<th>Rank</th>
<th>Maps</th>
<th>Rank</th>
<th>Photos</th>
<th>Rank</th>
<th>%↑ Change</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana State U., Dept. of Geography-Geology, Terre Haute</td>
<td>332,190</td>
<td>20</td>
<td>325,000</td>
<td>7</td>
<td>7,000</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>Kentucky Dept. of Commerce, Map Sales Division, Frankfort</td>
<td>332,180</td>
<td>21</td>
<td>260,000</td>
<td>29</td>
<td>120,000</td>
<td>15</td>
<td>?</td>
<td>49</td>
</tr>
<tr>
<td>U.S. Defense Mapping Agency, Aerospace Center, Air Force Station, St. Louis</td>
<td>326,266</td>
<td>22</td>
<td>225,000</td>
<td>19</td>
<td>none</td>
<td>0</td>
<td>63</td>
<td>7</td>
</tr>
<tr>
<td>*Boston Public Library, Boston, Mass.</td>
<td>322,800</td>
<td>23</td>
<td>320,000</td>
<td>9</td>
<td>none</td>
<td>0</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>U. of Wisconsin, Map &amp; Air Photo Library, Madison</td>
<td>310,008</td>
<td>24</td>
<td>181,900</td>
<td>32</td>
<td>127,300</td>
<td>12</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>Yale U. Map Collection, New Haven, Conn.</td>
<td>303,043</td>
<td>25</td>
<td>300,000</td>
<td>11</td>
<td>none</td>
<td>0</td>
<td>1</td>
<td>48</td>
</tr>
<tr>
<td>U. of Chicago Library, Map Collection, Chicago</td>
<td>268,357</td>
<td>26</td>
<td>257,329</td>
<td>13</td>
<td>10,000</td>
<td>28</td>
<td>7</td>
<td>41</td>
</tr>
<tr>
<td>*U.S. Geological Survey Library, Reston, Va.</td>
<td>253,803</td>
<td>27</td>
<td>250,000</td>
<td>17</td>
<td>none</td>
<td>0</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Penn State U., Pattee Library, University Park, Pa.</td>
<td>251,888</td>
<td>28</td>
<td>248,000</td>
<td>18</td>
<td>none</td>
<td>0</td>
<td>51</td>
<td>13</td>
</tr>
<tr>
<td>*California State U., Geography Dept., Northridge</td>
<td>241,885</td>
<td>30</td>
<td>163,000</td>
<td>36</td>
<td>65,000</td>
<td>17</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Pennsylvania Dept. of Environmental Resources, Bureau of Topographic &amp; Geologic Survey, Harrisburg.</td>
<td>252,869</td>
<td>32</td>
<td>80,000</td>
<td>65</td>
<td>152,000</td>
<td>10</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>*U. of California, Map Library, Los Angeles</td>
<td>251,700</td>
<td>33</td>
<td>220,000</td>
<td>20</td>
<td>11,000</td>
<td>27</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>U. of California, Map Room, General Library, Berkeley</td>
<td>219,263</td>
<td>34</td>
<td>213,638</td>
<td>21</td>
<td>3,823</td>
<td>35</td>
<td>31</td>
<td>14</td>
</tr>
<tr>
<td>U. of Michigan, Map Room, Ann Arbor</td>
<td>216,789</td>
<td>35</td>
<td>210,000</td>
<td>22</td>
<td>3,000</td>
<td>35</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Indiana U., Geography &amp; Map Library, Bloomington</td>
<td>212,901</td>
<td>36</td>
<td>200,000</td>
<td>28</td>
<td>none</td>
<td>0</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Princeton U. Library, Richard Halliburton Map Coll., Princeton</td>
<td>208,676</td>
<td>37</td>
<td>205,000</td>
<td>23</td>
<td>1,000</td>
<td>38</td>
<td>21</td>
<td>23</td>
</tr>
</tbody>
</table>

WINTER 1981
### Appendix A—Continued

<table>
<thead>
<tr>
<th>Name and Location of Institution</th>
<th>All Items</th>
<th>Rank</th>
<th>Maps</th>
<th>Rank</th>
<th>Photos</th>
<th>Rank</th>
<th>%†</th>
<th>Change</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>U. of Kansas, Map Library, Lawrence</td>
<td>205,198</td>
<td>38</td>
<td>203,000</td>
<td>24</td>
<td>500</td>
<td>42</td>
<td>20</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>U. of South Carolina, Univ. Libs. Map Depository, Columbia</td>
<td>202,793</td>
<td>39</td>
<td>160,000</td>
<td>37</td>
<td>41,000</td>
<td>20</td>
<td>28</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>*Columbia U., New York</td>
<td>200,359</td>
<td>40</td>
<td>200,000</td>
<td>27</td>
<td>none</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>*Middlebury College, Map Library, Middlebury, Vt</td>
<td>200,305</td>
<td>41</td>
<td>200,000</td>
<td>26</td>
<td>none</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Southern Illinois U., Map Library, Science Div., Morris Library, Carbondale</td>
<td>196,496</td>
<td>42</td>
<td>149,000</td>
<td>45</td>
<td>45,500</td>
<td>19</td>
<td>15</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>U. of Wyoming, Coe Lib., Documents Div., Laramie</td>
<td>179,439</td>
<td>43</td>
<td>179,000</td>
<td>33</td>
<td>(part of maps no.)</td>
<td>52</td>
<td>2</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>U.S. Dept. of Transportation, Federal Highway Admin., Washington, D.C.</td>
<td>175,000</td>
<td>44</td>
<td>175,000</td>
<td>34</td>
<td>none</td>
<td>0</td>
<td>?</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Johns Hopkins U., Government Publications &amp; Maps Dept., Milton S. Eisenhower Lib., Baltimore, Md.</td>
<td>166,186</td>
<td>45</td>
<td>165,000</td>
<td>35</td>
<td>100</td>
<td>48</td>
<td>9</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Western Washington U., Dept. of Geography &amp; Regional Planning, Map Library, Bellingham</td>
<td>165,881</td>
<td>46</td>
<td>150,000</td>
<td>43</td>
<td>15,000</td>
<td>25</td>
<td>37</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Western Illinois U., Geography &amp; Map Library, Macomb</td>
<td>162,098</td>
<td>47</td>
<td>140,000</td>
<td>47</td>
<td>13,000</td>
<td>26</td>
<td>31</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>*Southern Methodist U., Science Lib., Dallas</td>
<td>159,276</td>
<td>48</td>
<td>155,000</td>
<td>41</td>
<td>3,550</td>
<td>34</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Northwestern U. Library, Map Collection, Evanston, Ill.</td>
<td>159,187</td>
<td>49</td>
<td>155,100</td>
<td>38</td>
<td>1,727</td>
<td>37</td>
<td>15</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>New York State Library, Manuscripts &amp; Special Collections, Albany</td>
<td>156,828</td>
<td>50</td>
<td>155,000</td>
<td>40</td>
<td>25</td>
<td>51</td>
<td>4</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Western Michigan U., Map Library, Kalamazoo</td>
<td>156,740</td>
<td>51</td>
<td>155,000</td>
<td>39</td>
<td>300</td>
<td>45</td>
<td>7</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Northern Illinois U., Map Library, DeKalb</td>
<td>156,666</td>
<td>52</td>
<td>154,721</td>
<td>42</td>
<td>655</td>
<td>40</td>
<td>16</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>U. of Arizona Map Coll., Tucson</td>
<td>155,680</td>
<td>53</td>
<td>155,800</td>
<td>50</td>
<td>16,274</td>
<td>24</td>
<td>16</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Detroit Public Library, History &amp; Travel Dept., Detroit</td>
<td>154,155</td>
<td>54</td>
<td>149,247</td>
<td>44</td>
<td>none</td>
<td>0</td>
<td>11</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Free Library of Philadelphia, Map Collection, Phila., Penn.</td>
<td>145,655</td>
<td>55</td>
<td>140,000</td>
<td>46</td>
<td>100</td>
<td>49</td>
<td>9</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>
### The 70 Largest Collections

**Appendix—Continued**

<table>
<thead>
<tr>
<th>Name and Location of Institution</th>
<th>All Items</th>
<th>Rank</th>
<th>Maps</th>
<th>Rank</th>
<th>Photos</th>
<th>Rank</th>
<th>%</th>
<th>Change</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>U. of Vermont, Map Room, Burlington</td>
<td>144,681</td>
<td>56</td>
<td>138,000</td>
<td>49</td>
<td>6,000</td>
<td>32</td>
<td>19</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td><em>U. of Wisconsin, Map &amp; Air Photo Library, Milwaukee</em></td>
<td>132,205</td>
<td>57</td>
<td>125,590</td>
<td>52</td>
<td>6,500</td>
<td>31</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td><em>Appalachian State U., Geography Dept., Boone, N.C.</em></td>
<td>130,275</td>
<td>58</td>
<td>100,000</td>
<td>63</td>
<td>30,000</td>
<td>22</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Kent State U., Map Library, Kent, Ohio</td>
<td>127,842</td>
<td>59</td>
<td>126,000</td>
<td>51</td>
<td>(some)</td>
<td>53</td>
<td>?</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Florida State U., Strozier Library Map Section, Tallahassee</td>
<td>127,197</td>
<td>60</td>
<td>124,416</td>
<td>53</td>
<td>none</td>
<td>0</td>
<td>-10</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Toledo-Lucas Co. Public Lib., Local History &amp; Genealogy, Toledo, Ohio</td>
<td>122,581</td>
<td>61</td>
<td>121,000</td>
<td>54</td>
<td>1,000</td>
<td>39</td>
<td>1</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>San Diego State U., Univ. Library Map Coll., San Diego, Calif.</td>
<td>120,781</td>
<td>62</td>
<td>120,000</td>
<td>55</td>
<td>227</td>
<td>46</td>
<td>10</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>U. of California, Map Collection, Santa Cruz</td>
<td>120,674</td>
<td>63</td>
<td>108,175</td>
<td>58</td>
<td>9,287</td>
<td>29</td>
<td>19</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td><em>Cornell U. Library, Ithaca, N.Y.</em></td>
<td>114,438</td>
<td>64</td>
<td>113,000</td>
<td>57</td>
<td>400</td>
<td>44</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td><em>Public Library of Cincinnati &amp; Hamilton Co., Cincinnati, Ohio</em></td>
<td>109,502</td>
<td>65</td>
<td>107,849</td>
<td>60</td>
<td>125</td>
<td>47</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Georgia Inst. of Technology, Map Collection, Atlanta</td>
<td>109,360</td>
<td>66</td>
<td>108,377</td>
<td>59</td>
<td>none</td>
<td>0</td>
<td>8</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td><em>Clark U., Graduate School of Geography, Worcester, Mass.</em></td>
<td>108,412</td>
<td>67</td>
<td>105,000</td>
<td>62</td>
<td>180</td>
<td>43</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Wesleyan U., Science Lib., Middletown, Conn.</td>
<td>107,196</td>
<td>68</td>
<td>105,000</td>
<td>61</td>
<td>none</td>
<td>0</td>
<td>•</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>U. of Colorado Map Library, Boulder</td>
<td>87,000</td>
<td>69</td>
<td>87,000</td>
<td>64</td>
<td>none</td>
<td>0</td>
<td>-21</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>California State U., Dept. of Geography, Map Center, Long Beach</td>
<td>37,703</td>
<td>70</td>
<td>35,000</td>
<td>66</td>
<td>2,500</td>
<td>36</td>
<td>-81</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

*Questionnaire not returned; ranking was determined from data in Map Collections in the United States and Canada, 3d ed.*
†Compared to data from 3d ed.
‡Multiple copies of topo maps totals 2,235,000.
§Includes multiple copies of 876 topo quads.
STANLEY STEVENS

Appendix B

SURVEY OF THE 70 LARGEST MAP & AERIAL-PHOTO COLLECTIONS IN THE U.S.

THE COLLECTION

1. Name and Address of Collection: _______________________________
   _______________________________
   _______________________________

                           City       State         ZIP Code

2. Phone Number: (     ) - ______ Ext. ______

3. Size of Collection: (use total as of April 1, 1980 - or - as of your last tabulation)
   maps ______________________________
   atlases __________________________
   globes ____________________________
   relief models ______________________
   aerial photographs __________________
   reference books & gazetteers ______
   serials (titles received) _________
   microforms (# of maps) ____________

4. Has your library added any Depository collections in the past five years? Yes □ No □ If Yes, please indicate agency name: _________________

5. Indicate the approximate number of square-feet of space allocated to your collection: (or give exact figure if available)(include everything) ________

THE PERSONNEL

6. Number of persons employed: Professional
   ______________________ | Full Time | Part Time |
   Non-Professional

7. Total aggregate number of hours per-week for all employees: ____________

8. Do you anticipate, during the next two years, an increase □ , a decrease □ , or the number of personnel will probably remain the same, I hope □ .
The 70 Largest Collections

Appendix B—Continued

THE PATRONS

9. Categories of patrons served: (check all that are applicable)
   - [ ] General Public
   - [ ] In-house staff only
   - [ ] Students and Faculty only
   - [ ] No service offered
   - [ ] Students, Faculty, and General Public
   - [ ] Other __________________________

10. Number of patrons served during your last annual statistical period: ______

11. Has the number of hours of service to your patrons, during the past two years, increased [ ] or decreased [ ]?

THE EQUIPMENT

12. If you have a separate budget for equipment, please indicate the amount allocated during your last statistical period: $______________
   (No response will indicate no separate budget.)

13. Do you have any of the following equipment housed in your facility proper?
   - [ ] xerographic copy machine
   - [ ] microfilm reader
   - [ ] microfiche reader
   - [ ] microfilm reader/printer
   - [ ] microfiche reader/printer
   - [ ] aerial-photo & other image viewing equipment
   - [ ] On-line data base terminal with printer
   - [ ] map drafting equipment
   - [ ] map or image enlarging or reducing equipment
   - [ ] light-table
   - [ ] other __________________________

14. Within the next two years, do you plan to add any of the above? Yes [ ] No [ ]
   If yes, what do you plan: ________________________________________________
   I have no plans to add any equipment, but if circumstances were favorable I
   would like to add the following: _______________________________________

THE ACQUISITIONS PROGRAM

15. Budget for Acquisition of Maps & Aerial Photos: (this figure should include money in all categories: serials, standing orders and other discretionary amounts, but not the value of depository receipts): ( < is less than)
   - $1,000 [ ] $5,000 [ ] $10,000 [ ] $15,000 [ ] $20,000 [ ] $25,000 [ ]
   - $30,000 [ ] more than $30,000 [ ] other __________________________

16. Do you anticipate, during the next two years, an increase [ ] or decrease [ ].
17. Has your acquisitions budget, during the past two years, increased □ or decreased □? (not in value of dollars, but an actual + or -)

18. Has there been any cartographic format to which you have given special emphasis in acquisitions during the past two years?

19. Has there been any geographic area to which you have given special emphasis in acquisitions during the past two years?

THE HEAD OF THE COLLECTION

20. Name and title of person in charge of the collection: (optional)

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
</table>

(NOTE: This information will be used only for tabulation, and no individual name will be disclosed.)

21. Degrees (check highest applicable in each column):

22. Indicate the number of years library experience before becoming employed in map librarianship:

<table>
<thead>
<tr>
<th>College</th>
<th>No Degree</th>
<th>Associate</th>
<th>Bachelor</th>
<th>Master</th>
<th>Doctorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

23. Indicate the number of years in map librarianship:

24. Indicate the number of years as Head of the collection:

25. The Special Libraries Association's 1979 Salary Survey (Special Libraries, December 1979, pp. 559-589) indicates some trends which I would like you to verify with respect to your own position. "The mean (average) basic annual salary of SLA members on Apr. 1, 1979, was $19,300." For that date, was your salary below □, even □, or above □ that average?

26. "The 1979 survey indicates that the mean salary of SLA members is no longer keeping pace with the CPI". (Consumer Price Index) The survey "shows that while the mean salary has increased 101.0% since 1967, the CPI has increased 113.4%". Would you indicate the increase in your base salary, since Apr. 1, 1979?

0% □ 2% □ 4% □ 6% □ 8% □ 10% □ 12% □ or, □ amount $
The 70 Largest Collections

Appendix B—Continued

27. Please indicate the amount of time per week that you, as Head of the collection, are assigned to work on the map or aerial photo collection.
   100% □ 80% □ 60% □ 50% □ 40% □ 20% □ 10% □ no set amount □

28. Do you have a personal membership in one or more of the U.S. organizations that represent map librarians? (e.g., SLA Geography & Map Division; Western Association of Map Libraries; ALA Map & Geography Round Table)
   Yes □ No □

29. Are your dues paid by your employer? Yes □ No □

30. During the past two years, have you served on a committee □, held an office □, attended one or more meeting □, of one or more of the map librarianship organizations to which you belong?

31. During the past two years, have you written and had published one or more contributions to the literature of map librarianship? Yes □ no □
   Do you anticipate any within the next two years? Yes □ No □

32. Please indicate your primary reasons for attending meetings of map librarianship organizations (mark primary with # 1, second with # 2, third # 3)
   □ To learn some practical/theoretical information that might assist me in my job.
   □ To get recognition from my institution that will help in promotion and/or salary advancement.
   □ To engage in social contacts among my colleagues.
   □ To satisfy my institution's and/or supervisor's request to attend.
   □ To make a contribution to map librarianship by participating in the organization's activities.

33. Please indicate the kind of support that you receive to attend meetings of map librarianship organizations:
   □ Do not attend because my employer won't permit time off.
   □ Time off only.
   □ 100% financial support: transportation, food and lodging, reg. fees.
   □ Use of institution's vehicle at its expense.
   □ Transportation only: least expensive means – air-fare, car, etc.
   □ Food and lodging only.
   □ I pay all expenses, and take vacation-time to attend.
   □ Support varies from year to year, some time I get full □ partial □
   □ I did get support, but all travel allowances have been eliminated.
   □ Registration fees only.
   □ I applied for funds last year, but competition exhausted available funds.
   □ Although I don't get all I ask, I don't hesitate in applying for funds.
   □ other ____________________________
34. Approximately how much money did you spend of your own funds to attend your last meeting of a map librarianship organization? $__________.

35. Have you previously been aware that U.S. Treasury Reg. 1.162-5 permits an income tax deduction for educational expenses (registration fees and cost of travel, meals and lodging) undertaken: 1) to maintain or improve skills required in one's employment... (2) to meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of compensation. (see IRS Pub. 508)
   Yes □  No □  I am now □

Computer-Readable Data Base

36. Do you utilize a computer-readable data base? Yes □  No □  If no, do you have plans to utilize one in the next two years? Yes □  No □

37. Assuming you do, how do you use the data base: On-line searching □  On-line cataloging □  Patron reference □  Potential acquisitions □  Inter-library loan □  Other □

38. Which computer-readable data base do you utilize? MARC-Map □  DMA □  OCLC □  WLN □  RLIN □  Other □

Conservation/Preservation Program

39. Do you have a conservation/preservation plan for your collection? Yes □  No □

40. If yes, do you presently use any of the following techniques? humidity-temperature controls □  lamination □  polyester-film encapsulation □  deacidification □  acid-free folders □  other □

Promotion of Use

41. Please indicate the type(s) of effort(s) that have been undertaken to promote the use of your collection during the past two years: (check more than one category if applicable)
   □  Promoted and/or wrote one/or more news article about some aspect of the collection for release to local media.
   □  Conducted tours of the collection as part of my library's program.
   □  Given lectures to one/or more audiences in which I encouraged the use of the collection.
   □  Wrote a guide to the collection that describes its contents, etc.
   □  Compiled (perhaps on a regular basis) an acquisitions list or newsletter for distribution to on-campus and/or off-campus potential users.
   □  Selected and arranged an exhibition of cartographic materials for a location where the general audience of library users would see it.
   other □

Thanks again for you time in answering this survey. Mail in enclosed envelope to: STANLEY D. STEVENS, UNIVERSITY LIBRARY, UNIVERSITY OF CALIFORNIA, SANTA CRUZ, 95064
Map Collections and Map Librarianship in New Zealand: A Synopsis

P.L. BARTON

New Zealand was first discovered by Polynesians who had a detailed knowledge of the land.\(^1\) Abel Janszoon Tasman and crews in the Heemskerck and Zeehaen rediscovered New Zealand in December 1642 and partially mapped it.\(^2\) James Cook and the crew of the Endeavour delineated New Zealand between October 1769 and March 1770 during the circumnavigation of the world between 1768 and 1771.\(^3\)

Ross has adequately described the detailed charting of the coastline, the major contributions being those of the Acheron and Pandora between 1848 and 1855.\(^4\) The Hydrographer of the Navy assumed the responsibility for issuing charts of New Zealand from 1816, and subsequently for the detailed hydrographic surveying of the coastline. Since 1950 the Hydrographer, Royal New Zealand Navy, has assumed this responsibility.

The history of the land surveying and mapping of New Zealand is currently being written.\(^5\) No land surveying or mapping took place until after organized settlement began in 1840. Surveying and mapping was done initially for and by the New Zealand Company. The company became defunct in 1851, and this function became the responsibility of the ten provinces from 1852 to 1876. In 1876 the provinces were abolished, and the central government assumed the responsibility for surveying and mapping the land. A separate government department, now called the Department of Lands & Survey, became responsible for these operations.

P.L. Barton is Map Librarian, Alexander Turnbull Library, Wellington, New Zealand.
Because of its short European history, it would be reasonable to expect that New Zealand would have a high proportion of its cartographic heritage still intact. This may be so, but the fragile nature of maps has undoubtedly resulted in a number of casualties—natural causes, neglect (because of an uncaring attitude), and fire. Many government records in the past were housed in wooden buildings which were vulnerable to fire. However, most records are currently housed in concrete buildings. The greater proportion of New Zealand cartographic records are in state institutions. There are also small but very valuable collections held by the Hydrographer of the Navy (Taunton, Somerset, England) and by the Public Record Office in London.

Overview of Present Collections

The existing map collections fall into the following broad categories: maps generated by government departments (local government, etc.), and which are used for their day-to-day activities; maps in research collections, such as the National Archives of New Zealand and the Alexander Turnbull Library; and maps in institutions geared to teaching—the six universities. Thus, most collections are in government or government-funded institutions. The staffing, storage and accommodation (with the exception of the universities) range from very poor to fairly good. Map librarianship and reference services fall into the same ranges.

The map collections in the six universities are geared to teaching (with one exception) and generally have better staffing, storage and accommodation than state collections. Since World War II the universities have experienced considerable growth, thus funds have been available for the development of the map collections. Naturally, a demand for maps for the disciplines of geography and associated subjects has been the principal reason for this growth, but there has clearly been much more map awareness by university staff than by those in the state institutions.

A sense of history has only recently developed in New Zealand and has become fashionable. Many New Zealanders, including academic researchers, are graphic illiterates and do not realize the value of maps for historical or other research purposes. Thus, there has not been a great demand or pressure from genealogists and other researchers for the use of maps. The poor staffing, storage and accommodation in most of the state institutions means, of course, that the map collections are not properly organized and therefore cannot be fully exploited. Sufficient
public pressure and demand would result in action. There is an uncaring attitude throughout New Zealand society not only toward map collections but also toward libraries, museums and similar institutions.

State Collections

Department of Lands and Survey

The collection was founded in 1876 and has approximately 900,000 cadastral and topographical survey plans and maps. The department has twelve land district offices, each holding plans and maps for its district. Many of the plans are regarded as working documents, and have been microfilmed and are on aperture cards. The plans are stored in safes but clients may use the aperture cards for reference. Access to the plans and aperture cards is through the use of indexes and registers. The plan rooms are staffed by assistants who have no training in map librarianship, but they are trained to use the land district office system to locate plans, and in the use of aperture cards and reproduction methods. The main users of the plans are surveyors, lawyers, real estate agents, and land speculators. These people know the local land district office system and can locate the information they want. The serious researcher wanting other information must know a good deal about the history of the surveying and mapping of the land district in order to find his way through the indexes/registers to get the plans with the desired information. The plan room staff cannot assist very much because they do not have the knowledge.

The plans, particularly topographical plans and surveyors’ field books, date back to the early 1840s and often contain much information on human settlement and the environment. Important manuscript maps are also kept in the land district offices and there is a very important collection of manuscript maps kept in the head office in Wellington. The department also maintains in Wellington a collection of about 300,000 printed maps of English-speaking and foreign countries, obtained largely through exchange agreements. This collection is maintained by members of the department’s staff, who also handle the distribution of maps produced by the department. This map collection is mainly used by personnel from government departments.

Map Collection, National Archives of New Zealand

Founded in 1926, the collection has about 500,000 maps and plans which have been generated by New Zealand government departments. It is estimated that 25-30 percent of these holdings are maps. The
collection of maps and plans rapidly escalated in the 1970s due to extensive microfilming by government departments. The archives collection is open to researchers Monday through Friday. All types of researchers use the collection. Access points to the collection are indexes, inventories and registers. There is no access by area, date or subject. Much of the collection is unorganized and not adequately stored, but the accommodation is fairly good. There is usually only a part-time archivist working with the collection. If the recommendations of the Smith Report are eventually implemented, the staffing will be improved.

Map Collection, Alexander Turnbull Library

Founded in 1918, the library's collection includes about 19,000 atlases and maps. Areas of specialization are New Zealand and the Pacific, which complements the library's other collections covering these areas. The collection of research materials begun by Alexander Horsburgh Turnbull (1868-1918), a Wellington merchant, forms the basis of the present collection. The collection is open all day Monday through Friday, and is used by researchers and members of the general public. There is a classified catalog. The collection is classified according to the Boggs and Lewis system and is staffed by a full-time map librarian. Storage facilities and accommodation are barely adequate, but will improve when the new building for the National Library of New Zealand is completed.

The map librarian was responsible, until December 1979, for compilation of the monthly/yearly *New Zealand National Bibliography*, Section II, “Atlases, Charts and Maps.” The bibliography is now the responsibility of the New Zealand Bibliographic Unit. The map librarian is also responsible for looking after a collection of about 23,000 maps held in the General Assembly Library—New Zealand's parliamentary library. The collection's area specializations are New Zealand, the Pacific, and Britain. The collection was acquired through the legal provisions of the Copyright Act and by exchange. (The legal provisions of the act with regard to maps are currently administered by the map librarian.) The collection is adequately housed but seldom used. When the new library building is completed, this collection will be merged with the map collection of the Alexander Turnbull Library.

University Collections

*Geography Library, Department of Geography, University of Auckland*

The library was founded in 1946 as a Department of Geography collection, but in 1970(?) became a part of the main university library.
New Zealand

The collection has about 35,000 aerial photographs, atlases and maps. Areas of specialization are New Zealand, the Pacific and Southeast Asia. The library is open all day Monday through Friday and is used by university staff, students and is also open to the general public. There is no catalog; classification is by area and subject. The collection has one full-time geography librarian who is responsible to the university librarian. The collection is adequately stored and has good accommodation.

Map Library, Library, University of Waikato, Hamilton

The collection was founded in 1966 and has about 95,000 aerial photographs, atlases and maps. The library includes the map collection of the New Zealand Geographical Society. Areas of specialization are New Zealand, Antarctica, North America, and the Pacific. The map library is a depository collection for the U.S. Geological Survey 1:24,000 topographical series. The collection is open mornings Monday through Friday and at additional times by request, and is available to university staff, students and the general public. There is a classified catalog. Holdings are classified by the A.G.S. system. There are two part-time staff members, responsible to the university librarian. The collection is adequately stored and accommodation is good.

Map Library, Department of Geography, Massey University, Palmerston North

The library was founded in 1959 and has approximately 30,000 aerial photographs, atlases and maps. Areas of specialization are New Zealand, the Pacific and Australia. The map library is open all day Monday through Friday and is used by university staff, students and the general public. The map collection has a card index with area and subject entries and is classified by the A.G.S. system. There are two part-time staff members. The map librarian is responsible to the head of the Department of Geography. Storage of the collection and accommodation are adequate.

Library, Department of Geography, Victoria University of Wellington

Founded in 1946, this library has about 26,000 aerial photographs, atlases and maps. There is no stated area specialization. The library is used by university staff and students and is open all day Monday through Friday. A part-time staff member looks after the geography library and is responsible to the head of the Department of Geography. The collection has adequate storage and fair accommodation.
Map Collection, Department of Geography, University of Canterbury, Christchurch

Founded in 1945, the collection has about 80,000 aerial photographs, atlases and maps. Areas of specialization are New Zealand, the United States, Canada, and Australia. It is also a depository collection for the USGS 1:24,000 topographical series. The collection is used by university staff, students and general public and is open all day Monday through Friday. The collection has no catalog, and is arranged by region. There is one full-time and one part-time staff member. The map librarian is responsible to the head of the Department of Geography. Storage for the collection is adequate with good accommodation.

Map Collection, Hocken Library, University of Otago, Dunedin

The map collection was founded in 1910 as part of a bequest by Dr. Thomas Morland Hocken (1836-1910) to the people of New Zealand. The library has approximately 11,000 aerial photographs, atlases and maps with area specializations of New Zealand (particularly Otago and Southland) and the Pacific. The collection, used by university staff, students and the general public, is open all day Monday through Friday, and on Saturday mornings. There is a classified catalog, and the collection is classified by the Boggs and Lewis system. There is one part-time staff member, who is responsible to the Hocken librarian. The collection has adequate storage and accommodation.

Comments

As might be expected, the university collections are better off in terms of staffing, storage and accommodation than the nonuniversity collections. This reflects the attention they have been given, which has been previously outlined. Three of the map collections are part of the geography department and the map librarians are responsible to the department heads; the other three are part of the university library system.

By contrast, the two largest and most important government map collections in the country are very poor relations. This may reflect the fact that the map is regarded as a day-to-day working tool and that there is little awareness of its potential research value or its importance as part of New Zealand’s cartographic heritage. There is a dire need for education, not only to make the value of maps known but also to make all concerned map-conscious.
New Zealand

Map Librarianship in New Zealand

The present staff manning map collections have either library science qualifications, degrees in geography, a combination of the two, or no qualifications at all. There was no training conducted within New Zealand in library science until the New Zealand Library School was established in 1946. (The school was disbanded in 1979.) This school ran a one-year course in library science for graduates. The New Zealand Library Association sponsored a library technician correspondence course during which the student received on-the-job training while working in a library. The final part of this course was a session of six weeks at the library school. Since 1980 these courses have consisted of a graduate course at the Department of Librarianship, Victoria University of Wellington, and a technician course at the School of Library Studies, Wellington Teachers College.

Since 1968, lectures in map librarianship have been given to the graduate students by the map librarians of the Alexander Turnbull Library. From 1968 to 1977, this consisted of one 50-minute lecture yearly. After representations by the New Zealand Mapkeepers Circle, the time was extended in 1978-79 to three 50-minute lectures yearly; in 1980, two 50-minute lectures were given. There are no assignments; students are currently given a long reading list which is oriented toward helping them if they ever have to establish or take charge of an existing map collection. There are very limited opportunities for employment as a map librarian in New Zealand, and anyone seeking more extensive training must go overseas. The Department of Librarianship of Victoria University has options in its syllabus for such subjects as map librarianship, and any interested student can make an in-depth study in this field. Map librarianship training is not considered very important at the library schools in New Zealand, nor by book-oriented librarians. There is a tendency for these librarians to speak of books and nonbooks as "us and them"!

Map Librarian Seminars

Seminars in map librarianship began in November 1975 with the organization by the New Zealand Cartographic Society and Victoria University of Wellington of a two-day seminar entitled "The Changing Shape of Cartography in New Zealand." Map librarians were encouraged to attend this seminar, which was followed by a one-day session under the auspices of the Alexander Turnbull Library at the New Zealand Library School. The following day a visit was made to the
P.I. Barton

Department of Lands and Survey cartographic establishment. About twenty people attended this seminar at the library school. It was agreed that future seminars should be held, and that a mapkeepers' group within the New Zealand Cartographic Society should be founded, similar to that within the British Cartographic Society; the New Zealand Cartographic Society agreed to this proposal. This decision was made because some map librarians would probably not have been eligible to join the New Zealand Library Association, where, moreover, matters would only receive low priority treatment.

The next seminar was held at the University of Otago, Dunedin, in February 1977, and the emphasis was on the use of computers for map cataloging. At this seminar the New Zealand Mapkeepers Circle was formed, and the mapkeepers' group within the New Zealand Cartographic Society lapsed. Seminars have subsequently been held at the University of Waikato, Hamilton, in February 1978; at the University of Canterbury, Christchurch, in February 1979; and at the University of Auckland, in January-February 1980. In 1981 the seminar will be held at Massey University, Palmerston North, and in 1982 at Wellington. At the seminars a wide variety of papers and discussions on all aspects of maps and map librarianship are given; usually about twenty people attend. The circle has issued a newsletter twice yearly since 1977.

Conclusion

The main content of the map collections is of New Zealand. Does this reflect the introverted nature of New Zealand's cultural development or the insularity of the population because of the country's isolation in the South Pacific? The major external coverage is found in the map collections at the universities, which are geared to teaching. The only major collection of external material outside the universities is the large collection of maps of English-speaking and foreign countries held by the Department of Lands and Survey.

The major government map collections must be provided with qualified, knowledgeable and dedicated staff. The collections must be properly organized, cataloged and stored in suitable equipment in good, air-conditioned accommodation. Conservation facilities on a scale to handle the amount of work are also necessary. Adequate reference services with the necessary tools must be provided. Unfortunately, financing for such projects is very scarce.

There is a great need for the development of a national map collection which is available to all. The founding of a national map
collection and the development of a national union catalog of maps are important goals for the future. Barton, Marshall and Patterson, at the 1980 seminar, have each expressed thoughts on a national map collection. The combination of the two map collections in the Alexander Turnbull Library and the General Assembly Library would not make a true national collection such as those in the National Library of Australia, Canberra, and in the Public Archives of Canada, Ottawa. The potential for a national collection does exist, however, with the amalgamation of these two collections with the large printed map collection in the Department of Lands and Survey.

Barton has outlined a proposal for a union catalog of maps. The probable place for the development of a national union catalog of maps is in the National Library of New Zealand. Such a catalog should be on-line, but computer facilities do not exist in the National Library (as of April 1980), and are not likely to be available for some time. Therefore, a union catalog of maps must be considered as a long-term project.

In closing, it must be noted that the author of this paper is a public servant employed by the New Zealand government. The viewpoint expressed herein is a personal one and in no way should be construed as being official.

References

4. Ross, John O'C. *This Stern Coast; The Story of the Charting of the New Zealand Coast*. Wellington, Reed, 1969.
5. B.R. Patterson, Ph.D. student, Department of Geography, Victoria University of Wellington, is currently completing a doctoral thesis on the mapping of Wellington province. He has been engaged by the Department of Lands and Survey to write a two-volume history on the surveying, mapping, land administration, and settlement in New Zealand since 1840. This work should be completed in 1985.
9. Ibid.
10. Ibid.
11. Ibid.
P.L. BARTON

12. Ibid.
13. Ibid.
Map Collections and
Map Librarianship in Australia

DOROTHY F. PRESCOTT

In the Tauber Report, presented to the Australian Advisory Council on Bibliographical Services in 1962, the following comments appeared:

There has been a general neglect of maps which have been either regarded professionally and physically as problem material or disregarded entirely as insignificant. Professional or institutional incapacity, inability, or unwillingness to deal with maps is reflected by (1) the embryonic state of collections in most libraries, (2) omission of maps in professional library training, (3) separation of collections and librarians by departments or institutions having both, and (4) staffing of collections by non-librarians.

There is a dearth of published comment or record for the earlier years of this century with regard to map collections in Australia. For the purposes of this study, therefore, we shall take the Tauber Report as being indicative of what might have been found if the earlier years had been documented. Perspective may be added to this study by noting that the National Library in Canberra was created in 1960, although it grew out of the Commonwealth Parliamentary Library, founded in 1901. The other great collection, the Mitchell Library in Sydney, was founded in 1910. The state libraries of New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania were established between the years 1849 and 1889. However, maps were not collected systematically within any of the six state libraries until much later (see table 1). In 1961 only two general reference collections of any note existed in the country; these were the National Library and the Mitchell

Dorothy F. Prescott is Map Curator, National Library of Australia, Canberra.
## TABLE 1
### STATE LIBRARIES

<table>
<thead>
<tr>
<th>Library (and Year Map Librarian Appointed)</th>
<th>Year Collection Commenced</th>
<th>Staffing Prof.</th>
<th>Staffing Nonprof.</th>
<th>No. of Maps (1979)</th>
<th>Cataloging Code in Use</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales (1946)</td>
<td>General Reference, 1826</td>
<td>FT 1</td>
<td>PT 3</td>
<td>10,000</td>
<td>B &amp; L*</td>
<td>B &amp; L, with Mitchell</td>
</tr>
<tr>
<td></td>
<td>Mitchell, 1910</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Library expansion &amp; adaptation</td>
</tr>
<tr>
<td></td>
<td>Dixson, 1952</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>Since 1950s. Systematic acquisition commenced 1971</td>
<td>1</td>
<td>1</td>
<td>70,000 maps</td>
<td>AACR 1</td>
<td>B &amp; L, with Mitchell Library expansion &amp; adaptation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37,000 plans</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Australia (1967)</td>
<td>Maps held since 1836. Systematic acquisition commenced 1930</td>
<td>2</td>
<td>1</td>
<td>73,400</td>
<td>B &amp; L</td>
<td>B &amp; L, with Mitchell Library expansion &amp; adaptation</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Small collection until 1976, when systematic collection began</td>
<td>1</td>
<td></td>
<td>3,000</td>
<td>AACR 2</td>
<td>B &amp; L, with Mitchell Library expansion &amp; adaptation</td>
</tr>
<tr>
<td>Victoria (1970)</td>
<td>1856 (more intensive acquisition began 1970)</td>
<td>2</td>
<td>1</td>
<td>73,000</td>
<td>B &amp; L</td>
<td>B &amp; L, with Mitchell Library expansion &amp; adaptation</td>
</tr>
<tr>
<td>Western Australia (1978)</td>
<td>1960</td>
<td>2</td>
<td></td>
<td>8,100</td>
<td>AACR 2</td>
<td>LC</td>
</tr>
</tbody>
</table>

*B & L: Boggs and Lewis

Source: Data were obtained from a questionnaire, with the exception of figures of map holdings for South Australia, Tasmania and Victoria, which were obtained from the *Directory of Map Collections in Australia*, 3d ed. Canberra, National Library of Australia, 1980.
Library. The Tauber Report identified three functional groups of map collections: (1) general reference collections, which have already been mentioned, (2) teaching and research collections, and (3) collections of government departments or authorities. These groups represented "a disconnected series of narrowly specialised special map libraries staffed by a heterogeneous body of people of no common profession and with little outside contact." Within universities, maps were subjected to intensive use and exploitation, in contrast to libraries, where they were inspected rather than used. The Tauber Report identified the government collections as being the "outstanding national resource of maps." This description remains accurate today, as do many of Tauber's other comments. Librarians are severely criticized in the report on several counts: inadequate professional training; lack of knowledge in fields of study that are relevant to maps, resulting in a "cramping of vision untoward in a professional where breadth of vision and historic perspective are fundamental"; failure to demonstrate the efficiency of their systems and methods at an effective administrative level; and a reluctance to appreciate that map collections are often, in effect, special libraries lacking services and facilities which professional librarians are capable of rendering.

The Present Situation

The third edition of the Directory of Map Collections in Australia provides a good overview of the state of collections today. This edition lists 303 collections, as opposed to 226 in the second edition, 157 in the first edition, and 64 in the Tauber Report (see tables 2 and 3). Of the 303

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria</td>
<td>41</td>
<td>54</td>
<td>79</td>
</tr>
<tr>
<td>New South Wales</td>
<td>30</td>
<td>50</td>
<td>72</td>
</tr>
<tr>
<td>Australian Capital</td>
<td>12</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Territory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>19</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>Western Australia</td>
<td>19</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>South Australia</td>
<td>19</td>
<td>28</td>
<td>33</td>
</tr>
<tr>
<td>Tasmania</td>
<td>14</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>157</td>
<td>226</td>
<td>303</td>
</tr>
</tbody>
</table>

Source: Directory of Map Collections in Australia.
listed collections, 151 are located in the states of Victoria and New South Wales. Queensland, Western Australia and South Australia each have roughly half the number of collections found in either Victoria or New South Wales. If one includes the Australian Capital Territory with New South Wales, the two southeastern states of Victoria and New South Wales dominate the map library scene in Australia.

It is interesting to note that government departmental collections form over 51 percent of the total, the next largest group being university and college collections, with over 23 percent (see table 4). Thus, the comments in the Tauber Report remain basically true today. Government departments are still the outstanding national resource of maps and, together with the teaching collections, hold the majority of the country's map resources. The analysis of collections by type is worth closer scrutiny. The figures for industry and public libraries do not reflect the true situation, possibly due to a certain reluctance by these two groups to be listed in the Directory. In the case of the first group, this reluctance relates to a desire for privacy of information; and in the second case, the reasons advanced usually relate to the embryonic state of most collections within public libraries. This is a pity, because it is particularly the latter group which needs to be better known.

The most remarkable growth in collections is displayed in the academic group, where there is a 43 percent increase in the number of collections reported in the second edition of the Directory, and a 65 percent increase in the third edition. This situation can be attributed to
Australia

AND GEOGRAPHICAL DISTRIBUTION

<table>
<thead>
<tr>
<th>Western Australia</th>
<th>South Australia</th>
<th>Tasmania</th>
<th>Australian Capital Territory</th>
<th>Northern Territory</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>18</td>
<td>20</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>27</td>
<td>36</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Directory of Map Collections in Australia.

### TABLE 4

GROWTH IN NUMBER OF COLLECTIONS AND PERCENTAGE ANALYSIS BY TYPE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National and State</td>
<td>4</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Archives</td>
<td>7</td>
<td>13</td>
<td>14</td>
<td>4.6</td>
</tr>
<tr>
<td>University and College</td>
<td>9</td>
<td>30</td>
<td>43</td>
<td>71</td>
</tr>
<tr>
<td>Government</td>
<td>51</td>
<td>109</td>
<td>139</td>
<td>156</td>
</tr>
<tr>
<td>Industry</td>
<td>1</td>
<td>16</td>
<td>14</td>
<td>4.6</td>
</tr>
<tr>
<td>Public</td>
<td>1</td>
<td>1</td>
<td>30</td>
<td>9.9</td>
</tr>
<tr>
<td>Societies</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td>Private</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>157</td>
<td>226</td>
<td>303</td>
</tr>
</tbody>
</table>

Source: Resources of Australian Libraries; and the Directory of Map Collections in Australia.
two factors: first, the development of map collections within existing colleges and institutes of advanced education; and second, the natural growth that resulted from the establishment of many new colleges and institutes of advanced education by the Labor government in the mid-1970s.

The increase in numbers of government collections is mostly due to improved recording rather than to natural growth in this group. Government collections, particularly those concerned with map production, are usually as old as the departments themselves. It is particularly in respect to this group that the Directory is proving to be a valuable guide to those in need of specialized maps. A comparison of Australian and North American collections shows that while government collections are the predominant group in Australia (61 percent of the total number known, according to the second edition of the Directory), the comparable figure for North American collections is only 14 percent, or 104 collections.

A study of reported sheet holdings further underlines the trends identified above (see tables 5 and 6). The potential for growth in the figures reported for government collections is demonstrated by the fact that the total figure for this group takes no account of the holdings of more than sixty collections. The great collections in this group are those of the Registrar-General's Department and the Public Works Department of New South Wales, and the Titles Office of Victoria, collections of over 200,000 maps each. The only other collections in this category are those of the National Library and the Archives Authority of New South Wales. There are three collections with over 100,000 maps: the State Library of New South Wales, the Victorian Lands Department, and the Country Roads Board of Victoria. In the group of seven collections with over 50,000 maps are two university collections (Sydney and New England departments of geography), collections of the state libraries of Victoria and South Australia, and those of three government departments (Telecom and State Rivers in Victoria, and National Mapping in New South Wales). Collections with holdings of 25,000-50,000 maps are the Queensland State Archives, the Geological Survey of New South Wales, the Forests Commission of Victoria, University of Melbourne Baillieu Library, and Monash University Department of Geography. There are nineteen collections containing between 12,500 and 25,000 maps, but one-third of the collections listed hold fewer than 1000 maps each.

The archival collections are a most important group, and as yet one about which there is little information. These should ultimately
Australia

TABLE 5
TOTAL SHEET HOLDINGS BY TYPE OF COLLECTION
(IN THOUSANDS)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National Library</td>
<td>240</td>
</tr>
<tr>
<td>State Libraries</td>
<td>263</td>
</tr>
<tr>
<td>Archives</td>
<td>291.2</td>
</tr>
<tr>
<td>(7)*</td>
<td></td>
</tr>
<tr>
<td>University and College</td>
<td>512.4</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>15,661.6</td>
</tr>
<tr>
<td>(60)</td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>64</td>
</tr>
<tr>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>11.1</td>
</tr>
<tr>
<td>Societies</td>
<td>3.2</td>
</tr>
<tr>
<td>(1)</td>
<td></td>
</tr>
<tr>
<td>Total Sheets</td>
<td>17,046.5</td>
</tr>
<tr>
<td>(75)</td>
<td></td>
</tr>
</tbody>
</table>

*Figures in parentheses indicate number of collections which did not report holdings.


become the great map collections of the country, but as a group they have not to date assumed this role. Reasons for this state of affairs include inability to enforce archival deposit requirements, a lack of interest or a late appearance by archivists in the field of map collecting, and a dearth of personnel knowledgeable in map curatorship. The belated interest in these materials by archivists has resulted in some instances in the retention of archival maps by government departments which have assumed responsibility for their own collections of retrospective mapping. This is particularly evident in Victoria, which has the largest number of map collections and a huge number of maps controlled in this fashion. Within the archival collections there can be found, in addition to maps in document files, discrete collections of maps. The federated nature of Australian government is effectively responsible for the existence of fourteen archival collections, two in each state and one in each of the territories. The Australian Archives is the body responsible for Commonwealth government noncurrent records; it has branches in each state and also in the Australian Capital Territory and the Northern Territory. The maps held in each branch tend to reflect the region served by the branch, but this is not always so. The organization and functions of state archives vary from state to state. In some instances the archives is a branch of the state library; this is so in South Australia, Western Australia, Queensland, and Tasmania. Their responsibility is for state government noncurrent records; however, this does not in every case mean that they are responsible for collecting maps. South Australia, for example, leaves this function to the state library collection.
TABLE 6
SHEET HOLDINGS BY GEOGRAPHICAL DISTRIBUTION AND TYPE OF LIBRARY
(IN THOUSANDS)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Library</td>
<td>50.0</td>
<td>50.0</td>
<td>73.0</td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>—</td>
<td>10.0</td>
</tr>
<tr>
<td>University and College</td>
<td>(2)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
<tr>
<td>Government</td>
<td>381.0</td>
<td>14,380.1</td>
<td>14,434.1</td>
</tr>
<tr>
<td>Industry</td>
<td>(15)</td>
<td>(22)</td>
<td>(20)</td>
</tr>
<tr>
<td>Public</td>
<td>—</td>
<td>—</td>
<td>3.5</td>
</tr>
<tr>
<td>Societies</td>
<td>1.0</td>
<td>1.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>483</td>
<td>14,504.3</td>
<td>14,622.3</td>
</tr>
<tr>
<td>New South Wales</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Library</td>
<td>75.4</td>
<td>76.9</td>
<td>84.0</td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>207.0</td>
<td>225.0</td>
</tr>
<tr>
<td>University and College</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Government</td>
<td>153.5</td>
<td>189.0</td>
<td>216.0</td>
</tr>
<tr>
<td>Industry</td>
<td>(6)</td>
<td>(9)</td>
<td>(8)</td>
</tr>
<tr>
<td>Public</td>
<td>—</td>
<td>1.8</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>271.3</td>
<td>1059.8</td>
<td>1492.0</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Library</td>
<td>270.3</td>
<td>330.3</td>
<td>240.0</td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>University and College</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Government</td>
<td>25.5</td>
<td>40.5</td>
<td>29.4</td>
</tr>
<tr>
<td>Industry</td>
<td>(2)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Public</td>
<td>—</td>
<td>1.4</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>379.3</td>
<td>480.7</td>
<td>322.4</td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Library</td>
<td>30.0</td>
<td>50.0</td>
<td>73.4</td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>—</td>
<td>11.2</td>
</tr>
<tr>
<td>University and College</td>
<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
<tr>
<td>Government</td>
<td>22.1</td>
<td>25.8</td>
<td>38.0</td>
</tr>
<tr>
<td>Industry</td>
<td>—</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Societies</td>
<td>—</td>
<td>—</td>
<td>1.4</td>
</tr>
<tr>
<td>Total</td>
<td>105.7</td>
<td>145.8</td>
<td>270.5</td>
</tr>
</tbody>
</table>
TABLE 6—Continued

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Library</td>
<td>6.9</td>
<td>11.0</td>
<td>21.5</td>
</tr>
<tr>
<td>Archives</td>
<td>17.1</td>
<td>20.7</td>
<td>30.0</td>
</tr>
<tr>
<td>University and College</td>
<td>11.1</td>
<td>18.3</td>
<td>38.9</td>
</tr>
<tr>
<td>Government</td>
<td>8.7</td>
<td>24.4</td>
<td>21.0</td>
</tr>
<tr>
<td>Industry</td>
<td>—</td>
<td>4.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Public</td>
<td>—</td>
<td>—</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>43.8</td>
<td>78.7</td>
<td>116.2</td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td>(18)</td>
<td>(12)</td>
</tr>
<tr>
<td>Western Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Library</td>
<td>11.6</td>
<td>17.5</td>
<td>8.1</td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>—</td>
<td>14.2</td>
</tr>
<tr>
<td>University and College</td>
<td>28.9</td>
<td>11.5</td>
<td>72.3</td>
</tr>
<tr>
<td>Government</td>
<td>14.9</td>
<td>170.7</td>
<td>49.4</td>
</tr>
<tr>
<td>Industry</td>
<td>—</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Public</td>
<td>—</td>
<td>—</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>55.4</td>
<td>200.0</td>
<td>144.9</td>
</tr>
<tr>
<td></td>
<td>(14)</td>
<td>(17)</td>
<td>(11)</td>
</tr>
<tr>
<td>Tasmania</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Library</td>
<td>1.1</td>
<td>1.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>—</td>
<td>0.8</td>
</tr>
<tr>
<td>University and College</td>
<td>11.5</td>
<td>14.0</td>
<td>17.5</td>
</tr>
<tr>
<td>Government</td>
<td>11.0</td>
<td>7.4</td>
<td>12.6</td>
</tr>
<tr>
<td>Industry</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Public</td>
<td>—</td>
<td>—</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>23.6</td>
<td>22.8</td>
<td>34.9</td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(8)</td>
<td>(4)</td>
</tr>
<tr>
<td>Northern Territory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archives</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Government</td>
<td>—</td>
<td>—</td>
<td>10.9</td>
</tr>
<tr>
<td>College</td>
<td>—</td>
<td>—</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>—</td>
<td>—</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(5)</td>
<td>(3)</td>
</tr>
</tbody>
</table>

*Figures in parentheses indicate number of collections which did not report holdings. Source: *Directory of Map Collections in Australia.*
The National Library

The map collection is one of several collections of specialized materials developed by the National Library in Canberra. The library's holdings of maps were begun eighty years ago, and up to 1939 the emphasis of the collection was on historical mapping of Australia and the Pacific. The collection is rich in early engraved maps of the Australasian and Indian Ocean areas, having inherited the Nan Kivell, Petherick and Ferguson collections of these materials in the early years of this century. In 1973 the Tooley collection of maps of Australia was purchased by the library. These maps are listed in R.V. Tooley's *The Mapping of Australia*, published in 1979 by Holland Press Cartographica.5 With the advent of the Second World War, the library began to acquire more general mapping of areas involved in the war. By 1961, when the national and parliamentary libraries separated, there were 62,000 maps in the collection. Today the collection numbers approximately 250,000 maps and 500,000 aerial photographs, and has a staff of five. One of its more important functions is the publication of two cartobibliographies, *Australian Maps* and *Overseas Map Acquisitions*, both of which list currently produced maps received in the collection.10

The Mitchell Library

The map collection in the Mitchell Library is one of three maintained by the State Library of New South Wales in Sydney. Emphasis is on collecting for Australia, the Pacific and Antarctic areas. Many early and notable maps and atlases are held in the Mitchell collection, and for this reason it has earned the reputation of being one of the premier collections of Australiana. It has a staff of four who are also responsible for administering the general reference collection. The collection is the most completely cataloged in the country, and has been instrumental in recent years in providing guidance in this field to other libraries.

Future Trends

The economic climate today is not one in which collections can pursue their own interests regardless of others. This is demonstrated by the existence of cooperative acquisition programs between both individual libraries and groups of libraries in New South Wales and Victoria. Increasingly, therefore, we shall expect to find more regional specialization of resources, with collections concentrating on the acquisition of particular geographical areas or types of maps. The local public library can do this by collecting only for the immediate area in
depth, and supplementing this with a modicum of medium- and small-scale maps of other areas of interest to the library's clientele.

In the final analysis, this acquisition pattern will mean that a well-developed interlibrary loan system must be envisaged for the country, which will use both conventional and new techniques for transmitting information where it is required. In May 1976, a proposition to establish a cartographic information network was submitted by the Australian Map Curators Circle to the Director-General of the National Library. This is known as the ANCIS (Australian National Cartographic Information System) proposal, and recommends that assessments of map resources and user requirements be conducted on a national basis; that areas in need of rationalized collection development be identified down to the level of regional and local service points within states; and that the problems of establishing a central data bank of information be investigated by a body representative of all groups with an interest in cartographic resources. It further recommends that the current state of automated cataloging and the need for standardization of data elements be surveyed. Among other recommendations were the building up of color microfilm collections of rare and valuable maps, primarily in the field of Australian exploration, development and land settlement; the establishment of centers for conservation which would be advisory, practicing and teaching units; and the creation of map librarianship courses at both specialist and technician levels. All this is discussed under the heading of future developments, although it has been four years since these proposals were first put forward.

Map Librarianship—Education

At present in Australia there is a heterogeneous group of people working in map collections throughout the country. They include draftsmen, cartographers, surveyors, geographers, and librarians, supported by nonprofessional staff. This situation is, indeed, little changed from Tauber's 1961 description, with one or two minor improvements. No longer is it necessary for such people to work in isolation. Since the first Map Keepers' Seminar, which was organized by the National Library in 1973, the Australian Map Curators Circle has continued the dialogue begun at that meeting, and each year holds an annual conference for its members at which new trends and techniques are discussed, visits to map-producing agencies are arranged, and academic papers on many aspects of mapping and historical cartography are presented.

None of these people have been specifically trained for the work
they are doing, as no courses exist in Australia for the specialty of map librarianship. Such expertise as exists has been acquired by long familiarity gained during years of working with maps. A very few have been fortunate enough to receive training overseas, or have acquired a combination of qualifications in geography and librarianship together with years of practical experience working with maps in libraries. There has been little change to comment on since Cornelius's paper of 1978. Results of a questionnaire sent to twenty-four library schools and technical colleges in January 1980 indicate there are no fully developed courses on map librarianship taught in Australian library schools today, but maps are studied along with other material under aspects such as reference sources, bibliographical organization, selection, and storage. Attention is also given to cartographic materials in library technician courses, but again in a fairly general manner. Kuringai College of Advanced Education is about to introduce an elective in the second year of its Bachelor of Library Science program entitled “Visual Information Sources” which will permit students to study a particular medium in some depth. Maps are included in this program, which appears to offer the student an option similar to that available in the “Special Studies in Librarianship” unit in the second year of the bachelor program at Canberra College of Advanced Education. One further development of interest concerned a proposed postgraduate diploma course in map librarianship which failed to gain accreditation, not so much because of course content, but rather because of lack of experienced personnel to teach the course. Such a course, wherever it was set up in Australia, would need to consider the viability of inviting practicing map librarians as visiting lecturers in addition to any package programs available. Additionally, arrangements with a neighboring map collection for students to serve an internship of at least two months should be seriously considered.

What of courses outside the library schools? For the last four years, a course called “Cartographic Information Systems” has been offered within the Department of Surveying at the Royal Melbourne Institute of Technology (RMIT). The subject is taught as part of the Bachelor of Applied Science degree in cartography, but is available as a separate subject to students other than those in cartography. There are no special prerequisites. The broad aspects dealt with are maps and related documents, map producers and production, map documentation, map keeping, and map collections. The course runs for twenty-eight weeks, with one two-hour lecture per week, and is at present being reviewed to consider a reduction in the number of hours to twenty-eight one-hour
lectures supplemented by twenty one-hour tutorials. RMIT has also introduced the John Storey Junior Memorial Scholarship, which is for a cartography graduate undertaking the graduate diploma in librarianship. This is the first year of the award. At present, facilities such as these are only available in Victoria. Cornelius has identified a requirement for a small number of highly trained map librarians, who will in the future be responsible for the large map collections in the country. In addition to these, Cornelius identified a field for future development in most public libraries and educational institutions, which at present have no map resources but are eager to introduce these materials. Such institutions would benefit from staff attendance at short practical courses covering the basics of collection building, information organization and retrieval of cartographic material. This group is potentially large and could probably be catered to along with the much smaller group of practicing map librarians already in charge of modest collections. The Victorian Branch of the Australian Map Curators Circle (AMCC) is planning a one-day workshop directed at just such a group of people. To be effective, such workshops should be held regularly (about once a year) or packaged as a short course which can be presented by informed practitioners at various locations throughout the country. The AMCC recognizes the need for such action, but is physically handicapped by the scattering of its membership and the resulting difficulties of assembling a group to work on such a project. Under these circumstances, effort should be concentrated where the greatest return may be expected. For these reasons, the AMCC would be wise to concentrate its effort on catering to the groups identified above and to encourage RMIT to make its course on cartographic information systems more widely known.

Professional Associations

There are a number of professional bodies in Australia concerned with maps and mapping, each of which has a particular emphasis or approach to the medium. Among these are: the Australian Institute of Cartographers; the Institution of Surveyors, Australia; the Australian Photogrammetric Society; the Remote Sensing Association of Australia; and the Australian Map Curators Circle. Increased interest and participation in each other's meetings and activities has been noticeable in the past five years. Joint projects such as map user meetings have also been arranged, notably in Melbourne, by the Victorian Branch of the AMCC and the Institution of Surveyors, where three of these meetings
DOROTHY PRESCOTT

for the public have already been held.

The AMCC was founded in 1973 and is open to anyone with an interest in maps. It seeks to promote the development and effective exploitation of map collections throughout Australia; to improve the skills and status of persons working with maps; and to promote communication between producers, users and curators of maps. It is unique among associations of map librarians in that it opens its membership to map producers and users, and should perhaps be more aptly named the Australian Map Circle. In any case, it has been extraordinarily successful in establishing and maintaining dialogue with map producers and actively encourages their membership. This approach has helped to make publishers, particularly the federal and state mapping authorities, much more aware of the problems that obtain in managing map collections, and of the ways in which producers can help alleviate difficulties such as access to map information. (It is not simply a coincidence that the number and availability of official map lists has burgeoned in the past five years.) The group holds an annual conference, usually in a different city each year. The papers delivered at such conferences are issued in its journal, The Globe, which normally appears twice a year. For current events and news, the AMCC also publishes an occasional newsletter, which is issued when the need arises. It is included in the subscription to The Globe.

In the international sphere, Australia has had the opportunity to communicate through occasional attendance at the Geography and Map Libraries Section of the International Federation of Library Associations, and most recently through the Anglo-American Cataloguing Committee for Cartographic Materials. Such contacts act as a stimulus and are particularly significant for special groups such as map librarians; however, geographical isolation and the high cost of travel militate against on-the-spot participation by Australians in meetings held in the Northern Hemisphere. In the case of the International Cartographic Association, there has been no communication between this body and the AMCC until very recently, probably because Australia is already represented in this organization by the Australian Institute of Cartographers. At the present time, the New Zealand Mapkeepers Circle and the AMCC are discussing the possibility of a joint meeting within the next three years.

In retrospect, it is only seven years since the first meeting for map keepers was held in Australia. More has happened in those seven years than had occurred in the previous eleven years since the publication of the Tauber Report. Australia now has an association for map curators;
Australia

it holds regular annual conferences, publishes a journal and a newsletter, has a Directory of Map Collections, and issues several cartobibliographies. What Australia lacks is education for map librarians, a national union catalog and automated cataloging service—all of which are tied to the status of maps in libraries. It is here that effort is needed, most of all in gaining administrative support and acknowledgment of the intrinsic value of maps as concise, precise documents of value not only to history and social science, but also to science and technology.

References

5. Ibid., p. VIII-7.
14. Trask, Margaret (Head, School of Library and Information Studies, Kuringai College of Advanced Education), to Prescott, Feb. 1980.
15. Bertacco, J. (Senior Lecturer in Cartography, Department of Surveying, Royal Melbourne Institute of Technology), to Prescott, Feb. 7, 1980.
Additional References


This Page Intentionally Left Blank
## Partial List of Library Trends Issues in Print

<table>
<thead>
<tr>
<th>Title</th>
<th>Editor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>V. 11 N. 1 Library Boards</td>
<td>J Archer Eggen</td>
<td>July 1962</td>
</tr>
<tr>
<td>V. 12 N. 1 Public Library Service to Children in Selected Countries</td>
<td>Winifred C. Ladley</td>
<td>July 1963</td>
</tr>
<tr>
<td>V. 13 N. 1 Research Methods in Librarianship</td>
<td>Gary Garrison</td>
<td>July 1964</td>
</tr>
<tr>
<td>V. 14 N. 1 Metropolitan Public Library Problems Around the World</td>
<td>H.C. Campbell</td>
<td>July 1965</td>
</tr>
<tr>
<td>V. 15 N. 1 Government Publications</td>
<td>Thomas S. Shaw</td>
<td>July 1966</td>
</tr>
<tr>
<td>V. 16 N. 1 Cooperative and Centralized Cataloging</td>
<td>Esther J. Piercy</td>
<td>July 1967</td>
</tr>
<tr>
<td>V. 17 N. 1 Group Services in Public Libraries</td>
<td>Grace T. Stevenson</td>
<td>July 1968</td>
</tr>
<tr>
<td>V. 18 N. 1 Trends in College Librarianship</td>
<td>H. Vail Deal</td>
<td>July 1969</td>
</tr>
<tr>
<td>V. 19 N. 1 Intellectual Freedom</td>
<td>Everett T. Moore</td>
<td>July 1970</td>
</tr>
<tr>
<td>V. 20 N. 1 Personnel Development and Continuing Education in Libraries</td>
<td>Elizabeth W. Stone</td>
<td>July 1971</td>
</tr>
<tr>
<td>V. 21 N. 1 Trends in Archival and Reference Collections of Recorded Sound</td>
<td>Gordon Stevenson</td>
<td>July 1972</td>
</tr>
<tr>
<td>V. 22 N. 1 Analyses of Bibliographies</td>
<td>H.R. Simon</td>
<td>July 1973</td>
</tr>
<tr>
<td>V. 23 N. 1 Analysis of the Fields of Reading and Communication</td>
<td>Alice Lobier</td>
<td>Oct. 1973</td>
</tr>
<tr>
<td>V. 24 N. 1 European University Libraries: Current Status and Developments</td>
<td>Robert Vesper</td>
<td>April 1964</td>
</tr>
<tr>
<td>V. 27 N. 1 Collection Development in University Libraries</td>
<td>Jeraldine O.</td>
<td>Oct. 1966</td>
</tr>
<tr>
<td>V. 28 N. 1 Object-Oriented Development in the Library</td>
<td>Sarah K. Smygley</td>
<td>Apr. 1968</td>
</tr>
<tr>
<td>V. 29 N. 1 Abstracting Services</td>
<td>Foster E. Mohrhardt</td>
<td>Jan. 1968</td>
</tr>
<tr>
<td>V. 30 N. 1 School Library Services and Administration at the School District Level</td>
<td>Sara K. Smygley</td>
<td>Apr. 1968</td>
</tr>
<tr>
<td>V. 31 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 32 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 33 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 34 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 35 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 36 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 37 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 38 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 39 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 40 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
<tr>
<td>V. 41 N. 1 Young Adult Service in the Public Library</td>
<td>Audrey B.</td>
<td>Oct. 1968</td>
</tr>
</tbody>
</table>
Partial List of Library Trends Issues in Print*

<table>
<thead>
<tr>
<th>Title</th>
<th>Editor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>V. 23 N. 1 Health Sciences Libraries</td>
<td>Joan Titly Adams</td>
<td>July 1974</td>
</tr>
<tr>
<td>23 2 Library Services in Metropolitan Areas</td>
<td>William S. Budington</td>
<td>Oct. 1974</td>
</tr>
<tr>
<td>23 4 Resource Allocation in Library Management</td>
<td>Wolfgang Freitag</td>
<td>Apr. 1975</td>
</tr>
<tr>
<td>23 5 H. William Axford</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. 24 N. 1 Federal Aid to Libraries</td>
<td>Genevieve M. Casey</td>
<td>July 1975</td>
</tr>
<tr>
<td>24 2 Library Cooperation</td>
<td>Peace S. Grove</td>
<td>Oct. 1975</td>
</tr>
<tr>
<td>24 4 Commercial Library Supply Houses</td>
<td>Harold Roth</td>
<td>Apr. 1976</td>
</tr>
<tr>
<td>V. 25 N. 1 American Library History: 1876-1976</td>
<td>Howard W. Winger</td>
<td>July 1976</td>
</tr>
<tr>
<td>25 4 Trends in the Scholarly Use of Library Resources</td>
<td>Benjamin F. Page</td>
<td>Apr. 1977</td>
</tr>
<tr>
<td>V. 26 N. 1 Library Services to Correctional Facilities</td>
<td>Jane Pool</td>
<td>Sum. 1977</td>
</tr>
<tr>
<td>26 2 Trends in the Governance of Libraries</td>
<td>F. William Summers</td>
<td>Fall 1977</td>
</tr>
<tr>
<td>26 3 Institution Libraries</td>
<td>Harris C. McCluskey</td>
<td>Win. 1978</td>
</tr>
<tr>
<td>26 4 Publishing in the Third World</td>
<td>Phillip G. Altbach</td>
<td></td>
</tr>
<tr>
<td>26 5 Kirsh Smith</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. 27 N. 1 Films in Public Libraries</td>
<td>John A. McCrossan</td>
<td>Sum. 1978</td>
</tr>
<tr>
<td>27 2 State Library Development Agencies</td>
<td>Phyllis Dain</td>
<td>Fall 1978</td>
</tr>
<tr>
<td>27 3 Libraries and Society</td>
<td>Margaret F. Stieg</td>
<td>Win. 1979</td>
</tr>
<tr>
<td>27 4 Study and Collecting of Historical Children's Books</td>
<td>Selma K. Richardson</td>
<td>Spgr. 1979</td>
</tr>
<tr>
<td>V. 28 N. 1 Economics of Academic Libraries</td>
<td>Allen Kent</td>
<td>Sum. 1979</td>
</tr>
<tr>
<td>28 2 Emerging Patterns of Community Service</td>
<td>Jacob Cohen</td>
<td></td>
</tr>
<tr>
<td>28 3 Library Consultants</td>
<td>K. Leon Mongomony</td>
<td></td>
</tr>
<tr>
<td>28 4 Current Trends in Rural Public Library Service</td>
<td>Margaret Monroe</td>
<td></td>
</tr>
<tr>
<td>28 5 H. Leith Mason</td>
<td>Kathleen M. Heim</td>
<td>Fall 1980</td>
</tr>
<tr>
<td>28 6 H. Houlahan</td>
<td>Elsworth E. Mason</td>
<td>Win. 1980</td>
</tr>
<tr>
<td>V. 29 N. 1 Current Library Use Instruction</td>
<td>A.P. Marshall</td>
<td>Sum. 1980</td>
</tr>
<tr>
<td>29 2 Library Services to Ethnicultural Minorities</td>
<td>Leonard Wertheimer</td>
<td>Fall 1980</td>
</tr>
<tr>
<td>29 3 Map Librarianship and Map Collections</td>
<td>Mary Lynette Larsgaard</td>
<td>Win. 1981</td>
</tr>
</tbody>
</table>

* A complete list of back issues is available from Library Trends, Publications Office, 249 Armory Building, University of Illinois, Champaign, Ill. 61820.
† Also available in clothbound editions.
Forthcoming numbers are as follows:


Winter 1982, *Data Libraries for the Social Sciences*. Editor: Kathleen Heim, Assistant Professor, University of Illinois at Urbana-Champaign.