Online Numeric Data-Base Systems: A Resource for the Traditional Library

MARGARET O'NEILL ADAMS

"REFERENCE SERVICE IS the ultimate library service since its object is to insure the meeting of the library patron with the materials or knowledge which the library is established to afford him...."[1] With reference service as the ultimate library service, I propose that the ideal reference department in the latter decades of the twentieth century should coordinate a full range of computer-based services: online library networking, online bibliographic and textual searching and retrieval services, data library services, as described elsewhere in this issue, and utilization of online numeric data-base systems. This model for reference reflects a continuum in the evolution of information services during the past century. Its foundation is a conviction that libraries are better suited, by tradition and structure, to exploit selectively the full gamut of the emerging computer-based information resources than are individuals.

The following discussion analyzes one component of this reference service: online numeric data-base systems for time-series data. For purposes of definition, a numeric data base is described as a "computer-readable collection of data which are predominantly numeric in nature," with numeric data-base systems comprising "a functioning combination of one or more numeric databases...[with] a search system which can retrieve the numeric data...and further process them."[2] As used here, online numeric data-base systems refer to systems where the content of the data base is composed of discrete items of historic statistical information. Potentially the discussion could easily apply to data bases of statistical projections or forecasted data. A further limitation is

Margaret O'Neill Adams is Manager, Kentucky Economic Information System, Center for Applied Economic Research, University of Kentucky, Lexington.

that only online numeric data-base systems that pertain to the social sciences are considered, although many of the generalizations apply equally to natural science and technical online numeric data-base systems.

The context for a discussion of the library use of online numeric data-base systems is established by briefly tracing the tradition of reference service and by reviewing the ways in which computer technology has enhanced the provision of many library services in recent years. A discussion of some of the latent issues related to libraries and computer technology is also included. Finally, experiences with the Kentucky Economic Information System, an online numeric data-base system for time-series statistics related to the economy of Kentucky, are described to give specificity to the general themes.

According to Rothstein, the conception of an organized reference service descends directly from the ideas of a late nineteenth-century librarian. Samuel Swett Green of the Worcester (Mass.) Free Public Library proposed an explicit program for reference as a responsibility of the library to the 1876 conference of librarians. His ideas are reported to have received general approval at this conference, but the practice of providing reference service seems to have evolved first as a function of special libraries, and only later at university and research libraries. Most of the larger public libraries are said, however, to have adopted reference services by the end of the nineteenth century.[3]

Perhaps the most intriguing aspect of Green's suggestion, considered now more than a century later, was his perception that provision of a reference or information service, could stimulate library use and therefore garner support. As a public servant, he seems to have been at least partially motivated by the need to demonstrate the public utility of the library as a resource for general information in order to increase the number of patrons and to justify continuing public investment. In other words, his concern seems to have been to formalize reference service as a complement to archival and lending services. Evidently he considered both types of library activities as essential and believed that unless libraries provided an information service, continuing public support for their other tasks was unlikely.

Retrieval and manipulation of statistical information from online numeric data-base systems is but a current version of some aspects of the traditional information service just described. Although use of such systems extends Green's notions beyond anything he could have possibly imagined, it is easy to picture him nodding his approval. After all, the accepted practice of reference librarians has been "supplying...fac-

tual information, mostly out of books such as encyclopedias, directories, dictionaries or the like."[4] Libraries that have the means and the willingness to avail themselves of this new type of resource for numeric information are simply taking advantage of an innovative vehicle to provide efficiently what has become one of the most fundamental of library activities.

It should require no great adjustment for libraries to do this since they are already using computers in a great many ways. Machine production of catalog cards, online in-house catalogs, and management systems for materials circulation and inventory control are but a few examples. One significant library development directly related to technological innovation during the past decade has been the growth of cooperative online networks such as OCLC and RLIN (Research Libraries Information Network). Library networking provides patrons at participating libraries with an online catalog to the holdings of all other network libraries, thus expanding the possibilities for interlibrary lending and sharing of resources.

An equally revolutionary innovation has been the availability of online bibliographic data bases as basic tools in the provision of bibliographic reference services. Online bibliographic data bases achieved this status in most major academic libraries, as well as in many public and other libraries, only in the latter part of the 1970s, although these systems were preceded by computerized batch literature searching in the late 1960s and early 1970s. They emerged as byproducts of computerization in the production of indexes, abstracts, journals, and other secondary source publications. These developments occurred first in scientific and technical fields, but quickly spread to the more general arts, education, humanities, and social science fields, as publishers realized how marketable bibliographic data bases were.[5] Some have suggested that the next logical extension of online library services is full-text retrieval; at least one commercial firm currently markets two such services.[6]

All of the above-mentioned innovations to meld computer technology with library services provide better access to or reference about the information medium that has traditionally been the purview of the library: the printed word. They are creative and logical responses to the challenge of keeping pace with traditional library responsibilities in the face of what is now commonly referred to as the "information explosion." What the innovators have done, however, is simply taken structures and formulas that have been developed for printed information and stored them in a computer-readable and retrievable format. This feat is by no means trivial. Nevertheless, these innovations are limited by

the extent to which they depend upon print media. There is a vast volume of raw and processed information, computer-produced or in computer-readable form, that will never be suitable for publication. Reference service related to these materials is vital if patrons are to have the opportunity of exploiting all the available information resources.

It should be noted here that a commitment to information service for computer-readable nonprint data has been at the heart of the emergence of social science data libraries and archives since the latter part of the 1960s, and at least partially responsible for user-friendly features in some online numeric data-base systems for time-series data developed more recently.[7] When reference departments of traditional libraries adopt information services for computerized nonprint data, they give their clientele "the opportunity of locating information at the one place [they have been]...trained to look for it, the library."[8] Unfortunately, such services are far from commonplace in today's research or public library.

Indeed, as a consequence of the many technological developments of the past twenty years or so, some have predicted the demise of the traditional library altogether. In their crystal balls they have conjured up an amalgam of the library and the computing center.[9] Others envision a future where information seekers sit at their home or office computer terminals, inexpensively calling up and manipulating data at any time of the day or night from some master online data-base system where "everything you always wanted to know [is] on-line."[10] The paperless society becomes the millenium.

Using computer-based resources, especially online numeric data-base systems, need not be viewed as displacing the traditional functions of the library. The memory and manipulative capabilities of the computer cannot provide an appropriate substitute for the library's role in transmitting knowledge through print media, its "archive of learning."[11] It would be anti-intellectual to suggest that computer terminals or video screens alone are appropriate media for the transfer of the "product of the human intellect...[upon which traditionally] the continuation of civilization depends."[12] Contemplative consecutive reading will probably always be fundamental to this transfer.

The area where computer technology provides mechanisms ideally suited for information service comes, however, for reference service related to statistical or other numeric data. It was after all, "transformable information" which Licklider foresaw as comprising the "libraries of the future."[13] Used for this purpose, the computer furnishes a means whereby librarians can provide the information service for numeric data

required by contemporary researchers, planners and analysts, while in no way detracting from the services provided to the library's traditional constituency of readers.

Nonetheless, the issue becomes muddied further by suggestions from still others that continuing technological developments may soon enable end users to "bypass the library as the traditional information storage center."[14] If realized, this view would mean enhanced profits for the information industry. As a proposition, however, it ignores the economies inherent in the centralization of information resources, as well as the ideals of the "democratization of information."[15] Certainly there will be some who are able to afford the luxury of bypassing the library or other centralized resource; there always have been. It is short-sighted to suggest, however, that the society's requirement for all of its public information, even limited to that in computer-readable format, can be met by individuals accessing master online data bases in isolation.

As a practical matter, this is also an unlikely development, at least in the United States, for the foreseeable future. There are projections for over 100 million computer terminals in the United States by 1995.[16] Only a small portion of these are likely to be dedicated to the types of information services under discussion. Perhaps the greater limiting factor, however, is that truly master online data bases, numeric or otherwise, do not exist. Networks linking compatible statistical data bases, such as might be developed uniquely, but in coordinated fashion, by each of the fifty states, also do not exist.

The one ray of hope seems to be among academic repositories for social science data files. The prototype of a multi-purpose information system developed by the Institute for Research in the Social Sciences at the University of North Carolina includes access to item level responses from selected survey data, and this system is accessible in an online mode through a network. In addition, the Inter-University Consortium for Political and Social Research is working on a similar information system that will provide comparable capabilities relative to the 15,000 machine-readable data files (MRDF) of its repository; this system will also be accessible online through a network.[17]

The federal government is the primary producer of computerized statistical data in the United States, yet there are no plans, as far as the author can determine, to centralize all federal data production efforts, nor to make the products of the decentralized efforts compatible with each other. There are likewise no plans to develop publicly accessible, online, interagency federal data-base systems, even for macrodata.[18] In

contrast, Statistics Canada, through its CANSIM facilities, provides centralized online access to statistical data produced by Canadian federal agencies. Even CANSIM, however, does not approach full integration of all numeric computerized social and economic data produced in Canada.

Most contemporary time-series numeric data-base systems, with social and economic data that are national (United States) in scope, have been developed by the private sector using publicly generated as well as proprietary information.[19] Most are by-products of large-scale econometric modeling efforts. Generally, the range of data they provide and the extent of data availability are determined by their profitability. There is considerable overlap in the content of these data bases, and most are considered expensive to use, especially for individuals.[20] Several of the states have supported development of publicly accessible online numeric data-base systems for state and local area economic and social data. These have been designed for state and substate planning and analysis purposes, and at least one is the byproduct of a state-level econometric modeling effort.[21] In general, they are relatively inexpensive to use. Like the numeric data-base systems that are national in scope, they have potentially unlimited utility for government, commercial or academic research and analysis.

Taken together, all of these developments have resulted in the emergence of a rich variety of public and proprietary online numeric data bases, online data-base systems, and related computerized information resources such as social science data files. The expectations are for continuing growth. There can, however, be only considerable skepticism about the eventual emergence of master online data systems for several reasons. Data producers are not necessarily involved in the maintenance of numeric data-base systems. A national network of compatible data bases is absent and there is an almost complete lack of coordination among the range of computerized information resources.

In any case there is also considerable doubt about the desirability of an eventual emergence of master online data bases, should the many pragmatic problems be resolved. The potentially unlimited volume of data and the plurality of data producers would seem inherently at odds with such a development. Additionally, the prevailing political climate seems not to be one which portends support for centralization of national information services, nor perhaps even for subnational information. The more likely development will probably be greater diversity of computerized information resources than exists currently, mandating even more coordination of these disparate resources by centralized

institutions such as libraries. The library must utilize the wealth of information generated because of computer technology, regardless of the mode in which it is stored, if there is to be any chance of meeting the society's collective information requirements, as well as individual needs.

A true revolution will have been realized when computer technology is utilized by information professionals for more than coping with or substituting for print media, when it is relied upon to provide numeric data. For online technology allows direct access to data, and in the case of numeric information, eliminates the necessity for publication at all. While this sounds similar to suggestions for virtual journals, electronic mail, and so forth, the concept is quite different.[22] At issue is an understanding that the type of information which the computer can accommodate best and without alteration, and for which is has been specifically designed, is numeric or objectively quantifiable.

Online numeric data-base systems are, therefore, among the most logical and natural computer-based resources available for adoption by library reference departments. Use of them can be viewed as one aspect of a larger range of data library services, or more simply as one of the services offered by a reference department. In other words, where data libraries exist or are planned, online numeric data-base services may be considered as one of their services. Where such a structure does not exist, traditional reference libraians can utilize this service. Since online numeric data-base systems provide access to numeric data in a manner that is similar to bibliographic services provided by online bibliographic data-base systems, both types of service could be offered jointly by reference departments. The same individuals can be trained to do both types of searching, and frequently the same computer terminals can be used.

Retrieval and mathematical manipulation of data, together with table-making, graphing, and mapping capabilities, are standard features of many existing online numeric data-base systems. They enable reference librarians to furnish levels of information service that are far more complete and sophisticated than those that predate the era of the computer in the library. Use of this resource type allows computer technology to act as the catalyst of change, enhancing and extending traditional information service.

All of the considerations discussed thus far have allowed general conclusions about the utility of online numeric data-base systems for traditional libraries. A more complete analysis of this topic should, however, also include some specific description of at least one such

system and the ways in which it can be used by staff at a traditional library. Online numeric data-base systems have to be readily available for library use before any of their theoretical merits matter at all.

Experience with the Kentucky Economic Information System (KEIS) provides some specificity for this discussion because it is an example of a publicly available online numeric data-base system that is used, to some extent, as a resource in the reference department of M.I. King Library, University of Kentucky. This is an addition to its use as a general state and local area statistical resource, accessed directly by state government personnel, nonprofit and private sector analysts, academic researchers, and students throughout Kentucky. Reference librarians at other university libraries in the state, as well as the staff of the Kentucky Department of Library and Archives, are actively considering access to this resource as part of their computer-based services. At Western Kentucky University, Bowling Green, where the Academic Computing Office has for some time coordinated services for social science machine-readable data files with the staff of the university library, assistance in accessing the KEIS has also become a standard service.

Development and maintenance of the KEIS is one of the program activities of the Kentucky Council of Economic Advisors (KCEA).[23] Its development is an outgrowth of the construction of the Kentucky Quarterly Econometric Model. Many other states now support an econometric model, and so it is likely that these states may also support centralized, statewide statistical data-base systems in the future, since their general utility is evident enough. Online numeric information systems are also being developed for a variety of other purposes by states and research organizations.[24] Private economic forecasting firms are building state-level econometric models and selling access to regional online statistical data-base systems.

The KEIS was originally designed as a data system pertaining to state-level economic information, since the modeling effort which it supports is at the state level. Much of the policy and program analysis done by state government agencies requires substate-level data, however, so a county-level data base has also been made an integral part of the system. The public KEIS contains four data banks, distinguished by the frequency of the data series. For example, the annual data bank, ABANK, contains time-series, state-level economic and social data that are annual estimates; comparable quarterly or monthly state-level estimates, when available, are stored in the QBANK and MBANK, respectively. There are approximately 4000 discrete state-level data series. The county-level data bank, CBANK, contains only annual values, with

comparable information stored for each of Kentucky's 120 counties and 15 Area Development Districts. The content of the county data base is currently limited to approximately fifty data series per county, though given additional funding, there are plans to expand significantly the number of available county series. All of the data banks begin with observations in 1951 and include data up to the most currently released information.

Data for the KEIS data base is gathered from a wide variety of federal, state and private agencies. Occasionally the software or computer programs of the KEIS are used to create new data series, mathematically transformed from data stored in one of the data banks. In general, however, the KCEA staff does not generate data series. Rather, the KEIS should be viewed as a secondary data resource which effectively joins together statistical information produced by numerous primary source agencies. Some of these data series represent published information, but more are unpublished. Even those parts of the data base that represent published information generally include series for a more extensive time period than any single issue of a statistical source document. The multiplicity of sources from which the data are obtained, as well as the sheer volume of data, make this a very rich resource.

A statistical data base, such as that of the KEIS, can be considered in concept as analogous to a statistical abstract, or a collection of statistical abstracts and other statistical documents. Online numeric data-base systems can even be used to support the production of statistical abstracts, as is the case with the *Kansas Statistical Abstract.*[25] In Kentucky, however, no state agency or university publishes a statistical abstract.[26] Many state agencies publish statistical data related to their particular mission in an annual report, or in more frequent publications. In many cases the data released through these publications are, in the interest of currency of information, preliminary estimates. Disaggregated data frequently are not published and revised data are often not readily available. The same commentary can be applied to release of statistics by federal agencies, both as pertains to national economic indicators, and to state and local area statistics estimated by them.

Part of the process of maintenance of the KEIS involves direct communication with all appropriate source agencies or data producers, and receipt from them of all revisions of any data series which are included in the data base. The format of these data varies from computer-readable to handwritten. This is perhaps the most archaic part of maintenance of a numeric data base and is by no means limited to the Kentucky situation. It will continue to be the procedure followed by

maintainers of numeric data bases, however, until data producers themselves input their data directly into the data bases of online numeric data-base systems. The technical capabilities for doing this certainly exist, but the evolution of cooperative online ventures between data producers and data-base maintainers has thus far been illusory, as discussed earlier.[27]

Effectively, then, the KEIS furnishes Kentucky researchers, analysts, librarians, and so forth an online statistical resource which has the potential to serve them in lieu of a statistical abstract. It stores centrally more information than has ever been included in a single publication. This is not to suggest that all possible statistical time-series information about Kentucky are incorporated into the KEIS data base. That is clearly not the case, but it is not outside the realm of possibility. Limitations to the volume of data maintained as a part of any numeric data-base system are more institutional (i.e., staffing and support) than technical. A concerted effort has been made to ensure that all those state-level data series which are commonly needed by a wide range of persons are included in the KEIS data base and are maintained at the most current state of revision.

The nature of the updating or revision capabilities of the KEIS software is such that once an item of information is stored in the public KEIS data base, it is immediately available for retrieval or processing by anyone having an account on either of the two computing networks on which the KEIS is maintained.[28] No time elapses between the input of data and their accessibility. Such a feature is extremely important to anyone interested in information at the latest stage of revision. It is particularly relevant with respect to economic data because this type of information is revised frequently by source agencies.

Clearly, however, the most distinct advantage to the use of online numeric data-base systems is not just up-to-date retrieval of data, though this feature is desirable. It is rather the ability to manipulate data mathematically, to produce tables, graphs, or maps from raw or transformed data, or even to build models. Most of these capabilities are as useful to the reference librarian, excepting perhaps the model building, as they are to others who directly access online numeric data-base systems themselves. The arithmetic capabilities allow the librarian who is approached with questions such as "What is the percentage change in per capita personal income over the past ten years?" or, "How can I determine how much of this change is due to growth, and how much to inflation?" to manipulate the basic data from which this information is derived, and assist the searcher to obtain the answers needed. The

librarian's ability to do this is contingent upon his or her having some practical knowledge about fairly simple mathematical manipulation of numeric information, but this knowledge is common enough. Learning to exploit the capabilities of online numeric data-base systems may be a different type of experience for most librarians, but it is intrinsically no more difficult than learning many of the more traditional aspects of reference service. It is undoubtedly more simple than mastering the searching conventions used for most online bibliographic services.

There are a variety of programs in the KEIS which produce standardized tables, each having some unique arrangement of the desired data. Production of these tables is a straightforward activity, requiring only a few easily learned lines of input to the computer. One practical application in utilizing some of these features is for the reference staff periodically to produce printed tables (or hard-copy output) containing the most frequently sought information and to keep these tables at the reference desk to supplement the standard statistical reference materials, many of which are dated by the time they are distributed. To illustrate the usefulness to a reference staff of these various tables, one is included as appendix A of this paper.

In addition, the indexes to the KEIS data banks themselves function as reference documents, assisting the librarian, as well as other users, in determining whether the information sought is maintained in a KEIS public data bank, and therefore whether accessing the KEIS is worthwhile. Familiarity with the structure of the index comes from frequent use, as with all reference materials. A page from the annual bank (ABANK) index is reproduced as appendix B as an example. The reader will note that the index gives the data series name and its number, essential information for most KEIS procedures. A textual description of the data series, which follows as closely as possible the description used by the source agency, is the next piece of information about each data series. If the data are released more frequently than annually, the cross-reference columns, headed QRT (quarterly) and MON (monthly) on the index, will indicate the series number for the comparable data series in one or both of the other state-level data banks. The units in which the data are stored, and the source agency from which the data are obtained, are both given as acronyms in the two columns that follow. These acronyms are defined in the preface to each index. The final piece of information gleaned from the index is the period of time for which each data series is available. This piece of information is automatically revised each time the data series is extended, so the librarian using an index as a reference document will wish to produce a current version of

the index every several months or so. Likewise, when new data series are added to the data base, documentation for them is automatically and immediately incorporated into the data-bank index.

Reference use of a data-bank index will not help patrons understand whether the data stored are suited to their analytical purposes, nor will it tell them about the methodology employed in the production of any particular data series. Other materials, such as the *Kentucky Economic Information System User Manual* or methodological descriptions published by some data suppliers, can furnish some of this information. It seems reasonable to expect also that the user of these data bears ultimate responsibility for determining whether the information he or she seeks in fact provides the indicators sought. No reference librarian should ever be liable for making a patron's methodological judgments for him or her, nor would it even be proper to do so. This is true whether the information the reference librarian assists in locating is stored in a traditional or nontraditional mode.

Online numeric data-base systems that are maintained on computers having interactive, or conversational, mode of access are usually programmed so that they seem more apparently "user-friendly" than systems that are not interactive. On an interactive system, the user can be prompted to answer a few basic questions on the way to obtaining or manipulating the data sought. This way of utilizing a computer system can replicate English-language conversation, and thus poses few barriers to use by nonprogrammers.

One of the computing networks on which the KEIS is maintained, the state government centralized computing system, does offer interactive access. Because of this, an interface program, called the KEIS Procedure, has been written to allow interactive access to the data and statistical software of the KEIS on the state government computer. The KEIS Procedure can also be used to prepare automatically selected KEIS program input for batch submission for those programs which are inappropriate for interactive processing, such as those which produce a large volume of graphically or tabularly presented data, and for production of data-bank indexes. The simplicity, ease of use, and flexibility of the KEIS on the state government network is measured by the extent of its use by a variety of persons in almost every agency of state government. Many of these people have very little, if any, other reason to be accessing the computer.[29]

University personnel in Kentucky, including librarians, do not have access to the state government computing network. The computing facilities of the public universities in the state are linked to the

Kentucky Educational Computing Network (KECNET). The KECNET computer on which the KEIS has been publicly available since 1976, the University of Kentucky's IBM 370, is currently operational in batch mode only, so users of the KEIS on this network do not have the opportunity to use the KEIS interactively.

Use of the KEIS on KECNET is nevertheless a relatively straightforward operation since the system was designed from the outset for the user who is a nonprogrammer. It allows him either to submit requests (jobs) on punch cards, inputting them into the card reader physically located at the university computing center, or to access the KEIS online from a dial-up or hardwired terminal. To use the KEIS online requires that the user learn CJS (conversational job system), which is the job entry system used for the University of Kentucky's IBM 370. CJS is a command language which closely follows the logic of English; it is not difficult to master.

It should be evident that both of these ways of using the KEIS on KECNET require more learning than most professionals, who do not otherwise need it, would be willing or able to spend the time to accomplish. This was the case for the University of Kentucky reference staff who, although intellectually committed to the widest range of information services, were also already busy enough providing traditional reference service and learning procedures to utilize the computer for a variety of other purposes.

In an attempt to allow all potential users, reference librarians as well as the general public, the most "friendly" access to KEIS on KECNET, some special procedures were written which, from the user's perspective, mimic an interactive mode.[30] The user types in a single line of instructions to the computer, indicating the bank name, the inclusive dates for the requested data, and the data series number(s) having the information sought. The series numbers are obtained from a data-bank index. This single command line automatically activates the procedure, and the user receives the data returned to his or her terminal, more or less immediately thereafter. Lengthy output can be routed to an offline printer. These special procedures are limited to production of a data-base index and retrieval or querying of a data base, including some manipulation facility. A sample of the simplest case use of these procedures is included here as appendix C.

The availability of these special procedures has in fact extended the use of the KEIS to reference librarians, as well as to others who had little or not previous experience with computer-based resources. Formal KEIS training sessions have been held for the staff of the reference and

government publications departments. Use of KEIS by these library personnel in the months since their introduction to it has been limited, as was expected. It can be assumed, however, that as they become more familiar with the KEIS they will proceed from the procedures for simple retrieval of data to the standardized table-producing, graphing, or mapping capabilities, and perhaps to utilizing the statistical capabilities of the system.

Library utilization of online numeric data-base systems, no matter how "user-friendly" they are, will be a slowly developing phenomenon. As long as traditional statistical reference materials that seem to answer the needs of the reference staff continue to be produced, librarians will not necessarily turn to using online numeric systems to assist in the provision of information service. After all, this is not a familiar activity, and it is natural to turn to the unfamiliar only if the familiar does not provide what is sought. When the reference staff perceive, through considerable experience, that accessing online numeric data-base systems provides a more efficient and satisfactory information service for numeric data, they will begin to use this capability more and more frequently.

There can be little doubt that the availability of resources such as the KEIS will increase, though whether this will occur primarily through the public or private sectors remains to be determined. As this happens, reference librarians in general, as well as library administrators, will have to decide whether or not to take advantage of this new resource type. For those who decide positively, accessing online numeric data-base systems will become second nature, just as utilization of online networks for catalog information, or of online bibliographic data-base systems for bibliographic searches are today. And, Samuel Swett Green will rest in peace.

ACKNOWLEDGMENT

The author is indebted for comments and ideas to Charles G. Renfro, former Director, Center for Applied Economic Research, University of Kentucky, and primary developer of the Kentucky Economic Information System; Roy A. Sigafus, Senior Systems Analyst/Programmer, Center for Applied Economic Research, University of Kentucky; and Judith M. Wiza, Head of Data Services, Reference Department, M.I. King Library, University of Kentucky. The author alone is responsible for the content of this article.

K E N T U C K Y E C O N O M I C I N F O R M A T I O N S Y S T E M

STANDARDIZED TABLE 1

KENTUCKY ANNUAL ECONOMIC DATABANK

KENTUCKY PERSONAL INCOME: SUMMARY

SERIES		1975	1976	1977	1978	1979
7	INCOME, WAGE & SALARY DISBURSEMENT, TOTAL, BY PLACE OF WORK	9925.58	11179.35	12517.21	14177.13	15851.40
8	INCOME, OTHER LABOR, BY PLACE OF WORK	1004.06	1236.68	1433.88	1657.13	1882.67
9	INCOME, PROPRIETORS, BY PLACE OF RESIDENCE	1533.27	1687.08	1842.09	1928.40	2230.85
10	INCOME, PROPRIETORS, FARM	465.44	558.02	557.14	517.44	664.89
11	INCOME, PROPRIETORS, NONFARM	1067.83	1129.06	1284.94	1410.96	1565.96
12	INCOME, LABOR & PROPRIETORS, FARM	538.20	659.86	672.89	650.71	784.22
13	INCOME, LABOR & PROPRIETORS, NONFARM, TOTAL	11905.32	13443.26	15120.29	17111.94	19180.70
14	INCOME, LABOR & PROPRIETORS, NONFARM, PRIVATE	9750.62	11052.53	12528.70	14271.33	16047.36
15	INCOME, LABOR & PROPRIETORS, MANUFACTURING, TOTAL	3098.81	3634.73	4161.22	4660.91	5198.04
16	INCOME, LABOR & PROPRIETORS, MANUFACTURING, DURABLE GOODS	1826.42	2171.18	2548.99	2887.87	3230.90
29	INCOME, LABOR & PROPRIETORS, MANUFACTURING, NONDURABLE GOODS	1272.39	1463.55	1612.24	1773.05	1967.14
40	INCOME, LABOR & PROPRIETORS, MINING (SIC 10-14)	969.72	922.17	1141.66	1280.54	1476.36
46	INCOME, LABOR & PROPRIETORS, CONTRACT CONSTRUCTION (SIC 15-17)	723.70	867.71	978.04	1217.28	1338.18
51	INCOME, LABOR & PROPRIETORS, WHOLESALE TRADE (SIC 50-51)	728.20	780.17	829.65	958.45	1073.35
52	INCOME, LABOR & PROPRIETORS, RETAIL TRADE (SIC 52-59)	1221.31	1393.26	1504.78	1714.64	1924.02
61	INCOME, LABOR & PROPRIETORS, FIN., INS., & REAL ESTATE (SIC 60-67)	446.21	530.66	616.07	702.59	790.03
71	INCOME, LABOR & PROPRIETORS, TRANS, COMM. & PUBLIC UTIL (SIC 40-49)	900.68	1026.06	1187.36	1337.92	1530.92
82	INCOME, LABOR & PROPRIETORS, SERVICES (SIC 70-89)	1631.39	1860.92	2068.57	2349.69	2659.36
101	INCOME, LABOR & PROPRIETORS, AG SERV., FORESTRY, FISHERIES, AND OTHER	30.61	36.85	41.34	49.31	57.10
106	INCOME, WAGE & SALARY PLUS OTHER LABOR, GOVERNMENT & GOVT. ENTER.	2174.09	2390.73	2591.59	2840.61	3133.35
6	INCOME, LABOR & PROPRIETORS, TOTAL, BY PLACE OF WORK	12462.92	14103.12	15793.18	17762.66	19964.92
112	INCOME, PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE, BY PLACE OF WORK	664.23	722.07	807.47	924.47	1070.51
113	INCOME, RESIDENCE ADJUSTMENT TERM, KENTUCKY PERSONAL INCOME	114.68	88.56	103.45	129.84	135.93
115	INCOME, PROPERTY, DIVIDENDS, INTEREST, RENTS & ROYALTIES, TOTAL	1971.52	2206.73	2522.96	2839.35	3259.31
116	INCOME, TRANSFER PAYMENTS	2652.17	2890.42	3081.92	3289.07	3776.13
1	INCOME, TOTAL KENTUCKY PERSONAL, BY PLACE OF RESIDENCE	16537.06	18566.75	20619.50	23187.10	26016.30
2	INCOME, DISPOSABLE PERSONAL	14387.00	16119.00	17772.00	19814.00	22191.00
3	INCOME, PER CAPITA PERSONAL	4882.00	5404.00	5946.00	6645.00	7377.00
590	POPULATION, TOTAL RESIDENT, AS OF JULY 1	3.39	3.44	3.47	3.49	3.53
4	INCOME, REAL KENTUCKY PERSONAL, IN 1972 DOLLARS	13083.12	13980.99	14686.25	15458.06	16029.75
5	INCOME, REAL DISPOSABLE PERSONAL, IN 1972 DOLLARS	11382.12	12137.80	12658.12	13209.33	13672.83
281	INCOME, REAL PER CAPITA, IN 1972 DOLLARS	3862.34	4069.28	4235.04	4430.00	4545.29

UNITS: PER CAPITA INCOME IN CURRENT DOLLARS

REAL PER CAPITA INCOME IN 1972 DOLLARS

REAL PERSONAL AND REAL DISPOSABLE INCOME IN MILLIONS OF 1972 DOLLARS

POPULATION IN MILLIONS OF PERSONS

ALL OTHER SERIES IN MILLIONS OF CURRENT DOLLARS

SOURCE: U.S. BUREAU OF ECONOMIC ANALYSIS

Appendix A

Appendix B

KENTUCKY ECONOMIC INFORMATION SYSTEM — PAGE 9

INDEX FOR THE KENTUCKY ANNUAL ECONOMIC DATA BANK AS OF 09 APR 1981

SERIES

NUMBER	NAME	DESCRIPTION	QRT	MON	UNITS	SOURCE	AVAILABLE
401	LFPRATE	LABOR FORCE PARTICIPATION RATE(LABOR FORCE/POP GTE 16)			%	DHR-EIS	1970-1978
402	NPOPRATE	LABOR FORCE, RATIO OF EMPLOYMENT TO POPULATION			%	DHR-EIS	1961-1980
403	N	EMPLOYMENT, TOTAL BY PLACE OF RESIDENCE (INCLUDES PERSONS ON STRIKE)	132	121	TPPL	DHR-CPS	1970-1980
404	U	UNEMPLOYMENT, TOTAL	133	122	TPPL	DHR-CPS	1961-1980
405	URATE	UNEMPLOYMENT RATE	134	123	%	DHR-CPS	1961-1980
406	NRESADJ	EMPLOYMENT, RESIDENCE ADJUSTMENT FOR OUT-OF-STATE COMMUTERS	135	124	TPPL	DHR-EIS	1971-1980
407	NPW	EMPLOYMENT, TOTAL BY PLACE OF WORK (INCLUDES PERSONS ON STRIKE)	136	125	TPPL	DHR-EIS	1961-1980
408	NAG	EMPLOYMENT, AGRICULTURAL	137	126	TPPL	DHR-USDA	1961-1980
409	NAGM	EMPLOYMENT, NUMBER OF HIRED FARM WORKERS, KENTUCKY	138	127	TPPL	CLRS-FL	1961-1980
410	NAGNM	EMPLOYMENT, NUMBER OF NON-HIRED WORKERS, KY (BLS DEFINITION)	139	128	TPPL	DHR-EIS	1961-1979
411	NNAG	EMPLOYMENT, TOTAL NON-AGRICULTURAL	140	129	TPPL	DHR-EIS	1970-1980
412	NNWSNAG	EMPLOYMENT, NON-WAGE AND SALARY, NON-AGRICULTURAL (SELF-EMPLOYED)	141	130	TPPL	DHR	1961-1980
413	NSTRKE	EMPLOYMENT, PERSONS INVOLVED IN LABOR-MANAGEMENT DISPUTES	142	131	TPPL	DHR-CPS	1964-1980
414	NAGFAM	EMPLOYMENT, NUMBER OF FAMILY FARM WORKERS, KY (USDA DEFINITION)	144	134	TPPL	CLRS-FL	1951-1980
415	NNAGWS	EMPLOYMENT, TOTAL NON-AGRICULTURAL WAGE AND SALARY	145	135	TPPL	DHR-790	1951-1980
416	NMFG	EMPLOYMENT, MANUFACTURING, TOTAL	146	136	TPPL	DHR-790	1951-1980
417	NMD	EMPLOYMENT, MANUFACTURING, DURABLE GOODS	147	137	TPPL	DHR-790	1951-1980
418	NMND	EMPLOYMENT, MANUFACTURING, NONDURABLE GOODS	148	138	TPPL	DHR-790	1951-1980
419	NMNNAGWS	EMPLOYMENT, NON-MANUFACTURING, NON-AGRICULTURAL WAGE AND SALARY	149	139	TPPL	DHR-790	1951-1980
421	NFOD	EMPLOYMENT- FOOD AND KINDRED PRODUCTS (SIC 20)	151	141	TPPL	DHR-790	1951-1980
422	NDLW	EMPLOYMENT, DISTILLED LIQUORS, EXC. BRANDY (SIC 2085)	152	142	TPPL	DHR-790	1951-1980
423	NTOB	EMPLOYMENT, TOBACCO MANUFACTURES (SIC 21)	153	143	TPPL	DHR-790	1951-1980
424	NCIG	EMPLOYMENT, CIGARETTE MANUFACTURE (SIC 211)	154	144	TPPL	DHR-790	1951-1980
425	NTSR	EMPLOYMENT, TOBACCO STEMMING & REDRYING (SIC 214)	155	145	TPPL	DHR-790	1951-1976
426	NTEX	EMPLOYMENT, TEXTILE MILL PRODUCTS (SIC 22)	156	146	TPPL	DHR-790	1951-1980
427	NAPP	EMPLOYMENT, APPAREL (SIC 23)	157	147	TPPL	DHR-790	1951-1980
428	NMBS	EMPLOYMENT, MEN'S & BOY'S SUITS, COATS (SIC 231,232)	158	148	TPPL	DHR-790	1951-1980
429	NPAP	EMPLOYMENT, PAPER & ALLIED PRODUCTS (SIC 26)	159	149	TPPL	DHR-790	1951-1980
430	NPRT	EMPLOYMENT, PRINTING & PUBLISHING (SIC 27)	160	150	TPPL	DHR-790	1951-1980
431	NCHM	EMPLOYMENT, CHEMICALS & ALLIED PRODUCTS (SIC 28)	161	151	TPPL	DHR-790	1951-1980
432	NICM	EMPLOYMENT, INDUSTRIAL CHEMICALS (SIC 281)	162	152	TPPL	DHR-790	1958-1980
433	NPMS	EMPLOYMENT, PLASTIC MATERIALS & SYNTHETICS (SIC 282)	163	153	TPPL	DHR-790	1958-1980
434	NPNT	EMPLOYMENT, PAINTS & ALLIED PRODUCTS (SIC 285)	164	154	TPPL	DHR-790	1958-1980
435	NPETRPP	EMPLOYMENT, PETROLEUM,COAL,RUBBER & PLASTIC PROD. (SIC 29,30)	165	155	TPPL	DHR-EIS	1951-1980
436	NPET	EMPLOYMENT, PETROLEUM & COAL PRODUCTS (SIC 29)	166	156	TPPL	DHR-790	1972-1980
437	NRPP	EMPLOYMENT, RUBBER & MISC. PLASTIC PRODUCTS (SIC 30)	167	157	TPPL	DHR-790	1972-1980
438	NLTH	EMPLOYMENT, LEATHER & LEATHER PRODUCTS (SIC 31)	168	158	TPPL	DHR-790	1951-1980
441	NLUM	EMPLOYMENT, LUMBER & WOOD PRODUCTS, EXC. FURNITURE (SIC 24)	171	161	TPPL	DHR-790	1951-1980
442	NFUR	EMPLOYMENT, FURNITURE & FIXTURES (SIC 25)	172	162	TPPL	DHR-790	1951-1980
443	NSCG	EMPLOYMENT, STONE, CLAY & GLASS (SIC 32)	173	163	TPPL	DHR-790	1951-1980
444	NPRI	EMPLOYMENT, PRIMARY METALS (SIC 33)	174	164	TPPL	DHR-790	1951-1980
445	NBFS	EMPLOYMENT, BLAST FURNACE & BASIC STEEL PRODUCTS (SIC 331)	175	165	TPPL	DHR-790	1951-1980
446	NFAB	EMPLOYMENT, FABRICATED METAL PRODUCTS (SIC 34)	176	166	TPPL	DHR-790	1951-1980
447	NAMAC	EMPLOYMENT, ALL MACHINERY (SIC 35 & 36)	177	167	TPPL	DHR-EIS	1951-1980
448	NMAC	EMPLOYMENT, MACHINERY, EXC. ELECTRICAL (SIC 35)	178	168	TPPL	DHR-790	1958-1980
449	NELC	EMPLOYMENT, ELECTRICAL EQUIPMENT & SUPPLIES (SIC 36)	179	169	TPPL	DHR-790	1958-1980
450	NTRA	EMPLOYMENT, TRANSPORTATION EQUIPMENT (SIC 37)	180	170	TPPL	DHR-790	1951-1980

Appendix C

```
 keis cbank 1970 1980 6792 6824 6825 6839 6850 6857 6860
%***********************************************
PUN FILE 3594  TO  OS370    COPY 001   NOHOLD
  15:56:31 KEIS     V0652  READ BY OS370
PLEASE ATTEMPT NO INPUT UNTIL YOU HAVE
RECEIVED YOUR OUTPUT
%***********************************************
  15:59:11 KEIS     V0652  IN EXECUTION
  16:00:07 KEIS     V0652  COMPLETED EXECUTION
PRT FILE 3603 FROM OS370    COPY 001   NOHOLD

  SERIES: YPC$K098   SERIES NUMBER: 6792     UNITS: $        SOURCE: BEA
INCOME, PER CAPITA PERSONAL, PIKE CO.
                                ANNUAL DATA
1970-1975   2341.000  2574.000  2773.000  3172.000  4802.000  5259.000
1976-1979   4898.000  5493.000  6094.000  7337.000

  SERIES: YTRPK098   SERIES NUMBER: 6824     UNITS: M$       SOURCE: BEA
INCOME, TRANSFER PAYMENTS, PIKE CO.
                                ANNUAL DATA
1970-1975     21.707    26.585    31.814    43.893    48.381    56.685
1976-1979     64.144    73.872    79.410    93.662

  SERIES: POPTK098   SERIES NUMBER: 6825     UNITS: T        SOURCE: USC-P26
POPULATION, TOTAL, PIKE CO.
                                ANNUAL DATA
1970-1975     61.059    63.500    65.400    65.700    65.800    69.500
1976-1980     72.300    73.500    73.800    74.300    81.123

  SERIES: URTEK098   SERIES NUMBER: 6839     UNITS: %        SOURCE: DHR-70
UNEMPLOYMENT RATE, PIKE CO.
                                ANNUAL DATA
1971-1976      7.100     8.400     5.700     3.700     5.000     5.700
1977-1980      5.800     8.800     6.600     6.400

  SERIES: XPBCK098   SERIES NUMBER: 6850     UNITS: TTON     SOURCE: MYB-EDR
COAL PRODUCTION (SHIPMENTS), TOTAL, PIKE, CO.
                                ANNUAL DATA
1970-1975  21299.000     NA     19130.000 19090.000 21249.000 19178.000
1976-1978  19002.000 18141.000 15853.000

  SERIES: PAVCK098   SERIES NUMBER: 6857     UNITS: $        SOURCE: MYB-EDR
AVERAGE VALUE PER TON FOR COAL, F.O.B. MINES, PIKE CO.
                                ANNUAL DATA
1970-1975      7.640     NA        9.530    10.420    25.030    27.020
1976-1978     NA        24.490    28.490

  SERIES: MVRGK098   SERIES NUMBER: 6860     UNITS: T        SOURCE: DOT
MOTOR VEHICLE REGISTRATIONS, PASSENGER CARS, PIKE CO.
                                ANNUAL DATA
1970-1975     23.237    25.507    26.235    28.683    29.233    31.525
1976-1978     32.397    32.336    31.832


R;  $0.13 16:01:33
```

References

1. Phelps, Rose B. "Summary." In *The Library as a Community Information Center* (Allerton Park Institute No. 4), edited by Rose B. Phelps and Janet Phillips, p. 175. Urbana: University of Illinois, 1957.

2. Luedke, James A., Jr., et al. "Numeric Data Bases and Systems." In *Annual Review of Information Science and Technology*, vol. 12, edited by Martha E. Williams, p. 120. Washington, D.C.: ASIS, 1977.

3. Rothstein, Samuel. *The Development of Reference Services through Academic Traditions, Public Library Practice and Special Librarianship* (ACRL Monograph No. 14). Chicago: ACRL, 1955, pp. 21-22.

4. Klugman, Simone. "Online Information Retrieval Interface with Traditional Reference Services." *Online Review* 4(Sept. 1980):263.

5. Williams, Martha E. "Use of Machine-Readable Data Bases." In *Annual Review of Information Science and Technology*, vol. 9, edited by Carlos A. Cuadra, et al., pp. 221-48. Washington, D.C.: ASIS, 1974.

6. Hoover, Ryan E. "Computer-Aided Services in the Academic Library; Experiences in Organizing and Operating an Online Reference Service." *Online Review* 3(Oct. 1979): 37. (The full-text retrieval services referred to are products of Mead Data Central known as LEXIS and NEXIS. LEXIS provides interactive searching and retrieval of full texts of state and federal court decisions, statutes, regulations, etc. NEXIS provides similar capabilities for the full texts of selected newspapers, magazines and wire services.)

7. Discussed in Adams, Margaret O., and Dennis, Jack. "Creating Local Social Science Data Archives." *Social Science Information* 9(April 1970):51-59. (These ideas are developed further in the article by Alice Robbin in this issue.) Ways of designing an online numeric data-base system so that it is easily usable by persons with varying experiences are described *in* Charles G. Renfro. "An Online Information System for Aggregate State and Local Area Economic Data." *Journal of the ASIS* 31(Sept. 1980):319-33.

8. Rowe, Judith S., and Ryan, Mary. "Library Service from Numerical Data Bases: The 1970 Census as a Paradigm." *College & Research Libraries* 35(Jan. 1974):7.

9. Perhaps the most frequently cited work related to these ideas is Licklider, J.C.R. *Libraries of the Future*. Cambridge, Mass.: MIT Press, 1965. *See also* Holt, Charles C. "A System of Information Centers for Research and Decision Making." *American Economic Review* 60(May 1970):149-65.

10. Kiechel, Walter, III. "Everything You Always Wanted to Know May Soon Be Online." *Fortune* 101(5 May 1980):226.

11. The phrase "archive of learning" refers to the traditional collections of libraries as used by: Price, Derek de Solla. "Happiness is a Warm Librarian." In *The Role of the Library in an Electronic Society* (Proceedings of the 1979 Clinic on Library Applications of Data Processing), edited by F. Wilfrid Lancaster, p. 4. Urbana-Champaign: University of Illinois Graduate School of Library Science, 1980.

12. Dix, William S. "Automation and the Princeton University Library." In *Reader in Library Services and the Computer*, edited by Louis Kaplan, p. 14. Washington, D.C.: NCR, 1971.

13. Licklider, *Libraries of the Future*, pp. 1-2.

14. Mussmann, Klaus. "Will There be a Role for Librarians and Libraries in the Post-Industrial Society?" *Libri* 28(Sept. 1978):232.

15. The concept of "democratization of information" is discussed by Bunge, Charles A. "Reference Service in the Information Network." In *Proceedings of the Conference on Interlibrary Communications and Information Networks*, edited by Joseph Becker, pp. 109-16. Chicago: ALA, 1971. (The context for this discussion is networking, but the applications of these ideas to a discussion of online numeric data-base systems is appropriate.)

16. Lancaster, F. Wilfrid, et al. "The Role of the Library in an Electronic Society." In *Role of the Library in an Electronic Society*, pp. 162-91.

17. Robbin, Alice. "Strategies for Improving Utilization of Computerized Statistical Data by the Social Science Community." *Social Science Information Studies* 1(Jan. 1981):101-02.

18. Much has been written about the federal statistical system. Perhaps the most comprehensive current treatment is "Improving the Federal Statistical System: Issues and Options." *Statistical Reporter* 81(Feb. 1981):133-221. (See especially the discussion of online access to aggregate data, p. 210.) For some time there has been the expectation that the Bureau of Labor Statistics system, LABSTAT, would be made publicly available. *See, for example,* Mendelssohn, Rudolph C. "The New On-Line BLS Data Base and Information System." In *Readings in Business and Economic Research Management: Execution and Enterprise,* edited by Jayne D. Fischer, pp. 79-85. Madison, Wis.: Association for University Business and Economic Research, 1980. According to Mendelssoh, the LABSTAT data base and software were to have been made publicly available by the National Technical Information Service (NTIS) through a commercial computer. However, because it was later determined that NTIS might be competing with available commercial sources if it did this, NTIS is not, at this writing, offering online access to LABSTAT (information obtained from the Procurement Office, U.S. Department of Commerce, March 1981). The LABSTAT data base has recently been added to the DIALOG Information Retrieval Service, and customers who have access to this vendor have access to the LABSTAT data base, though not to any of the statistical or analytical capabilities of the LABSTAT software; *see DIALOG Chronolog* 81(May 1981):67-68. One additional development has potential promise for centralizing the availability of data produced by the federal statistical system, at least for data users within the federal government. This is the operation of the Interagency Decision Information Display System (DIDS). Although there is an experimental remote site for the DIDS system, there is a question whether DIDS will be extended to be publicly available outside the federal sector; *see* "Interview: DIDS and the Federal Statistical Community." *DIDS Doings* 3(18 Dec. 1980):3, 5-6; and "Late News: Reorganization Bill Signed Into Law." *DIDS Doings* 3(18 Dec. 1980):1, 6. An earlier appraisal of the DIDS system can be found *in* Edward K. Zimmerman. "The Evolution of the Domestic Information Display System." *Review of Public Data Use* 8(June 1980):69-81. For another aspect of the larger question of coordination of online numeric data-base systems being developed within federal agencies, *see* Coleman, Edwin J., and Cartwright, David W. "Toward a REIS [Regional Economic Information System] for the 1980s." *Readings in Business and Economic Research Management: Execution and Enterprise,* vol. 2. Madison, Wis.: Association for University Business and Economic Research, forthcoming; and Duncan, Joseph W., et al. "Private versus Public Sector Responsibility for the Collection, Distribution, and Analysis of Statistical Data." *Review of Public Data Use* 8(Dec. 1980):307-25.

19. The author has in mind the online numeric data-base systems developed by such firms as Data Resources, Chase Econometric Associates, and Wharton Econometric Forecasting Associates. Another national computer-readable data base, although not a data-base system, is CITIBASE, the CITIBANK Economic Database. This is a direct descendant of the National Bureau of Economic Research (NBER) Time Series Data Bank described by Boschan, Charlotte. "The NBER Time Series Data Bank." *Annals of Economic and Social Measurement* 1(April 1972):193-209.

20. Tyzenhouse, Joanne. "Econometric and Statistical Bases for the non-Econometrician." *Online Review* 2(April 1978):48-54. *See also* Kiechel, "Everything You Always Wanted to Know," pp. 233-36.

21. The Kentucky Economic Information System is a byproduct of the development of the Kentucky Quarterly Econometric Model. For a description of this model, *see* Renfro, Charles G. "The Kentucky Quarterly Econometric Model: Recent Developments." In *Modeling and Simulation: Proceedings of the Eleventh Annual Pittsburgh Conference,* edited by M.H. Mickle and W.G. Vogt, pp. 1317-24. Pittsburgh: Instrument Society of America, 1980.

22. For a discussion of virtual journals: *see* Roistacher, Richard G. "The Virtual Journal: Reaching the Reader." In *Role of the Library in an Electronic Society*, pp. 16-22.

23. The Kentucky Council of Economic Advisors is a state government agency, staff support for which is provided by the Center for Applied Economic Research, College of Business and Economics, University of Kentucky. The Kentucky Council of Economic Advisors was created by Executive Order in December 1970 and was confirmed by the Kentucky state legislature in Chapter 147B, Kentucky Revised Statutes in the 1972 regular session. One of its primary responsibilities is to collect, compile, and interpret economic data concerning the economy of the Commonwealth.

24. Examples of these are the Indiana Information Retrieval System (INDIRS) and the Kansas Policy Database System.

25. *See* Kruzas, Anthony T., et al., eds., *Encyclopedia of Information Systems and and Services*, 4th ed. Detroit: Gale Research Co., p. 569. The *Kansas Statistical Abstract* is a publication of the Kansas Policy Database System.

26. The Kentucky Department of Commerce, now known as the Commerce Cabinet, has published for many years an annual, *Deskbook of Kentucky Economic Statistics*, which is not a statistical abstract, but in a limited fashion served some of the same purposes.

27. *See also* Renfro, Charles G. "Reflections on a Theme by Mendelssohn: The LABSTAT Data Base System." In *Readings in Business and Economic Research Management: Execution and Enterprise*, edited by Jayne D. Fischer, pp. 86-90. Madison, Wis.: Association for University Business and Economic Research, 1980.

28. The Kentucky Economic Information System is maintained on two separate computing networks, and is publicly accessible to anyone with an account on either of these networks. The networks are the centralized state government computing network and the Kentucky Educational Computing Network (KECNET).

29. Adams, Margaret O. "The Kentucky Economic Information System: A Resource for Government, Academic, and Private Sector Researchers and Libraries." In *National Online Meeting Proceedings—1981*, compiled by Martha E. Williams and Thomas H. Hogan, pp. 7-14. Medford, N.J.: Learned Information, Inc., 1981.

30. The notion that these special sets of commands, or execs, mimic an interactive mode is the author's. Roy A. Sigafus wrote the special "user-friendly" procedures for use of the KEIS on KECNET, as well as the KEIS Procedure for use of the KEIS on the state government computing network.