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An Archive for the Social Sciences

Carolyn L. Geda and Erik W. Austin

During the past two decades a new form of facility to support research and instruction in the social sciences and related areas of inquiry has emerged. These facilities are devoted to the collection, preservation, processing, documentation, and dissemination of computer-readable social science data and are commonly referred to as "social science data archives." Although data archives may be viewed as specializing in services related to the quantitative research and instructional interests of social scientists, their development and continued existence demonstrate the value of their services and the computer-readable information which they hand

Methodological and technological innovations were the primary factors which led to the development of data archives. The methodological innovations included quantitative methods and statistical testing procedures. With the refinement of scientific sampling techniques--particularly the sample survey (or, as it is less accurately called, the public opinion poll)--human behavior could be studied by using samples of, rather than, entire populations. At the same time increased availability of electronic data processing equipment allowed the use of extensive bodies of data and complex statistical methods of data analysis that could not be widely or effectively employed when only human labor was available. Scholars were no longer forced to restrict their inquiries to small amounts of information that they could realistically expect to hand-copy or to analyze tabulations of social statistics. For example, researchers interested in a general question about the characteristics of American voting behavior no longer needed to limit the empirical portions of their investigation to a "case study" of a particular state over a short period of time due to the magnitude of clerical labor involved in a broader definition of the problem, but could test hypotheses over much more extended areas and time periods.

By the late 1950s, impressively rich research resources for social scientists existed in the form of computer-readable data from government and private sources. Unfortunately, until that time there had been few systematic attempts to preserve the data and fewer still that came to fruition. In fact, punched cards produced by some polling agencies and market research corporations had already been destroyed due to high maintenance costs and/or the need to provide space for data currently being produced. Data collected by the 1930 U.S. Census, stored on approximately eight million punched cards, were destroyed because of a belief that, since hard-copy or printed tabulations existed, the punched cards were no longer needed.[2] Extant computer-readable materials were uninventoried and difficult to access. Social scientists whose broadened research interests were related to quantitative data experienced mounting frustrations at the inability to extend their research due to difficulties of access

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resources. Ultimately these scholars were responsible for the
data archives as one solution to their research interests and

nter-University Consortium for Political and Social Research
ormerly the Inter-university Consortium for Political Research
as established in 1962 by political scientists from twenty-one
ies.[3] These institutions joined together to further the develop-
search in political science by creating a repository for the
and dissemination of computer-readable data resources, by pro-
ining in methodology for graduate students and faculty members,
rating a clearinghouse for the improved communication of infor-
out ongoing research. Subsequently, the activity of improving
for social sciences was added to the organization's goals. The
headquarters of ICPSR are located within the Center for Political
t the Institute for Social Research of the University of Michigan.
ion of the ICPSR represents a major innovation in the organization
rch: the pooling of financial resources of the research community
rs collectively some of the activities which each institution alone
t accomplish.
ently the ICPSR has a membership of over 220 institutions. These
ions pay an annual fee for their membership, thereby entitling
and students at the institutions to acquire the full range of ser-
ovided by the ICPSR.[4] This structure has encouraged maximum use
esearch support facilities of ICPSR by shifting the financial re-
ility for developing and maintaining resources from individual
to their institutions. The annual fees also provide a relatively
nd predictable financial base, thereby allowing ICPSR to engage
range resource development and planning. The member fees comprise
operating budget and sustain the central administration, the
trative costs of the training program, the data dissemination acti-
nd a major portion of data resource development. Most development
ter software, archival expansion, and a major portion of the train-
am costs are supported by foundation and federal government grants,
rom the University of Michigan, and charges for extraordinary services
rs and services to non-members.[5]
h affiliated institution is represented by one person, locally des-
and formally called the ICPSR "official representative." The
representative serves as the liaison between the member institu-
pus and the ICPSR. At the time ICPSR was created, the represen-
were usually political scientists since the initial impetus for
filiation came from the behaviorists in political science who had
are of the opportunities Consortium membership would afford their
and teaching. With the expansion of the membership and subsequent
of information about the ICPSR to other social science departments
e member institutions, however, the corps of representatives was
d by sociologists, historians, and data librarians as well as poli-
scientists. Furthermore, at the time ICPSR was created, these repre-
ves were generally senior members of their professions. As increas-
ra of young behaviorists were trained—in part through the Consor-
r Training Program—and were appointed to political science de-
across the country, they frequently encouraged their universities
affiliated with the ICPSR if the university was not already a
Their arguments were persuasive in terms of the research and train-
fits accrued through membership, and frequently these younger fac-
rs became the ICPSR representatives for their institutions. Many

official representatives found opportunities to capitalize on the resources available through the ICPSR and to establish data laboratories, libraries or computation facilities to promote and support research and training activities on their own campuses. The involvement of the representatives and the communication network they form has been critical to the growth and development of the ICPSR as it has continued to respond to the needs of the social science disciplines it serves.

The responsibilities of ICPSR official representatives are extensive, their record of performance of these duties is remarkable, particularly in view of the fact that there is no remmeration for their efforts and release time is rarely available through their own institutions. The representatives are the recipients of all organizational materials which they circulate or make available to interested users of ICPSR resources. As liaison officers, they forward data requests to ICPSR and in return receive the magnetic tapes containing the requested data and relevant documentation for the data. The tapes and documentation are in turn made available to faculty members and students on the local campus. The representatives also play a significant role by providing consultation and guidance in the selection and use of relevant data for particular research and teaching interests. Frequently they offer suggestions to the ICPSR staff on potential new data acquisitions as well as other needed services and, of course, communicate any difficulties they experience with the services. Applicants for the Summer Training Program are screened by the representatives before being forwarded to ICPSR. Finally, the representatives attend ICPSR biennial meetings to review and guide the activities and future developments of the organization on behalf of their institutions and are responsible for electing a governing Council of ten members.

The Council (which also serves without compensation) functions as the executive committee of the members and is authorized to act on behalf of the members to oversee administrative, budgetary, and organizational policies and procedures. Although the Council is composed of leading scholars in history, political science, and sociology, the broadening content of the archive and expanding disciplinary relevance of ICPSR requires guidance from a large and diverse set of experts in many fields of social science. Therefore the Council's work is supplemented by a set of advisory committees, each of which is usually chaired by a member of the Council. The advisory committees guide ICPSR in defining areas for possible special project funding, establishing priorities for the acquisition and processing of data, recommending expansion and revision of the curriculum of the Summer Training Program, and in accommodating changes in computing needs of social scientists. Advisory committees have been established in such areas as United States political data, comparative and cross-national data, elite data, organizational behavior data, sociological data, historical data resources, undergraduate curricular development, international relations data, membership activities, and computer assistance.

Data Resources

When the Consortium was established, member interest in data resources centered on access to survey data, particularly the Institute for Social Research survey data pertaining to the United States national presidential and congressional elections dating from 1948 onward. Other major political attitudinal surveys acquired early in the life of ICPSR included Gabriel

Almond and Sidney Verba's *Civic Culture Study, 1959-1960*; Samuel Stoffer, *Communism, Conformity and Civil Liberties Study, 1954*; William Flanigan, *New Haven Community Study, 1959*; and John Wahlke and Heinz Eulau, *Legislative Behavior Study, 1959*. The staff and Council, however, were persuaded that the future of social research would be in the integrated use of very different kinds of data. Therefore, expansion of the holdings in the direction of American political history was urged almost simultaneously by both political scientists and historians. Lee Benson, Samuel Hayes, William Riker, and Charles Sellers recommended that the Social Science Research Council commission Walter Dean Burnham to investigate the feasibility of collecting historical election data for the United States. Subsequently, the Council made a grant to Burnham to inventory the sources of data. The existence of the ICPSR, the Council grant, and Burnham's results prompted the American Historical Association to create a Committee to Collect the Basic Quantitative Data of American Political History, chaired by Lee Benson. Over one hundred scholars participated in locating reliable sources of historical election returns. Financial support required to complete the collection process and make the data computer-readable was awarded to ICPSR by the National Science Foundation. The result was a collection of county-level returns for over 90 percent of all elections to the offices of president, governor, and United States representative and senator from 1824 to the present. With the success of this project and with the further support of the National Science Foundation, a substantial collection of county- and state-level demographic, economic, and social data from published United States Census reports for the period from 1790 to the mid-1960s were made computer-readable and added to the archive. With support from the Ford Foundation, complete roll call voting records for the United States Congress from 1787 to the present were also made computer-readable and integrated into the archive.

The archival holdings have now been expanded to include materials relevant to most disciplines of the social sciences. Among the major bodies of data pertinent to other social scientists' research interests are a large body of micro-economic surveys (of consumer buying and savings attitudes and behavior as well as macro-economic time series for the United States and other nations. In the area of sociology, data on education, religion, crime and criminal justice, and aging have been acquired. Policy-related research has been facilitated by the addition of major collections of materials on the environment and natural resources, governmental operations, and the operation of the legal system. As a reflection of this expansion of archival resources and increasing pertinence of these resources to all social scientists, the name of the organization changed in 1975 from Inter-university Consortium for Political Research to Inter-university Consortium for Political *and Social* Research.

Archival Procedures

Data archived* by the ICPSR are acquired through external sources such as scholars, research centers, other data archives, and governmental agencies or are developed internally from original source materials, as with the historical data collections mentioned above. Obviously, before

*See n.1 in Introduction to Chapter 1.

data are sought, ICPSR must determine which data should be acquired. Recommendations for the acquisition of specific data may come from the user community (students and researchers), the ICPSR staff, the Council, data acquisition advisory committees, or individuals who wish to contribute data to the archive or acquire as given body of data. Foundation grants involving data collection activities frequently contain a clause that the data must be placed in the public domain. Recipients of these grants often contact ICPSR regarding interest in the data they will be producing and the future disposition of the data. The grants, however, rarely specify a time period during which the data must be archived. Consequently, the archive might receive the data one year after collection or several years later upon completion of the major reports or publications based on findings from the data.

The data advisory committees vary in size from three to twenty members and each committee focuses on date resources within a specific discipline or subdiscipline. Members of the committee are selected by the chairperson on the basis of their knowledge of research related to the committee mandate. The committee members are responsible for surveying extant or forthcoming computer-readable data within the related area. Suggestions of data to be acquired, including information on the title, collector, date of collection, location, scope, sample design (if relevant), and an appraisal of the collection, are submitted to the chairpersons by committee members. Chairpersons compile the suggestions and circulate all suggestions to each committee member for appraisal purposes. The committee members' reactions are summarized by the chairperson who usually contacts the data collectors regarding willingness to have their data archived, if this has not already been done by the committee members. The summaries are ultimately forwarded to ICPSR. The results of committee work are used by the staff to pursue acquisition and processing activities. Data collections which are recommended by more than one committee receive the highest priority. Occasionally an advisory committee will recommend the development of a particular data collection. The macro-economic time series data referred to above (originally compiled by the National Bureau of Economic Research) were made computer-readable at the suggestion of the American Historical Data Advisory Committee. This committee also assisted in developing a grant proposal for external funding to support this activity.

The process of determining which data are acquired is comparable to the appraisal process archivists apply to more traditional materials. Major considerations for acquisition include:

1) Whether the data still exist and are computer-readable

2) If the data collector is willing to have the data archived

3) Acquisition costs

4) Current and future research value

5) Whether the data complement a collection already held or represent a desired new data area for the archive

6) Whether the collection represents a major research contribution in a given discipline or subdiscipline

7) Time span of the collection

8) Instructional value of the collection

9) Whether the collection is longitudinal (collected at several points in time) or might be replicated in the future

10) Whether the collection is part of a continuing series such as roll call voting records, census materials, or election returns

11) Whether the data are tied to specific software systems since data that are software-dependent will be more difficult and costly to handle

12) Whether adequate documentation for the data is available

13) Whether confidentiality problems exist

Once the decision to archive a study is made, the data collector is contacted or recontacted. Acquiring extant data may take a prolonged period of time, often several years. With some bodies of data, the collector has invested significant amounts of time, effort, and resources in the process of coding and making the data computer-readable. Under these circumstances, the collector may adopt a monopolistic position with regard to the data and be unwilling to deposit them with an archive until his or her research is completed. Collectors of data may extend proprietary rights over their data to include their graduate students working on dissertations or research projects. Therefore, the data may not be available for accessioning until these secondary projects are completed. This attitude is reinforced if the original researchers and students feel that open access to the data mayaresult in their being "scooped" by a secondary user of the data. It is also possible that the collectors intend to replicate the collection in the future or extend the collection backward or forward in time, and consequently view the data as increasing significantly in research value. Again, they may prefer to retain control over the data until they have had the benefit of analyzing the data in the future as well as the present.

Most data archived by the ICPSR are received on magnetic tape, although punched cards are also received occasionally. As the data are received, they are subjected to a series of tests and procedures. The first step involves making a copy of the tape to secure the data; this also determines whether the data can be read by the computer(s) to which the ICPSR staff has access. It is not unusual to experience difficulties at this stage since adequate information regarding how the data were written onto the tape may not have been received, or information received may simply be in error.[8] When the data have been successfully copied and the number of records in files is determined, approximately twenty of the records are printed and compared to the documentation received with the tape. This check is performed to corroborate that data exist on the tape in the locations specified by the documentation, that all data fields are documented, that the data formatted as described in the documentation, and that the number of records in the file matches the number of records stated in the documentation. These early checks also ascertain whether potentially problematic code values (usually non-numeric characters) exist in the data. Each collection is given an archive serial number for internal inventory, record keeping, and data ordering purposes. A title is then

assigned to the collection. The documentation is checked to determine whether each variable or data field is described sufficiently; whether question text exists for each variable if the data are from a sample survey; and that each coded value used for every variable is adequately described. Documentation which conforms to these standards might be called "minimal documentation." A data collection generally cannot be used effectively without information of this type. In addition, valid substantive use of the data frequently requires adequate information on the design of the data collection techniques employed, as well as information on the structure of the data file, how missing data were handled, a list of publications or reports based on the data, and any other supplementary material that will make the data easier to use. Thus, the documentation received with the data is examined for the presence of these materials and, if missing, are solicited from the original collector of the data.

The data may be subjected to further checks and some corrections of anomalies if an advisory committee has recommended these activities, and if the costs of further checks are not prohibitive.[9] Fiscal constraints are critical at this stage since resources are never great enough to acquire all of the data desired or thoroughly check and correct all data acquired. Further checking and subsequent corrections of the data require computational facilities and software designed explicitly for these procedures. Available computational routines permit easy verification that all physical records for each "case" (or "unit of analysis") exist and, if any are missing, identification of which records are missing. Other routines determine (or ensure) that data records in the file are appropriately ordered for proper access by statistical analysis or display programs. Frequencies—a count of the number of occurrences for each coded value in each data item--across all variables can be obtained by additional computer routines and checked against the code values described in documentary materials to determine if invalid or undocumented codes exist. Inconsistencies within contingent or related variables can also be checked by computer. If new measures, indices, or scales were created by the original collector of the data, these may be replicated by the archive staff and errors noted. Following the data checking process, anomalies discovered in the data are corrected by referring to the original data sources or by contacting the collector of the data for resolution. If neither of these recourses is possible, corrections are often made on the basis of the best available information, and uncorrected errors are noted in the documentation. Although the majority of the errors may not have represented problems for the original collector or investigator, they may present obstacles for other users of the data. Certain variables may also be recoded to a standard archive code to permit merging with other data collections.

After the data are checked and corrected, they are usually reformatted or reorganized in a technical format which increases their compatibility with different computational systems. Once this work is done, several "backup" or duplicate copies of the data are made to secure the data against loss or destruction.[10] Concurrently, the documentation will be checked for comprehensiveness. Supplementary documentation will be produced by consulting the collectors of the data and publications based on the data. This documentation will frequently be made machine-readable to allow it to be distributed with the data on a magnetic tape and to facilitate the tasks of subsetting the data for specific research or teaching purposes. Often documentation for a completed collection acts as a guide for individuals who wish to format, code, and document data of their own.

inal version of documentation produced by the archive has also
ed by original collectors of data as a guide for handling their
ta.

tensive checking of the data and the creation of comprehensive
ntation requires considerable resources both in terms of money
the availability of skilled staff. Due to the costs involved, as
ioned above, not all data can be checked thoroughly. Some data are
ived, stored, and made available in their original form. The ICPSR
classification system for data which alerts users of the data to
evel of data processing which has been performed with each data col-
ion. The "classes" of data range from Class IV, which denotes data
are available in the form received from the original collector or
tigator, to Class I, whichimplies that the data have been checked,
ected, reformatted, and documented to the degree possible given avail-
resources. Classes II and III denote intermediate levels of checking
data processing.

As data are archived by the ICPSR and made ready for distribution to
public, a description of the data (called a study description or
tract) is written. These descriptions become part of a quarterly
formational mailing sent to each ICPSR official representative. Such
ilings ens that all members receive notification simultaneously of
w data ava ble through the archive. Additionally, documentation for
lass I data e bound in book form, printed in quantities of 500 or more
opies and a opy automatically sent to each representative. Each repre-
ntative, th refore, has a complete collection of documentation for the
lass I data llections. One copy of the documentation for the other
lasses of d a is available without charge to the representatives upon
quest. Th , individuals interested in examining documentation for par-
icular data o determine whether the data are related to their research
nd teaching nterests may do so on their own campus with minimum incon-
nience. Al hough originally the documentation was stored in the repre-
ntatives' epartment offices on each campus, representatives are now
requently st ring the documentation in data libraries, laboratories, com-
ting centers, or in the main library. Some member institutions have
urchased ad itional copies of the documentation to provide multiple
ca tions of the documentation on their campuses.

Further publicity for the data occurs through the publication of a
talog of the data holdings entitled *A Guide to Resources and Services*.
e *Guide* includes a study description for each data collection in the
rchive and information on membership and all services available through the
ICPSR. The study descriptions are ordered on the basis of a broad classi-
ication scheme. Three indexes (arranged by principal investigator or
ollector, study or data collection title, and subject) are included in
the *Guide* to assist in locating particular data. The *Guide* is updated
nnually and 5,000 copies are printed to allow for wide distribution.
Additionally, the data resources are promoted when the ICPSR staffs exhi-
bit booths at professional meetings; when contributors of data note that
the data are available through ICPSR, either by word of mouth or in their
publications; and through announcements in various professional newsletters.
e.

Dissemination of Data and Services

The member services section of ICPSR handles the distribution of data
and documentation through the filling of data requests or orders. This

section maintains complete tape specifications for each member institution to ensure that the magnetic tapes containing requested data are written specifically for each member's computer facilities. As each tape is written, a partial printout of every file supplied is obtained to ensure that the tape can be read and that no errors occurred in copying the requested data. Although the vast majority of member requests are for copies of complete data collections, the member services section can also distribute subsets of data collections or the results of statistical analysis on specific data collections. Since the archive is an open-access archive, non-ICPSR members may obtain data resources on a loan basis upon payment of an access charge for the data.

During the 1977-78 fiscal year, the members services section distributed approximately 6,700 data files totaling 171,700,000 card-image equivalents (where one card-image contains the information that can be packed on one punch card). With this volume of service, there is also the need to provide consultation on the use and accessing of the data. In fact, users of data archives' resources are often less sophisticated about computer technology than the archive staff who handle and manage the data.[11] Users of archives frequently require assistance in locating data that are related to their research and teaching needs, particularly since the descriptions of the data contained in the *Guide* or similar documents may not be detailed enough or provide complete coverage of all of the variables. The staff is familiar enough with the holdings of the archive to be able to direct users to the most relevant data source. In this capacity the staff functions as a reference service. If appropriate data are not held by the ICPSR, the staff may direct the user to another archive or source of data or may act as a liaison for the acquisition of the data.

The staff is also called upon to assist users with technical difficulties. The user may have problems accessing the tape received from ICPSR on his/her computer or obtaining the expected results from a statistical program. In both instances, the staff must be technically familiar with different computer installations and the variety of statistical software packages available. The ICPSR staff has access to the Center for Political Studies Computer Support Group and may consult with them on certain technical problems or refer the user to them for additional assistance. ICPSR members are also interested in technological developments and advancements and may wish to consult on which computer configuration would be most compatible to their needs and resources. The Computer Support Group is prepared to handle this type of consultation since this is an area that they stay abreast of in the normal course of their daily activities. The Computer Support Group is also responsible for the development of software required by the archive to process and maintain the data which are held by ICPSR.

Data received by members of the ICPSR are used primarily for research and instructional purposes. The data collection process requires substantial funds. In the case of sample survey data, in addition to funds, researchers must have skills in survey techniques as well as access to necessary facilities such as those provided by research institutes which draw the sample, administer the questionnaire, code the data from the completed questionnaire, and produce the data in machine-readable form. For data collections which are not sample surveys, the researchers must have access to appropriate source material, apply sampling techniques if relevant, develop data formats, code the information, and make it machine-readable. Given the limited amount of funding available for data collection, some researchers may have access only to data which have already been collected and made machine-readable.

The availability of data from which research findings have been
lished also ensures that the original research can be replicated by
testing the hypotheses formulated by the original researchers. Students
also able to engage in replicating original research in substantive
rses when access to the original data is possible. Furthermore, faculty
able to introduce students to quantitative techniques using appropriate
ta for statistical exercises.

The use of archives, however, is dramatically increased and enhanced
rough educational facilities. The ICPSR conducts a Summer Training
ogram annually. This program in quantitative methods of social research
cludes training in research design, statistics, data analysis, and social
thodology. It provides a wide range of advanced specialized seminars
r graduate students and post-doctoral participants, as well as opportun-
ies for introductory work for those whose careers or educational oppor-
nities did not provide such training. Unlike conventional statistics
rricula, this program stresses an active, learning-by-doing mode of
raining and instruction. Experience is gained in data processing as well
the analysis of data. The program is divided into two sets of four-
ek modules. Special two-week seminars and workshops are often offered
specific methodological and technical problems, including a data library
nagement seminar.

Data archives were established, in part, because traditional informa-
ion storage facilities did not handle machine-readable social science
ta, which made access to these materials extremely difficult. Existing
ta archive facilities cannot handle all of the important machine-readable
ta being produced. Even worse, information loss will occur unless archi-
sts become directly involved with the preservation of these materials.
e uses of machine-readable materials for research are increasing; indeed,
more data produced by institutions and governmental agencies become
ailable, researchers will begin to have the opportunity to analyze data
t have been used for policy decisions and to assess and verify the
dibility of the data and decisions made based on these data. Active
volvement with these materials will secure a more central role for archi-
sts in current and future research. Existing data archives have suffi-
nt experience to assist archivists with problems they may confront in
areas of procedures, technical expertise, and training (in the latter
rd, the structure of the ICPSR Summer Training Program affords an op-
rtunity for integration of a training program for archivists). In sum-
, the experiences of data archives like ICPSR offer abundant proof
the management of computer-readable materials can be accomplished and
the benefits of this endeavor will be substantial for the research
nity that we all serve.

NOTES

[1]Stein Rokkan, "Data Services in Western Europe," *American Behavioral Scientist* 19 (March-April 1976), 443-54.

[2]Charles M. Dollar, "Computers, the National Archives and Research," *Prologue* (Spring 1976), 29-34.

[3]University of California at Los Angeles; University of Chicago; Cornell University; University of Florida; Georgetown University; University of Illinois; State University of Iowa; University of Kansas; University of Michigan; Michigan State University; University of Minnesota; University of North Carolina; Northwestern University; University of Oregon; Princeton University; University of Rochester; Vanderbilt University; Washington University (St. Louis); Wayne State University; University of Wisconsin (Madison); Yale University.

[4]1979 membership categories with affiliated fees:

Category A: $6,400. Educational institutions which offer graduate work in the social sciences or related areas

Category B: $4,100. Undergraduate institutions and those with limited graduate degree programs in social sciences and related areas

Category C: $2,000. Institutions in developing countries

Category S: $2,500. Small colleges which do not have graduate degree programs in the social sciences or related areas and which have fewer than 2500 students

Category N: Varied feese National memberships generally reserved for countries other than the United States and Canada

Category F: Varied fees. Federated membership consists of a number of institutions in categories A, B, and/or S which have joined together around a common link to ICPSR. The common link is responsible for distributing data and documentation from the ICPSR to the other members of the federation. Fees are determined by the actual configuration of institutional types in the federation

[5]For 1977-1978 external sources of funding for ICPSR included the National Science Foundation, the National Endowment for the Humanities, the Law Enforcement Assistance Administration, and the Administration of Aging. The operating budget plus charges to non-members totalled $834,000. Additional sources of funding provided $564,600 for a total budget of $1,398,600.

1978-79 Council members are:

Hubert M. Blalock, Jr.9 University of Washington
Aage R. Clausen, Ohio State University
Richard Hamilton, McGill University
Robert T. Holt, University of Minnesota
Ruth Schuessler Jones, University of Missouri (St. Louis)
Charles McCall, Chair, California State College (Bakersfield)
Patrick J. McGowan, University of Southern California
Murray G. Murphey, University of Pennsylvania
Roberta S. Sigel, Rutgers University
John D. Sprague, Washington University

[8]For a discussion of the National Archives appraisal criteria, see Charles M. Dollar, "Appraising Machine-Readable Records," *The American Archivist* 41 (October 1978)9 423-30.

[9]The information required to access a tape includes density (bits per inch--200 bpi, 556 bpi, 800 bpi, 1600 bpi, 6250 bpi)9 track (7 or 9); code (ASCII, BCD, EBCDIC); parity (even or odd); block size; record length; label information (ANSI, IBM standard, other, none).

[9]Unlike a machine-readable division of a traditional archive such as the National Archives which seeks to preserve the integrity of official records as received, data archives will frequently correct data or records upon validating that error exists and will almost always reformat the data for ease of access.

[10]For a more extensive discussion of data checking and management, see Jerome M. Clubb and Michael W. Traugott, *Using Computers* (Washington, D.C.9 American Political Science Association, 1978)9 and John H. Sonquist and William C. Dunkelberg, *Survey Research and Opinion Research: Procedures for Processing and Analysis* (Englewood Cliffs, N.J.9 Prentice Hall, Inc., 1977)9

[11]Angus Campbell, "Some Questions about the New Jerusalem" in Ralph L. Bisco, ed., *Data Bases, Computers, and the Social Sciences* (New York, John Wiley & Sons, 1970), 42-51.