DOCUMENT RESUME

ED 053 773   LI 003 045

AUTHOR   Shank, Russell; And Others
TITLE   A Library Network for Western Canada; Automation for
                 Rationalization in College and University Libraries
                 in Alberta, Saskatchewan and Manitoba.
INSTITUTION   Kent State Univ., Ohio. Center for Library Studies.
PUB DATE   Feb 71
NOTE   78p.; (0 References)

EDRS PRICE   EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS   *Computers, Information Services, *Information
                 Systems, *Library Automation, *Library Networks,
                 Library Services, *University Libraries
IDENTIFIERS   Alberta, *Canada, Manitoba, Saskatchewan

ABSTRACT
                 The recommendations of this study are: (1) The
western provinces of Canada should move toward making available to
the university libraries of the region, the prospective benefits of a
magasystem organization during the next ten years. (2) There is no
present need or justification for mounting an immediate crash program
to create the computer-based subsystem. (3) Immediate work is fully
justified toward clarification of the design elements, systems of
governance, and essential limitations of the presumed
resource-management subsystems. (4) As a necessary accessory to the
previous recommendations, each university should develop internally
and formalize at its highest levels a clear and detailed statement of
the quality levels it requires for library and related informational
services. (Author/MM)

Kent State University

February, 1971

A LIBRARY NETWORK FOR WESTERN CANADA

Automation for Rationalization in College and University Libraries in Alberta, Saskatchewan and Manitoba

Revision of the March, 1970 report entitled: "Automation
for Rationalization in College and University Libraries
in Alberta, Saskatchewan and Manitoba" with appendices
and additional documentation

Report and Recommendations to
The Interprovincial Committee on University Rationalization
by a select study team

Russell Shank, Chairman
C. Dake Gull
Edward Heiliger
Duncan Wall, Project Editor

KENT CENTER FOR LIBRARY STUDIES
Kent State University
February, 1971

1

SUMMARY LIST OF PROJECT DOCUMENTATION

REPRISE OF RECOMMENDATIONS AND CONCLUSIONS

Prefatory Note on the Purpose of This Restatement

The work of the Center for IPCUR, at the time this restatement was drawn up, had extended over 16 months and resulted in a complex mass of documentation, drafted by a number of different individuals at different points in the study.

Much of this documentation, including the report of March, 1970, was prepared by the study team during that primary phase of the study. Another substantial part consisted of correspondence, preliminary reports, inter-personal memoranda, and briefs submitted by individual members of the team on particular points of inquiry.

The re-examination of certain matters following the submission of the team report, undertaken at IPCUR's request, involved both cost analyses and transitional questions intended to link together more clearly documents originally written separately. This work was done for the Center by individual associates after the study team had ceased its work. It has not been presented previously.

At the same time, as noted elsewhere in this document, a few emendations as observed necessary have been made in the text of the major report of the study team submitted in March, 1970. A new heading structure has also been emphasized to simplify the reading of the text. In a few places some transitional or background material omitted in the text of the draft of the March report has

been resupplied.

The slight recasting of the text of the March report which these changes effect is not intended in any way to alter or withdraw the conclusions or recommendations advanced by the study team. It is intended merely to make a fresh statement of these conclusions, which we hope in good-will to be somewhat more accessible to the readers of the report, either because of their own preconceptions, or because of the necessary haste with which that text was drawn up.

REPRISE OF RECOMMENDATIONS AND CONCLUSIONS
OF THE STUDY DOCUMENTATION

The fundamental concept that the study team was asked
to appraise appears to be a very simple one, and is worth
restating briefly here. It involves the creation of a large
computer-based library data system replacing all or most of
the existing catalog and other data systems now used by
the university libraries of the provinces. The creation
of this powerful data system, which would be available via
inquiry terminals to users of the system on all campuses,
would in turn lead to striking opportunities to improve the
performance of the libraries, and particularly the efficiency
of the staff activities connected with book processing.
At the same time, a system of rapid inter-campus delivery
by physical and facsimile methods would be created, and
the operation of these, together with the computer-based
catalog system, would permit the university libraries
collectively to reduce the presumed excessive redundancy
which would characterize their collections at that point.
The cost of the creation and operation of the system over-
all is presumed by its advocates to be amply returned by
theoretical savings in staff salaries, book storage space,
reduction of unnecessary duplication, and other efficiencies.

There is very little that is particularly novel about
the concept. It is quite familiar to anyone with any real
experience in library development or library automation

work. The library community has in fact been moving down the road to the creation of such systems with deliberate and steady pace for a number of years. The striking advances in both the effectiveness and efficiency of library service through the creation of such a megasystem are clearly sufficient to repay the expenditure of large sums of money and the best thinking of a generation.

At the same time, it must be quite clear that what we are talking about here is not a single system with some profitable fallout, but a whole collection of systems, each quite substantial, each required to operate effectively on a dozen campuses, each involving stunning changes in the organization of an enterprise which is intimately associated with a part of university life of the utmost centrality to the unique function of a university. What we are talking about here is not a system but a megasystem, with all the distinct capacity for a frightening mutation into a monster system.

Under such striking circumstances, it is particularly disturbing to find the discussion leading to the development decision being carried out chiefly under the animation of proposals and counterproposals from computer companies and other individuals who have little concern or responsibility for either the significance of the changes they propose, and who confuse the question of the megasystem in a rather juvenile manner with the creation of the computer-based data

system, its principal component subsystem. Thus system
concepts which are ripe for development in Ohio or Ontario
or Ottawa or Washington in 1968 are transferred artificially
to Western Canada without any real appreciation of the
very real differences in technical or economic payoffs
available in the region in 1969. This is silly business.

The experience so far with the development of such
systems, and particularly with the key computer-based
library data subsystem, has indicated rather clearly that
the development process is slow, complex and expensive.
We have taken the trouble to gather together in an appendix
to this report, some of the representative cost experience
of some similar projects. None of these projects is yet
within several years of sighting any kind of net return from
the project, and there is no certainty that any of them ever
will find such a happy result. Clearly a mechanical mimick-
ing of these projects, animated either by a desire to be
fashionable or the pursuit of imaginary savings would be an
ineffective way of achieving the real promise of the mega-
system configuration. What is required is a stable, continu-
ing, well-conceived development program working from the base
of a competent staff dedicated to the long haul toward the
megasystem. Anything less will result in a series of marches
and countermarches of little real effect.

RECOMMENDATION ONE. The western provinces of Canada, acting
through IPCUR or some other suitable instrument, should move
toward making available to the university libraries of the

region, during the next ten years, the prospective benefits
of a megasystem organization. An essential element in the
ability to use megasystem organization will inevitably be
the acquisition of the services of a thoroughly modern
computer-based library data system.

RECOMMENDATION TWO. There is no present need or justification
for mounting an immediate crash program to create the computer-
based data subsystem. The western provinces should direct
their development effort so far as this subsystem is concerned,
for the next several years, to the measured evolution of
a systems plan. The development of this systems plan will
require a small staff of highly competent people with adequate
quarters and travel funds. Activities of the staff would
properly include technical monitoring of other automation
programs both inside and outside the region, the negotiation
of long-lead-time components of the systems plan with the
member universities, funding of certain types of activities
at university libraries (e.g., supplying the extra funds
sometimes required to allow a data conversion to use a gen-
eral-purpose data format) and other activities. It is at
least conceivable that the result of the work of this
staff will be to acquire the services of a computer-based
subsystem operated outside the region, accessed by extensive
telecommunications networks.

RECOMMENDATION THREE. Immediate work is fully justified
toward clarification of the design elements, systems of

governance, and essential limitations of the presumed resource-management subsystem. This work should begin soon at a technical level with substantial commitment of manpower, preferably through a central organization with no special commitment to a particular institution or province. Academic planning is still in its adolescence at the institutional level, and at the inter-institutional level has almost no substantial successes to show. The present project presumes successful academic planning at the inter-provincial level. Under such circumstances, it will be absolutely essential for the universities to have a clear and detailed picture of what efficiencies can really be translated into the library system as the result of academic planning. At present, there is a rather naive tendency to believe that academic specialization itself can be carried off and that it can be translated rather directly into a static pattern of library specialization. This simplistic view is in no way justified by the behavior of the real men who would use the system, and it certainly is out of gear with certain fundamental problems in library management. In any case, if the megasystem is ever to be created anywhere but on paper, the universities will require a very much more specific picture of the library requirement which result from academic programs than has been attained at present. RECOMMENDATION FOUR. As a necessary accessory to the previous recommendation, each university should develop intern-

ally and formalize at its highest levels a clear and detailed statement of the quality levels it requires for library and related informational services. At present, a persistent misunderstanding of the quality and extent of collections and services required for academic work, and specifically the support of faculty and graduate research, makes it impossible to establish and maintain a sufficiently detailed local statement of requirements. Techniques used by the universities in the development and formalization of such a statement could vary widely, but the task is of sufficient importance and difficulty to occupy, for instance a mixed team on a part-time basis at each university for two years. Such study teams might be composed of several different kinds of individuals, including one or two librarians, a computer scientist with particular skills in system design of data base oriented systems, an economist, a historian or literary scholar, a physical scientist, and a sociologist or political scientist. These suggested team members are named not so much for representative purposes, but because of particular skills necessary to the task.

AUTOMATION FOR RATIONALIZATION IN COLLEGE

AND UNIVERSITY LIBRARIES IN

ALBERTA, SASKATCHEWAN AND MANITOBA

REPORT AND RECOMMENDATIONS
by

Russell Shank, Chairman
C. Dake Gull
Edward Heiliger
Duncan Wall

Prepared for the Interprovincial

Committee on University Rationalization

Kent State University, Kent Center for Library Studies

March, 1970

INTRODUCTION AND BACKGROUND

This report is responsive to a letter of June 13, 1969
from Principal W. A. Riddell, University of Saskatchewan
Regina Campus, to Mr. H. Duncan Wall, Assistant Director of
Libraries for Planning and Development, Kent State University
Kent, Ohio. In the letter Principal Riddell stated that the
general objectives of the study would:

> ...fall within the broad aim of IPCUR's interest
> in libraries, i.e. the rationalization of library
> development. The Project would investigate
> co-operative automated systems: 1. As one means
> of guiding collection development, 2. As increasing
> the sharing of library resources, 3. as providing
> better library services at the same or lower cost
> than could be otherwise achieved, 4. in relation
> to national computerized catalogues and other
> computerized services being planned by the
> national libraries, 5. in relation to other
> co-operative systems and projects being planned
> on a regional, national or international basis.

Mr. Wall, unable because of previous committments to
attempt the study by himself, referred this inquiry to
Professor Edward M. Heiliger, Director of the Kent Center for
Library Studies. They made a counterproposal to Riddell based
upon a team effort with themselves as members and selecting
from the Centers panel of available consultants Mr. Cloyd Dake
Gull, President of Gull & Associates, and Dr. Russell Shank,
Director of the Libraries of the Smithsonian Institution. Dr.
Shank was later elected by the team as chairman of the study
phase of the project.

The project began some months later than expected because
of delays in the authorization and funding of the study

by IPCUR.

The team visited the campuses of IPCUR members and of several British Columbia universities late in 1969, and talked with their librarians, computer center personnel and some of the principal administrative officers. Several of the team members met with Canadian librarians at the national meetings of the American Society for Information Science in San Francisco in October, 1969 and the American Library Association in Chicago in January, 1970. Throughout these meetings and discussions all of the individuals visited were extremely cordial and cooperative and made every effort to provide the team members with information relevant to the objectives of the project.

The team members were well aware that the university libraries of Canada had been surveyed several times in the last twenty years. We knew that the collections have grown considerably in strength as a result of these successive surveys, but that the demands and expressed and evident needs for library service still exceed the capabilities of the combined libraries to serve their users adequately. The team is particularly aware of accomplishments toward automation in the University of British Columbia and Simon Fraser University in British Columbia, of the substantial plans for improving information services set forth at the University of Calgary, of the active interest of Commission VIII, Library Resources

and Automation, of the Association of Universities and Colleges of Canada, of the activities of the Canadian Association of College and University Libraries, of the more recent development of the Council of Western College and University Librarians, and of the substantial study conducted by Mr. J. P. I. Tyas and his colleagues as part of the series of Science Council Studies.

This team's project is also traceable to an offer from IBM Canada to the University of Saskatchewan to participate in a joint study with an IPCUR Study Group concerning a shared library automated system, and by the subsequent observations of the chief librarians of the eleven provincial universities of the western provinces on this offer on October 25, 1968. This report addresses itself in part to that specific proposal.

An extremely pertinent, and also recent, declaration bearing on this Project is the "A Co-operative Acquisitions Plan for Canada" by Guy Sylvestre, the National Librarian of Canada, presented at the Commission on Library Co-ordination, Annual Meeting of the Association of Universities and Colleges of Canada, at Ottawa, November 5, 1969.

I.   THE SYSTEM CONCEPT

In a study of this kind, careful definition of system goals and system concepts is essential, and usually considerably more difficult than originally envisioned by those animating the study. In the present study, the separation of goals from presumed methods proved to be a substantial complexity.

The team has continuously attempted to define the system goals that the IPCUR representatives might have in mind, even vaguely, which could serve as a focus for our critique and advice. Our experience suggests that the following system definition is implicit in the 1968 IBM proposal and the comments elicited from IPCUR representatives during interviews. It seemed to us that IPCUR holds as its goal a coordinated and cooperative information system for its members, incorporating the information resources commonly found in libraries and information centers. The system would make use of traditional library and information center techniques, facilitated or supplanted by the rapid automated operations permitted by the use of electronic computers and peripheral equipment, and linking the several activities in their various locations by means of telecommunication circuits. The aim of the system would be to deliver information to users with the shortest practical delay. It is assumed that this system would permit the rationalization of the information collections by tending

to reduce the duplication of holdings among the campus
by substantially improving the rapid and easy provision
of information at present or reduced expenditures.

The system concept so defined is not a particularly
novel one. The system concept itself in reasonably similar
forms is at least a decade old, and projects directed toward
the realization of such a network are actually under way at
more than a dozen places in North America alone.

We believe that the technology of the present and the
likely advances in the next ten years mean that such a system
is technologically, but not economically, feasible. We believe,
moreover, that the system thus defined is not realistic for the
IPCUR universitites and those in British Columbia.

There are no cost figures for existing semi-automated
bibliographical endeavors which show that the manual work can
be done with the aid of a computer at equal or lower cost: and
there are no cost estimates for future bibliographical work and
for the larger system as defined above which show that the
manual work can be accomplished at the same or lower costs.
Indeed, the costs of operation of automated information net-
works are quite high.. The Tyas Report is particularly clear
on this point. The figures in that report are limited to the
provision of scientific and technical information and are
cited as follows:

> Estimates prepared by the Economic
> Subgroup proposed establishment of a
> swifter STI Network, containing six main
> regional information centres, introduced

> over a two-to three-year period. Cost
> for these centres was estimated at
> $1.5 to $2 million each for initial
> input and programming; the annual
> operating costs came to $2.5 million
> per centre. When all six are fully
> operating, the Government would have
> a capital investment of $12 million
> and running costs of $15 million
> yearly. This network can be increased
> to 20 centres over another three to
> five years, and the Government would
> be committed to no more than $50
> million in operating costs annually
> and an additional capital investment
> of $25 million.*

If these figures were to be reduced to show the distri-
bution for the area and population of IPCUR, they would still
most likely be in excess of the figures for present services.
Furthermore, we believe that the Tyas Report figures are not
substitutes for, but should be considered as additions to, the
existing costs

Technically successful automated systems cannot be substi-
tuted for all of the key elements required for acceptable levels
of rationalization of library programs. Automation may assist
library managers to know more about their collections faster,
hence allow better planning for acquisitions and the processing
of library materials with more chance that materials will be
placed where they are most needed. Automation may also help
the user to know where in the system he will find library
materials important to him. But the kinds and amounts of
library materials required on local campuses are functions of
the academic programs, and patterns of research and study of

---

*Scientific and Technical Information in Canada. Part
I. Ottawa, The Queens Printer, 1969. p. 10.

faculty and students. Hence, rationalization of library
programs will not be achieved without rationalization of
academic programs and changes in patterns of use of library
materials, and the major payoff for rationalization is rather
clearly in the rationalization of the academic programs them-
selves.

Furthermore, an important part of a successful rational-
ization program will be a function of the speed and economy of
getting books moved about from campus to campus in response to
contemporary demands. The time and cost of moving any sig-
nificant amount of library material by physical transport or
facsimile transmission among the libraries over the vast distances
encountered in the Prairie Provinces will be large enough for
some time to come to detract significantly from the utility
and economy of automated systems that locate materials quickly.
IPCUR should expect to have to allocate more funds for the
transportation of books and people as the ease of locating
books quickly in the system increases.

We believe even more strongly than Guy Sylvestre suggested*
in his "Cooperative Acquisition Plan for Canada" that the
attempted rationalization of the information resources will
fail until the university administrators can rationalize the
academic and research programs.

Although automated library systems invariably cost more

*Guy Sylvestre. A Cooperative Acquistion Plan for
Canada. Statement made at the meeting of the Commission on
Library Coordination, Annual Meeting of the Association of
Universitites and Colleges of Canada, Ottawa, November 5, 1969.
p. 7. (Processed)

than the manual systems they replace, they have potential

for the following economic advantages: (a) the unit costs

of output (e.g. a book ordered, an invoice typed), may be

lowered, and (b) more and different kinds of lists, dealers'

discount and performance reports, outstanding order controls)

than output can be obtained (e.g. in-process/is possible with

any reasonable amount of staff time to do the same work by

hand.) Thus, if libraries are expanding in size and amount of

work, they may cost less to operate because of increased

productivity at some future date if automated than they might

if they continued manual practices. This is the truly relevant

economic justification for automation.

No multi-campus automated system for libraries has yet

been made fully operational. Work proceeds at a number of

projects on various aspects of interlibrary cooperation based

on computer facilities (e.g. the Ohio College Library Center,

and the New England Library Network). The problems yet to be

solved are complex and costly to resolve. They involve general

systems considerations as well as matters of strictly local

concern. Unfortunately it is not yet possible to predict how

much of an investment will be required anywhere to bring

generalized library automation systems for multi-campus net-

works into existence. Because of this unpredictability, and

given the existing great shortage of funds for the acquisition

of basic library materials that would be required on each

campus even with automation, we cannot recommend that these

schools invest in the as yet risky business of attempting to
develop a total automated regional library system. IPCUR
would be better advised to proceed along less ambitious, but
still useful, lines pending developments elsewhere on which
its constituents can capitalize.

The matrix of problem areas for various aspects of auto-
mation suggested for the Library of Congress as shown in Table
I, shows a breadth and pervasiveness of the problem areas
involved in automating individual libraries to be assembled
into a system. There is no library activity that does not
contain problem elements in automation for system design, and
many automated routines and services may have as many as a
dozen concerns other than the strictly technical matters of
systems analysis and programming that must be resolved for
successful networking.

The maximum, large-scale system for automated library
tasks and services covering all of the IPCUR schools will come
not from the study and design of a full-blown system to be
introduced throughout the schools all at once, but from the
development of multi-campus automated systems involving
several campuses at a time, that may ultimately be linked
into larger units of operation. In other words, large-scale,
widespread systems that encompass all IPCUR schools will best
be advanced at present, through growth based on expansion of
the most successful small-scale (in size, region and number

of schools covered) systems.

IPCUR should take steps to increase the probability that such linkages will be feasible and attractive. This can be achieved through the establishment of an IPCUR agency for library automation that will: (a) emphasize the creation and use of standards; (b) monitor local automation projects in the developmental stage to promote the acceptance of alternatives in system design that lead readily to linkages among campuses; (c) assist in providing documentation of automated systems; and (d) undertake the development of linking and switching mechanisms and elements of network capability that local campuses cannot do alone. More detailed functions for such an agency are listed in a subsequent section of this report.

The essential ingredients for this purpose are:

1. Standardization;

2. Surveillance of local projects to promote the acceptance of alternatives in system design that lead readily to linkages among campuses;

3. Documentation of systems as they are developed to increase their use;

4. Development of linking and switching mechanisms and elements of network system design.

Success in rationalization will come through economy in library operations. This is a function of the quality of internal management of the libraries individually, and of the understanding of their cooperative programs. It is also a function of the cooperation among faculty groups on various

campuses (to steer clear of unnecessary competition for
students and the resources to support them in various subject
programs). Better management in libraries comes from well
designed systems for processing materials and serving users,
from the availability of well selected and well trained
staffs, from good technical support for the libraries' staffs
(e.g. equipment, space, access to new technologies), and
through constant surveillance, testing and refinement of
systems and procedures.

The real measure of value of practices that lead to
rationalization must, however, always be stated in terms of
service to the user. Automation can help, for example, to
expose more users to more information, with greater assurance
that the users will find pertinent materials. Information
can be communicated rapidly (in short messages), but the
movement of books and journals moves more slowly. Again, as
we noted earlier the automation in the world will be to no
avail if library materials cannot be put into the hands of
users within time limits they deem acceptable. Service time
requirements will vary depending upon the use to which the
information gotten from the books will be put. The type of
user and other factors which cannot be handled entirely with-
in a "storage" system optimized for known-item retrieval.

II.   PROGRAM FOR ACTION

1.   Areas of Opportunity for Automation

Projects and programs whose purpose is rationalization
in library services can and should take place at three
organizational levels. These levels, listed in the order in
which activities can be most quickly undertaken with highest
probability of success, and selected goals and topical areas
for development for projects to achieve rationalization are
as follows. These lists are not all-inclusive. Items listed
should be assigned priority for study and development. The
list is not intended to be prescriptive, but rather defines
the area of reasonable investment opportunity for the period
of years immediately ahead.

A.   Programs and projects for rationalization at the
     campus level:

1.   Systems that provide for repeated use of computer
     based bibliographical information, with single
     input and subsequent refinement:

2.   Creation of machine-readable records to be
     analyzed for management purposes·

3.   Creation of machine-readable records of holdings
     with access that provide for analysis of collec-
     tions to determine their quality for users' needs:

4.   Selective dissemination of information based on
     MARC and other tape services to (a) assist in

making decisions on selections, and (b) to

inform users of new literature in subjects

of interest;

5. Automated systems that improve the quality and

amount of service and provide for faster service:

    a. Circulation control.
    b. Delineation of strategy for locating
       information among all available resources,
       tailed to users' demands.
    c. Location of material on campus.
    d. Announcement of new publications in the
       system (non-selective).
    e. Monitoring of material in process.

B. Programs and projects for rationalization at the regional
level (library interaction):

1. Projects that make joint use of MARC records.

2. Cooperation among faculties for planning

specialties and courses to be offered;

3. Creation of generalized modules (software) for

library processes for local application:

4. Development of systems to perform various tasks

in one place for several libraries:

5. Projects that tend to increase the usefulness

of electronic data transmission for interlibrary

communications for any purpose;

6. Projects that tend to improve the ease and

speed of transfer of books and people among

libraries:

7. Provision of bibliographical and information

services based on machine-readable files

(internally and externally generated) at cost:

8. Expansion of specialized bibliographical and information services in various subjects to cover more than one campus, using machine-readable files (internally and externally generated), at cost to the user or user campus:

9. Projects that add to or draw from national services.

C. Programs and projects for rationalization at the national level:

1. Submission of data and information to national services:

2. Use of national files and services for local needs;

3. Cooperative planning of collection development;

4. Cooperative planning of academic program offerings:

5. Improvement of national interlibrary loan policies to give premium to joint use of materials (but not at the cost of lowering essential and high priority service to users of the lending library).

2. Recommendations: An Interim Program

A. A number of Canadian university libraries, including both IPCUR schools and others, have been able to mobilize sufficient resources to undertake substantial automation projects. Other IPCUR schools should be encouraged to make use of as much of this work as possible. This is not simply a

matter of copying software and installing similar machines on
the "underdeveloped" campuses. Because of the many vari-
ations in configuration of library facilities, in ways of
operating local libraries, in the form, style and content of
local records, and other characteristics of individual library
environments, software is not readily transferrable. Slight
differences among the computers of the same model require
modification of programs. The advanced libraries are not yet
funded well enough to spend so much time and resources
on the problems of other libraries. IPCUR chief campus offi-
cers should give priority in funding to proposals from their
libraries that aim at the exploitation of already developed
systems and software elsewhere, and the "host" library
should be further subsidized to provide additional staff,
travel, and publication costs related to their effort on
behalf of other libraries.* Funds for data conversion, parti-
cularly should be sufficient to avoid mutilated record
conversion projects.

B. Priority for automation tasks should be given to those
elements of operation that create bibliographical records of
holdings. This begins to provide the data base that will be
most useful in locating materials in the network of libraries
in IPCUR schools, in analyzing the collections of individual

---

*The inventory of automation work in Canadian libraries
appended to the AUCC report: Standardization in Canadian
University Libraries--an Approach and a Proposal will be use-
ful in identifying the potential of various schools to serve
as the developmental agency for various automated library tasks.

libraries and groups of libraries for the purpose of identifying strengths and weaknesses. Attention should be given to automation in the acquisitions area first in order to capture information about books coming into the system at the earliest possible moment. Action should be taken as soon as possible to begin to merge data bases from several campuses.

The creation of a combined record of holdings in machine-readable form of the libraries that feel they can usefully cooperate to provide joint access to literature is an essential development for success in rationalization programs. The task of creation of the combined data base should be divided into two parts: (a) input of current acquisitions, and (b) conversion of retrospective records.

Efforts should be devoted first to the capture of information concerning current input from acquisitions and cataloging for a combined machine-readable data base. Once this task is under control, the size of the retrospective file will be constant, and plans can be made, with accurate cost estimates, to convert it.

The current record can be captured and merged in several ways.

(1) Centralized processing. If a central technical processing department were to be established to do the acquisitions and cataloging, or at least some aspects of these functions--for the IPCUR libraries, the center could obtain data for a union catalog of current holdings automatically as a by-product of the ordering and cataloging work for the

individual libraries. The center could create book catalogs
for individual campuses, or for any combination of campuses,
and according to several arrangements (e.g. by author, title,
subject). Centralized technical processing for all IPCUR
schools is not recommended at this time.

(2) Pooling of locally produced records. The most
frequently used technique to produce a union catalog of the
holdings of several libraries has been to collect catalog
copy after it has been produced by the individual libraries
in various localities, to-be interfiled in a separate
bibliographical center. The record is thus not a by-product
automatically obtained, but an add-on product, actively made
viable only through conscious effort by individual libraries
to contribute their catalog copy to a bibliographical center
after they have themselves produced it.

In the automated mode, the separate, pooled record could
be created by having individual libraries send machine-
readable cataloging copy (e.g. magnetic or punched paper tape
or punched cards) to a central source for merging, storing
and service. If this were done, a standard format for the
communication of bibliographical information in machine-readable
format must be adopted. We recommend that the MARC format
be adopted for this and other interlibrary communication
purposes.

At the present time it appears that the centralization
effort, if it were deemed appropriate, would produce meaning-
ful results in terms of introducing useful services sooner

and cheaper if a center were established to collect records
of library materials as they are ordered or received (in
the case of gift items)in local libraries. Such records
would have to be up-dated as the books are processed and
added to collections on local campuses. The center would then
have a data base that could be queried by any local campus to
ascertain if particular titles were on order or available
elsewhere, for whatever use that information might be, and
that could be transmitted to the National Library of Canada
to support the development of the proposed large-scale, auto-
mated national union catalog effort. The IPCUR universities
should avoid the establishment of a system for a regional
purpose that cannot be altered from time to time to be com-
patible with a national system for Canada.

(3) Conversion of retrospective records. Part of the
input may already be available in machine readable form by
the time IPCUR organizes to convert retrospective catalog
records. The Library of Congress of the United States is
working on the problems of converting its various catalog
files to machine readable format (RECONS Project). If this
project is successful, a large machine-readable data base
will be available for local use. Libraries wishing to use
RECONS products will have the problems of matching records
on the RECONS tapes with local holdings, and of ascertaining
how much and how accurate the information on the tapes is.
Undoubtedly IPCUR libraries will contain a significant amount
of material that will not be covered by RECONS services, hence

IPCUR will still have a large conversion job to fund. Retrospective conversion should not be begun until a system for handling current input is operable.

C. We recommend that IPCUR establish a Library System Development and Service Office, administratively responsible to IPCUR, and preferably not located on the campus of any IPCUR school. The Office would perform the following functions essential to the promotion of rationalization through automation:

1. Develop a master guide for the assessment of local automation proposals in terms of the potential contribution of developments to serve the purpose of rationalization.

2. Guide the integration of local effort in automation into an interactive network.

3. Review all plans for library automation of IPCUR member libraries and provide a critique of these plans for chief campus officers.

4. Plan and arrange for the development of automation projects on its own initiative that promote inter-campus use of library materials and the new means of access to information.

5. Develop general automated systems software packages for library tasks.

6. Assist local automation staffs in the application of these packages on each campus to suit their local needs and idiosyncracies.

7. Serve as the negotiator for the development of standards in automation and system characteristics and operations.

8. Act on behalf of IPCUR libraries in assisting the National Library of Canada in its development of an automated national bibliographical service.

9. Assist in the training of local campus library staffs in the basics of library automation, and, for those who need it, the advanced technologies in the use of computers in libraries.

10. Offer consulting services on local campuses on all matters of library automation.

11. Carry on special studies that enhance the development of automation applications that serve the purpose of rationalization.

12. Generate grant proposals for developmental work in library automation.

13. Review and inform IPCUR representatives and local campus librarians of the state of the art in library automation and information science.

14. Assess budgetary needs for the development of automation needs at local and regional levels, and to advise IPCUR representatives of the need for funds.

15. Facilitate communication of local applications development among the IPCUR librarians.

16. Accumulate machine-readable data on the holdings
    of individual IPCUR campus libraries.

17. Operate regional union bibliographical services
    based on the holdings of IPCUR libraries. these
    to be developed from the process of accumulation
    of machine-readable bibliographical data from
    local libraries as they produce it. (At the same
    time, the office should be helping the National
    Library establish a national machine-readable
    bibliographical file of holdings of Canadian
    Libraries. When such a file is operational, the
    office would transmit local tapes to that file, or
    would direct the local libraries to send them to
    the national file. The office would then shift its
    attention to using the national file in order to
    provide management advice and guidance on collection
    development needs in the IPCUR region).

18. Work with other regional bibliographical centers
    in Canada and elsewhere to coordinate developments
    in the IPCUR region with the work of these centers
    in ways that insure the viability of operations
    that increase the potential for rationalization.

19. Assist in the documentation of on-going automated
    tasks in various libraries, thus facilitating the
    transferability of automation among libraries.

20. Assess hardware as it is developed and to represent
    IPCUR libraries among manufacturers.

D. IPCUR schools should cooperate closely in the exploitation
of specialized, computer-based bibliographical and
information services being developed or available from sources
outside the university.

The computer will do more than serve as a tool for library
automation of technical services, and for the analysis of the
data bases thus created for service to faculty and students.
An ever-increasing number of data bases in machine readable
form containing data and information useful for reference and
research purposes are being created by government, commercial
and other agencies. Libraries of the future will have to
have a computer or information processing capability in order
to provide access to these files just as they now provide
access to information in printed indexes, catalogs, encyclo-
pedias, etc.

Typical examples are:

> Chemical Abstracts on tapes
> Science Citation Index in tapes
> American census data (to come after 1970 census)
> NASA bibliographical tapes
> MEDLARS tapes (U.S. National Library of Medicine)
> MARC tapes (Library of Congress cataloging information)
> Scientific and Technical Serials in Canada
> (National Science Library)

The National Science Library of Canada offers a service
of searching several of these files to locate bibliographical
citations that match interest profiles of its customers.
This selective dissemination of information system need not
be duplicated on various campuses: they can be accessed for
a fee through the National Science Library. The University

of Saskatchewan at Saskatoon is testing the value and
quality of this service with a number of its faculty. The
Alberta Information Retrieval Association, with the cooperation
of the Universities of Alberta and the Research Council of
Alberta, was formed recently to provide computer-based
current-awareness services to Canadian scientists. AIRA
works with the Chemical Titles tapes and the COMPENDEX tapes
in engineering. It helps a limited number of users gain
access to several tape files at the National Science Library.
The Department of Computing Science at Alberta and the
Information Systems Group at the University of Calgary are
key agencies in the offering of these services.

Such cooperative ventures should be continued and
expanded, hopefully with as little duplication of effort as
can be managed. The cost of acquiring and searching these
services is high: these resources and the systems and
programs for using the tapes should be shared to the fullest
extent possible. It would be advisable to develop a search
capability in or near the libraries that can most probably
offer the highest quantity of literature on which each tape
is based, although this is not an absolute requirement. All
search services should be offered on a cost basis, with each
campus, or each user, paying a share of the costs of acquiring
and searching the tapes according to use.

In optimizing both technical progress and economic
dividends from such projects, the role of the proposed IPCUR
Library System Development and Service Office would be an
essential element.

APPENDICES

APPENDIX A

Campus Visit Assignments

Russell Shank

    University of Saskatchewan, Saskatoon
    University of Saskatchewan, Regina

Duncan Wall

    University of Manitoba
    University of Winnipeg

C. Dake Gull

    University of Alberta
    University of Lethbridge
    University of Calgary
    University of Notre Dame (not visited because of air
                                 reservation errors)

Edward Heiliger

    Simon Fraser University
    University of British Columbia
    Victoria University

APPENDIX B

Comment on the Gross Proposal (1968)

Several shortcomings of technology for automation in
libraries are noted in the proposal to IPCUR for a study of
library automation made in September 1968 (Gross). One of
the objectives of the proposed study states that centralized
circulation system would have to be accessed by some form of
terminal probably not yet in existence. Another task for the
proposed study would be "to investigate the economics of
memory files and data communication requirements for a ...
data bank where holdings are stores in machine readable form."
This is followed by a recognition that this system is
'probably some 5 - 10 years off being a practical reality."

The concern about circulation systems on an inter-
provincial level is misplaced: circulation control is the
least of the task areas that are likely to contribute meaning-
fully and economically to rationalization if automated. And
if a useful machine-readable data base will not be practical
for the next 5 to 10 years (a vague generalization that
really means it is impossible to predict when such a data
base will be available), consideration of the economics of a
memory file and data communication is premature and a waste
of time at this time.

The proposal improperly defines the MARC concept
(Library of Congress Machine Readable Cataloging format for

the communication of bibliographical information in machine
readable form). It is not a <u>system to be tied into</u>, as the
proposal suggests might be possible hence worth study.
It is a service of the Library of Congress that distributes
cataloging copy for some of the books cataloged by the
Library of Congress in machine readable format. As such it
provides the data base for automating some aspects of part
of the acquisitions and cataloging functions. The problem to
be faced by local libraries is not how to tie into the MARC
system, but how to design a system to use the MARC service
records.

The proposal calls for a feasibility study of an odd and
incomplete assortment of library functions and pieces of
records, when it should be addressed to an examination of the
problem areas of IPCUR libraries most amenable to automation,
to priority order in which these problem areas should be
studied in detail (with regard being given to the state of
the art of automation and communication and to library and
campus needs), and a generalized system design statement
which then could be the subject of a feasibility study. In
other words, the proposal says· "Have machine--what's your
problem?" rather than "What's your problem, then let's see
what characteristics of these problems suggest the utility
of machine applications."

APPENDIX C

Miscellaneous Correspondence In Connection with the Project.

The following selection of correspondence on the
project is included because of its general relevance in
defining the intent and limits of the study. No attempt
has been made to include all of the correspondence of the
study team, or informal memoranda between members of the
team in which detailed problems within the overall library
automation picture were summarized.

THE EARLY INFORMAL REPORT OF DEC. 18, 1969

The study phase of the project was originally
expected to be carried out in August and September of 1969
but was delayed for some time awaiting authorization and
funding by IPCUR. In spite of the difficulties in personal
committment schedules caused by the delay, members of the
team had completed all of the campus visits by the end of
November, and had held several general meetings in Washington
and Kent. By the middle of December, the shape that the
major findings would assume had become clear, and was put in
the form of a 12 page informal letter memorandum to Dr. Riddell.
The informal report was drafted for the study team largely
by Dake Gull. Its essential content is of some interest, and
can be summarized in the following excerpted text:

> "This team believes that the technology of
> the present and the likely advances in the
> next ten years mean that the system...is
> technologically feasible."
>
> "The team, however, does not believe that
> the system is realistic for the IPCUR univer-
> sities and those of British Columbia for the
> following reasons:"
>
> The three major findings made were that
>
> 1. Development and operating costs for
> the computer-based subsystem would be ex-
> cessive, as suggested by both actual exper-
> ience of similar projects and independent
> estimates such as those of the Tyas commission.
> "These costs out should be considered as a
> additions to the exiting costs."
>
> "2. The rationalization of the library
> and other information collections...is a
> function of the rationalization of the
> academic and research programs of the
> participating universities. ....We believe

that the human beings making up the
universities will resist every attempt to
rationalize the academic and research
programs by controlling the growth of
the information resources through rational-
ization. We believe...that the rational-
ization of the information resources
fail until and unless the university
administrators can rationalize the academic
and research programs."

"3. The IPCUR and British Columbia
Universities ought to avoid the establish-
ment of a system for a regional purpose
if that system has any possibility of
being incompatible with a national system
for Canada." The requirement for handling
inquiries to an uncontrolled data base not
now in digital form (and both very large and
complex) is a particular design factor which
should not be compared naively with familiar
but altogether different examples such as
the airlines reservation systems. "The project
team found no evidence..." that the librarians
or computer people "had determined what the
actual needs for service are which will be
required in the design of an information
system network."

The major conclusions of the early
memorandum set forth essentially the same
package of recommended actions incorporated
in the major project report and elsewhere.

UNIVERSITY OF SASKATCHEWAN REGINA CAMPUS

PRINCIPAL'S OFFICE   REGINA, CANADA

June 13, 1969

Mr. H. Duncan Wall,
Assistant Librarian for Planning
and Development,
Kent State University,
Kent, Ohio 44240

Dear Mr. Wall:

The universities of Western Canada, through the Interprovincial Committee on University Rationalization, have embarked on a joint examination of the possibilities for automated procedures in the various libraries that would permit the eventual linking of these libraries for more effective utilization of the resources.

Since there have been quite a number of studies undertaken with the objective of developing a system or systems that could be adapted to a group of libraries, we decided that we would engage a consultant who was familiar with this area. Knowing of your recent study for the Ontario Council of University Librarians, it was agreed that we would ask if you would be available to undertake this study.

As a preliminary guide to assist you in assessing the request I provide the following information:

1. There are eight libraries in the three prairie provinces involved in IPCUR that are directly involved but, in addition, it has been agreed that the three university libraries in British Columbia should be included because of their interest, and because the University of British Columbia and Simon Fraser have probably the most advanced automated systems in Western Canada.

2. Apart from the B.C. systems, there have not been any extensive applications of computer procedures, although all but one or two are planning to initiate programs.

3. The librarians estimated that with your knowledge of the field and of the Canadian situation it might be possible to complete the work in about two months.

4. The general objectives of the study have been stated as follows:

The project will fall within the broad aim of IPCUR's interest in libraries, i.e. the rationalization of library development.

Mr. H. Duncan Wall,
June 13, 1969   - 2 -

        The general objectives of the project are to investigate co-operative
automated systems:

        1. as one means of guiding collection development,

        2. as increasing the sharing of library resources,

        3. as providing better library services at the same or lower cost
            than could be otherwise achieved,

        4. in relation to national computerized catalogues and other
            computerized services being planned by the national libraries.

        5. in relation to other co-operative systems and projects being
            planned on a regional, national or international basis.

        If you are interested in enquiring further I would be pleased to have
you write me and, if you wished, could arrange to meet you when I am in eastern
Canada toward the end of the month. I would also appreciate some indication of
the time when this could be undertaken and the financial arrangements you would
expect. I would need to have this in order to secure some final approval of the
project.

                                        Yours sincerely,

                                        W. A. Riddell,
                                        Principal

WAR/dt

KENT STATE UNIVERSITY
KENT. OHIO 44240

Kent Center for Library Studies

July 3, 1969

Dr. W. A. Riddell, Principal
University of Saskatchewan
Regina Campus
Regina, Saskatchewan
Canada

Dear Dr. Riddell:

Thank you for your explicit letter of 13 June, which I
believe gives me a sufficiently clear view of the task at
hand. Unfortunately I have had to be a little slow in
making a response to your letter, partly because of a
protracted heavy cold, and partly because I wanted to talk
with several other people about it. I am happy to put on
paper below the information which I gave you by telephone
yesterday.

I believe strongly that it would be preferable to handle
a planning task of the kind you describe as a team project
probably using a blue-ribbon team. A convenient instrument
for this purpose is the Center for Library Studies, a research
arm of the graduate School of Library Science at K.S.U.
Among other activities, the Center assists in formulating
survey and consulting projects, in locating particularly
qualified consultants, and in assembling study teams.

I have discussed the matter at some length with the
Director of the Center, whose signature also appears at the
foot of this letter, and we would like to make the following
counterproposal:

We would like to assemble a blue-ribbon team of three
to four particularly experienced people: a list of prospective
members is appended. Individuals from the team would spend
several man-days on each campus as appeared necessary, and
visits to Toronto and Ottawa would also be made. Total
man-days would not exceed 50, or approximately would be
about 90 days: the field work in Canada would be done in
August and/or September, and a summary report of perhaps 50
pages would be prepared by the team in Washington or Ohio and
presented to IPCUR in November. Two or three of the team
would return to Canada for a discussion of the report after
the report had been submitted.

44

I estimate the cost of using a team in this manner would
not exceed $11,500, but the Center will require a fee of
10% for assembling the team and handling certain details
of its work, and the total cost might therefore approximate
$12,600. The cost of the four man team is somewhat higher
than the cost of an equivalent effort from a single person,
if a qualified one could be found, but we believe the
balanced perspective and greater authority of the team is
preferable to the present task.

                    Sincerely,

                    H. Duncan Wall
                    Associate Librarian for
                    Planning and Development
                    K.S.U. Library

                    Edward H. Heiliger, Director
                    Kent Center for Library Studies
                    Professor, School of Library Science

lhg/iz

cc: Cloyd Dake Gull
      Russell Shank

PERSONNEL PROPOSED FOR THE PROJECT TEAM

As we presently conceive it, the project team would have
four members. Brief resumes follow below for the four people
proposed. The project has been discussed briefly with each,
and each has indicated particular interest in participating,
and probable availability, particularly if details of the
project can be firmed up soon. At the moment no guarantee
can be made of the participation of any of the four.

Dr. Russell Shank. Dr. Shank, 43, is presently Director
of Libraries for the Smithsonian Institution, and would
probably be chosen by the group as its project leader. The
Smithsonian Institution, perhaps best known for its scientific
work in progress. Dr. Shank is the holder of four earned
degrees, including a B.S. in electrical engieering, M.B.A.
in business Administration, and Ph.D. in library service, the
latter from Columbia University. He has extensive academic
library experience, and served for five years as Assistant
Librarian of the University of California at Berkeley. He
has taught in a number of library schools, and has recently
produced a program plan for the integration of the science
library resources of the New York Metropolitan area. The
study was done for METRO, the responsible regional library
agency for the Metropolitan area. Shank is originally from
the American northwest, and his parents homesteaded on the
Canadian prairies.

C. Dake Gull. Mr. Gull is 54, the holder of three earned
degrees including the sixth-year Master's degree in Library
Science from the University of Michigan. He has extensive
experience in research libraries, has worked for the Library
of Congress at the Deputy Division Chief level and as a
principal member of the Information Systems staff of the
General Electric Company was involved in the creation of the
automated MEDLARS system of the National Library of Medicine.
He has extensive teaching experience at the University of
Indiana graduate library school and four others, including
McGill. He has been president of the American Society for
Information Science (the principal professional society in
its field) and chairman of the U.S. National Commission for
the International Federation for Documentation. Until
recently he has served as Liaison Officer for the National
libraries in the U.S. He has just finished an automation
program plan for one of the massive bibliographic operations
of the Library of Congress. He is currently active as a private
consultant in a firm in which John Cornin, recently Director
of the Processing Department of the Library of Congress, is
also active.

Edward M. Heiliger. Professor Heiliger, 59, is Director
of the Center for Library Studies and teaches data processing
courses in the School of Library Science of Kent State
University. He holds three earned degrees, including an M.A.
in history from the University of Denver. He has extensive
university library experience in Latin America, and in the

U.S. has served as Associate Director of the New York State
Library, Director of Libraries for the University of Illinois
at Chicago, and Director of Libraries and Information Retrieval
Services of Florida Altantic University. At Illinois and
Florida Atlantic he was responsible for important pioneering
efforts in the use of computer-based system in academic
libraries which have greatly affected subsequent developments
through the training of personnel (many of them now quite
prominent in the library automation 'movement,') and through
the articulation of many of the intellectual-linguistic
distinctions now embodied in digital catalog formats such
as the MARC format. His book on library automation, co-
authored with Paul Henderson of the Allis-Chalmers Corporation,
is now under consideration by a major publisher.

H. Duncan Wall. Mr. Wall, 35, is Assistant Director of
Libraries at Kent State University. He holds an M.S. from
the School of Library Service of Columbia University. He
participated in the design of the original MARC Pilot Project
of the Library of Congress, and worked for two years with
the United Aircraft Corporate Systems Center on the first
three phases of the System Development Program of the Library
of Congress. In 1968, as Systems Consultant to the Ontario
Council of University Librarians, he conducted a detailed
survey of the prospects for innovation and integration among
the university libraries of Ontario. He developed an action
plan for the Committee of Presidents of Universities of
Ontario notable for a carefully staged five-year program

to provide powerful tools for assisting individual university
libraries in their responsibilities, and notable also for
its de-emphasis of immediate organizational changes.

WORK STATEMENT FOR IPCUR PROJECT

A summary of the tasks to be carried out by the survey team.

1. Examine the development of the universities and their libraries in the light of changing requirements for information and library resources, and in the light of changing technology.

2. Identify opportunities for organizational and technological innovation which are available within actual technical, economic and political constraints, both long-term and short-term.

3. Forecast costs and benefits likely to result from various types of technological and organizational innovations, in the generalized terms required for an investmental decision by the universities:

4. Identify organizational and fiscal measures required to realize these opportunities;

5. Synthesize the program most satisfactory in terms of benefits, costs and hazards, priorties, etc.

6. Summarize the key points in the program and its supporting argument in a brief report sufficiently readable by persons who are not library or computer specialists:

ON SOME SPECIAL PROBLEMS OF NONCATALOG DATA BASES
Edward M. Heiliger

Cooperation in Western Canada on the acquisition and
use of data bases can be a major reason for creation of an
IPCUR center. The major problems in data base use are the
following: 1) Selection 2) Overlap 3) Training: 4) Co-
operation: 5) High prices; 6) Royalties; 7) User Profile
construction; 8) Question profile construction: 9) Retro-
spective searches; and 10) Lack of standardization.

Selection guides for machine readable materials are
not available. Therefore, there must be cooperative ef-
fort to critically judge existing and new data bases.
Standards for evaluating must also be developed. The
Canada Consortium should be able to do this collectively
for its own needs.

Commercial data base services have a strong tendency
to overlap with each others' services. This is done know-
ingly, on the theory that a wider coverage will make the
product more marketable. A Canadian center could develop
a standard file format adequate for searching all commercial
data base services. Coversion to this format could be done
once for all Canadian users as each service output arrived.
The searching time thus saved, would greatly reduce the cost.
The University of Georgia and the Illinois Institute of
Technology Research Institute have both developed such a
format and are giving service to business and industry, as
well as campus users. They estimate a 70% to 80% saving by
dealing with overlap in this fashion.

A cooperative effort is needed in the considerable prob-
lem of educating library staffs, computer staffs, and users
in an awareness of what data bases there are and what proper
search techniques in their use will yield. Also, people must
be trained in the use of these bases.

The very high price of many of the commercially available
data bases is perhaps the strongest argument for cooperative
effort. The Goodyear Research Library in Akron, informs me
that Engineering Index tapes are quoted at $6,000 per year,
the complete PLASDOC tape service (patents) from London is
$4,000 per year, and the one service (polymer science) they
get from chemical abstracts is $1,000. These are only a few
of hundred that are being offered. Joint use of such services
would make subscription possible and add considerably to the
resources of the cooperating universities.

The development of a system-wide Selective Dissemination
of Information program for relating the data base services to
the individuals on each campus needing specific information
from those services will call for an effort which could best
be done cooperatively. User profile must relate to the struct-
ure set up for data base use. Question profiles for individual
searches must also be constructed according to accepted techniques.

All of this could best be handled by a well staffed center
devoted to cooperative use of data bases.

Although most data base services are concerned with
current awareness, those who buy the tapes are gradually
building capability for retrospective searches. This capa-
bility will become increasingly important. A Center can
be a resource for such searches.

There are two extensive lists of data bases. One is a
commercial loose-leaf service provided by Science Associates
International, which contains detailed descriptions of over
318 major data bases in the field of science. The Kent Center
for Library Studies has compiled a less detailed list of 368
data bases and a source of data bases for the social sciences
and humanities. EDUCOM is undertaking a file resources survey
of its 100 universities. The results of this should highlight
the vast number of locally produced data bases that universities
generate. Many Canadian universities are members of EDUCOM.

Existing telephone networks have been set up for voice
communications. Recently there has been an increased need for
graphics transmission, closed circuit TV transmission, computer-
to-computer communication, etc., much of which requires wide-
band capability. The solution to this leads to consideration
of private microwave networks and communications satelites,
both of which can provide this. At the EDUCOM Fall Council
meeting in October, a communications lawyer from New York pre-
dicted a great growth in microwave networks in the next few
years. At the same meeting, a U.S. senator from Alaska, talked
of the potential of a communications satellite to tie Alaska
more closely to Washington for various purposes, mainly edu-
cation. He also mentioned exploratory talks between Canada
and the U.S. on negotiations for putting up a communications
satellite for Canada. A tentative cost figure given was in
the neighborhood of $25,000,000. At this Spring's EDUCOM
Council meeting, President Nixon's special assistant on com-
munications said that the wide-band capability of a domestic
communication satellite launched. There is some evidence in
the U.S., that the telephone networks are moving to meet the
competition. A three year experiment by AT&T is beginning in
the tier of states running from Illinois to New York, called
system 11,000. This provides a broad-band communication pack-
age between two heavily used points plus regular service to
other parts of the area for a special price.

Two developments in British Columbia universities (U.B.C., Simon Fraser, and Victoria) merit attention. Each university library has a strong systems staff and a strong collection-building staff. Members of these staffs get together with their counterparts at the other universities for exchange of information. This approach to both library automation and improving the total offering of the three universities seems to have merit. The prairie provinces might give this a try, both as an aid in the individual efforts of members of IPCUR and as an aid to any cooperative center established. A field as new as library automation requires experimentation and innovative efforts. Those involved in this on each campus can benefit greatly from sharing experience and know-how with those with the same specialty on other campuses. Cost and use studies are badly needed and they could be undertaken cooperatively. Automation can help collection building, by providing information about the collection and its use, and in other ways. A computer-assisted cooperative effort at collection building, with staff specialists at each university, should be able to create a better total resource for the same money. The distances involved impose some restrictions, but then there are areas, such as long sets of little used journals, and rare book materials in special fields, that could be shared and not duplicated.

Equipment costs per operation are going down exponentially. Software costs are going up just as precipitously. This suggests sharing of programming work in such a way that software costs can be kept in line. EDUCOM has set up its EIN network to help accomplish this for its members. Available programs are listed regularly for distribution to members. For some purposes the emphasis will be on service sharing rather than program sharing, but the essential problem is cutting the software cost. An IPCUR center could aid in this direction in the same way.

THE ROLE OF THE BRITISH COLUMBIA UNIVERSITY LIBRARIES IN
THE COOPERATIVE PLANNING OF THE PRAIRIE PROVINCE LIBRARIES
Edward M. Heiliger

The University of British Columbia, Simon Fraser University
and the University of Victoria would be a formidable group
in anybody's library automation competition. Fortunately,
the individuals involved in this extraordinary effort are
cooperating with one another and are willing to extend this
cooperation to other parts of Canada. They are busy people,
with their full share of the problems that university libraries
have these days. Serious approaches by prairie provinces
people are respected. There is a certain desire for feed-
back that hasn't been fulfilled. Has the help given resulted
in any positive development to those helped? Have they, in
turn, discovered new methods as a result of the help given?
More give and take between the two groups would hopefully
lead to a more fruitful relationship.

A query by one B.C. librarian indicated a strong interest
in just what was going on in library automation in Ontario.
There was a certain respect in his voice that indicated a
feeling that a fruitful cooperative effort with Ontario might
be useful. If the prairie provinces work at library auto-
mation, they can shortly offer the same attraction and meet
the B.C. libraries on a more equal ground.

The three B.C. libraries all have systems staffs, with
systems people, programmers and computer-oriented librarians.
These staffs meet together and exchange information. The
directors of the libraries do likewise, and so do the
members of the collection-building staffs. The latter is
important because one of the savings resulting from better
library automation and communication will be in the collec-
tion building area. The effect of this kind of cooperation
might also assist in cooperative curriculum-building
planning. The absurdity of having a medical school on
every campus can be more clearly seen if the cost of develop-
ing and maintaining a medical library are considered. The
availability of fringe materials for medical research then
becomes a matter of cooperative effort.

The Canadian Rockies are simply not the barrier they
once were. The isolation mentality of B.C. is melting, with
somewhat more orientation to the East, but it is still there.
The enormous size of the Canadian provinces tends to create
a texas mentality that makes for happiness in your own area
without much concern for the outside world. Fortunately,
every effort apparently is being made to break this down.
Success in this over-all effort will help the librarian.

Cooperative development of data bases usable by the B.C.
University libraries and by the university libraries of the
prairie provinces could be fruitful. Also, cooperative use

Page 2
THE ROLE OF THE BRITISH COLUMBIA UNIVERSITY LIBRARIES IN
THE COOPERATIVE PLANNING OF THE PRAIRIE PROVINCE LIBRARIES

of expensive commercial data bases has real possibilities.
Both of these would call for decisions on standards,
storage, and communicative. The current EDUCOM effort to
inventory data bases on the campuses of the 100 universities
now belonging to EDUCOM, will give those Canadian universities
belonging to EDUCOM a chance to have access to a large number
of university data bases. In addition to this file resources
survey, EDUCOM is working on the problem of interchange of
computer programs (EIN). The documentation Standards Hand-
book for EIN Software Catalog, published in June, 1969,
is part of this effort, All Canadian Universities could
benefit from this effort.

APPENDIX D

COMPARATIVE COSTS OF LIBRARY NETWORK PROJECTS

Computer-based library data systems:

Costs of some representative projects

September, 1970

Report to the Inter-Provincial Committee on
University Rationalization

Prepared for IPCUR by a select study team

Kent Center for Library Studies
Kent, Ohio 44242

We have appended following some figures for the cost
estimates (or apparent cost experience) of some projects compar-
able in scope and overall requirements to the sytem model under
consideration, together with a brief review of the context in
which the project is progressing, and some key details of its
conceptual design.

The cost data has been developed chiefly by Duncan Wall, in
most cases from obscure or confidential sources. The actual costs,
like the true progress and the economic success of projects of
this kind, are usually the object of evasion and actual conceal-
ment: they are rarely 'published' in any of the usual senses of
the term, and in a number of the cases cited have been procured
privately with assurances of nondisclosure. It is invariably
true that published 'costs' of projects of this kind are stated
inaccurately and in such cases a true picture of projects costs
can be obtained only from knowledgeable manipulation of fragment-
ary cost details obtained privately. There have been a number
of cases where commercial systems houses have ended up as much
as several hundred thousand dollars in the red on such projects--
losses which are not advertised.

No cost estimates concerning data conversion are included
in the project cost descriptions. In a few cases, substantial
conversion costs are carried as a part of an operational
subsystem or earlier system. Cost of data conversion has, with

software and machine costs, been the object of evasion and
concealment. No cost estimate of less than 75¢ per record for
a record of catalog quality, need command much credibility
although studies and conversion projects have often reported
lower figures achievable. Actual costs for carefully engineered
projects commonly run over $1.00 per title for a record whose
quality is capable of maintaining an inquiry system with capabil-
ities comparable to a card catalog. Costs of $1.50-$2.50 per
record have been experienced in several places. There have been
several notable cases of what appears to be simple fabrication by
a large equipment manufacturer whose interests which should be
apparent to all but the naive (or those who also are blinded by
special interest.) Conversion costs for partial records, reported
from a few well-managed projects as low as 12¢ a record on large-
volume conversions, are achievable, but are incapable of producing
a file whose retrieval performance will be satisfactory in any thing
beyond very limited applications.

Nonlibrarians will want to note carefully in this connection
that, contrary to expectations, it has not proven possible for
one institution simply and easily to make use of the fruits of
the conversion project of another library. In a collection of
any size, mutual duplication rates fall rapidly, supposed
'duplicates' turn out to possess astonishing differences, and
the cost of locating and verifying the 'duplication' begins to
approach the cost of actual original conversion.

It is likely that the only real solution to the problem will

be found in the conversion (at high quality standards) of the
catalog files of a number of very large libraries, especially the
Library of Congress. Conversion by the use of the inquiry
method, with the creation of data for local call numbers and
locations, variant edition data, etc., via on-line text manipu-
lation, promises eventually to lower conversion costs to a
level of perhaps 20 cents per title in quantity. The achievement
of such costs assumes the creation and availability of a rather
expensive and sophisticated system fueled in advance by a large
number of records--say 2 or 3 million--from a really large record
conversion of high quality. A number of large libraries for
varying reasons have converted 500,000 to 900,000 records, but
always at rather mutilated quality levels, e.g., without the
added entry and subject data required to reconstitute a full set_
of catalog cards, or without enough bibliographic data to allow
the record to be identified with sufficient confidence with a
'similar' record in the files of another library, or without even
enough information for a user to identify most known references
with confidence.

The Library of Congress is in fact now pursuing through the
RECON project a study of the value to other libraries of the
conversion to machine-readable form of its own retrospective
files. Its degree of enthusiasm concerning the subject may be
judged from the facts that the Library (with a budget requested
for 1971 of $51 million) refused to fund the project itself,
insisting upon foundation funding; and that the Library, four

years after innovating the MARC 'system' with considerable
publicity, still does not use the MARC record itself in any
significant internal operation.

The projects whose costs have been cited in the pages
following are limited to those reasonably comparable to the model
system under consideration. These possess all or most of the
following critical characteristics:

1) One or more CPU's dedicated entirely or almost entirely
   to the system, with a minimum of 256,000 characters of
   core memory;

2) Many remote users;

3) Operations dominated by the conversational or "inquiry"
   mode rather than batch mode;

4) A requirement for the creation and maintenance in
   direct-access memory equipment of data files of a
   relatively large size by data-processing standards; e.g.,
   the smallest such file included involves 100 million
   characters at the outset;

5) Operation of the system requires access via bibliographical
   keys such as author and title to a large number of
   discrete, lightly used records;

6) A high degree of interaction with the machine system is
   required by library staff involved in book processing
   operations, performing tasks beyond the capability of
   the machine system;

7) Every project requires at least two years from funding

to the target dates for the operation of the first
subsystems.

A few cases are noted where some of these characteristics are
absent.

A few notes have also been attached concerning the circum-
stances surrounding the projects, one of which has been
officially abandoned (but will inevitably be revived); another
of these has been abandoned in fact but without official
acknowledgement, and with continuance of development on simpler
lines. The projects are all in much more promising circumstances
than apply with the IPCUR group, both fiscally and politically.

A number of somewhat comparable projects such as the moribund
NELINET (New England) project, have been excluded, although
this latter is an excellent example of the great difficulties of
conducting a highly innovative, expensive and certainly speculative
system development project without a natural political watershed
and across the lines of six major political entities. NELINET
made a brave and promising start, but never progressed far enough
(except in the imagination of the commercial software firm involv-
ed) to allow a useful comparison to be made here.

Readers of this report will want to note carefully that actual
cost experiences commonly exceed cost estimates, however carefully
drawn; and every project cited has been assisted by analysis and
planning work or actual development work in a commercial systems
house. The projects cited have had major assistance in analysis
and design phases, or in actual implementation work, from at

least seven different major system firms and from a number of
different individual consultant and ad-hoc survey teams.

A table synthesizing an estimate of the two key components
of software development and recurring machine costs follows.
If the simple average of project costs is ignored in preference
for a more reasonable average ignoring Projects A and G, the
most atypical, a reasonable interpretation would see such a
project typically costing about $800,000 for each of three
years.   These costs would exclude certain other significant
costs, e.g., telecommunications charges, overhead, etc.   When
these are included a prudent cost estimate might be a total somewhat
exceeding $900,000 in the first year, rising to just over a
million in the third.   These estimates would not include the
costs of large-scale retrospective data conversions by the
user libraries.

TABLE I: TYPICAL COSTS, KEY COST COMPONENTS

	Non-Recurring Software Development	Continuing Equipment	Date of est. or Contract
A	160,000	360,000	1967
B	2,000,000	700,000	1967
C	1,000,000	480,000	1969
D	300,000	400,000	1970
E	5,200,000		
F	400,000	500,000	1969
G	1,500,000	500,000	1969
Simple Average:	1,510,000	528,000	
Average of Projects: B,C,D, F,G, discarding highest and lowest projects (A and G)	1,052,000		

Project A.   A large computer-based processing center serving
             several dozen academic libraries.

             These are 1967 cost estimates by a well-known
        firm of management consultants, with no special
        interests in the library industry affecting the
        firm's judgement, and a modest amount of previous
        experience in the library automation field. The
        conceptual design demanded heavy use of remote batch
        processing, thus minimizing individual inquiry
        telecommunications costs and processor costs associated
        with conversational timesharing in the inquiry mode.
        A relatively modest on-line file of 200,000,000
        characters (an estimated 400,000 titles) was
        envisioned at the end of the first several years of
        the project, with local staff at the universities
        continuing to handle very substantial activities for
        all library materials, and all processing activites
        for the more difficult research materials, e.q.,
        serials, foreign imprints, retrospective materials,
        government publications, and the like.

             Estimated Computer costs: $360,000 per annum
        for a 256Kb processor and an array of other peripheral
        and memory equipment.

             Estimated Software costs: $160,000 for programming
        and related software, a non-recurring expense.

Estimated calendar time: remote catalog access would be achieved only during Phase III; Phases I and II were estimated to require two years funding.

Project B: A large research library with national responsibilities in a group of disciplines.

The conceptual design for the project began from the base of a previous successful automation project which had been limited to very much narrower goals. The extended system to be produced by the new project replaces manual file-search and processing methods with on-line text editing, computer-based author searching, remote catalog access from distant locations, and a potentially large catalog file. Development of the extended system was preplanned carefully by a well-known firm of computer consultants. Another large software firm has been conducting the development work under contract, with three years initially planned for implementation. The project is approximately a year behind schedule and the contractor is in deep trouble technically.

Estimated Computer costs: $700,000 per annum for a 512Kb processor with an additional million characters of main memory and an array of other peripheral and memory equipment.

Estimated Software costs: $2,000,000 for

programming and related software, a non-recurring
expense.

Project C: A large computer-based library data system serving
several dozen academic libraries.

These are 1969 cost estimates by an experienced
individual without special interests, who carried out
a rare survey-in-depth of the actual existing
activities of the libraries involved. The conceptual
design was for a first-phase 'foundation' system'
which provided individual libraries with powerful
computer capabilities, without shifting processing
personnel to a new center, and without attempting
on-line author-title searching capabilities. The
program allowed each of these to occur efficiently in
a subsequent Phase II when several years later the
simpler foundation system had been successfully
demonstrated. The estimates are decision-oriented
overestimates intended to put an upper limit upon
actual cost experience, which would be most likely
to be in the range of 60-80 per cent of the estimates.

Estimated Computer costs: costs rising to
$480,000 per annum for a 256Kb processor with
800,000,000 characters of direct-access memory near
the start of the project (and about 2 billion toward
the end of the project) and an array of other

peripheral equipment.

Estimated Software costs: $1,000,000 in
non-recurring programming and other software costs.

Estimated calendar time: 2.5 years from funding
to first operational subsystems, 4.5 years to
initiation of development of more advanced Phase II
system.

Project D: A large computer-based processing center serving
several dozen academic libraries.

These are 1970 cost estimates by a project now
moving through implementation of its first phase, with
implementation of the second and more demanding phase
anticipated about summer 1971. The conceptual
design involved leaves all processing personnel but
a few clerks at the local institutions.

Estimated Computer costs: $192,000 per year for
Phase I, with a relatively modest file of 200 million
characters anticipated in direct-access storage; costs
for Phase II probably in excess of $400,000 per year,
with files exceeding a billion characters in Phase II.
Phase II requires a second CPU.

Estimated Software costs: not less than a total
of $300,000 in software costs will have accumulated
by the first several years of Phase II.

Estimated calendar time: from funding to the
operational status for Phase I required 2.5 years;

Phase II, which is comparable to the system concept
being examined, will require at least another 1 to
1.5 for the first subsystems. Careful examination
of library realities and a willingness to avoid
rushing into glamorous but costly projects has made
rapid and successful progress possible so far for
this project. A funding crunch, now approaching,
may hazard the previous success of this project.

Project E: A very large research library with national responsi-
bilities across many disciplines.

This project was conceived following the
extended exploratory analysis in 1961-62 by a
blue-ribbon team almost entirely composed of non-
librarians, and has been managed from the funding of
the project by experienced computer specialists
without library experience. A major systems
contractor assisted for two years with the analysis
and design phases of the project, which uncovered
unsuspected major problems.

The conceptual design requires two or three
medium-to-large CPU's and at least several billion
characters of direct-access storage.

Estimated Computer costs: no reliable estimate
can be given since the original conceptual design
has been abandoned.

Estimated Software costs: $5.2 million has
been spent during the period 1966-1970; it appears a
at present several times as much will be required.

Estimated Calendar time: the project was
originally estimated as requiring six years when in
the hands of an external systems contractor. It is
now two years behind that schedule, and is currently
in the hands of the third major software contractor;
the project has also had specialized technical
participation by about two dozen other software
contractors; and the library's own in-house systems
staff had been led and dominated by non-librarians.

Project F: <u>A large academic library with more than 2 million
volumes.</u>

The conceptual design calls for a crude type of
computer catalog access to a file exceeding 900,000
titles initially, but with the early subsystems
concentrating on circulation control rather than
processing routines.

Estimated Computer costs: $500,000 per annum;
costs are fairly firm '69 estimates, and include
several dozen inquiry terminals with modest
capabilitites.

Estimated Softward costs: $400,000; estimates
are by the manufacturer's software staff, conducting

the development, and are not exactly firm.

Estimated calendar time: 1.5 years from funding
to planned operational capability. The goal may be
achieved since involvement with processing consider-
ations has been rigorously avoided, but at the cost
of an expensive duplication of record conversion
several years hence, since the record format being
used is not adequate for most catalog access users,
and is probably not capable of locating by reasonable
means more than about 80 per cent of the records
actually in the file.

Development costs for what may be considered as
Phase I of the project have now passed $300,000 with
annual Hardware costs of $150-200,000 a reasonable
estimate. Hardware costs have been kept down by
concentrating most inquiry traffic at a single
6-station set of inquiry consoles, with user access
by telephone via an intermediary operator.

The project has some justification in the
existence of an antique and overworked central
library building with an excessive number of branch
libraries but actual funding of the project has been
dictated by the political needs of a new "Learning
Resources" organizational structure including the
library, the new organization apparently being able
to achieve funding for show projects.

Project G: <u>A large academic library with approximately 4</u>

<u>million volumes.</u>

The cost estimates for the project, located at

a large and wealthy private university, have been

developed carefully over the first three years of the

project, which has had active and substantial

participation by the university's outstanding computer

center: Conceptual design for the system gives

on-line query capabilities at first to staff only,

with users of the library being limited to card

catalogs of the usual kind for some years yet,

although these catalogs will be maintained in part

by computer supported activity. Economic justifi-

cations for the project offered formally justify the

project in terms of long-range assumptions concerning

library growth, salary trends, etc., rather than

present or near-future costs.

No cost estimates are available for data

conversion, and the university has not committed

itself yet to a complete retrospective data conver-

sion. The costs involved clearly make it reasonable

and prudent to gamble that the Library of Congress

and other sources will assist with the task over the

development period.

Estimated Computer costs: $500,000 per annum

by 1971, and thereafter rising slowly as file

requirements grow.

Estimated software costs: $1.5 million in direct costs over the development period.

Estimated calendar time: 5-8 years, approximately 1967-1975. Some subsystems using direct query methods are expected to be put into operation by the end of 1971.

COMPATIBILITY PROBLEMS

APPENDIX E*

LIST OF DESIRABLE PRODUCTS AND SERVICES FROM THE JOINT AUTOMATED SYSTEM OF THE THREE NATIONAL LIBRARIES, AND COMPATIBILITY PROBLEMS ASSOCIATED WITH EACH

PRODUCTS AND SERVICES	1. Data Formats	2. Standard Coding	3. Character Sets	4. Machine File Structures	5. Filing Rules	6. Cataloging Practices	7. Terminology	8. Transliteration	9. Data Conversion	10. Communication Links	11. Provision for Others' Use	12. Output Requirements
I. Book catalogs (off-line)	x	x	x		x	x	x	x	x			x
II. Catalog cards (off-line)												
A. Full	x	x	x			x	x	x	x			x
B. Tailored	x	x	x			x	x	x	x		x	x
III. Machine-readable cataloging data	x	x	x			x	x	x	x	x	x	
IV. Bibliographies (demand or recurring)	x	x	x	x	x	x	x	x	x	x	x	x
V. Location of information on specific bibliographic items (on-line)												
A. Within one or more nat'l libraries												
1. Processed	x	x	x	x		x	x	x	x	x	x	
2. In process	x	x	x	x		x		x	x	x	x	
3. Desiderata	x	x	x	x		x		x	x	x		
B. Within other libraries	x	x	x	x		x	x	x	x	x	x	
VI. Coordination of cataloging activity												
A. Consultation of name authority file (on-line)	x	x	x	x		x		x	x	x	x	
B. Consultation of subject headings file (on-line)	x	x	x	x		x	x	x	x	x	x	
C. Provision of information on cataloging practices	x	x	x	x		x	x	x	x	x		x
D. Coordination of classification	x	x		x		x	x		x	x		
VII. Coordination of acquisitions activities												
A. Information on exchange partners and dealers	x	x	x	x				x	x	x	x	x
B. Lists of acquisitions in subject areas	x	x	x	x	x			x				x
VIII. Coordination of reference services												
A. Automatic interlibrary loan requests	x	x	x	x		x		x	x	x		x
B. Information on non-bibliographic sources of information (on-line)	x	x		x			x		x	x	x	
IX. Provision of statistics on performance and use of the system	x	x		x			x					x
X. Information on the system for other libraries												
A. Common codes											x	x
B. Common data formats											x	x
C. Common character sets											x	x
D. Equipment used by the system											x	x
E. Programs											x	x
1. System programs										x	x	x
2. Conversion programs										x	x	x

APPENDIX   F

COMMUNICATIONS COSTS AND DESIGN ELEMENTS IN THE MEGASYSTEM
--brief by Duncan Wall for the IPCUR Project--

In the absence of an actual set of system require-
ments, which would have as major parameters both the size
and organization of the data base and the query load it
is expected to service, communications costs for the
'catalog inquiry data subsystem' must remain rather indet-
erminate. That is the usual status with studies at the
small scale of this one, where only rather approximate
estimates based upon personal experience and interpre-
tation are possible. In any case, even if IPCUR were
to attempt the kind of major cost/feasibility study of
the kind done at LC and now beginning in California,
technical progress in the communications field is perhaps
even more rapid and unpredictable than in the computer
field, and the most responsible of estimates made at this
point could be obsoleted rather rapidly during the three-
to-five year period it would require to bring the catalog
data subsystem into operation.

It is a rather common estimating convention during
this phase to make an interim estimate, using the costs
associated with a rather simple design based upon arrange-
ments such as leased lines at the usual tariffs, or one of
the dialup services offered for timesharing purposes.
When an actual design is attempted, in the light of
detailed system requirements, costs thus estimated will
usually be found to be within the previous estimate, with

user service and response time being somewhat better than presumed in the original estimates. The process of making this kind of estimate usually requires a fair amount of familiarity with the characteristics of the traffic.

A cost of about $110,000 a year can be used as provisional estimate for recurring costs if this kind of estimating technique is used here. The effect upon costs of a totally different technical communications situation--e.g., the creation of an extensive broadband network dedicated to the universities or research and based upon satellite or waveguide technology is essentially impossible to predict within the terms of the study.

However, it should remain clear that communications costs associated with the catalog inquiry subsystem would remain one of the simpler and least expensive components of the cost equation for that subsystem. For this reason other factors in the system acquisition process will assume the character of the decisive role.

There is, of course, a second prominent role of telecommunications in the megasystem, involving the potential use of telefacsimile in physical delivery of materials. There is very little doubt that over the next five years fascimile transmission among the participant libraries might assume a very useful role, although at present the impact of this increased use would be more as an improvement in services than as a delivery on dividends from the resource-management subsystem. Here we encounter this

characteristic naivete encountered in physical scientists and many others, where the retrieval and delivery of known items is used as a model for the entire informational process served by the research and academic library, without recognition of the extensive use of these libraries outside the known-item mode. Large returns are consequently anticipated from the 'necessary duplication' imagined to be eliminated by the resource-management subsystem. Someone should tell them that world book production is now above 500,000 titles a year and increasing at a steady 5 per cent per year. The information should help them better to put into some kind of reasonable order of magnitude the kind of modest effort mounted by the typical 'large research library.'

The most optimistic estimate which can be made concerning the potential use of telefacsimile is entirely dependent upon major improvements in the 'catalog data' subsystem, which will have to be brought into existence first. As a simple matter of staging, the potential of telefacsimile is nearly irrelevant at present: in a similar way, major improvements in physical delivery by interlibrary loan, interloan and other physical materials traffic are heavily dependent upon improvements in the catalog data system and the 'library business' data systems dependent upon it. What we have here is a relatively simple decision/development tree, the critical path of which runs through the basic systems planning tasks

preceding the development of the computer-based catalog
data system. It would be a very serious mistake for the
universities collectively to mistake the high value which
their faculties and students would probably place upon
direct physical access to their research materials not
only outside the known-item-retrieval situation, but
outside the catalog lookup one as well. In any event,
planning for the megasystem which does not include a
sufficient appreciation by local research communities of
their local and immediate needs for physical access to
their materials, will inevitably be illusory in results.