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Machine-Readable Data Bases In Australia: A State-Of-The-Art Report

This paper aims to present an overview of the use of machine-readable data bases in Australia. (A summary of some commerically available services is given in the Appendix.) I will discuss the Australian scene in the light of some problems which are, if not unique to, certainly aggravated by the Australian environment. These include problems of geography and population distribution, formulation of national information policy, government support of research and development, and the Australian telecommunications network. Plans expounded during the last four years have aroused an unprecedented interest among librarians. Unfortunately, progress to date has been disappointing.

HISTORY AND GEOGRAPHY

Australians look toward the United States and Europe in political and economic affairs, so it is not surprising that the Australian library world behaves in a similar fashion. Librarians look primarily to the United States for new developments.

Australia is geographically isolated. In talking about modern communications and the ease of transporting people from one continent to another, let us not forget that it is a 24-hour flight from Sydney to London and 15 hours from Sydney to the west coast of the United States. Australian librarians do

not go to Paris for a two-day seminar as is done with great frequency and enthusiasm in the Northern Hemisphere. Because of our isolation and historical background, Australian librarians feel they are missing out. One of the consequences is a great effort at awareness of overseas developments. This concern can at times be out of proportion and is often expressed in the belief that if systems or concepts are to have any credibility, they must be imported. This is not valid; wholesale importation of systems from a totally foreign environment cannot be accepted without taking account of local conditions.

The population of Australia in 1972 was estimated at 13,091,297, of which 7,132,590 were located in the main cities along the eastern coast.[1] Just as industry and commerce developed in these areas, so did the libraries that support society. Attempts to decentralize have not been successful; for example, colleges of advanced education established outside the metropolitan areas exemplify the problem with their severe lack of resources, particularly qualified, experienced staff. The resources, materials and people are located in twelve major libraries in three capital cities.

THE AUSTRALIAN LIBRARY COMMUNITY

A brief discussion of the structure of the Australian library community is appropriate here. At the federal level is the National Library, which has no statutory supervisory power over any other libraries. The Director General (previously titled the National Librarian) is appointed by cabinet on advice of the Council of the National Library of Australia (NLA). The NLA is responsible for national collection building and, incongruously, for providing local library service to the Canberra community.

At the state level there are reference libraries which differ greatly from each other, in the concept of their function as well as in size. For example, the state library of New South Wales seems more like the National Library than the Queensland State Library. This is due to historical development, since the state libraries (particularly those of New South Wales and Victoria) pursued national policies in their collection building. The state library of New South Wales was the first major collection in Australia, and remains one of our major collections today.

Great variation in the type of organization can also be found at the local government level; for example, library services in New South Wales and Victoria are subsidized by the state on a per capita basis, whereas in Western Australia the state owns the total bookstock. However, development of public libraries has been very slow and the majority have been established only within the last twenty years.

The libraries of educational institutions offer another picture. The majority of primary school libraries are run by the state, while secondary

schools are divided sharply into government and private institutions. Government schools are supported by state funds and private schools receive state government subsidies. However, in recent years considerable commonwealth funds have been provided for schools, with libraries receiving a large share. At the tertiary level there are the universities, colleges of advanced education, and technical colleges. All of the universities are independent institutions supported by the commonwealth funds. Since 1958 the universities have been funded directly by the federal government and on a much larger scale than was previously possible. The federal government is the only taxing authority in Australia, there being no direct taxes levied by the states. Over the last few years the federal government has also accepted responsibility for funding the colleges of advanced education and the technical colleges. These were previously administered by state departments of education. Special libraries also cover a wide range, e.g., industrial, business and governmental. In the case of the commonwealth, they are coordinated by their department rather than by the National Library or another central body. In some states the departmental libraries are centrally staffed; for example, in New South Wales the state library is responsible for staff, but does not have authority over departmental library policies.

The library system of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) stands outside these patterns and is an interesting example of a "national" library network. The CSIRO, a statutory corporation operating under its own act of Parliament, is Australia's largest civil scientific body. Its main function is to carry out scientific research for the primary and secondary industries of the commonwealth and its territories. It does not conduct defense, medical or atomic energy research. The CSIRO's Library and Information Service is coordinated centrally and plays a vital role in the Australian library community. Its role as a service center for machine-readable data bases will be discussed later.

Thus we have a picture of library services operating at many different levels and with little overall direction. Development of library resources outside the state library of New South Wales and the libraries of the University of Sydney and the University of Melbourne has occurred since World War II. Together with the NLA, these three libraries hold the major resources of the country. For each type of library—public, university, special, etc.—there are some who have initiated new developments and are leaders in their field, both in traditional methods and in implementation of computer-based systems.

MACHINE-READABLE DATA BASES

Development of machine-readable data bases has therefore been stimulated by the requirements of those libraries' patrons, and while I believe all

have attempted to keep an eye on proposed national plans, systems have, o
necessity, been established in isolation. Without general guidelines or a nationa
policy there is no alternative. There is, however, some evidence of voluntar
cooperation among a few industrial concerns who decided to use the sam
software package for creating and searching data bases. On the other hand
some government departments developed their own software, and both soft
ware and the data base are largely unavailable to the information communit
because of security problems; examples include systems developed by th
Department of Defence (formerly Department of Supply).

Early in the 1960s, the concept of the ADSATIS (Australian Defenc
Science and Technology Information System) information retrieval system was de
veloped by the library service within the Department of Supply. Considering th
remoteness of Australia from other parts of the world where such system
were beginning to appear, the scarcity of hardware and the lack of experience
this was a significant development. The ADSATIS system has developed ove
the years and is now using COSATI (Committee on Scientific and Technica
Information) headings and TEST (Thesaurus of Engineering and Scientifi
Terms) as the indexing language. ADSATIS is a locally developed system an
is used for SDI (selective dissemination of information) and retrospectiv
searching, the majority of the data being classified and unavailable publicly.

As is often the case, the most sophisticated information retrieval system
have been developed within government departments and cannot be used b
the information community at large because of their confidentiality. Th
CSIRO has also developed its own software and is now offering a number o
services to the Australian community.

The 1968 survey of computer-based systems in Australian libraries liste
twenty-one institutions with a total of thirty-eight "operational" systems. *
recent survey indicates that there is a 50 percent increase in both the numbe
of libraries and systems listed.[2] There has been a concurrent significan
increase in the number of new libraries, particularly with the establishment o
the colleges of advanced education (CAEs), which fill an educational ga
between technical colleges and universities. Although funding has bee
generous, it will be many years before their libraries will be well established
While there has been a slight increase in the number of governmental specia
libraries, industrial libraries have been hit hard by the economic conditions o
the last few years. This overall increase requires a similar increase in th
availability of qualified and experienced staff in all areas, particularly i
systems and planning. The situation is not totally discouraging because lack o
resources does encourage cooperation; it is just not possible for everyone t
reinvent the wheel. It does happen of course, but the environment is no
encouraging.

Developments in Australia have followed the traditional scheme, i.e.

housekeeping systems and information retrieval systems. This pattern tends to emphasize the division by type of library: the former systems are a necessity, and usually the first step for large university, college, and public libraries, whereas information retrieval systems are largely the province of the special library. With all libraries striving to decrease their overall operating costs to reduce the staff budget—which assumes an increasing portion of the total—it seems essential to implement cooperative housekeeping systems. I shall outline some of these developments before discussing information retrieval systems and national information policy.

Victoria leads Australia in the cooperative use of machine-readable data bases; this is largely due to the coexistence of a few librarians with foresight and imagination and an entrepreneur willing to risk capital. A number of public (regional) libraries in Victoria are using a consultant, Libramatic Systems, to provide computerized services. Available systems include acquisitions, cataloging and circulation. This venture is successful because, like the Ohio College Library Center (OCLC), the software allows the participating libraries to vary the standard to suit their local requirements. Unlike OCLC, however, it is a batch processing system with each regional group maintaining a separate data base of its holdings. The bibliographic data base system has been available since 1967 and has developed from a brief fixed format record to a MARC-compatible format. In 1974, the circulation system was upgraded from a punched paper-tape system to an on-line system using bar-coded labels and point-of-sale type terminals for data capture. The new system has been installed in two regional libraries in Victoria and one in New South Wales. The University of Sydney Library is developing its own on-line charging system using the Libramatic terminals and Data General minicomputers. Without doubt, Libramatic Systems has pioneered in the use of computerized systems in Australian libraries. It has introduced operational, efficient and cost-effective systems in the face of extreme scepticism.

It is true that many enthusiastic librarians have had their enthusiasm dampened by reports of failure of heavily funded systems in the United States. However, nourished by success, librarians in Victoria have taken further steps towards cooperation with the formation of TECHNILIB and the Victorian Institute of Colleges Chief Librarians Association (VICCLA). The TECHNILIB committee was formed in 1973 to investigate the feasibility of a centralized processing center for Victorian municipal libraries. VICCLA is an attempt to coordinate developments of CAEs. Both groups are looking toward a central, machine-readable bibliographic data base around which a central processing center can be developed. However, both are still at the planning stage. The use of machine-readable data bases in public and educational libraries is still primarily concerned with the creation of a bibliographic file to be used primarily for card catalog or book catalog production. There has been

cooperation in setting up these bibliographic files by exchange of data, systems and programming work.

During 1974, the NLA launched the Australian MARC record service, a landmark in the development of bibliographic data processing. The service began with eight institutions and the NLA as registered users, and provided Library of Congress, British National Bibliography and Australian MARC records. The software was designed and written by Libramatic Systems, who also run the system on behalf of the NLA. Initially, the service offered access only by record control number for each type of record; however, refinements planned will ensure that all records will be available in the Australian MARC format. The use of the MARC data base overseas has to some extent combined the two streams of data base development, in that MARC is used to provide SDI services as well as for inventory control.

It seems that users and creators of information retrieval systems have one tremendous advantage: they are neither burdened by tradition nor necessarily conditioned by the history of librarianship. Consequently, they should be able to adopt a much freer attitude to what computerized systems have to offer. On the other hand, users of library stock control records are very much conditioned by tradition and by their expectations of traditional catalogs, and thus often cannot readily recognize the need for new methods and capabilities.

AN EMERGING NATIONAL INFORMATION POLICY

The 1970s marked the first steps toward establishing a national information policy, with particular emphasis placed on the role of computers. Milestones in this development include: (1) the appointment of the Scientific and Technological Services Enquiry Committee (STISEC) in 1971, (2) government approval of the STISEC recommendations and the establishment of an interdepartmental committee, (3) creation of the Australian National Scientific and Technological Library (ANSTEL) in 1974, and (4) establishment of the Australian Library Based Information System (ALBIS) in 1974.

STISEC

The Scientific and Technological Services Enquiry Committee was appointed by the Council of the National Library in February 1971. Its objectives were: (1) to investigate the national need for scientific and technological information services; and (2) to suggest how, in the national interest, inadequacies identified by its inquiries may be overcome.

The STISEC report, published in May 1973, concluded that there were urgent and growing needs which should be met by coordinating and assisting

existing library and information services and by providing additional services.[3] The report recommended that the Australian government establish a national scientific and technological information authority whose functions would be: (1) promote the orderly development of scientific and technological library and information services, and (2) to foster the coordination and extension of existing services, with particular attention given to computer-based information services. The authority should advise on policy development, undertake and support associated research activities, and act as the Australian focus for international cooperation on the transfer, storage and dissemination of scientific and technological information. STISEC also urged that information services in science and technology not be created in isolation, but that they be integrated into a total information service with the humanities.

This report and subsequent developments have been encouraging because the government is concerned about formulating a national plan to enable the future development of library-based information services to be rationalized and coordinated. The government accepted the committee's recommendations with only one reservation: the proposed STISEC authority should not be established as a separate new independent body, but should be within the framework of the National Library Act. Provision was made for initial development in fiscal year (FY) 1973/74.

ALBIS

The Australian library world was anticipating clarification of proposed principles of development of this national service. However, nothing was forthcoming until an advertisement issued by the NLA burst on a surprised public in October 1974. It stated that ALBIS was to be based on voluntary cooperation among federal, state, municipal, industrial, social, academic, artistic, humanistic, scientific, technological and other organizations able and willing to contribute to a library-based information system. The needs of the Australian community would thereby be met by developing traditional and computer-based services in the most effective way. To achieve this, the National Library is to undertake extensive consultations and surveys over a period of two years to determine the feasibility of such a system. To fund these studies, $1,025,000 has been provided to the National Library.

The library community was unsure about what was really required of it but responded enthusiastically with more than 200 submissions made to ALBIS, with 24 percent coming from federal and state bodies, 23 percent from business and commercial organizations, 15 percent from educational and university institutions, 13 percent from library associations and libraries, 13 percent from individuals, and 11 percent from associations.

The objectives that such a national system might be expected to meet

could be summarized as follows: (1) taking responsibility for providing individuals with the necessary day-to-day information to enjoy the benefits of society, (2) meeting the professional and business needs of individuals and groups in the community, including specialized groups, (3) rationalizing development to avoid overlap in acquisition, maintenance and provision of information services, and (4) ensuring that the development of information services remains in line with developments in electronic and communication technologies. To meet these objectives, the information needs and user requirements must be defined, quantified and evaluated. In addition, computer and telecommunications requirements should be established and costed. ALBIS has been declared alive, but Australian librarians are still going through mental gymnastics in an attempt to find those promised guidelines of leadership and inspiration.

I have taken some time to attempt to analyze this situation, because the formulation of a national information system has been the basis of our thinking for the last few years. Librarians in Australia have been attempting to coordinate their developments in line with this imminent national policy. However, it is difficult to identify with something as intangible as ALBIS.

Until recently the National Library has been the focal point for the development of services from machine-readable data bases. Major developments have been: the introduction of the Australian MEDLARS service in 1969; the 1972 design of the ANB/MARC system to create Australian MARC records for newly published monographs and to automate the production of the Australian National Bibliography; implementation of a pilot project for SDI services from ERIC during 1972/73; introduction of ERIC on an operational basis in 1974; expansion of the biomedical information services in 1974 with the introduction of *BA Previews*; and introduction of the Australian MARC record service in 1974. Moreover, the National Library is the central agency for Australian involvement in a number of activities, including the Australian national focus for UNISIST, the distribution center for MARC records, and the national agency for ISBN/ISSN/ISDS.

CENTRALIZED SCIENTIFIC INFORMATION RESEARCH ORGANIZATION: A DE FACTO NATIONAL INFORMATION SERVICE?

In the light of the developments outlined, it is not surprising that alternative services have sprung up. The CSIRO (Commonwealth Scientific & Industrial Research Organisation) has emerged as an alternate national focus for maintaining and running SDI and retrospective search services.

The function of CSIRO as defined in the Science and Industry Research

Act of 1949 is to further and encourage research in Australia. More specifically, it is entrusted with the "collection and dissemination of information relating to scientific and technical matters; and publication of scientific and technical reports, periodicals and papers."[4] The services offered by CSIRO, which include CA CONDENSATES, INSPEC, *BA Previews* and *Food Science and Technology Abstracts,* are an extension of those developed for its own clientele, and are now being actively marketed for the Australian community at large.

Lack of resources has hampered progress in Australia and the establishment of an alternative service should be encouraged. The NLA has received government approval and funding to establish an Australian library-based information service. It cannot be established too soon. The initial burst of activity which marked the first two years appears to have expended too much energy, as indicated by a present lull. It is to be hoped that the current inactivity is not due to a loss of direction, but is merely a pause to redeploy forces.

I mentioned earlier that in some instances state libraries tend to behave more like the National Library. This quality is also exemplified by the CSIRO Library and Information Service, which is operating as a national library information network by providing service to the entire country.

W. D. Richardson, former Assistant Director General of the NLA, stated recently: "If the National Library has *a* central role to fill in Australian library services it is one of leadership. The first duty of a leader is to ensure that the necessary resources are available for all to undertake their assigned task."[5] The CSIRO is certainly providing leadership by example. It is to be hoped that the NLA will be able to meet the objectives outlined by Richardson and not fall by the wayside.

It is significant that a number of professional bodies have become increasingly aware of the problems of the information-oriented society. The Royal Australian Chemical Institute and the Institution of Engineers Australia have been influential in pressing for formulation of a national information policy. In March 1975 the Australian Mineral Foundation sponsored the Geoscience Information Seminar which resolved to form an Australian Geoscience Information Association. A working party was elected to pursue the formation of such an association and examine and report on its role. It was instructed to consider the establishment of a coordinating body for geoscience information in relation to any proposed national developments, particularly ALBIS. There was a strong recommendation to create a national geoscience data base and the seminar recommended the immediate extension of the CSIRO's SDI services to cover the geosciences through the use of existing international data bases, ensuring that the Australian material was adequately covered.

It is vital to coordinate all these strands at a national level, not by enforcement of rigid policy, but by recommending standards and by example. The National Library should be able to demonstrate the benefits of new services and alternative methods. More important, it should be able to advise on all aspects of information services, including computing and telecommunications.

There is a scarcity of data available on the information needs and use patterns of research workers and practitioners. There should be further investigation into user needs and existing methods of information gathering both overseas and in Australia. One of the few Australian in-depth studies is that by Maguire and Lovelace of the information needs, usage and attitudes of medical researchers in Australia. This preliminary investigation concluded that, in general: "there is extensive non-use and lack of awareness of information services available to users of medical information; local library services are inadequate at both the community and hospital levels to serve the needs of medical practitioners; and the interlibrary loan network is inadequate, even as it functions in the medical libraries of the larger universities." After evaluating the Australian MEDLARS service, they concluded:

> non-users of MEDLARS appear likely to prefer to use the spoken rather than the written word in disseminating information and to be less literature-oriented than MEDLARS users; MEDLARS could be of use to many who do not use it now, especially to those who feel the lack of a literature alerting service; even among users of MEDLARS there is considerable ignorance of the capabilities and limitations of the system; few MEDLARS users are able to call upon the assistance of a suitable informed librarian to assist them in using this and other information services effectively; a number of MEDLARS users who profess themselves satisfied with the service are not in fact using it to best effect and a number who feel some dissatisfaction do not know that the system could be made to work better for them.[6]

In the Australian environment these findings would apply to any of the data base services being offered, both in government and industry. The CSIRO has been monitoring its service and has come to similar conclusions:

> Not all scientists and technologists are convinced that machine readable techniques are useful. . . . Attitudes can depend upon the field of research, the extent of the literature in the field of interest, and the strength of attachment to traditional methods of acquiring information.
> On balance however, the evidence to date in CSIRO indicates that in research there is a significant place for SDI. However to convince scientists of the usefulness of this service, and also achieve optimum benefits, demands good communications between users and information scientists.[7]

Good communications are a basic prerequisite, but much more is required. For example, improvement in library services, particularly inter-library loan and extensive training programs for librarians, is needed. More-over, if we believe these services are vital to the needs of society, we should make society aware of them and provide easy access to them. The concept of the information services librarian was introduced to Australia by F. W. Lancaster in 1974 at the first Special Libraries Section Conference. The knowledge and skill of the information services librarian is urgently needed to overcome the present situation, in which machine-readable reference services are still regarded as something unusual and difficult to access.

No university in the country is currently processing either SDI or retrospective services on a regular production basis. For example, the Univer-sity of Sydney channels requests for MEDLARS, BIOSIS and ERIC to the NLA, and requests for CA CONDENSATES to CSIRO. It is not a question of lack of demand, but rather of finance and expertise to establish and offer these services locally.

RESEARCH AND DEVELOPMENT AND NATIONALISM

The level of government spending on research and development has not allowed significant development of information services. Australian libraries have not been through a period of rich funding such as that which U. S. libraries experienced during the 1960s. Australia spends less per capita on research and development than does Canada, France, Germany, Sweden, the United Kingdom or the United States. The Netherlands, comparable to Australia in population and gross national product, spends about 67 percent more per capita on research and development.[8] However, the last few years have seen a change in government attitude. An awareness of the infor-mation-based society and of the need for a national information policy has developed, and funds have been made available to begin planning.

It has been estimated that Australia produces 2 percent of the world's research; this obviously influences the generation and use of information services. In any country there is a multilevel information requirement to be met. Information in the "hard sciences" disciplines, such as medicine, is valid internationally. On the other hand, the "soft" or social sciences are partisan and relative to the environment; thus, national or international information sources must be supplemented with local information. The integration of these local and international services has affected both hardware and software design and usage.

One of the basic requirements of a national information system is a common retrieval language. Compatibility of all system components would include a common organizational structure, a single information retrieval

language, compatible hardware and software, a uniform method of selecting and processing information, and a standard method of documentation and coding. Such compatibility would ensure success, but few national or regional information services have managed to establish it. Institutions seeking to provide effective services would like a uniform processing and searching format. The data base creators are not moved by the same motives. The creation of the machine-readable data base has often been as a by-product or development of the published form; in many cases, as with Index Medicus or ISI, computerization has been undertaken to ecomonize on the production of the printed indexes—that is, to be able to produce them more quickly and to reduce publishing costs. Having achieved this and set up the relevant systems, their answer to suggestions for a uniform, standard processing format is: What's in it for us? On the vexed question of indexing and classification principles, I think it would be extremely difficult to ensure uniformity. Particularly when commercial organizations operate on the principle that success is profit, uniformity will not be achieved. All existing services have already made such a large investment in their products that it is difficult to envisage a change without major government financing. The responsibility lies with the users of these systems; they should state their requirements in an attempt to ensure compatibility in the future.

Australia must be able to create and maintain certain specialized data bases which are endemic to the Australian environment. In addition, there is an obligation to provide people with access to the information they need, which requires operation on a national level or on a regional basis, depending on needs, technology, and certain data bases, e.g., MEDLARS or ERIC. There is also a certain political and economic requirement to develop within the country the skills necessary to run national information systems. In the world context, Australia may well develop as the focal point for Southeast Asia and Oceania and serve as a distribution center.

ALBIS is expected to ascertain the feasibility of the types of services that are required and can be supported in Australia. For example, ALBIS could determine whether it is feasible to establish regional networks in each of the capital cities of the states, or perhaps one or two regional centers serving the east coast. These would be the public sector networks where the NLA or another delegated institution would act as the national or Southeast Asian distribution center. In other instances, users could go directly to commercial entrepreneurs for specialized needs.

COMPUTERS AND TELECOMMUNICATIONS

The other major consideration in setting up machine-readable data bases is that of the current and anticipated advances in computing and telecom-

munications. It is the telecommunication aspect which I would like to consider here because the local situation again dictates progress. Its development is similar to that of ALBIS—promises and high expectations, but as yet no real solutions.

Since 1960 more than three billion dollars has been spent on building an Australian telecommunications network, and an estimated one percent of the gross national product ($400 million) is being spent annually on further developments.

Today, a centralized information service network can be established by using leased telephone lines, but the practical number of separate stations on one line is limited and the cost is prohibitive. The basic cost of such a national network can be estimated from the cost of a single leased line from Canberra to each of the other state capitals—$200,000 annually.

The Common User Data Network (CUDN) claimed to provide initially three types of communication—data collection, data distribution and interrogation. Data transmission has been handled via the existing networks, which include telegraph, Telex, telephone and video transmission. These facilities were adequate at first, but the increase in volume of data transmission and the need for high-speed transmission facilities led to the development of a network designed exclusively for digital transmission, the CUDN. The Australian Post Office (APO) has held out the hope of CUDN as the answer to a national information service. CUDN is a system of computer switching centers in each of the capital cities and can support peripherals (VDUs, printers, etc.) throughout Australia.

The advantage of a switched service is that users pay only for the amount of traffic they generate. The APO estimated that costs, based on length of messages sent, would be much lower. For example, an individual message of less than 220 characters would cost about one cent via CUDN. It has also been suggested that international access would be possible as the demand arises.

However, there have been severe problems with CUDN, and it is clear that it cannot meet present demands, let alone those of the future. The problems are both technical and financial and have come to light in the report of the Australian Post Office Commission of Inquiry headed by James Vernon. The original projected installation dates for the multicenter operation of the network were: Brisbane—November 17, 1971; Melbourne—March 13, 1972; Sydney—September 11, 1972; Perth—November 11, 1972; and Adelaide—January 7, 1973. A revised schedule indicated that all centers would be operational in 1974. There have been considerable delays in the installation of the various centers, and none will be connected until September 1977. The Vernon report states that while some delays in completing the facility would have been understandable in view of technical problems likely to arise, a time

lag of three years is not reasonable. During negotiations, expansion of the CUDN capacity was decided upon at a cost of $6,200,000, and the APO has closed its customer consulting bureau on CUDN. Because of these problems, there is concern that CUDN will become a captive communications network for a small number of government departments and that its stated aim of providing a public service will not be met. To date it has only two customers.

Telecommunications facilities for economical data transfer by library and information services is therefore not yet a reality in Australia. The facilities offered by telecommunications should be publicized; information centers also need to make their requirements known. It is obvious that there has been insufficient communication to date; STISEC stressed the need to overcome these problems. It is hoped that the recommendations regarding telecommunications will be acted upon.

The development of local data base services has been forced onto the community by the cost of networking. Perhaps the emphasis should be on developing links to the United States for data base services until costs within Australia become feasible. Costs of international communication are decreasing, while internal costs continue to increase.

In the area of computing technology, one of the major difficulties is the unavailability of certain equipment; this is often due to the marketing policy of certain firms, and to the Australian government's policy of protecting local industry. Those attempting to design and install new systems frequently must install obsolete equipment because nothing else is available. Spare parts and maintenance are clearly important considerations in this situation.

I hope that I have been able to convey some of the problems faced by library and information centers in Australia in establishing machine-readable data base services. The major developments to date have been isolated ones in the Australian environment, but there must be some coordination and direction in the future. Plans for an Australian domestic satellite should overcome the present technical and financial problems with hard-wired networks, and the formulation of a national information policy may be considered to be the first step in rationalizing the future development of Australian library and information services.

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Appendix

SELECTED LIST OF OPERATIONAL DATA BASES
IN AUSTRALIA

Data Base	*Institution*	*Software*	*Availability*
B A Previews	NLA	CAN/SDI	no charge
	CSIRO	in house	not available
C A CONDENSATES	CSIRO	in house	available at cost
COMPENDEX	Dept. of Defence	TEXTPAC	not available
E R I C	NLA	TEXTPAC	no charge
FSTA	CSIRO	in house	available at cost
INIS	AAEC	in house	no charge
INSPEC	CSIRO	in house	available at cost
Institute of Paper Chemistry Abs.	APM	DPS	available at a charge
MARC	NLA	Libramatic Systems	20c per bit
MEDLARS	NLA	NLM	no charge
NTIS	Dept. of Defence	TEXTPAC	not available