SEARCHING THE SOCIAL SCIENCE LITERATURE ON WATER: A GUIDE TO SELECTED INFORMATION STORAGE AND RETRIEVAL SYSTEMS - PRELIMINARY VERSION

by
Fred Hogge and Norman Wengert

September 1972

ENVIRONMENTAL RESOURCES CENTER

Colorado State University
Fort Collins, Colorado

SEARCHING THE SOCIAL SCIENCE LITERATURE ON WATER:
A GUIDE TO SELECTED INFORMATION STORAGE AND
RETRIEVAL SYSTEMS - PRELIMINARY VERSION

by

Fred Hogge and Norman Wengert
Department of Political Science

submitted to

submitted to

WATER RESOURCES SCIENTIFIC INFORMATION CENTER
Office of Water Resources Research
U. S. Department of Interior
Washington, D. C.   20240

September, 1972

Colorado Water Resources Research Institute
Colorado State University
Fort Collins, Colorado   80521

Norman A. Evans, Director

PREFACE

This GUIDE is a by-product of a state-of-the-art survey and
literature review on the topic "Institutions for urban-metropolitan
water planning, development, and management" undertaken with the
joint support of the Water Resources Scientific Information Center
(Office of Water Resources Research, U.S. Department of the Interior)
and Colorado State University. The principal investigator for the
project has been Professor Norman Wengert, Department of Political
Science, Colorado State University. Mr. Fred Hogge was a graduate
research assistant on the project for one year and during that time
produced the first draft of this GUIDE.

This version of the GUIDE is entitled "preliminary," to suggest
that an ultimate final version should benefit from comments,
suggestions and criticisms that may result from its use by research
workers. Such comments, suggestions and criticisms are specifically
invited. In addition, the Principal Investigator (Wengert) intends
to solicit such inputs so that in due course a more useful and usable
GUIDE may be produced.

This particular state-of-the-art survey was undertaken because
there appeared to be a growing recognition that institutions and
institutional arrangements were important to the realization of water
programs and policies. Thus, for example, the National Water
Commission was mandated in its statute to consider institutional
dimensions of water problems, and is devoting considerable attention
to the subject. Similarly, frequent reference to the relationship
of institutions to achievement of water policies has been made by the
Water Resources Council. Moreover, terms like "institution," "insti-
tutionalization," "institutional arrangements," and "institutional
constraints: are becoming common in water literature. Thus it seemed
desirable to examine what was meant by these terms, to review what has
been written on the subject, and to identify research needs and
opportunities.

It became apparent early in the investigation, however, that there
was no commonly accepted definition of the term "institution" (or of
its several variants), either as used in the literature on water, or in
more general social science literature. Evidence mounted, in fact,
that the term in many cases was simply a handy synonym for "organi-
zation." In others, it was used without much meaning at all. In still
others, the term was a kind of "catch-all," when confronted with
behavioral or societal problems which could not readily be solved.
Labelling a problem as "institutional" was a way of recognizing
important variables which could not be dealt with.

If the term "institution" is not carefully defined, then it is not clarified by prefixing other words to it, such as "water" or "legal" or "economic" or "social."

This problem of the meaning, scope, and content of the terms "institution" and its several variants, led to a realization that the search for relevant literature would be much more complicated than had been originally expected. It would not be possible, for example, simply to use the term "institution" as a key word and expect to find the relevant references. Instead, it became clear that the search would need to be much more comprehensive, and would involve a much wider range of disciplines and journals. Most importantly, the search would need to be concerned with inferrentially related topics. It was this realization that led to a thorough review of information storage and retrieval systems, particularly those in the social sciences. And this then led to the preparation of this GUIDE.

It should be emphasized that the project proceeded on the premise that the term "institution" was a useful one; that it could be clarified and given more precise meaning. This premise, in turn, rested on the belief that water management in urban-metropolitan areas requires human collaboration in regular and systematic ways, and that societal arrangements (not simply organization) and human behavior with respect to urban water is governed by norms and customs and can be researched in meaningful ways. These premises have continued to be a kind of working definition of "institutions" for this state-of-the-art review. (The concept is discussed in greater detail in the project report and in the set of essays by scholars from various disciplines.)

This GUIDE has three purposes: (a) to suggest some of the dimensions of the information storage and retrieval problems in the social sciences; (b) to indicate the progress that is being made to improve information storage and retrieval systems in the social sciences; and (c) to describe some of the presently available systems of particular utility to investigators dealing with water problems.

Because the systems reviewed include some that are well-established and quite familiar, as well as some of the newer, developing systems, and because the descriptions of these systems are in general terms, the GUIDE may be useful to others besides those interested in water problems. It is possible, for instance, that the GUIDE could be useful to anyone seeking an overview of social science information systems, whether their interests are in institutions, in water, or in other problems of the social and behavioral sciences.

Responsibility for the GUIDE belongs to the principal investigator under whose direction it was prepared.

Norman Wengert

TABLE OF CONTENTS

Chapter One

INTRODUCTION

The Literature "Deluge"

It is a commonplace observation that scientists in most disci-
plines are finding it more and more difficult to keep abreast of
relevant research literature in their fields of interest. Span of
attention limitations together with increased specialization con-
verge to encourage focusing on smaller and smaller problems. For
awhile this provides a temporary respite, but in a short time
literature on specialized subjects soon exceeds the capacity of
the specialist to keep informed. In addition, of course, most
scientists feel an obligation to keep informed on linkages to other
fields and disciplines. Thus the problems seem to grow even more
complex.

The quantity of research literature is said to double every
8½ years. This growth is evident in the increase in number of
scientific journals (as well as in their size and frequency). For
example, the 1924 edition of the World List of Scientific Periodicals
contained 24,000 titles; the 1952 edition listed 50,000 titles; and
it has been estimated that by 1979 the total number will be about
100,000.

The problem is not unique to the United States. It has been
reported that Soviet Scientists complain that they are able to devote
only about 35 percent of their time to experimental work. The balance
of their time is devoted to reading articles, writing articles, partici-
pating in conferences, and similar communication activities.

A causal factor is obviously the increasing rate of expenditure
for research and development. In a recent ten year period, for
instance, the annual outlay for R&D in the U.S. increased three fold--
to seventeen billion dollars--by the end of the period. But a concern
is being expressed that the United States may be approaching a decline
in research productivity (and perhaps in quality), since the growth in
personnel involved in research has not been keeping pace with expendi-
ture increases. Financial support has been rising 15 percent a year,
but technical manpower involved in research has been increasing only
6 percent per year. Behind these trends are the turning away from
"science" by significant segments of the public, as well as the more
subtle impact of inflation.

In any event, the amount of research information now available is
so large that its very immensity probably prevents its most effective
use. As a consequence, if available information is not used, a large
amount of research time may be consumed in repeating work others have

already done. To avoid such duplication, and to insure that new research supplements and extends work already completed, research information must be readily available. Recognition of this need has given a major impetus to the development of information storage and retrieval systems which represent an effort to reduce the problem by the application of management and technology.

Greater progress in information storage and retrieval has been made in the "hard" sciences than in the social sciences. This reflects both differentials in financial support and differentials in the structure of the various disciplines. Although much lip service is paid to the idea that the most pressing problems of our current era are societal, fund allocations continue to be made more readily to fields directly related to the physical aspects of our system.

Types of Information Systems

The discussion from this point on focuses on information storage and retrieval developments relevant to the social sciences, although certainly some of the descriptive material also applies to other fields.

In broad terms, information systems may be categorized as either "traditional" or "new."

The library card catalog is an example of a traditional system. Topical bibliographies, either the terminal ("one-shot") variety or the continuous, periodical type, have also been with us for a long time. Published indexes, such as the Readers Guide to Periodical Literature, The Industrial Arts Index, or the New York Times Index, are other examples of traditional information retrieval systems.

The newer type of information systems take a variety of forms and use a variety of techniques, and relatively more emphasis is placed on the newer systems in this GUIDE.

One type that has recently been introduced involves the reproduction of the tables of contents of selected journals. Examples (to be described more fully in later chapters) are ABC POL SCI and CURRENT CONTENTS. Another type of system (well established in many of the "hard" disciplines, but relatively new in the social sciences) are the periodicals devoted to publishing literature abstracts. These seek to summarize and bring together in brief or abstract form information from a number of other journals, periodicals, books and research reports. Examples are Sociological Abstracts and the Journal of Economic Literature.

Water Resources Abstracts cover the entire subject field, include many "social science" references, and illustrate a kind of interdisciplinary or subject oriented approach similar to chemical abstracts.

Another obviously new approach is that which involves the use of computers for storage and retrieval. The newness is in the technology, and not particularly in the way in which the information is organized. Included in this category are the indexes, such as that for the American Political Science Review based on the "Key-Word-in-Context" (KWIC) approach. Another is the so-called "Datrix" system ("Direct Access to Reference Information: A Xerox Service") which stores and retrieves Ph.D. dissertation titles compatible with _Dissertation Abstracts_, both systems being published or made available by the same company (University Microfilms). These and other systems are explained more fully in subsequent chapters.

Because of the substantial number of systems now available in the social sciences or dealing with public policy issues, it is apparent that the task of informing potential users about these systems is indeed formidable. This is a major purpose of this GUIDE. At the same time, it is worth emphasizing that its coverage does not purport to be complete, if for no other reason than that new systems are appearing with considerable frequency. Hence it is important to echo a disclaimer made in one of the directories published by the National Referral Center for Science and Technology in the Foreword to its report on the _Social Sciences_: ". . . . There are other important information activities in the social sciences with which contact has not been established." But perhaps this present GUIDE represents a beginning.

A Preview

This GUIDE has necessarily been selective in the presentation of storage and retrieval systems. Only a few systems are described in detail, chiefly those relevant to an exploration of the social and behavioral aspects of water problems.

The following chapter describes some of the efforts that have been made in the social sciences to manage the previously described information explosion. Kenneth Janda and some of his students of Northwestern University are playing a prominent role with respect to retrieval in political science. Some details of his information retrieval application to political science will be described. William A. Welsh, formerly of the University of Georgia and now with the University of Iowa, adapted Janda's techniques for use at Georgia's Political Data Analysis Center. Welsh's so-called Georgia Project, starting in 1966, in information retrieval will be described in Chapter Two. The January and February, 1967 issues of _American Behavioral Scientist_ (edited by Janda) reviewed information retrieval developments in the social sciences

to that period. Approximately a dozen articles (including one each by Janda and Welsh) are in this two-issue series and a review of these issues will also be included. In the concluding portion of the chapter reference is made to the "information awareness" approach of special publications, for example, Current Contents, and ABC POL SCI. These are described in more detail in Chapters Three and Four.

Chapter Three covers eight of the generalized information systems or sources. The National Referral Center for Science and Technology is an example of one in this category.

In Chapter Four, on the other hand, the systems are focused on specific disciplines or subjects. Thus, the Universal Reference System covers political science areas, while the subject of "water" is indicated in the titles of three other systems, for example those produced by the American Water Resources Association.

Chapter Five covers bibliographies and a number of examples of other information retrieval aids relating to social science fields and applicable to research in metropolitan water planning, development and management.

Chapter Two

INFORMATION SYSTEMS IN THE SOCIAL SCIENCES

Social scientists, like scientists in the physical and biological disciplines, are not simply "giving up" in the face of formidable burdens of organizing and disseminating the growing mountain of information relating to their respective fields. Despite the presently bleak evidence pointing to the impossibility of ever "catching up" in the information management area, some significant efforts are being made to apply management and technology to the situation. A few examples of such efforts will be reviewed briefly in this chapter.

Kenneth Janda[1]

Janda's efforts in the information retrieval area have emphasized application rather than the technology involved in setting up the

---

[1]Information in this section is based on Janda's Information Retrieval: Applications to Political Science (Indianapolis: The Bobs-Merrill Company, Inc., 1968).

programs involved. The use of the key-word-in-context (KWIC) system
of information retrieval in the political science area has constituted
the major thrust of Janda's work at Northwestern University. But he has
also applied other information retrieval systems in his classes and
seminars at Northwestern, for example, key-word-out-of-context (KWOC)
and Technique for Retrieving Information from Abstracts of Literature
(TRIAL). The KWIC system, which was developed by H. P. Luhn of IBM
in the late fifties, is computer based. It has been used by Janda for
two major projects: (a) indexing the first fifty-seven volumes of the
American Political Science Review (1906-63), and (b) indexing the first
ten volumes of the Midwest Journal of Political Science (1957-66).
Janda describes the operation of the KWIC system best in reference to
his cumulative index of the Midwest Journal of Political Science.[2]

The citation for almost two hundred articles published in this
journal since its beginning in 1957 were recorded on punchcards. Dif-
ferent "classes" of cards were used for keypunching different types of
information. Authors names were keypunched on class 1 cards, titles on
class 2 cards, and sources (publication data) on class 3 cards.
Operating under a specialized bibliographic data processor (BIDAP)
program, the computer was instructed to prepare an alphabetical listing
of all keywords in the titles and to print out those keywords in con-
junction with part or all of the titles in which they occur.

For a KWIC index printout, such as that produced for the Midwest
Journal of Political Science, the computer may be instructed to
"decide" what constitutes a keyword in one of two ways. It can be
instructed either to refer to a list of keywords prepared in advance by
the researcher, or to a list of words that are not to be considered
keywords. In the first case, the computer looks at every word in the
title and compares it with its own stored list of keywords. Words in
the titles that match this list are then selected for indexing. The
process operates in a comparable way when a list of non-keywords (words
prevented from indexing) is used: the computer includes the word in
the index only when it does not appear in the list. Janda used the
latter technique for the Midwest Journal index. A sample from this
index is reproduced on the following page. A careful examination of
this printout is recommended as the fastest and most efficient means of
obtaining a "working" knowledge of the KWIC system and its potential
value to the user.

---

[2]Ibid. pp. 4-7.

KEYWORDS

```
     FEDERAL JUDICIAL SELECTION-- THE WORK OF THE  ABA COMMITTEE.=                                        GROSSMAN J 08-A-64
                                     ON THE  ABUSES OF POWER IN DEMOCRATIC STATES ( THEORY ).  SPITZ D    01-N-57
OYEES ).= POLITICAL EXPRESSION UNDER THE HATCH  ACT AND THE PROBLEM OF STATUTORY AMBIGUITY( UNIT  NELSON DH  02-F-58
                                  POLITICAL  ACTIVISM IN A RURAL COUNTY.=                        ALTHOFF P  10-F-66
                                    PARTY  ACTIVISM IN WISCONSIN.=                               EPSTEIN LD 01-N-57
HE VOTING IS OVER ( TRANSITION OF PRESIDENTIAL  ADMINISTRATION ).=                       AFTER   LONG NE    06-M-62
E CHARACTERISTICS AND LEGISLATIVE OVERSIGHT OF  ADMINISTRATION.=                        COMMITT  RIBBY JF   10-F-66
  POLICY MAKING BY GOVERNMENT AGENCIES (PUBLIC  ADMINISTRATION,BUREAUCRACY).=                    BOYER WW   04-A-60
AS IN THE RHODESIAS.=                           ADOPTION OF POLITICAL STYLES BY AFRICAN POLITICI  SCARRITT J 10-F-66
CONGRESSIONAL RESISTANCE TO REFORM-- THE HOUSE  ADOPTS A CODE FOR INVESTIGATING COMMITTEES.=     HEUREL EJ  01-N-57
  1958 GENEVA CONFERENCE OF EXPERTS ( TECHNICAL  ADVISORS ).=        SCIENTISTS AS NEGOTIATORS-- TH  STRICKLA D 08-N-64
TIVE RELATIONS.=                                AEC AND CONGRESS-- A STUDY IN EXECUTIVE - LEGISL  NIEBURG HL 06-M-62
                        THE EISENHOWER  AFFAIR IN PERSPECTIVE ( GERMANY ).=                       GIMMEL J   09-A-65
                          THE SPIEGEL  AFFILIATION AND IMAGERY ACROSS TWO RELATED GENER  DODGE RW   06-A-62
IZATION AND CHILDREN#S ATTITUDES ).= POLITICAL  AFRO - ASIAN WORLD.=            THE CHANGING SOVI  CARLISLE D 08-N-64
T PERCEPTION OF THE DEVELOPMENT PROCESS IN THE  AGE FACTOR IN THE 1958 CONGRESSIONAL ELECTIONS.=  WALKER DB  04-F-60
                                   THE  AGENCIES (PUBLIC ADMINISTRATION,BUREAUCRACY).=  BOYER WW   04-A-60
           POLICY MAKING BY GOVERNMENT  AGENCIES AND AN APPROPRIATIONS SUBCOMMITTEE-- A  SHARKANS I 09-A-65
OMPARATIVE STUDY OF BUDGET STRATEGIES.= FOUR   AGREEMENT BETWEEN JUSTICES OR LEGISLATORS.=        MACRAE D   10-F-66
              INDICES OF PAIRWISE  AGRICULTURE ).=            THE COMMODITY CREDIT C  WILLIAMS O 01-A-57
RPORATION AND THE 1948 PRESIDENTIAL ELECTION (  AGRICULTURE ).=                                 P  GILPATRI T 03-N-59
ICE SUPPORT POLICY AND THE MIDWEST FARM VOTE (  AGRICULTURE APPROPRIATIONS COMMITTEE ).=          JONES CO   06-N-62
   THE ROLE OF THE CONGRESSIONAL SUBCOMMITTEE (  AID AND THE NATIONAL INTEREST.=                   PACKENHA R 10-M-66
                            FOREIGN  AID TO INDIA.=                        INTERAGF  RIPLEY RB  08-M-64
CY COMMITTEES AND INCREMENTALISM-- THE CASE OF  ALEXANDER HAMILTON AND THE AMERICAN TRADITION (T  LIVINGST J 01-N-57
EORY).=                                         ALTERNATION REFERENDA.=                           JOYNER C   02-M-58
           AUSTRALIAN POLITICS AND CONSTITUTION  AMBIGUITY( UNITED STATES CIVIL SERVICE, GOVERNME  NELSON DH  02-F-58
DER THE HATCH ACT AND THE PROBLEM OF STATUTORY  AMENDMENT, PRESIDENTIAL ELECTION ).= HUBERT HUMP  GOLDMAN RM 02-F-58
L FOR ELECTORAL COLLEGE REFORM( CONSTITUTIONAL  AMERICA.=                                  POLIT  ANDERSON C 05-N-61
CS AND DEVELOPMENT POLICY IN CENTRAL ( LATIN )  AMERICA.=            TAXES ON THE ##EXTERNAL## SEC  KLING M    03-M-59
OR-- AN INDEX OF POLITICAL BEHAVIOR IN LATIN -  AMERICA.=                                          MILLER WE  02-A-58
             THE SOCIO-ECONOMIC ANALYSIS OF (  AMERICAN ) POLITICAL BEHAVIOR.=                   DYE TR     08-N-64
ION-- CONDITIONS ASSOCIATED WITH ANNEXATION IN  AMERICAN CITIES.=          URBAN POLITICAL INTEGRA  SCHUBERT G 02-F-58
E PUBLIC INTEREST IN JUDICIAL DECISION-MAKING(  AMERICAN LAW ).=                THE THEORY OF T   SCHLESIN J 01-M-57
                       LAWYERS AND  AMERICAN POLITICS-- A CLARIFIED VIEW.=               SIGEL RS   10-F-66
                     IMAGE OF THE  AMERICAN PRESIDENCY.=                            EULAU H    03-M-59
        THE POLITICAL SOCIALIZATION OF  AMERICAN STATE LEGISLATORS.=                      LIVINGST J 01-N-57
          ALEXANDER HAMILTON AND THE  AMERICAN TRADITION (THEORY).=                     SEIDLER M  05-A-61
               THE SOCIALIST PARTY AND  AMERICAN UNIONISM ( INTEREST GROUPS ).=         SMITH JM   01-M-57
         FREEDOM AND AUTHORITY IN THE  AMPHIBIAL STATE ( THEORY ).=                     BELKNAP GM 02-N-58
                  A METHOD FOR  ANALYZING LEGISLATIVE BEHAVIOR.=                    ALBINSKI H 02-F-58
       THE PLACE OF THE EMPEROR ASOKA IN  ANCIENT INDIAN POLITICAL THOUGHT( BUDDHISM ).=  ALBINSKI H 02-F-58
TICAL INTEGRATION-- CONDITIONS ASSOCIATED WITH  ANNEXATION IN AMERICAN CITIES.=        URBAN POL  DYE TR     08-N-64
```

KWIC computer output: sample keyword listing from the cumulative
index to the **Midwest Journal of Political Science.**

The Georgia Project[3]

William A. Welsh, formerly with the University of Georgia, and presently at the State University of Iowa (Iowa City), conceived and directed the Georgia project while he was director of the Political Data Analysis Center at that university. Welsh begins his description of the Georgia project by placing it in a broader context of information management in existence at Georgia in the mid-1960's:

> ...The project utilizes modification of computer
> programs developed elsewhere, especially at North-
> western University and by the IBM Corporation.
> The Georgia Project differs somewhat from efforts
> underway at other universities in three particulars.
> First, it utilizes students in undergraduate and
> graduate courses as researchers and abstracters.
> Second, and relatedly, the Georgia Project is part
> of a broader program of formal instruction for under-
> graduates in the uses of electronic data processing
> equipment. Third, the computer programs used in
> manipulating data have been modified in an effort
> to make master tape files amenable to use with
> different types of data retrieval systems now in
> operation.[4]

Welsh chose the TRIAL system (Technique for Retrieving Information from Abstracts of Literature) as the computer technique for the Georgia Project. The pilot project, initiated in April, 1966, involved a class of thirty students in Welsh's Eastern European Political Systems course. Each student was assigned several years' issues of a profession- al journal likely to contain relevant articles and was asked to prepare two or three abstracts per week. During the course Welsh's class prepared an average of fifty usable abstracts. After the abstracts were approved for use in the TRIAL system, they were punched onto data processing cards, and transferred to magnetic tape at the University Computer Center. It was then possible to ask the computer to search the accumulated abstracts for any word, combination of words, or topic in which a student or faculty member might be interested. The computer could then examine all abstracts stored in its memory, select those containing the specified words or phrases, and print out those abstracts.

---

[3]Information in this section is derived from William A. Welsh, "The TRIAL System: Information Retrieval in Political Science," American Behavioral Scientist, January 1967, pp. 11-24.

[4]Ibid., p. 11.

After the TRIAL pilot project proved successful, the system was utilized in several other political science courses at the University of Georgia.

Welsh summarized the research benefits of the TRIAL system as utilized in the Georgia project as follows:

> In addition to the pedagogic advantages of TRIAL, there seem to be important research advantages evolving. Perhaps most important, the interest generated by this project in information retrieval and other data processing applications helps us to develop a substantial core of knowledgeable under-graduate (as well as graduate) students who contri-bute significantly as assistants to departmental re-search projects. The University has been willing to support the time of these assistants, and this has aided our data retrieval work considerably. Second, as the SDI (Selective Dissemination of Information) segment of the project becomes routinized, we anti-cipate significant reduction in the time spent by both faculty and students in bibliographic research .... Relatedly, third, we anticipate a significant theory-building contribution for these kinds of in-formation retrieval systems. The important contri-bution of TRIAL to propositionalizing and synthesiz-ing the existing literature in political science cannot be overstated. And by determining what <u>has</u> been done, we should be able to isolate those areas of neglect which demand attention.[5]

American Behavioral Scientist

The January and February (1967) issues of <u>American Behavioral Scientist</u> were devoted to the topic, "Advances in Information Retrieval in the Social Sciences." The Series, edited by Kenneth Janda, includes a brief report on his previously described information retrieval projects at Northwestern University. Welsh's Georgia project is also included in the series. Space limitations prevent a detailed discussion of the remaining eleven articles in this series. But the articles' titles and authors are reproduced here, elaborated only as appropriate by Janda's brief notations of the thrust of each article, and omitting further reference to his and Welsh's articles contained in the series.

---

[5] <u>Ibid</u>., p. 22.

January (1967) issue.

1. Hesung C. Koh, "A Social Science Bibliographic System:
   Computer Applications," (Computerization of a social
   science bibliography on Korea.)

2. Oswald Werner, "Systematized Lexiography or 'Ethnoscience':
   The Use of Computer Made Concordances," (Compilation of
   a dictionary of Navaho medical terms.)

3. Allen R. Wilcox, Davis B. Bobrow, and Douglas P. Bwy,
   "System SESAR: Automating an Intermediate Stage of
   Survey Research." (Retrieval of data from banks of
   sample surveys on public opinion toward national security.

4. Eugene Garfield and Irving H. Sher, "ASCA (Automatic
   Subject Citation Alert): A New Personalized Current Aware-
   ness Service for Scientists." (Employment of citation
   indexing in a personalized reference subscription service.)

February (1967) issue.

1. Alfred de Grazia, "Continuity and Innovation in Social
   Science Retrieval: Illustrations from the Universal
   Reference System."

2. Thomas J. Condow, "Computers, Traditional Research, and
   the American Council of Learned Societies."

3. Frieda B. Libaw, "Information Handling in the Behavioral
   Sciences: Report of a First Convocation of a Conglomerate
   Clan." (A conference report which includes a useful
   inventory of information retrieval activities.)

4. John F. Vinsonhaler, "BIRS: A System of General Purpose
   Computer Programs for Information Retrieval in the
   Behavioral Sciences," (An announcement of a series of
   FORTRAN computer programs for information retrieval.

5. James S. Aagaard, "BIDAP: A Bibliographical Data Pro-
   cessing Program for Keyword Indexing."

6. Donald G. Morrison, "The Human Relations Area Files
   Index."

7. Carl Beck and Douglas K. Stewart, "Machine Retrieval of
   Bibliographical Data." (A data retrieval example involv-
   ing Eastern European political elites.)

Publication of Social Science Abstracts and Tables of Contents

The publication of abstracts in the various social science disciplines is perhaps the most firmly established and familiar effort for keeping up with what is being published. Book and article summaries naturally make up the great majority of these abstracts. Since this is a familiar information "system," only three examples in this category will be briefly summarized.

The Journal of Economic Literature is published quarterly by the American Economic Association. Prior to 1968 it was called the Journal of Economic Abstracts. The principal change, beginning with the name change in 1969, was the publication of complete articles in addition to abstracts. Most of the space is still devoted to the latter, however. In the December, 1970 issue for example, 72 pages were devoted to articles. The remaining 310 pages of this issue were devoted to abstracts and indexes under four major headings: Book Reviews; New Books: An Annotated Listing; Current Periodicals; and General Index.

None of the political science journals publish abstracts, but book reviews are regularly included. The Political Science Quarterly, published by the Academy of Political Science at Columbia University, devotes more space to abstract type materials than do the other political science journals. In the June 1971 issue, for example, more than one-half of the 200 plus pages were devoted to "Book Reviews" and "Book Notes." Four articles took up the remaining pages.

Sociological Abstracts is co-sponsored by the American Sociological Association and three other sociological groups. As the name implies, this publication is devoted exclusively to abstracts. It is world-wide coverage. There are six issues annually, including a cumulative index. The subject matter is broken down into twenty-seven categories. Examples of these categories having particular interdisciplinary interest are: 0600 - complex organizations (management); 0900 - political interaction; 1100 - rural sociology and agricultural economics; 1700 - sociology of science; and 2300 - community development.

A more recent development in the continuing effort to "keep up" with the information explosion is the appearance of publications devoted exclusively to the reproduction of tables of contents of various journals in particular fields of interest. ABC POL SCI, Current Contents and Hydata are examples of such publications. Since these will be described in detail in the next chapters, they are merely cited here as examples in the "tables of contents" type retrieval system.

This chapter has presented a few examples of efforts by social scientists to keep up with the literature in particular fields. Although the task is formidable, it is encouraging to note the growing interest in this problem of information retrieval. The next two chapters describe in detail several of the systems for information management that have been developed.

Chapter Three

GENERAL INFORMATION SYSTEMS

This chapter and the next describe fourteen information systems. Some of these are of interest to scientists in general. Some break down their information into disciplinary categories thereby permitting selectivity within the broad system. The third category is discipline or subject-specific.

In this chapter, the first two types of systems are represented in the eight systems covered. Some attempt has been made, also, to arrange these in a descending order of generality within the chapter. Thus, Public Affairs Information Service has no specific focus being concerned with public affairs generally. On the other hand, HUD Clearinghouse Service--the eighth system described in this chapter-- is urban oriented, but still at a "general" level.

It will be noted that the systems are presented in a "directory" format, with names as well as addresses and phone numbers included. This type of specific information may impose an added burden in keeping the manual current. But this disadvantage should be outweighed from the user's standpoint, especially in cases where there is a need to make immediate contact with a particular organization.

PUBLIC AFFAIRS INFORMATION SERVICE, INC. (PAIS)

Address: Public Affairs Information Service, Inc. 11 West 40th Street New York, New York 10018

Purpose of System

PAIS states its purpose as, "the publication of a weekly bulletin, listing by subject current books, pamphlets, periodical articles, government documents, and any other useful library material in the field of economics and public affairs."

Characteristics of System

PAIS is a non-profit association of libraries chartered by the Regents of the University of the State of New York. It was organized by the Special Libraries Association in 1913.

The PAIS Bulletin is published weekly with the exception of August (fortnightly) and December, when one issue is omitted. Originally designed for the use of legislative and municipal reference librarians, the Bulletin has been expanded subsequently to meet the needs of State, municipal, university and special libraries. It is not primarily an index to periodicals, but selected articles from more than one thousand periodicals are listed each year. Works in foreign languages are not included.

Cumulated Bulletins, superseding the previous weekly editions are published five times a year. The fifth cumulated issue is the annual bound volume for permanent reference use.

Use of System

Each Bulletin includes a section to aid in using the alphabetic entries. These "aid" sections, appearing in back of each weekly issue and in front of the cumulated edition, are entitled: Key to Bibliographical Symbols (and Abbreviations), Key to Periodical References, Directory of Publishers and Organizations, and Publications Analyzed.

Membership rates are available in three categories:

Full Membership - weekly and cumulated Bulletin (including annual)
$100.00 a year.

Associate Membership - Five cumulated Bulletins (including annual)
$50.00 a year.

Limited Membership - Annual cumulated Bulletin $25.00.

Materials indexed in PAIS are generally retained in the New York Public Library. Publications no longer available from the listed sources can usually be obtained in microcopy from Photographic Services, The New York Public Library, Fifth Avenue and 42d Street, New York, New York, 10018. PAIS Bulletins do not state the cost of this service.

The PAIS Bulletin is a well established and valuable information tool, available in many libraries.

NATIONAL REFERRAL CENTER FOR SCIENCE AND TECHNOLOGY

Director: Marvin W. McFarland

Phone: 202-067-8265

Address: Library of Congress
National Referral Center
for Science and
Technology
10 First Street, S.E.
Washington, D.C. 20540

Purpose of System

Operating in the Library of Congress, with the support of the National Science Foundation, the Center, established in 1962, is designed to provide a single place to which anyone with an interest in science and technology may turn for advice on where and how to obtain information on specific topics. The Center is concerned with all fields of science and technology: physical, biological, social and engineering sciences, and many technical areas relating to them.

The exceptionally broad scope of the mission which the Center has set for itself is stated in each volume of series entitled Directory of Information Resources. For example, the volume dealing with the Social Sciences is prefaced by the comment: "In its continuing efforts to identify and gather detailed data on significant information activities in all areas of scientific and technical endeavor, the National Referral Center solicits contributions to its register from any organization that possesses knowledge or expertise in any form and is willing to share it with others."

Characteristics of System

Through a continuing survey, the Center is building up a central inventory of detailed data on information resources describing services provided by a wide variety of organizations and individuals. Included in the inventory are professional societies, university research bureaus and institutes, Federal and State agencies and units within them, industrial laboratories, museum specimen collections, testing stations, and individual experts; as well as more traditional sources of information, such as technical libraries, information and document centers, and abstracting and indexing services. All such information resources are registered with the Center and included in its referral services. The Center's criterion for registering a resource is not size, but the ability and willingness to supply information to others within reasonable limitations. The Center currently has some 10,000 resources in its inventory.

Use of System

The Center publishes a document series entitled, A Directory of Information Resources in the United States with each directory covering one subject area. Its first two directories Physical Sciences, Biological Sciences, Engineering, and the previously quoted Social Sciences, both published in 1965, are broadly oriented. With the publication of its Water directory in September 1966, the Center initiated the publication of more specialized directories. In June 1967, it published Federal Government. These four subject areas constitute the presently published directories. Since three of these directories have either direct relevance for all social scientists, or a broad group of specialists therein, the following additional data is furnished on them.

These directories may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

1. **Social Sciences** (1965, $1.50, LC 1.31:D 62/2, 218 pp.)

In the foreword to this directory, the Center makes a significant reservation regarding the scope of the resource listings: "In the present volume. . .some significant resources have been omitted because they did not respond, or responded incompletely, to requests for organizational and operational descriptions. There are other important information activities in the social sciences with which contact has not been established."

Certain agencies which have broad varied interests are described in the Social Sciences directory in a generalized fashion, then again in the Water directory with a focus on water specialization which had been subsumed in the more generalized description. Examples of agencies in this category are the National Science Foundation, the Smithsonian Institution, and the Urban Land Institute.

One of the more valuable aspects of the directory is the inclusion of agencies (with complete addresses and phone numbers) which, like the National Referral Center are extensive information gathering systems in their own right. Examples are the Institute of Governmental Studies, University of California; and National Opinion Research Center, University of Chicago.

2. **Water** (1966, $1.50, LC 1.31:D 62/3, 248 pp.)

The Center has included a listing and description of several hundred water-related agencies in this directory. Yet, its "foreword", like that in the Social Sciences, cites significant omissions: ". . .the broad field of oceanography has been excluded. Also, commercial, profit-making organizations have been omitted, as initial efforts to obtain data on manufacturing and consultant engineering firms proved that even a reasonably complete listing could not be achieved."

The agencies in this directory vary greatly in scope of interest relating to water. Two examples at opposite ends of this continuim are Bituminous Coal Research, Inc.: "Water pollution control as related to the coal industry," and American Water Resources Association: "Broad aspects of water resources research, planning, development, and management; water resources education and information retrieval."

There are numerous listings of special interest to social scientists, to cite only three examples: Advisory Commission on Intergovernmental Relations, National League of Cities, and the Division of Public Affairs in HUD.

3. Federal Government (1967, $2.75, LC 1.31:D 62/4, 411 pp.)

The "Foreword" to this directory states that, "All appropriate Federal organization, as well as information resources sponsored in whole or in part by the Federal Government are represented." Security restrictions are perhaps implied in the additional statement that, "Certain Federal organizations were omitted at their own request, and a few agencies were excluded because adequate information concerning them was not available."

Since this directory is not subject oriented, it provides resources information for all the sciences. The "sponsored" agencies of the Federal Government are of special interest, and the listing of these makes a valuable contribution to this often overlooked and little known dimension of Federal activity.

AMERICAN SOCIETY FOR INFORMATION SCIENCE (ASIS)

President: Charles P. Bourne   Address: American Society for
                                                Information Science
                                                Suite 807
                                                1140 Connecticut Ave.,
                                                N.W.
                                                Washington, D.C. 20036

Purpose of System

ASIS states its purpose as follows: "The American Society for Information Science is a non-profit, professional association organized for scientific literary and educational purposes and dedicated to the creation, organization, dissemination and application of knowledge concerning information and its transfer. An auxiliary purpose of the Society is to provide its members with a variety of channels of communications within and outside the profession, including meetings

and publications, and with a service organization to help them in their professional development and advancement."

Characteristics of the System

ASIS publishes (bi-monthly) the Journal of the American Society for Information Science (formerly American Documentation) in January, March, May, July, September, and November. The majority of articles in the Journal are technical in nature, oriented in large part toward the more sophisticated aspects of computer applications to data storage and retrieval. Articles of a more general orientation for those interested in the broader aspects of information science are also included. The titles of two selected articles in the July-August, 1970, issue of the Journal provide examples of these respective categories of interest:

"An Evaluation of Index Medicus and Medlars in the Field of Opthalmology; and

"The Role of the Federal Government in Information Systems in Education."

There are three classes of membership in ASIS: individual, student and institutional. Each member of ASIS automatically becomes a member of a local chapter (if one exists in his area) and may apply for membership in one or more special interest groups, which are, in effect, small professional organizations within ASIS that give scope and focus to the specific interests of ASIS members. There are ten special interest groups (SIG's), one of which is Behavioral and Social Sciences.

Use of System

Individual membership dues are $25 annually; student memberships are $10. This includes a subscription to the Journal and membership in a "Prime SIG" (see above). Additional SIG memberships are $2 each. Non-member subscriptions to the Journal are available as are individual copies. The costs are, respectively, $26.50 and $7.00.

The Journal includes a full page of "Instructions to Authors" detailing the specific requirements for articles submitted for publication. An "Exclusive" clause is of particular interest here: "Papers already published or in press elsewhere are not acceptable."

The Journal also includes advertisements from other publishers of information science data, and lists other publications of ASIS. One of the most important of the latter is the Annual Review of Information Science and Technology, of which five volumes have been published.

The first four volumes (1966-69) are available, on a special package plan to members, for $49.95. The price for non-members is $54.95. Volume 5 (1970) is available at $14.87 to members, $17.50 to non-members. Chapter 12 in this latest volume: "Information Systems in State and Local Governments," by Edward F. N. Hearle, has special relevance for social scientists.

DATRIX (DIRECT ACCESS TO REFERENCE INFORMATION: A XEROX SERVICE)

Customer Services: Mrs. Helen K. Wise   Address: University Microfilms
                                                     A Xerox Company
Phone: 313-761-4700   Ann Arbor, Michigan
        Ext. 359   48106

Purpose of System

DATRIX is a computerized information retrieval system begun in 1967 to give access to tens of thousands of doctoral dissertations written in all fields.

Characteristics of System

Since 1938 University Microfilms has been microfilming most of the dissertations written by doctoral candidates in North America. The number of these originally researched documents has climbed to more than 126,000 and is currently being increased at a rate of 18,000 annually from nearly 200,000 institutions. The titles of these dissertations have been computerized into the DATRIX information retrieval system.

Dissertation abstracts are published by University Microfilm, also, and appear in its Dissertation Abstracts International, a monthly publication in two parts and available in most university libraries. Section A includes newly available dissertations in the humanities and social sciences. Section B is devoted to the physical sciences and engineering.

Other publications of University Microfilms include monographs of scientific and scholarly interest as well as previously published books which are out of print. Its newest major publication on dissertations is its highly regarded Dissertations Abstracts International Retrospective Index (1970) described in more detail in the following section.

Uses of System

Formerly a keyword list, provided by DATRIX, served as the initial tool for formulating search requests. The approach now used is indicated in the following paragraphs from a form letter sent out by the DATRIX staff:

"We regret that we are no longer issuing Key Word Lists to our customers. Inasmuch as the Key Word List is being constantly up-dated to include all dissertations from each previous month, it is quickly out-dated as well as bulky in volume.

"However, you may continue to submit your order for a search with the assurance that each one will be checked against our own copy of the up-dated Key Word List. We recommend that you supply related words from your own vocabulary and allow us to amend the structure of the query order to your best advantage. A clearly descriptive summary of your subject field or your research goal helps us to search for the most relevant references for you."

The basic fee for a DATRIX inquiry is $10 and this includes the first 60 (or less) titles. Additional titles are 10 cents each.

The latest (1970) publication of University Microfilms list flat-rate costs for complete dissertations as follows:

Microfilm: $ 4.00
Xerographic: $10.00

The aforementioned Dissertation Abstracts International Retrospective Index is a nine-volume work made possible by the DATRIX system and makes full use of the keywords utilized by this system. The Index entries list: keyword, dissertation title, author, institution or origin, and order number. The Indexes, then, represent an alternate means of procuring DATRIX bibliographic entries without the searcher having to write to University Microfilms but may require a considerable investment of the searcher's time. Following are the subject categories of the Index:

Volume I	Mathematics and Physics
Volume II	Chemistry
Volume III	Earth/Life Science
Volume IV	Psychology,/Sociology, Political Science
Volume V	Social Science
Volume VI	Engineering
Volume VII	Education
Volume VIII	Communication,/Information,/Business,/Literature,/Fine Arts
Volume IX	Author Index

Each Retrospective Index provides complete ordering information.

Both the Index and the DATRIX system provide access to the Dissertation Abstracts.

INSTITUTE FOR SCIENTIFIC INFORMATION (ISI)

Current Contents

Contact: Barbara L. Fry

Phone: 215-923-3300

Address: Marketing Services Dept.
ISI, 325 Chestnut St.
Philadelphia, Pa. 19106

Purpose of System

ISI publishes Current Contents, a weekly "table of contents" reproduction from several thousand periodicals from throughout the world designed to keep the reader up-to-date on the titles of all current journal articles pertaining to his particular area of interest, together with a means of obtaining further information on each article. Additions are constantly being made.

Characteristics of System

Separate and distinct weekly issues of Current Contents are published for seven broad subject areas, each involving several hundred "table of contents" entries. The seven areas are: Education; Life Sciences; Physical Sciences; Chemical Sciences; Engineering and Technology; Agriculture, Food and Veterinary Sciences; and Behavioral, Social and Management Sciences.

The Behavioral, Social and Management Sciences series is further broken down into the following disciplines:

Anthropology and Linguistics
Automation and Computers
Banking and Finance
Business and Law
Clinical Psychology
Communication
Criminology
Economics and Statistics
Experimental Psychology
Forecasting
Gerentology

History and International Affairs
Human Development
Industrial Relations
Mental Health
Personnel Management
Political Science
Population and Geography
Psychiatry and Neurology
Social Medicine
Sociology
Urban Affairs

Uses of System

Subscription rates to <u>Current Contents</u> for "educational organizations and affiliated persons" is $67.50 annually. In addition ISI has several services which for a fee enable the subscriber to obtain specific information on a given article or subject field. Among these services are:

a. An "Author and Address Directory" in the back of each issue of <u>Current Contents</u> keyed to the particular page number on which the author's name and article title appear.

b. OATS (Organized Article Tear Sheets) Hot-Line Service: 215-923-0460. The cost of OATS is $2.00 for articles up to 10 pages, plus $2.00 for each additional 10 pages or portion thereof. There is also a total service charge of $1.00 per article for a Hot-Line report. Calls are taken Monday through Saturday from 8:30 a.m. to 10 p.m. EST or by an answering service at other times. Orders are processed within a few hours following receipt.

c. ASCA IV (Automatic Subject Citation Alert). ISI describes this service as follows: "52 weeks a year ASCA IV searches the scientific literature picking out only those current items specifically related to your own interests, and ASCA IV reports these findings to you by mail on a personal computer printout... and it costs about $2.00 per week for your own individual computer printout." A "Descriptive brochure, ASCA IV profile entry form, and instruction booklet" are provided to those desiring more information on this service.

MONTHLY CATALOG OF UNITED STATES GOVERNMENT PUBLICATIONS

Address: Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Purpose of System

This system was established by the <u>Printing Act</u> of January 12, 1895. This Act provided that all Government publications, except administrative and confidential (or restricted) be entered in the Monthly Catalog.

Characteristics of System

The Monthly Catalog lists new government publications by alphabetical reference of the various U.S. government agencies. In the December 1969 Catalog, for example, Agriculture Research Service is the first listing; Womans Bureau, Labor Department is the last. The December Monthly Catalog also includes the cumulated Annual Index for the relevant year.

The Monthly Catalog contains several ancillary sections which deal with Previews, New Classification Numbers, Discontinued Series, and Corrections for Previous Monthly Catalogs.

Uses of System

The Monthly Catalog is for sale by the Superintendent of Documents at the above address. The price is 50 cents per copy except the December (Index) issue which varies in price. The subscription price is $6.00 per year which includes the index. A major shortcoming of the Monthly Catalog system is the lack of a uniform, centralized method of obtaining the listed documents. This can be noted from the fact that five distinct distribution systems are coded in the front of each catalog with their appropriate symbols as these appear in the individual document listings. These categories (with symbols omitted here) are:

a. For sale by Superintendent of Documents

b. For sale by the National Technical Information Service, Springfield, Virginia 22151.

c. Distribution made by issuing office. Not definitely available if unaccompanied by a price.

d. Printed for official use (Not available for distribution)

e. Sent to Depository Libraries.

A further significant reservation is made by the Superintendent of Documents concerning the lack of availability from that source of more than a token number of Congressional documents. The language of the Catalog on this subject is equivocal, ". . .It may be that a copy could be obtained from your Congressman. . . We will attempt to print for sale a few of the more important ones, but if not priced the only possible source would be from your Congressman."

CONGRESSIONAL INFORMATION SERVICE/INDEX TO
PUBLICATIONS OF THE UNITED STATES CONGRESS

Publisher: James A. Adler

Phone: 301-654-8595

Address: Congressional Informa-
tion Service
500 Montgomery Bldg.
Washington, D.C. 20014

Purpose of System

CIS/Index is a privately organized reference service the purpose of which is suggested by the title. The service began in January, 1970.

Characteristics of System

The CIS/Index takes the form of a monthly publication averaging 100 to 150 pages. Each issue abstracts and indexes almost every document issued by the U.S. Congress during the previous month (except for the Congressional Record which has its own index). A full year's service includes twelve monthly issues and four quarterly cumulatives, plus a two-volume clothbound cumulation of the entire year's output.

Each issue of the CIS/Index is divided into two major sections:

a. Summary Section, which contains a brief abstract of each publication covered. Types of publications covered include:

Committee Hearings
Committee Prints
House and Senate Reports
House and Senate Miscellan-
eous Publications

House and Senate Documents
Senate Executive Reports
Senate Executive Documents

b. Index Section, which contains, first of all, the Main Index of Subjects and Names, which offers access to all data according to:

Subjects of documents and hearings
Subjects discussed by individual witnesses
Names of authors (corporate or individual)
Affiliation of witnesses and authors
Names of subcommittees
Popular names of laws, reports, bills, etc.

Additional indexes offer cross-references according to: bill numbers, report numbers, documents numbers, and names of committee and subcommittee chairmen.

Use of System

The basic rate for subscribers to the CIS/Index is $320 annually. There are lower "special rates" for institutional libraries, small colleges, and public libraries whose annual book and periodical budgets fall below $400,000.

The annual cumulated indexes and abstracts in two clothbound volumes are offered to CIS/Index subscribers at $80 per set. The price for non-subscribers ir $160.

CIS offers a wide choice of options for procuring complete copies of Congressional documents. The most comprehensive and costly of these is an annual subscription to the complete CIS/Microfilm Library of the working papers of the United States Congress. The charge for this service is $2,450.00. Several intermediate plans are offered, such as an annual subscription to House and Senate Reports, priced at $600.

Finally, CIS provides individual documents in either microfilm or "hard" copy form. Microfilm copies are sold on a unit basis--a unit being equal to 400 document pages or part thereof. Thus, 300 document pages equal one unit, 700 pages equal two units, etc. CIS offers coupon books for microfilm payment, coupon books ranging from $30 to $100. The cost of hard copies is 20 cents per document page with a minimum order or $2.00 per document.

HUD CLEARINGHOUSE SERVICE

Director: Bernard Urban

Phone: 202-755-5426

Address: Department of Housing and Urban Development
Urban Management Assistance Administration
Room 8210-451 7th Street, S.W.
Washington, D.C. 20410

Purpose of System

The Clearinghouse assists governmental units at all levels, general government groups, professional and trade associations and corporations, universities, and research organizations by providing technical information on urban-related research and community development activities.

Characteristics of System

The Clearinghouse serves as a central organization in a national urban information exchange network, linking the major producers and

users of urban information in both the government and private sectors.
The subject matter covers urban related programs and activities of HUD
and of other Federal agencies as well as of State and local govern-
ments, and non-governmental organizations concerned with community
development problems. The types of services provided include reference
and referral responses to specific inquiries, a selective dissemination
of information system, and provision of current awareness publications
to a wide variety of specialized audiences in the urban field.

Use of System

In addition to answering specific inquiries, HUD compiles and
publishes comprehensive reports on urban and regional information
systems and sources. These publications may be ordered from the
Superintendent of Documents, U.S. Government Printing Office, Washing-
ton, D.C. Three examples of such publications are:

a. Urban and Regional Information Systems: Support for Planning
   in Metropolitan Areas. October, 1968; $3.25

   HUD contracted with Systems Development Corporation, Santa
   Monica, California, to study the problem of how the avail-
   ability and accessability of information may be improved
   through the application of automatic data processing. This
   publication sets forth the results of this study. Two infor-
   mation "listings" in this report are of particular note:

   1. Appendix A, "Urban and Regional Information System:
      Agencies, Individuals, and Programs," which is an alpha-
      betical listing by states and summarizes the status of ur-
      ban and regional information systems as of June, 1967.
      Unfortunately, this listing contains numerous "negative"
      responses from planning agencies: "Response to a request
      for information. . .not received," or "No system is
      presently under consideration." Undoubtedly, updating
      of this report would show a higher development of urban
      and regional information systems.

   2. Part 3 is devoted entirely to bibliography and may be the
      most valuable portion of this publication. The biblio-
      graphy is divided into two major sections, "Stratified
      Bibliography" and "Author Bibliography." The subject
      matter is, logically, related to information storage and
      retrieval and the bibliography provides an extensive
      listing of publications in this area through 1967.

b. <u>Selected Abstracts of Planning Reports</u>. June, 1969; $1.00, 98 pages.

This publication contains summaries of planning studies supported by HUD throughout the country. The abstracts selected represent studies conducted in 1967 and 1968. The studies range from general planning to specific development or implementation plans for the use of human, technical, as well as physical resources. Each report gives the address for "source of copies." In addition, the appendix, "Availability of Planning Reports" describes the method and costs for obtaining these reports from CFSTI - Clearinghouse for Federal Scientific and Technical Information (now renamed: The National Technical Information Service, NTIS), and lists the Depository Libraries where the reports will be filed.

c. <u>Selected Information Sources for Urban Specialists</u>. June, 1969. 50 cents, 43 pages.

This booklet describes thirty-two information sources (including the HUD Clearinghouse Service) which may be of interest to planners, government officials, and others working in urban-related fields. Included is basic information about referral, reference, abstracting, and document reproducing services, both automated and non-automated. Each fact sheet provides names, locations, directors, purposes, characteristics, and general direction for using each system.

Chapter Four

DISCIPLINE OR SUBJECT-ORIENTED INFORMATION SYSTEMS

This chapter describes six information systems: three of these selections are discipline oriented--one relating to education, two to political science; the other three are subject-oriented. All three of the latter are "water" information sources in conformity with the previously described research emphasis.

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Director: Harvey Marron   Address: Educational Resources Infor-
                                           mation Center
Phone: 202-962-0104   Bureau of Research
                                           U.S. Office of Education
                                           Room 3013, FOB #6
                                           400 Independence Ave., N.W.
                                           Washington, D.C. 20202

Purpose of System

The purpose of the ERIC System established in June, 1964, is to keep teachers, administrators, educators and social scientists among others abreast of current educational research and development activities.

Characteristics of System

ERIC is a computerized system for collecting, storing, and disseminating educational research results, research-related materials, and other resource information that can be used in developing more effective education programs. Through a nationwide network of 20 "clearinghouses," each responsible for a particular educational area, the information is acquired, selected, abstracted, indexed, and listed in ERIC reference publications.

The newest of ERIC's 20 clearinghouses is the ERIC Clearinghouse for Social Sciences/Social Studies Education (ERIC/CHESS) located at 970 Aurora, Boulder, Colorado, 80302. This clearinghouse was established in May, 1970.

ERIC/CHESS performs the standard functions as listed above for all clearinghouses, in _this_ instance, covering any phase of social studies and social science education at all levels. History, geography, and civics, along with anthropology, economics, political science, psychology, and sociology are included. In addition to processing information for the two major ERIC publications listed under "User of System," below, ERIC/CHESS publishes a newsletter (presented on an irregular schedule), available free of charge from its Boulder address.

Use of System

ERIC publishes material in both generalized and specialized categories. An example of the latter category, which will not be further described here, is ERIC Catalog of Selected Documents on the Disadvantaged.

The following are perhaps the most useful of ERIC's generalized publications:

    a. Research in Education (RIE), a monthly abstract journal of documents, indexed by subject, author or investigation, and institution. Subscription price is $21 a year, available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Most documents indexed in RIE are available in microfiche (4" x 6" cards of microfilm containing up to 70 pages of text, 65 cents per document) or

hard copy ($3.29 per 100 document pages). They may be ordered by the ED (ERIC document) number from ERIC Document Reproduction Service, Leasco Information Products Company, 4827 Nugby Avenue, Bethesda, Maryland, 20014. If a document is copyrighted and the copyright holder does not wish to permit ERIC to reproduce the document in microfilche or hardcopy, the abstract announcement or book review contains a notice of availability giving the address where the document may be purchased, and the price.

b. Current Index to Journals in Education (CIJE), a monthly annotated index to more than 500 journals. Subscription price is $34 per year, available from CCM Information Corporation, 909 Third Ave., New York, N.Y. 10022.

At the present time, reprints of articles indexed in CIJE are not available from a central source. However, a Source Index is included in this publication which will enable users to correspond directly with the journal publishers.

c. Thesaurus of ERIC Descriptors, Second Edition, April, 1969, OE-12031-69, $3.25. Structured compilations of educational terms used to index and enter documents into the ERIC system. Available from GPO (see "a", above).

d. How to Use ERIC, OE-12037-A, 25 cents. A graphic aid to the use of the ERIC system. Available from GPO.

AMERICAN BIBLIOGRAPHICAL CENTER - CLIO PRESS

Publisher: Eric H. Boehm   Address: ABC - CLIO, Inc.
                                             Riviera Campus
                                             2010 Alameda Padre Serra
                                             Santa Barbara, Calif.
                                             93103

Purpose of the System

ABC - CLIO, Inc. publishes ABC Pol Sci (Advanced Bibliography of Contents: Political Science and Government). ABC Pol Sci is a guide to current periodical literature (foreign and domestic) which serve the fields of political science and government.

Characteristics of System

The table of contents pages from about 300 journals currently appear in ABC Pol Sci. Serial publications in related disciplines such as law, sociology, and cultural anthropology, are included. References to necrologies, letters to the editor, book reviews, unsigned notes, anecdotes, fiction and poetry are deleted prior to publication.

ABC Pol Sci is published nine times annually. Issue No. 9 is an "Annual Index" published in December. Issue Nos. 1 through 8 are published in two parts. Part I is a reproduction of the previously described Table of Contents. Part II is a separate "Index Number" keyed to Part I. The index has three major divisions: Subject Index, Court Decisions and Case Notes, and Author Index. ABC Pol Sci is not published in January, February, July or August.

Use of System

ABC Pol Sci is available to individual subscribers at $6.50 per volume. Library rates are higher, varying by annual expenditures of the subscribing library.

Tables of Contents (Part I) of each issue is in alphabetical order, with index numbers appearing in an uninterrupted series for every article appearing in a given number of ABC Pol Sci. Thus, in Volume 2, Number 7 (November 1970) the index number series is 2:8448 to 2:9556 with the first number "indexing" the first article in this number, in this instance, from the Table of Contents of the September 1970 issue of Administrative Science Quarterly. The last index number in the reference series (2:9556) appears beside the last article reproduced in the Table of Contents of the Yale Law Journal (March 1970). Part II, "Index Number" makes use of the index serial numbers in each of its three major divisions as does the Annual Index.

ABC - CLIO, Inc. offers article copying service at 5 cents per page plus postage and handling. Journals which have granted "blanket" article copying rights are indicated by asterisks in each edition of ABC Pol Sci. Otherwise, the requester must obtain such permission before asking for reproduction. To date, somewhat less than half of the journals listed indicate blanket copying approval, but it is assumed that ABC - CLIO, Inc., will continue to negotiate with "hold-out" publishers to permit this service.

The publishers of ABC Pol Sci also list relevant books and other publications which may be obtained through this firm.

THE UNIVERSAL REFERENCE SYSTEM (URS)

Address: Princeton Research Pub-
          lishing Co.
          20 Nassau Street
          Princeton, N.J. 08540

Purpose of System

URS is a computerized documentation and information retrieval system citing significant material appearing in all social and behavioral sciences, annotated, and indexed in depth.

Characteristics of System

URS, instituted in 1965, at present covers ten subject fields of political science, and has published these in ten separate CODEX volumes as follows:

Volume I	International Affairs (Second Edition)
Volume II	Legislative Process, Representation, and Decision-Making
Volume III	Bibliography of Bibliographies in Political Science, Government, and Public Policy
Volume IV	Administrative Management: Public and Private Bureaucracy
Volume V	Current Events and Problems of Modern Society
Volume VI	Public Opinion, Mass Behavior, and Political Psychology
Volume VII	Law, Jurisprudence and Judicial Process
Volume VIII	Economic Regulation: Business and Government
Volume IX	Public Policy and the Management of Science
Volume X	Comparative Government and Cultures

URS employs a set of standard index descriptors that are arranged according to a master system of topics and methodological techniques, plus various descriptors pertaining to the particular field. The basic format for entries is an annotated bibliography arranged by alphabetical sequence of truncated descriptors listed in the front of each volume. Thus, in Volume I, ABM/DEFSYS - standing for anti-ballistic missile defense systems - is the first coded/annotated entry under the "Index of Documents" section; YUGOSLOVIA is the last such entry.

URS updates its basic ten volumes through the use of Quarterly and Annual Supplements. These supplements give a composite coverage of the most recently published literature in all ten political science fields listed above. The supplements cumulate the materials for the previous period(s) covered. Thus, the "fourth quarterly supplement" is, in reality, the Annual two-volume supplement of accumulated materials for the relevant year.

Use of System

The cost of the ten-volume basic library is $550.00; cumulative quarterly supplements for one year, including bound volumes, are priced at $250.00.

Complete illustrated instructions for CODEX use are contained in each basic volume and supplement.

Each basic volume contains a "Directory of Publishers" section from whom the listings in all ten volumes may be ordered, after cross-referencing with the "Catalogue of Documents" section for the subject field involved.

AMERICAN WATER RESOURCES ASSOCIATION (AWRA)

Address: P.O. Box 434
          Urbana, Illinois 61801

Purpose of System

AWRA is a non-profit scientific organization incorporated in Illinois in March, 1964. It was established to provide an organization for encouraging and fostering interdisciplinary communication between professionals of diverse backgrounds working on all aspects of water resources problems.

Characteristics of System

Three general categories of membership are available: Members - professional persons having a college degree from a recognized institution and engaged in any aspect of water resources activity; Student members - individuals engaged in the study of any aspects of water resources as full-time students at a recognized institution; Corporate members - Institutions, organizations, business concerns and consulting firms actively engaged in the field of water resources. Membership is granted upon approval of a formal application. Annual dues are: members - $18.00; student members - $15.00; corporate members - $100.00. The association currently has members from fifty-five foreign countries, as well as from the U.S. The basic fee for members and student members includes subscription to AWRA publications under either of two plans as described under "Uses of Systems," below.

AWRA has assigned itself three comprehensive and significant objectives within the water field:

1. The advancement of water resources research, planning, development, and management.

2. The establishment of a common meeting ground for engineers, and physical, biological, and social scientists concerned with water resources.

3. The collection, organization, and dissemination of ideas and information in the field of water resources science and technology.

Uses of System

Operationally, AWRA pursues its objectives by two primary means—meetings and publications.

Meetings. The Association sponsors annually American Water Resources Conferences and National Symposia to provide a forum for the presentation of technical papers dealing with water resources science and technology.

Publications. Detailed information on AWRA publications is contained in its booklet, __AWRA Publications__, available on request from their mailing address above. The following are most important of these publications with a brief explanation and costs of each:

1. __Hydata__. Editor: Dr. Icko Iben. This publication's sub-heading reads: "A Monthly Title List and Index of the World's Scientific Literature in the Field of Water Resources." It generally contains the following: (a) a reproduction of the whole table of contents of the most important periodicals (world-wide) in the water resources field; (b) a listing of pertinent titles from periodicals not entirely devoted to water resources; (c) a listing of titles of reports, monographs, etc. (d) a computer-produced Keyterm Index. Non-members subscription - $25.00.

2. __Water Resources Abstracts__. Editor: Dr. Icko Iben. Published monthly and issued (looseleaf) in sections, this publication provides abstracts of many of the papers indexed in __Hydata__. Abstracts are printed in 3" x 5" format, divided into fifty categories. Examples of social science related categories are:

   23 - Effects of man's related activities on water;
   33 - Economic evaluation; and
   36 - Water law and institutions.
   All 50 categories: $120.00
   Four categories: $ 10.00.

3. __Water Resources Bulletin__. This is a "Bi-monthly Journal of Water Resources Science" for original papers on professional subjects and for pertinent information about the entire water resources field such as meetings, books. It includes the Water Resources Newsletter and the Proceedings (papers) of the AWRA Annual Conference. Non-member subscription: $20.00.

Publication "Plans" for Members and Student Members

The membership fees indicated under "Characteristics of System" include subscription to selected publications, just described, under one of the following plans:

Plan A: Water Resources Bulletin, which includes the Proceedings of the Annual Conference and the Water Resources Newsletter.

Plan B: Hydata and the Water Resources Newsletter. (Note: The Bulletin can be added to Plan B for an additional $12.00. Hydata can be added to Plan A for an additional $12.00).

UNIVERSITY OF CALIFORNIA WATER RESOURCES CENTER

Address: Office of the Director
Water Resources Center
University of California
Los Angeles, Calif. 90024

Purpose of System

The Water Resources Center, founded in 1957, is responsible for development, coordination, funding, and dissemination of results from water-related research conducted on the several campuses of the University of California system. It is because of its unusually well developed "dissemination" program relative to water information that this university's water resources center is singled out here as an information system of general interest.

Characteristics of System

The remainder of this report will focus on the Center's Water Resources Archives since they represent the major on-going water information service available to clients both within and outside the University of California.

The Water Resources Center Archives are depositories for significant research and historical documents, most of which are generally not the type of materials found in libraries. As implied above, the materials are available for study in the Archives by faculty, students, and interested people outside the University. The largest of the two Archives is on the Berkeley campus; the other is on the Los Angeles campus. Since the larger (Berkeley) Archives is set up to serve "outside" clients, it will be described in more detail in the following section.

Use of System

The Archives collection of approximately 80,000 pieces (both campuses) covers the following fields:

Water as a natural resource and its utilization;
Municipal and industrial water uses and problems;
Flood control;
Reclamation;
Waste disposal;
Coastal engineering;
Sediment transport;
Water quality;
Water pollution;
Water law; and
Water resources development and management.

Emphasis of the collection is on report literature, with books and journals of secondary importance. Materials collected include technical and scientific reports (e.g., engineering consultants' reports, research institute reports); government publications (municipal, State, regional and Federal); publications of water-related societies and associations; conferences and symposia; photographs and maps. A manuscript collection includes the papers and personal libraries of men prominent in this field. The period covered is 1890 to date.

The major reference tool for access to the Center collection has only recently (late 1970 - early 1971) become available to the general public for determining the specific content of the Archives:

Dictionary Catalog of the Water Resources Archives,
University of California at Berkeley (Boston: G. K.
Hall and Co., 1970)

This 5-volume dictionary-catalog is available to the general public at a cost of $360.00. The Water Resources Center's Annual Report No. 21 of 1, July, 1969-30, June, 1970, in announcing the forthcoming publication of the dictionary-catalog, stated that: "This publication will establish the (U.C. Water Resource Center) Archives as a foremost research library in the water field."

In the Introduction to Volume I of the 5-volume Dictionary-Catalog, Mr. Gerald J. Giefer, the Archives Librarian, describes the availability of Archives reproductions in one brief and very generalized paragraph:

"Reproduction of the materials described in this catalog can, within the usual restriction, be obtained from the Library Photographic Services, 20 Library, University of Calif., Berkeley, 94720.

WATER RESOURCES SCIENTIFIC INFORMATION CENTER (WRSIC)

Director: Raymond Jensen

Phone: Area Code 202
343-8435

Address: U.S. Department of Interior
18th and C Streets, N. W.
Washington, D. C. 20240

Purpose of System

The Center has nation-wide responsibility for improving access and for providing a more effective and prompt dissemination of information concerning on-going research and the results of completed research in water resources, including the economic, legal, political, and social aspects of water resources planning, development, and control.

Characteristics of System

The Center administers its program by means of memoranda of agreement, contracts and grants with other Federal organizations, universities, or research organizations with significant water resources programs. Through this support program the Center builds and services two information bases: one concerned with research-in-progress, and the other with the literature resulting from completed research.

All inputs to these information bases are converted to computer usable format and include citation, abstract, and set of indexing terms for each entry. The inputs come from water resources organizations and from selected water resources research organizations responsible for covering specified areas of the literature. Outputs are made available through regular publications, such as: the Water Resources Research Catalog which covers research in progress, and Selected Water Resources Abstracts which covers the literature of completed research. In addition, individual searches of the information bases produce topical bibliographies on a selective basis.

The Center also supports programs for compilation and evaluation of the literature in important areas of research and these result in state-of-the-art reports.

Use of the System

Services of the Center are available through subscription to its regular publications and purchase of its topical bibliographies and state-of-the-art reports. Those with content related to the social sciences include:

1. Water Resources Research Catalog. An annual available from the Superintendent of Documents, Washington, D. C. 20402. Price variable. Volume 7 for fiscal year 1971 contains more than 6,000 project summaries arranged in accordance with the categories

established by the Federal Committee on Water Resources Research, and indexed by principal investigator, supporting organization, and subject. The latter includes social science related terms.

2. <u>Selected Water Resources Abstracts</u>. This is a semi-monthly publication available as individual issue copies or by annual subscription (from the National Technical Information Service, Springfield, Virginia 22151). The 1972 annual subscription is $22.00 for domestic and $27.50 for foreign subscribers. About 16,000 abstracts per year are published.

Abstracts are arranged in accordance with the categories established by the Federal Committee on Water Resources Research, and indexed by author, supporting organization, subject, accession number, and abstract source. An annual cumulative index is published. Numerous social science related indexing terms are used.

3. <u>Topical bibliographies and state-of-the-art reports.</u>

   a. Topical bibliographies (examples):

      1) <u>Bibliography on the Socio-economic Aspects of Water Resources</u>, Battelle Memorial Institute, Columbus, Ohio, 1966 (out of print).

      2) <u>Urbanization and Sedimentation</u>, available from the National Technical Information Service, PB 203188.

      3) <u>Institutional Aspects of Water Resources Development</u>, available from National Technical Information Service.

   b. State-of-the-art Reports (examples):

      1) <u>Metropolitan Water Resource Management as an Emerging Specialized Technical Area</u>, Center for Urban Studies, University of Chicago, Chicago, Illinois, 1969.

      2) <u>Institutions for Urban-Metropolitan Water Planning, Development, and Management</u>, Colorado State University, Fort Collins, Colorado 80521, 1972.

4. <u>Search and References Services.</u>

During 1972 the Center will begin providing individual computer searches of its information bases through its Centers at the University of Wisconsin, Cornell University, and the University of North Carolina.

5. <u>Water Resources Thesaurus</u> (2nd edition, 1971). This <u>Thesaurus</u> was prepared for WRSIC by the Smithsonian Science Information Exchange (SSIE) in accordance with the information requirements of the Water Resources Research Act of 1964. With respect to the functions of the Thesaurus, the <u>Foreword</u> states:

> "The need for developing and distributing a vocabulary for indexing and retrieving the literature of water resources research and development stems from section 300 of the Water Resources Research Act, wherein the Secretary of the Interior is directed to assure that the programs authorized in the Act will supplement and not duplicate established water research programs, stimulate research in otherwise neglected areas, contribute to a comprehensive nationwide program of water and related resources research, and make generally available information about completed research.

> "A word list containing cross references and relationships among the scientific and technical terms used by researchers and others is an essential tool for ready access to knowledge about the relevant research by means of storage, dissemination, and retrieval of information on water resources problems.

> "The availability of this thesaurus will make it possible to enlist individual researchers and other authors of water resources literature to contribute to the documentation of their work by providing indexing terms from this volume indexing at the source and improving the information content of titles, descriptions of research projects, and abstracts of reports and general literature are part of a concerted effort now underway by scientific and engineering societies, universities, and Government to improve communications and facilitate retrieval of scientific and technical information."

In the <u>Introduction</u> it is reported that the <u>Thesaurus</u> contains 4,288 main terms and consists of three sections: Descriptors which are the main terms, Descriptor words which is an alphabetical listing of each significant word making up the terms in the Thesaurus, and Descriptors which list all valid descriptors alphabetically to provide a quick reference for checking and verifying word forms, spelling, etc.

Classification Categories

As indicated above, the Center utilizes a classification system developed by the Federal Committee on Water Resources Research. This Committee has identified ten subject categories, as listed below. Social science topics tend to be concentrated in category 06, but are also found scattered among the other nine. The category structure, with a brief description, is as follows:

01 Nature of Water
   Includes the following Groups: Properties;
   Aqueous Solutions and Suspensions

02 Water Cycle
   Includes the following Groups: General; Precipitation; Snow, Ice, and Frost; Evaporation and
   Transpiration; Streamflow and Runoff; Groundwater;
   Water in Soils; Lakes, Water in Plants; Erosion and
   Sedimentation; Chemical Processes; Estuaries

03 Water Supply Augmentation and Conservation
   Includes the following Groups: Saline Water Conversion; Water Yield Improvement; Use of Water
   of Impaired Quality; Conservation in Domestic and
   Municipal Use; Conservation in Industry; Conservation in Agriculture.

04 Water Quantity Management and Control
   Includes the following Groups: Control of Water
   on the Surface; Groundwater Management; Effects
   on Water of Man's Non-Water Activities; Watershed
   Protection.

05 Water Quality Management and Protection
   Includes the following Groups: Identification of
   Pollutants; Sources of Pollution; Effects of
   Pollution; Waste Treatment Processes; Ultimate
   Disposal of Wastes; Water Treatment and Quality
   Alteration; Water Quality Control

06 Water Resources Planning
   Includes the following Groups: Techniques of
   Planning; Evaluation Process; Cost Allocation;
   Cost Sharing, Pricing/Repayment; Water Demand;
   Water Law and Institutions; Nonstructural Alternatives; Ecologic Impact of Water Development

07 Resources Data
   Includes the following Groups: Network Design;
   Data Acquisition; Evaluation, Processing and Publication

08 Engineering Works
      Includes the following Groups: Structures; Hydrau-
      lics; Hydraulic Machinery; Soil Mechanics; Rock
      Mechanics and Geology; Concrete; Materials; Rapid
      Excavation; Fisheries Engineering

09 Manpower, Grants, and Facilities
      Includes the following Groups: Education--Extra-
      mural; Education--In-House; Research Facilities;
      Grants, Contracts, and Research Act Allotments.

10 Scientific and Technical Information
      Includes the following Groups: Acquisition and
      Processing; Reference and Retrieval; Secondary
      Publication and Distribution; Specialized Information
      Center Services; Translations; Preparation of Reviews

The following terms are from the index of the Water Resources Research Cata-
log; they are listed here to suggest the detail of that index as related to
social science topics:

Administrative Structures
Attitudes and Attitude Changes
Behavior - Human
Citizen Participation
Computer - Usage
Computers
Conjunctive Use
Data Acquisition
Data Analysis
Data Processing
Demography
Economics
Federal Government - Management
Government
Information Centers and Services
Land Use
Legal Aspects of Water

Management
Multiple Purpose Projects
Planning
Pollution Abatement
Publications
Recreation Sites
Road and Highways
Social Aspects
Social Change
State-Local Government
Survey Studies
Systems Analysis
Urban Studies
Water Allocation
Water Demand
Water Quality Control - Gen-
  eral

Chapter Five

BIBLIOGRAPHIES AND MISCELLANEOUS INFORMATION RETRIEVAL SOURCES

Important sources, sometimes overlooked, are published biblio-
graphies. Most libraries have separate bibliographic collections
and many have other bibliographic sources, such as bibliographies
of bibliographies. The bibliographies described in the following
pages are selected as illustrative, rather than representing a
comprehensive search. But this brief list may provide the researcher
with some leads, even though the bibliographies included are simply
intended to be representative, and to suggest the kinds of biblio-
graphies which are available.

Obviously, one of the serious limitations of prepared biblio-
graphies is that they soon become dated. To overcome this limitation,
a few provide for systematic updating. For example, the Universal
Reference System referred to in Chapter 3 includes a volume (Vol. 3)
entitled "Bibliography of Bibliographies in Political Science,
Government and Public Policy." This volume is kept up to date by
regular supplements and thus provides useful current information.

Since 1938 the H. W. Wilson Company has been publishing the
Bibliographic Index: A Cumulative Bibliography of Bibliographies
(New York, N.Y. 10452). This index is organized by subject listing
books, parts of books, pamphlets, and articles, including both
English and foreign sources. Over 1600 American and foreign
periodicals are covered.

Of particular interest to researchers is the Government-wide
Index to Federal Research and Development Reports, published by the
National Technical Information Service of the Department of Commerce
(Springfield, Virginia 22151). It lists new unclassified government-
sponsored research reports and is issued concurrently with U.S.
Government Research and Development Reports which includes abstracts
of government research reports resulting from both in-house and
contract research.

Two current bibliographies deal with agriculture. One of these,
published by the H. W. Wilson Company, is entitled: Agricultural
Index, 1916 to present. (New York, N.Y. 10452). The other, published
by the U.S. Department of Agriculture, has the title of: Bibliography
of Agriculture, 1942 to present. (U.S.D.A., Washington, D.C. 20250).

A special bibliographic index of interest to social scientists and
others is the Index to Legal Periodicals which has been published since
1908 by the H. W. Wilson Company (New York, N.Y. 10452). This index
is selective but extensive, covering leading articles, notes, case

comments and book reviews in some 275 English language periodicals.
Many of the listed publications are law reviews of which at least
one is published in each state, usually by the state law school.

A unique source for public policy research is the Encyclopedia
of Associations published and kept up to date by Gale Research Company,
Detroit. The most recent edition is 1970. This directory gives the
founding date, membership, staff, nature of activities, publications,
addresses and other information on more than 14,000 trade and
professional organizations, labor unions and other groups. In
addition to a name index, a subject index is provided. This same
publisher also issues Research Centers Directory, the most recent issue
of which is dated 1968.

UNESCO publishes a group of comprehensive, annual Social Science
Bibliographies, entitled Documentation in the Social Sciences, one
volume each dealing with Economics, Sociology, Social and Cultural
Anthropology, and Political Science. These have been issued since
1951, and seek to tap world literature. They must be used with
some caution, however, since the definitions of fields do not
necessarily reflect American usages. For example, the Political
Science bibliographies do not include policy topics.

Beginning in 1957 the American Behavioral Scientist (Sage
Publications, Inc., 275 South Beverly Drive, Beverly Hills,
California 90212) began publishing in each issue a bibliographical
section called "New Studies," which is a guide to recent publi-
cations in the Social and Behavioral Sciences. The items listed
in this periodical bibliography were selected and annotated by the
staff of the American Behavioral Scientist from almost 400 journals
and reviews, including nearly 100 published outside of the United
States. In addition books and pamphlets were included, selected
from the total output of American commercial, governmental, and
non-profit publishers, as well as from some foreign publishing houses.
In 1965 Sage Publications put out what was titled the ABS Guide to
Recent Publications in the Social and Behavioral Sciences. This was
a compilation of the bibliographic notes published in the journal under
the heading of "New Studies." A year later a supplement volume was
published. In addition, the American Behavioral Scientist has con-
tinued to publish in each issue the bibliographic section entitled
"New Studies." It is also possible to subscribe to "New Studies"
separately. This effort is a select bibliography, and as such, it
clearly does not provide systematic coverage but what the editor's
believe to be important.

In 1970 the Oceanic Library and Information Center (La Jolla,
California 92037) began publishing pollution abstracts--a guide to the
world literature about pollution and its control, providing
bibliographic citations and abstracts. This publication is issued
six times a year.

A somewhat similar publication dealing only with water pollution and entitled, Water Pollution Abstracts, has been published by the Ministry of Health of the British government since 1920.

The various state water centers publish special bibliographies from time to time. Some of the centers have been more active in this field than others. A few selections of this type of bibliography are cited here:

1. A Selected Annotated Bibliography on the Analysis of Water Resources by Marshall Gysi and Daniel P. Loucks, publication number 25, August 1969, Cornell University Water Resources and Marine Scientists Center, Ithaca, New York (177 pages plus charts). A second volume of this bibliography was issued as publication number 35 in June 1971, compiled by Carol Kriss and Daniel P. Loucks (251 pages).

2. Social Science Studies of Water Resources Problems: Review of Literature and Annotated Bibliography by R. N. Singh and Kenneth P. Wilkinson, Water Resources Research Institute, Mississippi State University, State College, Mississippi 39762, 1968 (82 pages).

3. Benefit-Cost Analysis for Water Resource Projects: A Selected Annotated Bibliography (revised), by Hubert Hinote, Center for Business and Economic Research, College of Business Administration, the University of Tennessee, Knoxville, Tennessee, June 1969, (148 pages).

The Water Information Center, Inc., (44 Sintsink Drive East, Port Washington, New York 11050) publishes a number of volumes of interest to specialists in the field of water. One of their most recent publications is titled: Water Publications of State Agencies, a compilation of books, reports, bulletins, maps, papers and periodicals (approximately 10,000) produced by 335 state agencies from all 50 states. This should be a useful source book for tapping a body of literature which has been heretofore very difficult to identify and locate.

Chapter 4 has reviewed the publications of the Water Resources Scientific Information Center. It should be noted that this center also publishes a number of bibliographies and supports the publications of such collections. Illustrative of this publication effort (much of which is based on computer printouts) are:

1. Institutional Aspects of Water Resources Development, A Bibliography, September, 1971.

2. Legal Aspects of Water Pollution in New England, A Bibliography, October, 1971.

3. Metropolitan Water Resource Management, by John R. Sheaffer, Shirely A. Starr, George Davis, Alan Richmond, published by the Center for Urban Studies, University of Chicago, 1969. The research effort which went into this publication was supported by the Office of Water Resources Research. The book contains a 30-page bibliography of considerable scope and usefulness.

Reflecting the development of information centers, the Committee on Scientific and Technical Information through its panel on Information Analysis Centers, issued a report in January 1970 entitled Directory of Federally Supported Information Analysis Centers. This directory was issued by the National Bureau of Standards, U.S. Department of Commerce for the Federal Council of Science and Technology (COSAI-70-1; pb 189 300.) It lists 119 Federally supported Information and Analysis Centers giving a brief description of the mission, scope and services provided by each one. The directory includes a subject index, an organization index, a geographic index, and an index of the center operators and directors.

Many of the Social Science disciplines have a variety of handbooks and similar publications which are designed to aid the researcher in the particular field. There are also numerous general Social Science guides to research and research literature. It is impossible to list all of these in this report, but one that is of particularly high quality is Sources of Information in the Social Sciences by Carl N. White (ed.), 1964, the Bedminster Press, Totowa, New Jersey. This book lists basic reference works in each of the Social Sciences and includes a bibliographic essay outlining the development of the field, various approaches and schools of thought, and representative books.

Of a different character, but very useful, is the book entitled Information Retrieval: Applications to Political Science by Kenneth Janda, (the Bobs Merrill, Inc. Indianapolis, Indiana, 1968). Although additional developments have occurred since this book was published, it still provides a basic source on the subject of information retrieval as applied to a particular Social Science discipline. In this connection, reference should also be made to the writings of William A. Welsh, particularly Considerations in the Design of Information Retrieval Systems for the Social Sciences, a report from the laboratory for Political Research, Department of Political Science, University of Iowa, Iowa City, Iowa, 1970.

There are a number of SDI systems (Selective Disseminations of Information) operating, particularly in government agencies. There are also a number of these systems, developed by commercial organizations,

available by subscription. In the case of the government systems it is
difficult for non-government employees to have access to them except
in the agency libraries. It is even difficult at times for government
employees not working for the responsible agency to subscribe to the
SDI system of a particular agency. One such system has been developed
by the Office of Engineering Reference of the Bureau of Reclamation,
U.S. Department of the Interior. Some universities and large research
organizations and institutes have also developed SDI systems. The
basic operating method of most SDI systems is that the subscriber
indicates his areas of interest as indicated by particular topics,
sometimes by key words. These then are used regularly to secure
computer printouts of materials relevant to these interests. Of
course, like all computer assisted programs of this sort, the
retrieval system is no better than the original storage program.

Of a similar nature is the Encyclopedia of Information System
and Services by Anthony T. Kruzas, Edward Brothers, Ann Arbor,
Michigan, 1971. This is a much more detailed directory than the one
previously listed. It is available in most larger libraries.
Another useful general source is the Council of Social Science Data
Archives currently located on the campus of the University of Pittsburg
(224 Social Science Building, University of Pittsburg, Pittsburg,
Pennsylvania 15213). In 1967 the council published a pamphlet entitled
Social Science Data Archives in the United States which describes 25
such archives. In 1970 the council prepared an inventory of the
information in some of the archives in the category of survey data
(opinion research). Computer printouts of this inventory are available.
It should be noted, however, that the council itself has stated:

> "The original intention of this project was to develop an
> inventory of survey data holdings of all archives participating
> in the council. Unfortunately, this project was never completed
> in the sense of actually doing the inventory of the total
> holdings of all the archives involved. A mountain of cards
> marked 'inventory' were kept at the council headquarters with
> one print out originally run at Columbia University through
> the persistence of Raymond Maurice."

> "The unexpected death of Ralph L. Disco, executive director
> of CSSDA, made it impossible for us to reconstruct the
> program he had been working on for the dissemination of
> this inventory. ....with a technological step backwards
> in order to disseminate the inventory that had been
> undertaken we concluded that the best procedure was to
> retype the original print out and to use an indexing
> program developed by the Center for International
> Studies (University of Pittsburg) as a means of producing
> a guide to the inventory. This program named CISBIP
> allows for the interactive indexing of materials...."

A useful general bibliography which has been updated by means of
three supplementary volumes is Metropolitan Community: A Bibliography
sponsored by the Institute of Governmental Studies, University of
California, Berkeley, and published by the Public Administration
Service, 1313 East 60th Street, Chicago. This bibliography first
published in 1956 contains well over 1,000 references and is probably
one of the most comprehensive available on the subject.

As has already been indicated, there are a considerable number
of guides on the market dealing with particular disciplines and
research resources. One of the more useful of such guides was
published in 1968 and 1971 by the American Bibliographic Center.
It is entitled Research Resources: Annotated Guide to the Social
Sciences Volumes I and II by John Brown Mason (ABC-CLIO Press,
Santa Barbara, California, Volume I 1968 and Volume II 1971.)
The first volume is a comprehensive, interdisciplinary guide to the
literature of international relations and recent history, but the
title is narrower in some respects than the contents. The first
four chapters, for example, deal with general indexes, specialized
indexes, indexes and abstracts in the Social Sciences, and indexes
and abstracts in fields related to the Social Sciences. Part five
of this first volume consisting of four chapters deals with U.S.
Government publications and while it emphasizes international
relations, works of more general interest are also included.
Volume II covers official publications of the U.S. Government,
the United Nations, other international organizations, and statistical
sources. The amount of useful information in this volume is indeed
impressive.

Three hard cover bibliographies emphasizing governmental publica-
tions are illustrative of materials of this type. These three are:

1. Comprehensive Urban Planning, by Melville C. Branch (Sage
    Publications, Beverly Hills, California, 1970.) 480 pages.

2. Government Publications and Their Use, by Laurence F.
    Schmeckebier and Roy B. Eastin, second revised edition,
    the Bookings Institution, Washington, D.C., 1969, 501 pages.

3. American County Government with an Annotated Bibliography, by
    John C. Owens in association with John R. Bayes and Kathryn L.
    Utter, Sage Publications, Beverly Hills, California, 1969,
    433 pages. The first 94 pages of this work present discussions
    of the literature and research needs in the field of county
    government and outline an inquiry into the county's political
    vitality. These chapters are particularly useful in setting
    the context and indicating the problems associated with county
    government.

A number of bibliographies have been published in various sources presenting materials dealing with natural resources or with the environment. Some deal explicitly with a particular aspect of the environment such as water. These can be useful but are not listed here because so many are available and the researcher is well advised to search his own library for relevant bibliographies of this kind. Some of these bibliographies are published as monographs by commercial presses, by university presses, and by government agencies, including the Congress. Others appear as articles in various journals.

Finally, reference should be made to Social Sciences encyclopedias. Most important in the United States is the International Encyclopedia of the Social Sciences edited by David L. Sills and published by Crowell-Collier-MacMillan in 1968. This encyclopedia fills 17 volumes and may provide a useful beginning for some research projects. The articles generally are followed by bibliographies which may also be of use. There are similar encyclopedias in some foreign countries, and for researchers working in foreign literature these can be particularly useful in defining concepts and explaining disciplinary points of view.