The automation of libraries and bibliographic information systems in Brazil

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THE AUTOMATION OF LIBRARIES
AND BIBLIOGRAPHIC INFORMATION SYSTEMS
IN BRAZIL

by

Cavan Michael McCarthy


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ABSTRACT

This thesis identifies the major problems involved in the use of computers in library and bibliographic information systems in Brazil, examines motives for and results of automation, and offers an in-depth description of existing automated systems. The researcher personally visited the thirty-one most significant automated systems in five localities in Brazil, and systematically collected numeric and descriptive data that could help characterise automated processes and identify problem areas. Questionnaires were sent out by post to institutions which could not be visited. Attitude tests were also applied to fifty-five senior staff of these institutions, to determine their ranking of problems, motives and results, their views of other relevant factors and their educational background. This same attitude test was also applied postally to a group of senior librarians in institutions which did not use computers; eighty-six replied.

Automation was found to be firmly established amongst library and bibliographic information systems in Brazil; the thirty-one institutions had a total of eighty-five operating automated processes, of which the most popular was cataloguing, automated seventeen times, followed by data bases, circulation control, indexing and SDI. Lack of experienced personnel was felt to be the major problem, followed by lack of finance, lack of official guidance and government policy, and lack of networks and cooperation; lack of official policy was seen as a far more serious problem by respondents who used computers, than by those who did not. Automation was adopted to improve service to users, increase productivity and because manual methods could no longer keep up with the quantity of work. The latter point seemed to reflect inefficient manual methods, as automated systems handled a level of activities which was numerically quite low by British or North American standards. Respondents generally had a positive opinion of automation, which they felt permitted improved service, increased productivity and faster information processing. The author's major suggestion is for seed money to encourage limited automation projects, with consultative and cooperative elements, in major cities throughout Brazil, making the experience gained so far available to most professionals.
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Prof. Antonio Maria Amazonas Mac Dowell, Foreign Fellowships Coordinator, Capes, Brasília.

My family and friends.
This thesis represents original research and is based on information which was either published or freely communicated to the author. It examines libraries and bibliographic information systems, but does not discuss any information systems of a confidential or sensitive nature. Similarly, the author has avoided criticisms of named institutions, as being inappropriate for a study of this nature.

The Brazilian currency is the cruzeiro; at the time of the field research one hundred cruzeiros were worth one pound sterling. There does not appear to be an accepted rule for the capitalization of acronyms in Brazil; for instance both "PETROBRAS" and "Petrobras" can be found; for the purposes of this thesis the author used the latter form for pronounceable acronyms of five letters or more. Citations have been given in the Brazilian form, which is fuller than the British Standard form, to assist Brazilian users of this thesis, because Brazilian interloan systems normally require very full information. In the text of this thesis the words "the researcher" refer only to Cavan McCarthy; terms such as "the author" or "the contributor" are reserved for other persons.
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INTRODUCTION

1.1 General background

Brazil is a country of subcontinental size, rapid development and even greater potential. Its area of 8.5 million square kilometres is roughly the same as that of the United States without Alaska, its population of 120 million in 1980 had increased by 25 million in the previous decade, but was still not particularly large in relation to the size of the country. In area it is the fifth largest, in population the sixth largest country in the world. The original indigenous population was reduced to a remnant by Portuguese colonists who gave the country its language, borders and institutions. They imported numerous Africans as slave labour and there was large scale European immigration, notably of Italians and Germans, around the turn of the century, accompanied in its final stages by a considerable influx of Japanese. These variegated influences produced a unique and fascinating culture, incorporating features of many societies, but remarkably homogeneous, because Portuguese, with only the faintest of regional accents, is spoken by everybody in all corners of the country. It also has many typically South American aspects, notably a tendency towards urbanisation. Brazil's population is almost 70% urban; three out of ten Brazilians live in nine metropolitan areas with a total population of 35 million people; the largest, São Paulo, has twelve million, Rio de Janeiro nine million and the other seven metropolitan regions have from one to three million each. The federal capital, Brasília, is not located in a metropolitan region but in a federal district, which also has a population of more than a million.

The middle and upper classes live in the centre of the cities, where urban services are more easily available, and as the middle class is numerically perhaps 10% of the population, or twelve million people, the central areas have a highly developed appearance. The skyline dominated by serried ranks of tall skyscrapers, the streets choked with modern cars, the shops full of consumer goods and the pavements thronged with well-dressed people all combine to give an impression of wealth as great as that of Europe or North America. Almost anything that can be found in a British supermarket can be bought in one of Brazil's ten thousand supermarkets or in one of the many, recently-built, American-style shopping malls, often with the same brand name and packaging;
even more remarkable is the fact that all goods, with the exception of a few, mainly luxury items, are produced in Brazil. City suburbs and rural areas are not as rich as downtown areas; but even so extreme poverty is rare in Brazil and consumer goods are well distributed. Recent surveys show that 76% of households have a radio, 54% a TV, 42% a fridge and 22% a car; 67% had electricity and 53% piped water (RETRATO..., 1980; BOAS novas..., 1982). In the researchers experience these figures were reasonable for the urban areas where seven out of ten Brazilians live. The statistics also show that there is considerable scope for improvement; this can be seen as a positive, rather than a negative aspect; Brazilian industry has an enormous internal market, both actual and potential. Recent articles in the Brazilian press state, for example, that Brazil absorbed annually seven million watches, 420 million pairs of shoes, 26 million audio tapes and twenty million rolls of film.

Nearly 20% of the workforce already works in industry, in tune with a global tendency to transfer traditional industries to recently-industrialised countries. The leading industrial sector is automobile construction, which began to be organised on a large scale in the mid-fifties and now regularly produces a million vehicles a year, roughly the same as Britain. The Brazilian branch of Volkswagen, for example, had exported 420 thousand vehicles to 65 countries; one small factory, producing a hundred reproduction MG sports cars monthly, cheekily began to export them to England. Another Brazilian company, founded in 1964, purchased Garrard, a bankrupt British manufacturer of record players, largely to obtain use of its brand name, closing its British factory and transferring production to Brazil. Brazil's national aircraft company sold more than forty planes to the French army and navy, while Brazilian combat cars played an important role in the Iraq-Iran war. Brazil's energy-supply picture is complex; between a third and a quarter of crude oil needs are satisfied from national production, and much effort has gone into the search for alternatives, notably alcohol produced from sugar cane. Electricity is fairly cheap, coming from large hydro-electric schemes, or even from nuclear stations. In fact electricity was so abundant the new nuclear stations were having difficulty in finding users for their production.
Brazil is an intensely audiovisual culture, and this love for music, dance, colour and conversation is reflected in the importance given to electronic media. There are eight million telephones, and the phone book of Brazil's largest city, with more than two thousand pages, is larger than that of Manhattan. There are more than fifteen million television sets, in some rural areas backed by solar-powered transmitting stations, and the major network has exported programmes to 71 countries. At the time this thesis was being written, videotape was becoming popular in Brazil and an estimated 50,000 videotape recorders had been imported. They were all technically illegal, as importation was, in theory, prohibited, but local production started in 1982, when videotape libraries already existed. The production of "Walkman" type cassette players began in Brazil about a year after their international debut, and at about the same time the first domestic computers were already going on sale. The first signs of cable television could also be seen. It is very important to note that the timelag between the Brazilian and global electronic industries seems quite brief.

The Brazilian press frequently claims that Brazil's production, market, or exports of specific goods are amongst the top ten countries of the world. They are usually said to be in fifth, sixth, seventh or eighth place, worldwide, sometimes higher. World Bank figures state that Brazil and Canada, with almost identical gross GNPs, occupy ninth and tenth positions in the global table of ranked GNPs (WORLD Bank atlas, 1982). The BRANDT report (1980, p.53) considered that Brazil's growth rates were such that by the year 2000 its economy would rival in size that of Federal Germany. It is true that Brazil has received massive foreign investment, but the basic industries are so well established that if foreign technical aid was to be withdrawn they could continue with little or no disruption. The fact that Brazil owes about US$70 billion overseas, of a total of over $300 billion loaned to "third world" countries, can also be seen as positive; the industrialised countries can scarcely afford to let Brazil go bankrupt, as this would spell disaster for major financial institutions with heavy commitments to her. The nine largest US banks had lent Brazil the equivalent of 49% of their capital; they had lent a total of 195% of their capital to the six most heavily-indebted third world countries (The Times, 26 April 1982, p.15). The problem was also reciprocal, because Brazil was lending to other countries; Brazil was amongst Poland's top ten creditors.
International bankers, of course, like Brazil because it is a country to which they can relate positively. The Brazilian political tradition is basically authoritarian or oligarchic, occasionally populist, while democracy has been sporadic and limited. At the time this thesis was being prepared the political situation could have been described as transitional; a formerly hardline military government was attempting a democratic revival while trying to remain in overall control of the situation by the populist means of appealing to the masses. This government was committed to raising the living standards of the masses, not only for reasons of politics and social stability, but also because they would form a huge market for industrialised goods.

It is in the roots of the political process that we can find features which have decisively influenced the planning process in Brazil. It is an authoritarian country, in fact one major book by an American political scientist is simply called "Authoritarian Brazil" (STEPAN, 1973). Power and decisions are generally vested in and transmitted by individuals. Committees do exist in Brazil, just as they do in other countries, but their influence is much less in Brazil; the important decisions will normally be taken by one person (president, governor, vice-chancellor, chairman, etc.) while the group organisations (parliament, committee, commission, etc.) will be side-stepped, or used as a rubber stamp or only for peripheral decision-making. This is called "caudilhismo" or bossism, and is similar to nineteenth century American political bossism; it is a purely cultural trait and occurs even though all concerned are thoroughly trained in the latest American management techniques. Party politics is often more concerned with personalities than with policies or ideologies. This was shown very clearly at the time of the preparation of this thesis, which coincided with a period of political "opening", during which new parties were being formed. It also seems that this is traditional in Brazil; SCHURZ (1961, p.244) even speaks of partnerships between groups of opposing ideologies, when a "conservative candidate may welcome the support of a communist minority in a close election".

Caudilhismo or bossism is a purely cultural trait; it occurs even though all concerned are thoroughly trained in the latest American management techniques. As one person takes the decisions, these will frequently change when another person takes office. And the traditional Brazilian method of making the authoritarian aspects of its society tolerable is through the rapid rotation of power. So a person will have a
position and decision-making power, but only for two years or four years, before relinquishing the post; holders of most political posts cannot, by law, succeed themselves on expiry of mandate, and the principle tends to filter down to most institutions. Once a Brazilian has been placed in a position of authority for a limited period, that person naturally does the utmost to make a lasting impression on the institution within the short time allotted. The motive, authority and tradition for such behaviour all exist.

This means that a country whose political and economic history offers few established policies or guidelines to direct development, also has a tradition of rapid turnover of personnel in key positions, and a tradition that an institution's policy is formed by the person currently in charge. The result of this is that long-term planning is largely absent, while institutional objectives change rapidly. This system is not totally negative; it could not have survived for so long if it was; it could indeed be argued that it is an excellent system for a country with a very small managerial cadre which has to confront the sudden change so typical of the modern world. Such extreme flexibility and capacity to react to events could be invaluable in many activities, although the researcher will argue below that it is prejudicial in certain fields, such as librarianship and information services, where institutions offer a service which will improve with time, as it becomes more established and better used. Robredo stressed this point when discussing the establishment of information networks:

"Officials often come and go in the developing countries and this may cause policy shifts at all levels. With the most praiseworthy desire for improvement, they may introduce new ideas or guidelines which, in some cases, may mean subjecting all or part of what has already been planned, approved and begun by their predecessors to a new critical examination. Unfortunately, there have been too many programmes and projects which were started but could never be carried out fully" (ROBREDO, 1976).

This flexibility is an essential ingredient in the pragmatism which has so marked Brazilian policy in recent years:

"Brazil's basic approach has been to determine its development targets and not to be constrained in reaching them by doctrinaire or ideological commitments as to means. This is not to say that Brazil's philosophy has been that the ends justify any means. The Brazilian approach recognises and accepts limitations in the choice of means, but within those limits, the stress is on flexibility and imagination in "getting the job done". Brazil's firmness on ends, rather than means, is well exemplified by its flexible policies in
making use of private, public, domestic and foreign enterprises. Except for a few special cases, such as petroleum and radioactive materials, Brazil has never placed official restrictions on the types of enterprise which can operate in the various fields of economic activity" (ROBOCK, 1975, p.191).

Robock compares Brazil favourably with India, which he characterises as having elegant and sophisticated plans which do not work. One of the problems of pragmatic planning is that, from the receiving end, it can resemble a lack of planning, and examples of apparent lack of planning, or poor planning, abound in everyday life in Brazil. One typical example was a model agricultural settlement founded in the Amazon which had been named after the president and given a model library; the researcher devoted a paragraph to it in a 1975 book on Brazilian libraries (McCARTHY, 1975, p.91-2). According to a recent press report the village was to be flooded by a new dam; the organisation responsible for the colonisation had not known about the dam, nor did it know where to resettle the five thousand families affected. (ORDEM..., 1980). Large new bus stations were built in two state capitals in North-East Brazil known to the researcher; it had been planned to inaugurate them immediately before the 1978 elections. Two or three years later, neither were yet in use, although they represented a major investment, probably the largest buildings constructed recently in these cities. The official reasons were that one was too far out of town, the other liable to flooding; in fact there was little pressure on the new administration to inaugurate what was essentially an achievement of the previous administration. This was not a local problem; in Rio de Janeiro at the same time the underground railway, one of Brazil's major construction projects, of vast social importance, had been inaugurated with a short stretch of line by the previous governor, but the new governor was not interested in it because each new section would simply be a prolongation of the work of his predecessor (CHAPÉU..., 1980). Expansion would only occur when the next election was near. Again, in one of the state capitals of the North-East a downtown park had been remodelled in 1978 to provide a large public open space; until then there had been no such area near the city centre; the incoming mayor immediately drove major roads through the park, stating that they were essential to the traffic flow. In Brazil little attention is paid to these events because change of policy with change of leader is an established principle of Brazilian society. Although it may appear strange to persons from the
U.K. or U.S. it permits flexibility and softens authoritarianism, and therefore has survived as a cultural trait.

A natural corollary of this is the importance given to persons, rather than institutions or groups, within Brazilian society. Almost all business is conducted on a personal level and it is frequently necessary to speak to a specific individual; visits to institutions include a visit to the boss, even if only to say hallo, and routine arrangements will often require a chat with the very highest level. This is not only to control subordinates, but also means that persons making requests have to prove that they really want what they have asked for. Other facets of bureaucracy seem to have less justification; for instance typed documents always have both margins carefully justified. This reduces the speed of a Brazilian typist to about half of that of an English-language typist, with no corresponding benefit. Typists are generally amazed when told that when English-language texts are typed only the left-hand margin is justified. Bureaucracy is a feature of most, if not all, non-industrialised and South American countries; bureaucracies were set up by colonial powers in order to rule at a distance, and continue in modern times because they soften the effects of change and authoritarianism and provide employment. In the latter sense they are particularly useful as a means of strengthening loyalties, because persons in authority can often place members of their family, ethnic or political group in secure government posts.

In recent years, however, there has been a general trend towards easing of bureaucracy in Brazil. A telephone bill, which a few years ago could be paid only at the company, became payable in most banks, and now telephone companies are beginning to permit subscribers to post in their cheques, thus eliminating queues. The latter development, of course, has only become possible because the postal service itself has vastly improved recently. The government has also had a special anti-bureaucracy campaign which has had useful results; numerous measures have been taken to weaken bureaucracy, while authoritarianism frequently means that bureaucracy is bypassed and certain things can be done quicker than in other countries. When persons in key positions want action, buildings are constructed, university courses opened, roads built, industries established, etc., at a much greater speed than would be possible in Europe or North America.
The government is able to move more rapidly when it wishes because it has a vastly pre-eminent situation within Brazil, which is a capitalist country where state penetration is very deep. Some sources state that Brazil is, amongst Latin American countries, second only to Cuba in its proportion of state control (SEIS meses..., 1980). This may well be correct, because other sources claimed that the state was responsible for 70% of Brazil's capital investment, and the 550 state-owned companies employed 1.3 million persons, who received 14% of the national wages bill (ARRUMACÃO..., 1981; ESTADO abre..., 1981).

There were also nearly half a million federal civil servants, plus those contracted by the municipalities and states.

Brazil, therefore, can be briefly characterised as a rapidly-developing country which has already formed a strong industrial base and has a large and growing number of consumers for manufactured goods and specialised services. From the point of view of this thesis it is important to note that Brazil is a country which has developed to a stage where computer technology can have a major role. Its culture and society are not markedly different from that of other Western, especially South American, countries. It has some specifically Brazilian features, but the society as a whole functions well and is able to offer a rapid rate of development to the population.

1.2 Information in Brazil

It is common-place, in more industrialised societies, to speak of an information explosion. In less-industrialised countries, however, the opposite is true; it would be more correct to speak of an information famine, a lack not just of books and periodicals, but of information on all levels. Brazil is no exception to this rule, and everyday examples are only too easy to find. For instance most intercity travel is done by bus, but there are no bus timetables. In the bus station each company has its own ticket window, but these frequently do not display departure times; it is necessary to queue and ask. Despite this the bus service works very well; buses leave on time and are comfortable and modern, with airconditioning, toilets and smoked glass windows. The Brazilian middle class lives in flats, but it is not customary to write the occupier's name, either at the entrance to the block or on the door of the flat. So everybody receives constant visits from people who ask whether so-and-so lives there. Another deeply ingrained Brazilian custom is that of writing
the return address only on the back of the envelope, and not the letter itself. This causes endless confusion, complicates filing, and leads to broken correspondence. The person who signs a letter will frequently not check the envelope, and a secretary may despatch it without a return address. The researcher, for instance, once received a job offer, via a third person, from an organisation which had not given an address and could not be found in the phone book. Correspondence from Brazil to foreign countries frequently fails to receive a reply because the address is written only on the envelope, and in many cases secretaries open the mail and throw away the envelopes.

Government naturally reflects this lack of information. Anyone coming from Europe or North America to a Brazilian government office will be struck by the way in which business on a variety of levels is conducted verbally. There are no leaflets to guide members of the general public, explanatory notices are rare and the enquirer is forced to ask directly. The official, in turn, will normally give a verbal reply, without referring to any document. This is, of course, well in line with the Brazilian tradition of close personal contact, but it means that printed or written information is totally excluded from this part of the governmental process, and citizens cannot complain because they cannot base their complaints on any official document. The system is highly advantageous to the bureaucrats, because it gives them considerable personal authority, which can compensate for a boring, albeit secure, job with low pay and status. Decisions can be, and frequently are, changed according to the status of the person making the enquiry. This, incidentally, is one aspect of Brazilian life which should change radically when computers are more widespread; typically, automated systems do not have this kind of flexibility and the necessity to standardise inputs requires detailed instructions to be available on all levels. This should do much to balance the current situation, in which the bureaucracy oscillates between the purely verbal, as above, to excess paperwork, when large numbers of documents must be submitted in support of a simple request, with no middle ground between the extremes.

The Brazilian government recently held surveys to determine the exact number of federal civil servants and state enterprises. The latter produced a couple of very interesting press reports. In 1980 "The problem is graver because of the massive quantity of state enterprises which multiply across the federal administration. The fact is that the
confusion is so great that the government itself does not know for certain how many they are: 181 have been registered, but the government has not yet managed to count all of them and hopes to register around 270 by the end of the year." (FREIO..., 1980). Precisely one year later the same weekly news magazine stated categorically that "... today, according to a government survey, 554 state enterprises are in existence." (ESTADO..., 1981). One of the more humorous stories of lack of government information published around the time this thesis was being prepared concerned a national plan for staggered working hours, drawn up by an interministerial commission of the previous government, but not put into practice. The new government wanted to use the plan, which was considered excellent, but nobody could find a copy of it. Not even the president of the commission had retained a copy (SARDENBURG, 1980).

About the same time there was a fascinating and highly publicised dispute between the Brazilian Ministry of Health and Dr. Albert Sabin, the American who discovered the widely-used polio vaccine and who had been a special consultant to the Ministry. Much of the disagreement hinged on the incidence of polio in Brazil, which was either extremely low or exceptionally high, depending on which statistics were accepted. Sabin suspected that Brazil might have had ten times as many cases of polio as the official statistics suggested (GOVERNO..., 1980). The affair was complicated by the fact that the lower figures had become linked to the presidency of a specific general; between 1972 and 1973 the criteria for data collection had been changed, reducing the polio statistics from 15,000 to 2,000 per year (PARALISIA..., 1980). Thus any discussion of these statistics, especially by a foreigner, became a criticism of that particular period of Brazilian history, which was considered intolerable in certain quarters. When Sabin got out into the field he found even more surprises. He went to one of the most developed cities in Brazil, Florianópolis, where he discovered that the number of children in the age group most at risk was in fact 25% more than the official statistics had stated. "And all the data on population, condition of hygiene and health were the fruit of projections, imagined by technicians. There was no concrete data." (BRIGUGLIO..., 1980). The story ended fairly well, however; all concerned agreed the most important aim was to eradicate polio, an entirely preventable disease. The arguments about statistics were shelved, and mass vaccination campaigns were held, which caused a very substantial and verifiable drop in the number of cases of polio.
This incident gives a fairly good idea of the situation regarding Brazilian statistics. A relatively large amount of data can be found, but various problems reduce the usefulness of that data. Statistical yearbooks are regularly published, each annual volume containing several hundred pages of closely printed figures. A large quantity of data is available on many facets of Brazilian life. But detailed examination will throw up many deficiencies not apparent at a superficial glance. Statistics may take a long time to appear in the yearbook, or may be marked provisional. An examination of several consecutive volumes may fail to discover figures for some years, or may reveal anomalies in the statistics themselves which make the user doubt their accuracy. Data on periodical titles held by libraries, where poor states sometimes appear to have massive holdings, is an example of the latter case. Again, not all statistics are published in a form in which they are easy to use. The researcher had difficulty with this at one stage, while studying library statistics, and noted:

"The facts are of great value, but not always in the form most useful to the planner, professional or researcher. For instance, we wish to know how many books there are in the libraries of Pernambuco state. The statistical yearbook gives data for catalogued and uncatalogued books, in federal, state, municipal and private libraries. We need to add these eight numbers to find our answer. How many books in the North-East region? Add together 72 numbers, eight for each of nine states." (McCarthy, 1980).

A more insidious problem, in the researcher's experience, is that the data available is frequently not that required for a specific application. In the library field, for instance, it is possible to calculate the mean size, in number of volumes, of a library, but the tables do not permit us to draw up a frequency distribution by size, e.g. those less than 1,000 volumes, those with 1,000 - 1,999 volumes, etc. Statistics of general social relevance, easily found in other countries, can often be difficult to find in Brazil. For instance unemployment statistics only began to be collected on a systematic basis while this thesis was being prepared. Occasionally the government is accused of deliberately withholding statistics for political purposes. For example a former governor of the state of Pernambuco, Cid Sampaio, claimed that statistics were being withheld to disguise government favouritism to certain regions of the country; for instance federal government expenditure per state had not been disclosed since 1966 (Santos, 1977). Accusations of this type are in fact rare; normally the user of statistics is unable
to tell whether data is unavailable as a result of a deliberate policy
decision, or because of poor organisation or lack of finance. In such
cases it is natural to give the government the benefit of the doubt, and
in fact Brazil is well ahead of most less-industrialised countries in
the quantity and quality of statistics available. In most of the third
world almost no statistics are available; in Brazil the basic system for the
collection of statistical data has been firmly established and large
quantities of statistics are published. The system needs to be
tightened up and speeded up, and the presentation of certain data needs
to be improved, all of which will doubtless occur as the whole of Brazilian
society reaches new levels of organisation.

In education the lack of information can be seen at all
levels; in librarianship, for instance, very few textbooks or professional
periodicals are published in Portuguese, while library school libraries
may have few books and almost no current periodicals, and the teachers
themselves may have quite limited experience. This leads to the adoption
of teaching methods suited to a low-information environment: teachers
are frequently forced to base classes on notes they themselves took when
they were students; codified areas, such as cataloguing and classification,
are taught in detail, whereas other fields may be covered to a large
extent by project, practical or discussion work. All teachers become
adept in teaching areas on which little information is available. It is,
for instance, possible to give a lecture on Unisist consisting largely of
definitions and discussion of the terms "information" and "system"; the
researcher has in fact attended such a lecture. Such anomalies will
disappear as educational levels rise and university teachers have
sufficient information at their disposal. The first abstracting and
indexing periodical for librarianship was published in 1980 (ABCD..., 1980).
It was also interesting that this thesis was being written during a
recession, yet the Brazilian professional press contained nothing about
the effect of the recession on libraries. It is also necessary to point out
that the professional journals in library and information science
concentrate on dry research results; there is no news-oriented equivalent
to "Library Journal" or "Library Association Record".

The general situation as regards printed matter is somewhat
similar to that in statistics. At first sight there seems to be considerable
amount of printed matter available, but on closer examination various
problems arise. For instance in the researcher's own medium-sized city
(330,000 inhabitants) there are no less than three daily newspapers; all are published regularly, but they are poor resources for national and international news, and not always reliable for local news. Large cities often follow a pattern of a major newspaper, a popular or down-market newspaper and a third, which has seen better days and always appears about to close. The researcher's city has at least four shops devoted to books, and several others which sell books as well as other items; the relatively high numbers of newspapers and bookshops in the city seems to be more closely linked to low salary levels of bookshop workers and journalists. Brazilian bookshops can sometimes appear very impressive, large and well-stocked; they frequently rely on textbook sales for the bulk of their turnover. But when one examines the stock more closely, looking only at the Brazilian books, it becomes clear that there are deficiencies in several areas. For instance, there are very few paperbacks, very few technical books, very few illustrated or "coffee-table" books. Whole areas, such as local history, cookery or hobbies, which are strongly represented in British or North American bookshops, are weak in Brazil. Much publishing in Brazil is done by official bodies, and their books are notoriously difficult to obtain; they are not usually sold, and it is necessary to go to the correct office and persuade the right official that one has a need for the volume. No wonder a Brazilian book-lover commented that it was easier to purchase a rare incunabula (MORAES, 1975, p.155). The national formats for bibliographic interchange also fell into this category of official rarities. A recent trend is for industrial and commercial companies to produce quality illustrated books as Christmas gifts for their clients.

Reference works are few and far between, and even the simplest reference guides, taken for granted in the U.K. or U.S., may be lacking. For example there is no weekly guide to TV programmes, although in many countries these guides are the periodicals with the highest circulations. The stations themselves frequently do not specify the times of the programmes, just saying that they come after the serial, or after the news. Presumably television companies want to keep people viewing, rather than permit them to plan their viewing. It was not until 1979 that a straightforward list of names, addresses and telephone numbers of senior government officials was published. This became highly popular, and is now selling 20,000 copies, which perhaps proves a latent demand for certain types of reference book. The first Brazilian "Books in
Print" was launched, on microfiche, while this thesis was being prepared (CATÁLOGO Brasileiro ..., 1981), as was the first list of official documents (BIBLIOGRAFIA de publicações..., 1981). The microfilming of theses only began in the late 1970's.

A more general problem is the lack of attention paid to the national memory in Brazil. Tourists immediately note that there are few museums, and major monuments are often in a bad state of repair, unprotected or not marked by signposts. Museums usually appear even more underfinanced than libraries, and have worse opening hours; many museums close at weekends and on public holidays. The markets selling collectors items and memorabilia, which are such a feature of the British scene, are absent from Brazil, and there are few collectors. It is rare to find a private person who collects old postcards, newspapers, autographs or photographs, and as official institutions are equally weak in this respect, material for the history of Brazil is being continually lost. This process continues; radio and television programmes are especially ephemeral, because magnetic tapes are wiped and re-used (MEMORIA curta, 1980; PINHEIRO, 1980), although there are now signs of a movement to preserve the early Brazilian cinema. Such tendencies are vital, because it is essential for Brazil to preserve her national cultural heritage, especially in the face of foreign mass media, and this is an area in which libraries can have a major impact.

Other aspects of lack of information have been just as serious; for instance there is a tradition of poor land registry in Brazil. This means that land ownership is frequently in dispute; in one major state only 15% of the land was held by legal title (LUTA ..., 1981). This situation had continued, because it had benefitted the rich, who were able to hire lawyers, and profit from other peoples' lack of documents, but contributed greatly to social unrest and injustice. As this thesis was being written, new legislation was being introduced to give legal title to occupiers of land through simplified judicial procedures, but the fact that the old system had lasted for so many years and had left such deep marks on Brazilian society is itself significant. If it is impossible or difficult to obtain very basic information, such as who owns a particular piece of land, what attention would have been paid to less essential information?
The researcher has on occasion been tempted to define a less-industrialised country as a country where information is not available. It would appear that all less-industrialised countries can be described as information-poor, and we can conclude that lack of information is not just a symptom, but also a cause of lack of industrial development. This is, of course, not a total definition; a much more powerful case could be made for the less-industrialised countries being the waste societies of the world. Human resources are wasted by not being educated, or having insufficient nourishment or health care to enable them to lead full and useful lives. Natural resources are wasted, mined and shipped overseas to give employment to foreign workers; land is wasted, exhausted by monoculture of crops required by the industrialised world. Compared with this, information poverty seems an almost benign disease, but it is an essential element of the non-industrialised world, and the deficiency which the library profession is trained and equipped to remedy. If a country is to progress, it must improve on all levels, and this includes making more information available, to enable society to organise itself to make a better life available for all its members.

1.3 Libraries in Brazil.

The history of Brazilian librarianship has yet to be written; the field is one of those which suffer from the lack of information spoken of above. Library services began in the nineteenth century, in some cases quite early. The first, in Salvador, opened with 3,000 volumes in 1811, and published a printed catalogue of 15,000 items seven years later. Most, if not all, state capitals and various smaller cities opened libraries in the same century. In many cases these were quite imposing buildings, with good book collections. From Manaus, for instance, they wrote to ask the National Librarian in Rio de Janeiro for a list of recommended books, and ordered a thousand from Paris. All information available to the researcher indicates that cultural life in nineteenth century Brazil was quite intense; large theatres were built, and numerous newspapers and periodicals published. It was, of course, a "plantation" society, in which only a minority had the education and leisure to appreciate formalised cultural activities, but by the standards of the time the libraries appear to have been well-organised. And today in Brazil formal cultural activities are still a minority pursuit.
Brazilian libraries entered the twentieth century with a fair tradition behind them, and contacts with British and North American librarianship. For instance the state library in Maranhão adopted the Quinn-Brown classification in 1900, only five years after it had been published in England. The twentieth century, however, was, and still is, the period of most rapid development in Brazil's history, with political, economic and social changes occurring with ever-increasing frequency. The libraries, however, had difficulty in finding their correct role in this new situation; they had functioned quite well as sources of cultured literature for the leisured classes, but had no obvious function in a politically volatile society facing rapid industrialisation. It would, of course, be unfair to criticise them for this, because no country in the process of industrialisation has solved this problem, as far as the researcher knows. The library system of the United Kingdom, for instance, grew to maturity after the industrial revolution had been solidly established. Brazilian libraries have spent this century attempting to find their true function in society.

Reading, for instance, is not always considered a socially acceptable activity in Brazil; it is a solitary activity, and Brazilian culture values group activities. Brazilians do not like to go out alone, and most university-level work, such as essays, projects, etc., is done in pairs or groups. Brazil is not the only place where this happens; an African teacher of librarianship commented:

"Most developing societies today are still an "agora" or outdoor people and not individualists preferring the seclusion of the home or reference library, where they can indulge in the internal monologue of reading.... the smallness of the library in Africa is not merely due to the relative smallness of the literate population, but also the fact that literate persons would rather talk than read." (KOTEI, 1977).

The birth of modern librarianship in Brazil could be seen in São Paulo in the 1930's, with American teachers lecturing library science, and the formation of a pioneering Department of Culture which united library services with other cultural services, and gave special attention to childrens libraries. Branches were built in poorer areas of the city, while the richer areas were left without branches; Brazil's first mobile library went on the road and a landmark central building was constructed. As we have noted, continuity is rare in Brazilian activities; the pace of development slowed and the library
never had the impact on the national library service that it deserved to have. But the Americans had introduced not only the Dewey classification, but also a library school tradition, and this was reflected in a steady growth in the number of library schools, 17 in 1971, 30 in 1981; all are located in universities. Courses are for a bachelor's degree, although post-graduate degrees have become significant within the last decade.

Possession of a bachelor's degree is considered a legal pre-requisite for the practice of the profession, by federal law. Brazil, like other South American countries, is a male dominated society where female occupations are popularly considered to be of low status. Librarianship is about 95% female; this may possibly contribute to the low status most librarians say they are accorded. Brazil needs so many library schools because of lack of mobility of librarians. Most spend their entire careers in one major city, and have minimal professional contact with other places. This is partly due to purely practical difficulties; vacant positions are advertised locally, if at all, and payment of removal expenses is extremely rare. It would also appear that women, under paternal protection until marriage and expected to run a home afterwards, suffer additional obstacles to their mobility. Some deny this is a problem, and say they would work in other cities if they could be informed of posts at appropriate salaries. Whatever the reasons, the facts are that the experience gained in one city is transferred to another at an extremely slow rate. In the U.K. and U.S. a major method of catching up with a development is by hiring somebody who has already done it. That option is rarely used in Brazil, and very few people know what is happening in other places.

An in-depth survey of Brazilian libraries, including all those with more than 300 volumes, was carried out in 1976 (BIBLIOTECAS brasileiras, 1980). This covered 15,000 libraries, with a total of 48 million volumes and 30,000 employees. The mean size of each library was therefore very small, around 3,200 volumes; the survey included 9,000 school libraries with a mean of 2,000 volumes each. Of the 30,000 staff, 10,000 would be graduates and 4,500 of those would have graduated in librarianship (SUAIIDEN (1980, p.19) speaks of a total of 10,000 graduates in librarianship; the two figures are not contradictory, as many librarians do not practise their profession; some enter other occupations, while many are married women, who may spend a period bringing up a family).
A statistically average group of 100,000 inhabitants would, therefore, have at its disposal thirteen or fourteen libraries, with a staff of 27, of whom one third would be graduates. Their combined stock would total 44,000 books, for which there would be 6,700 registered readers, who would use the collection about 57,000 times each year (in Brazil it is customary to compile statistics on collection use; readers are asked to leave books on tables rather than reshelve them). Only 18,000 loans would be recorded, and 2,700 books (about 200 per library) purchased each year. The community would spend about US$52,000 each year on its libraries; this would break down into 51% on staff, 23% on acquisition of publications, 19% on capital expenditure, the remainder on other expenditure, including rent.

It would appear that these figures provide a fairly reasonable picture of the situation. The results are, proportionally, quite similar to those which can be calculated from the figures in the annual statistical yearbook (McCARTHY, 1980). (As the statistical yearbook data only covers 3,500 libraries, with 25 million books, the mean size of each library comes to 7,000 books in this case). They are also fairly similar to the general picture of the library situation which the researcher has built up through direct experience. A solid basis of libraries has been formed, but many aspects of service and use still leave room for improvement. There is no lack of libraries, but they are numerically very small. They are relatively well-off from the point of view of staff, but their level of stock is very low, less than half a book per capita, and this when we combine all types of library: school, public, university, national, etc. As the stock is low, one cannot expect usage to be high. About 7% of the population is registered as a library user; this would be a low figure for some industrialised countries, but is a fairly satisfactory level for Brazilian conditions, even though nearly half are registered as readers of school libraries. A book is used roughly once a year; this is a fairly low level because one would expect small libraries to be intensively used and the fact that they are not would suggest that collection quality is poor.

An examination of acquisition levels provides strong confirmation of this suspicion. The libraries serving a community of 100,000 people would add about 2,700 new books per annum, an extremely low figure; put another way annual acquisitions are numerically equal to 6% of existing stock, or Brazilians spend twelve cents (US) per capita each year on the
acquisition of publications for all types of library. The other figures available on the subject, the statistical yearbook data, offer very similar results for acquisitions; they also indicate that collections are growing at about 6% per annum (McCARTHY, 1980). The only possible conclusion is that collection quality is very low; sadly, the researcher's personal observations have constantly confirmed this. It is interesting to note that total library acquisitions are around three million volumes, whereas national book production is said to oscillate around 160 million items per annum, according to a 1980 paper by CARVALHO (that would give a national book production figure of about 1.5 volumes per capita, which would be reasonable for Brazil, and which is confirmed by MIRANDA, 1980, p.108). These figures indicate that less than 2% of national book production goes into libraries, which again explains why publishers and booksellers accord them little attention. Most books, for instance, are printed on good paper, then cased in flimsy card wrappers. The resulting book is expensive and also becomes tatty after very little use; because of this bookshelves rarely look tidy or organised.

Turning to circulation data, we see that each book is loaned roughly once every other year, while each registered reader borrows less than three books per year. These low figures not only indicate a poor quality stock, but also point up custodial attitudes common in many countries like Brazil where loan services are not considered an essential feature of librarianship. It is quite easy to find public libraries without loan services, a combination which would sound bizarre, if not heretical, to a British librarian. The circulation desk is a fertile field for the bureaucracy rampant in Brazilian life; Newark-type loan systems, based on two, or sometimes three, cards, are standard. In one major university library, each member of staff has a card, kept at the desk to record loans. But as filing is only by the first letter, a whole package has to be searched every time a teachers' card is needed. Late return is often punished by suspension of loan rights; this avoids the bureaucracy which would be necessary to keep track of small amounts of fine money, but negates the basic principle that libraries are for use and irritates readers. Other fertile fields for library bureaucracy are purchasing, where cumbersome tender systems are standard, even though more important aspects of acquisitions may be forgotten. For instance, when a library has money, it may simply purchase all books which the teaching staff suggest as necessary, without checking to see whether the books are already in the library. This results in expensive duplicates,
which cannot be exchanged, as they are part of the permanent property of
the library. Cataloguing and classification are done to a very high
standard, new books often remaining in the cataloguing room for many
months for this purpose. The 1976 survey showed that 31.5% of volumes
in Brazilian libraries were not catalogued (BIBLIOTECAS brasileiras,
1980, p.22). Cataloguing and classification codes are easy to communicate
nationally and teach, therefore have become disproportionately represented
in library school curricula (although there were, at the time this
thesis was being written, moves to introduce a wider, more intellectual
syllabus). Frequently, cataloguing and classification are taken to excess;
the researcher once saw a mobile library, in a van so small that the
readers remained outside and reached in for the books. The collection was
95% juvenile, but every item had full U.D.C. and Cutter numbers.

Despite custodial attitudes which encourage, or sometimes force,
readers to use books within the library, libraries are rarely congenial
places to work, frequently being cramped, or noisy, or decorated along
boring, unwelcoming, institutional lines. We noted above that 19% of
library expenditure is capital expenditure; this breaks down into 11%
on acquisition, construction and repair of buildings, 8% on furniture and
equipment. In money terms, this means an expenditure of approximately
US$6.5 million on buildings, which will not buy much, even in Brazil in
1976. Even so, there has been some remarkable building in recent years,
such as the libraries of the universities of Brasília and Paraíba, and the
state libraries in Salvador, Recife and Fortaleza. The most recent
tendency is for large buildings erected on cultural centre principles,
often influenced by the Pompidou Centre in Paris. The latter is a tourist
attraction in a city much visited by Brazilians, and has therefore tended
to be adopted as a model. São Paulo's new cultural centre can hold
20,000 people, and has two theatres, a cinema and auditorium, as well as
three libraries (ARTES no Paraíso, 1982). This was the first Brazilian
library to permit users to listen to records through headphones, rather
than inside cabins. João Pessoa also opened a major cultural centre,
incorporating the state library, also in 1982 (an election year in Brazil).
Major library and cultural centre buildings in Brazil are architecturally
first-rate; smaller buildings tend to be designed by less capable architects.

Having briefly examined the state of library services, we can
pause to note the impact this has on the user. Users rarely complain
about libraries; they put up with what they get and do not expect to
receive adequate service. Much the same applies in other areas of interface between humans and organisations, such as government offices, banks, airlines, etc. Incompetence, injustice or decisions which change from one minute to the next cause anger, grumbling, but almost never any positive attempt to improve the situation, e.g. by complaining in writing. The reasons most commonly given are that it would be useless, or mark the complainant as a troublemaker; this is presumably a result of an authoritarian tradition of government. The researcher once spoke to the librarian of a small municipal library, who had disactivated the loan system because she was tired of walking around the suburbs outside working hours, trying to recover unreturned books. Asked what the public reaction to the closure had been, she said that there had been none. In Brazil it is not difficult to find libraries which could very easily improve their services: public libraries with no loan system, childrens libraries closed on Saturdays, university libraries with grossly inadequate seating space. They could not resist pressures from users for improvement, but users do not expect much and therefore do not ask for more. When a university central library, the only library on an major campus, closed down for a month in mid-semester to move to a new building, there was no perceivable reaction from users. In this, as in other ways, Brazilian librarians are frequently under little pressure.

As in many other non-industrialised countries, the service ethic, considered so central to British and North American librarianship, is weak in Brazil. This is not just a problem in libraries, but exists in banks, shops, airlines, hotels, etc. Perhaps it happens because life in Brazil has always been, on one level, relatively easy: there has always been land to cultivate, war and invasion are almost unknown, and the competitive aspects of modern society did not penetrate Brazil until recently. A large proportion of the labour force works for the government, and is frequently criticised for inefficiency. Private sector workers sometimes claim their sector is efficient, but the researcher feels that it is not socially or logically possible for an inefficient public sector to coexist with a highly efficient private sector. They would tend in time towards a central balance. Meanwhile it is interesting to note that Rosenberg's indepth study of users of Brazilian information systems found that libraries were generally rated high on pleasantness; they were also rated high on speed of service, but low on collection quality and currentness of collection (ROSENBERG, 1981b).
Users also felt they had little or no influence over library operations and purchases. Reference services are poorly developed, librarians remaining in their offices, engrossed in cataloguing and bureaucratic tasks. It is the researcher's opinion, incidentally, that the essential feature of a profession is that its members come into direct one-to-one contact with the public; doctors, dentists, lawyers, etc. always give individual consultations. The Brazilian librarian's unwillingness to meet users would therefore be a contributory factor to the failure by the public to accord librarians the status of a profession.

It is also important to note that libraries are isolated; they do not work together and there is very little contact between librarians. In many cases this is because institutions guard their libraries against outside use; geographic distance and the fact that, until recently, postal services were untrustworthy, are contributory factors. Interlibrary loan is rare in Brazil, and it is frequently confused with sending out photocopies or admitting members of other institutions to a library. One 1979 paper on interlibrary loan describes it as "small scale and between people who know each other, that is, personal favours between people who work in libraries" (MACHADO, 1979). The article only mentioned one operating network, that of the Regional Medical Library (BIREME), which mostly sends out photocopies and is therefore not quite the same as an I.L.L. network in the U.K. or U.S. In one university the researcher wished to borrow a book from the library of another department, located in the same building. To do this it was necessary to present a completed loan request form for that specific book, signed by the librarian of the researcher's own departmental library. This was probably entered in somebody's statistics as an interlibrary loan, and perhaps this type of transaction helps explain the curious figures in the 1976 statistics, according to which 155,000 interlibrary loans were made, but only 70,000 received (BIBLIOTECAS brasileiras, 1976, p.47). Whatever the level, it is very low, perhaps one loan per thousand Brazilians each year, and half of it occurs in one state, São Paulo.

University libraries are responsible for more than half, or 87,000 loans made; this figure could be reached if, in the course of a year, one out of every twenty-five students plus half the staff were to use the system. Brazilians are very concerned about lack of cooperation, and a major national scheme, known as Comut, was being set up as this thesis was being written. This would facilitate the supply of copies of periodical articles; libraries which sent out more photocopies than they received would
be paid from a central fund (COMUT, 1980). This is an obvious move, and the fact that it was only being set up in 1980 is eloquent testimony to the level of development of librarianship in Brazil. Full use of bibliographic resources available inside Brazil would do much to save foreign exchange now poured away to buy photocopies overseas; one person closely involved with COMUT denounced publicly an expenditure of about half a million US dollars per annum on purchase of photocopies from abroad (ASSESSOR, 1980). This level of expenditure would appear quite plausible. Other recent developments include the rapid growth of inter-loan facilities offered by Embrapa and the Ministry of Foreign Affairs (LEMOS, 1979). Embrapa was handling over 50,000 requests a year for photocopies of documents on agriculture; the Ministry of Foreign Affairs in 1976 set up a system whereby STI could be obtained via Brazilian embassies; requests for Brazilian STI from overseas could also be satisfied via the same channels.

Examining the field as a whole, we can indicate some priority areas for Brazilian librarianship. One key factor would seem to be acquisitions; regular investment in books and periodicals would improve collections, therefore encouraging usage. A second element would have to be a scheme to increase awareness of modern views on the nature of library usage amongst library staff, thus eroding custodial tendencies and encouraging personal contact with users. Thirdly, libraries need to work together, and combine forces to offer better services. This is similar to the programme of the National Book Institute (Instituto Nacional do Livro - INL) in public libraries. The National Book Institute makes co-edition agreements with publishers; thus when the books are published the National Book Institute buys a large part of the edition, say half. The publisher benefits from the rapid turnover and improved liquidity, while the Institute has large quantities of books which are distributed free to public libraries. In many small public libraries they make up the bulk of annual acquisitions, and are books of good quality. Meanwhile, state libraries offer training courses for staff of small public libraries under a National Book Institute sponsored scheme.

The Institute is doubtless an effective organisation, but certain other national bodies are not quite as active. The Brazilian library and information field suffers from a policy vacuum at the centre. The federal government is so hard-pressed by the myriad problems of a non-industrialised country in an era of massive change, and libraries are considered so
peripheral that no real directives are ever formulated or maintained. The central organisations which should determine policy and offer leadership to the profession are either inactive or change their directors or their policies so frequently that they become objects of irritation or derision in the profession. Deprived of leadership, the profession is unable to sustain pressure on the government to formulate and maintain an information policy. Almost overwhelmed by other concerns, with no significant pressure from librarians and other information professionals, the government does not even attempt the most obvious rationalisation.

The capital city, Brasília, is an entirely planned city, but its libraries are totally unplanned. The national library remained in the old capital; two major libraries, those of the Chamber of Deputies and the Senate, went to Brasília, but were located in different parts of the same building; a huge new library was formed on the nearby new university campus. It might be argued that many industrialised countries have similarly vague information policies, in which planning consists largely of tacking together existing institutions and taking pragmatic decisions only when circumstances make them inevitable. The crucial point is that the industrialised countries have a wealth of resources, and with deficient planning can still offer quality services. In the non-industrialised countries resources are spread extremely thin, and it is necessary to plan in order to get the best use of them. The weakness of library and information services is a general problem; it can be seen from the surveys cited above and also when constituent parts of the field are examined separately. Perhaps this is an appropriate time to examine the situation layer by layer, from the national library down to school libraries.

The National Library was very strong at the beginning of the century, but has decayed since. Constant lack of funds did not permit it to fulfill its major obligations of collecting and organising national literature; the reading room was used largely by university students and its downtown location in Rio de Janeiro, designed for 400,000 volumes, does not permit it to expand. It was denied the chance of a new life in Brasília, because when the new capital was constructed it was left in its old quarters in Rio, where its 3.5 million volumes cannot begin to be used adequately and beneficially. A 1972 paper by the then director spoke of 2.5 million items, of which 20% were uncatalogued and therefore unavailable to readers; it was taking an average of six years to process books (MONTE-MOR, 1972). At that time the researcher was told the library
was receiving about 20% of Brazilian publications; ten years later the estimate had risen to 60-70%, but it is impossible to know whether the difference represents a true improvement or difficulty in making estimates. It is the only library with national legal deposit rights, although many state libraries receive all books published in their states; the Chamber of Deputies and Senate both have large libraries, but the parliamentarians who use them have never voted legal deposit rights for them.

University libraries probably offer the best-developed services in Brazil. Until recently they were organised departmentally, but the last decade has seen the rise of the central campus library, with an often imposing, architecturally-designed building. The seminal example was that of Brasília, with 400,000 volumes, fully centralised, and a building which can stand comparison with any other architectural marvel of that city. This example has been, and still is being copied in many other universities; larger centralised libraries are locations where professionals can offer users an in-depth range of library services. The students, who will presumably form the next elite, can be shown the value of a large library and professional assistance while at university. Centralised libraries are, of course, more economic from the point of view of personnel, books, periodicals, processing, etc. than a network of small libraries, and considerably improve the situation of the library staff within the university. This is valuable, because Brazilian university education is traditionally lecture oriented, rather than book oriented, and teachers frequently do not give sufficient emphasis to use of the library as a source of information. The university authorities are naturally influenced by such attitudes, and this is reflected in low budgetary provision for library services. As elsewhere in Brazil, hard figures are difficult to come by, but FERREIRA (1980, p.74) succeeded in obtaining figures for the percentage of the university budget spent on libraries over a period of years in the mid-seventies, by four federal universities in various parts of the country. 80% of the results fell within the range 0.2% - 0.8%, with a median of 0.315%. The author commented:

"The budget is one of the factors strangling university libraries, responsible for many of their problems of collection, personnel, material, equipment and installations. On the other hand, these budgets are frequently fragmented amongst countless libraries which end up unable to achieve anything with such a ridiculous sum of money.... Generally speaking
the acquisition of publications is greatly reduced in some universities, because, apart from the problems cited above, there are also serious bureaucratic obstacles to the purchase of bibliographic material" (FERREIRA, 1980, p.75).

MIRANDA (1980) was even more incisive:

"The Brazilian university library does not serve even half of its true public, that is, teachers and registered students .... Limited to tightly-controlled loans of text-books, rather than of research materials, university libraries consume almost all their space and the energy of their personnel in routine procedures of reserves, claims for overdue books and illegal fines. The costs of these "services" are considerably higher than would be needed to increase the collection ..... Fully engrossed in the bureaucratic tasks of uncoordinated selection, decentralised acquisition and repetitive cataloguing (the same book can be catalogued as many times as there are libraries on the campus) and loan services with overtones of police work, librarians and assistants do not have time for the most elementary tasks, such as advising readers and evaluating services, let alone planning activities." (MIRANDA, 1980).

Such figures as we have on the size of university libraries also make quite depressing reading. The 1976 survey (BIBLIOTECAS brasileiras, 1980) found a total of 875 university libraries, of which 124 were central libraries. They had a total collection of 9.7 million volumes (5.4 million titles), giving a mean of about 11,000 volumes per library. At that time there were 1.1 million university students, so we have a mean of about nine volumes per student. 1968 statistics, cited by the researcher in a previous publication, gave roughly similar results (MCCARTHY, 1975, p.189). Both surveys also agree in pegging book use at a very low level. A typical student looks at about ten books each year, and borrows five. As the researcher noted above, university education in Brazil is lecture oriented, not book oriented. An examination of post-graduate education libraries (MIRANDA, 1978) concluded they had a mean size of 15,000 volumes, 11 per registered reader or three per potential reader. Half of these libraries, incidentally, operated on a closed access system. Libraries were certainly not periodical oriented, either; studying the holdings of 55 chemical journals in 550 Brazilian libraries, SANTOS (1979) discovered that only 20% were complete over the last five years in any library; U.K., U.S. and Canadian libraries held the same journals with 70% completeness.

The most immediately noticeable fact about special libraries in Brazil is that the term "special library" is never used, being
replaced by "documentation centres". (It is, incidentally, difficult to imagine a more telling comment on the status of librarianship in Brazil, although such distortions do, of course, occur elsewhere. An American text speaks of those who "avoid applying the word "librarian" to themselves, fearful that this indicates a lesser status" (PALMER, 1973, p.xv)). In fact special libraries can often be efficient and respected units of their parent organisations, although in relation to the profession their influence is diminished by the fact that they are small and scattered and little or no survey-type information is available on them. They are generally in the pre-mechanised age, operating UDC-based, catalogue card retrieval systems, and due to the lack of published abstracts and indexes, staff frequently index and abstract journal articles onto catalogue cards. From a national point of view this is wasteful, as the same periodicals are indexed or abstracted numerous times. In many ways the work of Brazilian special libraries is similar to that of their equivalents overseas; for instance the preparation and distribution of bulletins is common. Some differences can, however, be noted; in the researcher's experience it is rarer in Brazil for users to visit the special library; researchers, it appears, are more likely to be expected to remain at their desks or laboratory benches. Many special libraries are part of profit-making companies, and therefore cooperation is frequently discouraged lest it should lead to security leaks.

Uniterm and optical coincidence systems are rare in Brazil, where special libraries will apparently jump direct from the typewriter to the terminal. Indeed the only way forward for Brazilian special libraries would seem to be use of automated information systems. These are described in detail in this thesis; for the moment we may note that systems exist in several major fields, such as agriculture, nuclear energy and medicine. SDI services are the most popular and retrospective searching is often available. Some measure of indirect government support is usually received, and purely commercial operations are absent. Services are, naturally, in an embryonic state; a recent article by FERREIRA (1979) questions reliance on imported magnetic tapes, calls for national coordination and complains that:

"While some areas of knowledge, such as agriculture, have more than four data bases which can be used for bibliographic investigations, others, such as chemistry and chemical engineering, do not exist in this country. There is also the problem of open use of online connections, for which there is
no national control, nor even adequate publicity or centralised usage. On the other hand, the magnetic tapes of some files are not accessible for rapid solution of queries, because the centres which operate them do not always have full-time access to a computer" (FERREIRA, 1979).

Public libraries have always been a grey area within Brazilian librarianship or indeed in any non-industrialised country. GILMORE (1975) was frank on this point:

"To the majority of individuals in a developing country the public library is a totally irrelevant institution. To many, the library as a community institution is a nonentity as they have never experienced library service, either at school, at work or in their community, and are unlikely ever to do so in the remainder of their lifetime. One of the reasons is that their public library in its present form is virtually incapable of giving a relevant service to its community" (GILMORE, 1975).

The mass public library movement, along British lines, was a child of the industrial revolution in the U.K., and the industrial revolution arrived recently in Brazil under totally different circumstances. It is in fact difficult to think of a non-industrialised country which has a quality public library service. Just as Brazilian university libraries can have various forms - centralised, departmentalised or hybrid - so do Brazilian public libraries offer a variety of organisational structures. State libraries normally operate within one library building in the state capital; these can be modern, circulation-oriented libraries, or concentrate on consultation of books in the reading room; even some state library buildings completed in the last decade are designed mainly for the latter usage. Municipal libraries are found in larger municipalities; the 1976 survey (BIBLIOTECAS brasileiras, 1980, p.11) speaks of 2,543 municipal public libraries. This apparently included branch libraries, whose numbers were stated, so the data suggest that 2,203 municipalities, or 55%, had libraries. An article in a weekly journal was more depressing; only 1,174 municipalities were said to have libraries; 1,897, or 48%, were "zero-municipalities", that is, they had no cultural life: no radio or TV transmitter, no newspaper or magazine, no cinema, theatre, museum or library (CALLADO, 1980). Whether we evaluate the situation as bad or very bad, the culprit is easily identifiable. Municipalities are often created for political motives and 40% have less than 10,000 inhabitants. There is no way that municipalities of this size can offer cultural services or maintain libraries; the weakest link in the public library chain in Brazil is the municipality, which has responsibility for local services but which is generally unable to discharge this responsibility effectively. Even in State Libraries the situation may not be much better; SUAIĐEN (1980) examined state libraries and found a lamentable
situation; for instance he attempted to compare purchases in 1976 and 1978 for a variety of headings, such as bibliographic materials and binding, but discovered that 12 out of 23 state libraries had spent nothing on these in either of the two years for which data was sought (SUAIIDEN, 1980, p.20). It may be objected that Brazil does not need public libraries, because the population is illiterate, but this is not true, as 75% of the population can now read, according to census data (BOAS novas ..., 1982).

The only recent published survey on a state level was for Paraíba, a poor state with many small municipalities, 171 for a population of 2.8 million, giving a mean of 16,400 inhabitants per municipality. The survey covered 66 municipalities with a population of 1.7 million and makes depressing reading (COSTA, 1980). The stock was almost entirely confined to books, and three-quarters of these were donations; numerically the stock was insufficient to offer one book for every ten inhabitants. Less than a third of the libraries offered loan services; trained staff were found in only a fifth of the libraries. Many more had been trained, but dismissed for party-political reasons after the municipal elections. Only five municipalities included the library in their budget. It must be stressed that Paraíba is one of the poorer states; should similar surveys be carried out in other parts of Brazil they would doubtless reveal a more satisfactory picture. For instance public or popular libraries, in Brazil as a whole, had 13 million volumes in 1976 (BIBLIOTECAS brasileiras, 1980, p.22) for a population of 110 million, giving a mean of 118 volumes for every thousand inhabitants, more than 50% better than the figure of 76 volumes per thousand inhabitants found by the Paraiban survey. Even so, 118 volumes for a thousand inhabitants leaves plenty of room for improvement.

Even superficial observations will prove that public libraries in Brazil are used in a manner totally different from those in the U.K. or U.S. Almost all users are schoolchildren or students, and they usually refer to items directly related to their studies. During the vacations libraries are largely empty. The concept of adults visiting the library to borrow books for recreational, background and other reading not directly linked to formal education, is almost totally absent in Brazil. Although public libraries are called public, and are divided into childrens, adults and reference sections, their function is more similar to that of a school library serving a group of schools. There are some bright spots in
Brazilian public librarianship, notably the work of the National Book Institute in distributing books and organising training, which was described above. This gives state libraries some responsibilities beyond the state capital, and could therefore begin to lay the foundations of networks, because as long as public libraries are organised solely at municipal level they will not be able to offer satisfactory service. Brazil does actually have a couple of successful popular library networks, set up by organisations responsible for social services to workers in industry and commerce (Servico Social da Industria - SESI; Servico Social do Comercio - SESC). All industrial and commercial employers give them a small percentage of their payroll; they therefore have a regular, inflation-proof income which is spent on social centres, holiday centres, training courses and, of course, libraries. These are generally of a high standard, normally open to the public, and are probably the closest one can come in Brazil to a public library system of the type known in the U.K. or U.S. They also occasionally set up joint libraries with municipalities, and operate bookbox schemes, placing small collections in factories and shops.

School libraries offer a pretty dismal picture; very little is known about them and they very rarely employ professional staff. The 1976 survey (BIBLIOTECAS brasileirases, 1980) found 9,000, with about 2,000 volumes each. But Brazil is said to have 175,000 primary schools, with twenty million pupils and 900,000 teachers; secondary schools number 30,000, with 2.5 million pupils and 170,000 teachers (STATESMAN's Yearbook, 1981, p.238). These figures indicate that libraries exist in less than 5% of schools; in the researcher's experience this figure is probably approximately correct and shows the daunting task facing Brazilian school librarians. Weakness in the school library field naturally implies weakness in audiovisual materials, for it is here that A/V media is most developed in industrialised countries. Brazilian libraries in general have very few audiovisual aids; the Regional Medical Library (BIREME) is one of the handful with significant collections. Universities often establish separate audiovisual departments, outside the library. School and small public library collections are mostly book collections, rarely having audiovisual aids, receiving a minimal number of periodicals.

Library schools exist in all major Brazilian cities; thirty institutions offer a bachelors degree, with students studying either in the morning, or in the afternoon, for three to four years. Five institutions now offer masters degrees and the first Ph.D. course is
getting under way. Bachelors courses are usually quite traditional; nine schools had a course related to computing in their curriculum, but in seven cases this was an introductory course with no special relevance to librarianship (DIRETORIO das escolas..., 1977); although they appear in the curriculum, there is no way of knowing how frequently they are offered.

Other types of library can be dealt with briefly; the first mobile service was in 1935 in São Paulo and they are now common. The National Book Institute stimulates their spread, lending vehicles for six-month trial periods to test demand. Vehicles in current use are generally small converted six-seater mini-buses, about the size of a "transit van", and normally spend three to four hours stationary in each location; they are replacements for branches the library cannot afford to build, rather than true mobile libraries. Most states and many larger cities have Institutes of Geography and History and Academies of Letters which maintain collections of considerable historical value. The Brazilian Institute for Geography and Statistics (IBGE) maintains an important network of statistical libraries, stocked chiefly with its own publications. Personal collections are also of importance in a country where public collections are weak; the owner of Brazil's major private collection, Dr. Plínio Doyle, was director of the National Library at the time of this research. The appointment did not meet with the approval of librarians, who thought the post should have gone to a professional librarian, but probably ensured that his book collection, occupying his house and two large buildings in his garden, would be bequeathed to the National Library. Subscription libraries were never common and have largely disappeared; the Portuguese community set up some interesting libraries, reflecting Portuguese culture, but these are not very active, although the one in Rio de Janeiro does receive all Portuguese books by legal deposit. Initiatives such as these are very rare, although in one state in the North-East an office-worker operates a network of 235 small libraries on a shoestring, helped by relatives and friendly bus companies, who carry parcels of books free (LIVROS a granel, 1981). There is little tradition of spontaneous community activity in Brazil. A history of deep government penetration and of repression (workers libraries, such as those common in Britain in the nineteenth century, would have been politically unacceptable at most times in Brazil) has created a situation where the people do not do things, but wait for the government to do them on their behalf. The researcher had an interesting example of this when
talking recently to the director of a major state library. The state government only rarely purchased books, and had purchased nothing for several years. The researcher suggested the librarian should make a public appeal for books for the library, but the director was not willing to do this, as a public appeal would provide an opportunity for the opposition to criticise the governor.

This has been a long and complex account; how then can it be summarised? Here, it would appear, we have a profession which has no clear function within society. Brazilians do not feel a great need to use libraries; the community has adopted forms of organisation, communication and education which work, but which operate without using libraries. Libraries are therefore considered peripheral and receive low financial support; bureaucracy, poor bookstock and unwelcoming premises combine with a lack of the service ethic to maintain what usage there is at a very low level. There is no lack of programmes. The National Book Institute has three major objectives: 1) to promote the establishment of library services, registering libraries and setting up libraries and reading rooms in municipalities where these do not exist; 2) improving the operation of existing libraries, turning them into centres for cultural action and permanent education, by distributing books, supporting the work of the Institute's representatives and offering technical advice and assistance; 3) offering training and qualifications for library personnel (SUAIĐEN, 1980, p.41). MIRANDA (1980, p.114-116) suggests six objectives for public libraries: 1) promote the national language; 2) make official publications available; 3) offer books and other materials to students; 4) support alphabetization programmes; 5) be the depository of local intelligence and history; 6) offer technical and commercial information services. The researcher has himself elaborated such codifications, calling for instance for more attention to the four R's: "Redes, Referência, Revistas & Recursos audiovisuais" (networks, reference, periodicals and audiovisual resources). The researcher has also used in teaching a modified version of Ranganathan's Five Laws of Librarianship: 1) Libraries are for use; 2) Libraries are for everybody; 3) Libraries help the user; 4) Libraries develop; 5) Libraries cooperate. As the Brazilian library situation is less sophisticated than the Indian, a simplified version of the five laws can have more impact. Perhaps, as a result of programs such as these, Brazilian libraries and information systems will be able to improve, reaching a level where they
offer quality services and fulfill a valid function within society. All industrialised nations, whether capitalist or communist, use libraries heavily; if Brazil is to become fully successful as an industrialised nation, she too will have to develop and use her library and information resources. As President Marcos of the Philippines told an IFLA conference, the Third World suffers from an information dearth, not an explosion, and it is essential to fill the "information black holes" in our global system before the information gap between rich and poor countries becomes increasingly wider (Marcos, 1981). And Rosenberg (1981b, p.49-50) asked users of information systems what would happen if Brazilians were limited to national information. There was a very clear feeling that Brazil would develop more slowly and Brazilian research would be less effective.

1.4 Computers in Brazil

Of the modernised sectors of Brazilian society, the computer industry and data processing has shown especially spectacular growth. The first computer was imported by the Pontifical Catholic University of Rio de Janeiro in 1959 (MARANHÃO, 1978). This seems late, but is a fairly logical time, coinciding with the modernisation of industry and the establishment of a national automobile industry. The first major application of data processing was by the Federal Government, which set up its own DP division, SERPRO, in 1964. Its primary task was to organise income tax, which until then was paid only by a tiny minority of the population. The period up to 1972 can be seen as the prehistory of Brazilian computing; equipment was imported, especially by IBM, the first degree courses were opened, but there was minimal governmental control over a very buoyant market, expanding at a breakneck 30-40% per annum. This changed in 1972 with the formation of Capre (Comissao de Coordenacao das Atividades de Processamento Electronico - Commission to Coordinate Electronic Processing Activities) Capre was to organise censuses of computer equipment, give advice on the purchase of computers by federal agencies and coordinate training in computer science. By 1975 the government was becoming concerned about the foreign exchange drain caused by uncontrolled computer imports, and subjected future deals to Capre's authorisation (Katz, 1981). The annual rate of growth rapidly fell to the 10-20% level.
There were said to be about a thousand computers in Brazil at the beginning of the seventies; precise information is available from 1974, when there were 2,756:

**COMPUTERS INSTALLED IN BRAZIL**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cumulated number of computers</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>2,756</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>3,787</td>
<td>37%</td>
</tr>
<tr>
<td>1976</td>
<td>5,078</td>
<td>34%</td>
</tr>
<tr>
<td>1977</td>
<td>5,963</td>
<td>17%</td>
</tr>
<tr>
<td>1978</td>
<td>6,641</td>
<td>11%</td>
</tr>
<tr>
<td>1979</td>
<td>7,488</td>
<td>12%</td>
</tr>
<tr>
<td>1980</td>
<td>8,844</td>
<td>18%</td>
</tr>
</tbody>
</table>


There was, therefore, an increase of 220% from 1974 to 1980; in the latter year there was one computer for every 13,000 inhabitants, or about 73 computers per million inhabitants. (In 1974 there was one for every 38,000 inhabitants, or 26 computers per million). These would appear to be highly satisfactory levels for Brazilian conditions. A fascinating paper in "Datamation" rated non-industrialised countries on a "Computer Industry Development Potential Index", based on economic, educational and technological factors (BARQUIN, 1976). Brazil and Israel were the only two countries placed in the highest category, "operational to advanced". The next lowest category, "operational" was occupied by Argentina, India and Mexico, while countries such as Hong Kong, Hungary and Greece came even lower. Another "Datamation" article from around the same time compared Brazil in 1976 to Japan ten years before, and found many significant parallels (LEVINE, 1975). The author was also sufficiently acute to note, as the major difference between the two countries, that:

"Japan began with a large inventory of well educated and sophisticated engineers and technicians, built on a foundation of extensive education and near total literacy. Brazil has yet to achieve this happy state". (LEVINE, 1975).

But full education is not an essential prerequisite for the fairly deep penetration of a society by data processing, because only a relatively small cadre of trained personnel are required to operate the computers. Automation now influences all levels of Brazilian life, even though many Brazilians fail to realise how widespread they have become. The researcher constantly had the problem, when teaching library automation to undergraduates, that some students would claim the
subject was of no use, because they would never work in a library which used computers. One solution was to write up on the blackboard, with the help of the class, a list of all the computer-produced documents handled by a typical middle class family of that city at that time. It was easy to collect a dozen or so: electricity bill, telephone bill, water bill, municipal tax demand, vehicle tax demand, income tax contributor's card, income tax statement, university students registration form, bank statement, credit card statement, mortgage statement, hire purchase repayment book, etc. The public also handles machine-readable input documents when playing the Federal football or numbers lottery or when being examined for university entrance. In other parts of the country identity cards and driving licences are already computer produced.

Another exercise which was useful to drive the point home was to send the students to make a census of the computers in the city. João Pessoa has a population of about 330,000 and little industry. The students could locate a dozen or so computers with little difficulty. (According to Capre the city had no less than 23 computers: seven IBM, seven Burroughs and nine Olivetti (COMPUTADORES instalados....., 1979)). The crunch would come when the researcher asked the students to name a dozen permanently-staffed libraries in the same city; that was quite difficult, and amply demonstrated the penetration of the computer, even in a relatively poor part of Brazil.

A 1976 survey found 15,000 libraries, employing 30,000 people (BIBLIOTECAS brasileiros, 1980). In the same year CAPRE counted 5,000 computers, and calculated that on average each was supported by a staff of nine to ten persons (ESTUDO sobre recursos..., 1979), giving a total of 45,000 - 50,000 people in computer-related positions. This total seems reasonable; a 1978 article by MARANHÃO spoke in terms of 6,000 computers and 60,000 people. What is certain is that computing is a stronger profession than librarianship, both numerically and from the point of view of status. Computer personnel have considerable status within Brazilian society because modern Brazil could not exist without computers. Indeed the modern centralised state and its private counterpart, the multinational company, both are totally reliant on the computer; it would not be possible to structure and control organisations of such size without data processing, and both grew in strength parallel with the spread of computing. Within living memory, Brazil was a loose federation of states, jostling to dominate, occasionally even to fight each other; private armies roamed the interior and long-distance communication was by
boat. Now the Federal Government and the President have means of intervention in all areas of society and huge banks and industries extend to all places of any importance. Deprived of computers, all this would stop; the government could not collect taxes, (over six million Brazilians file income tax returns every year), the banks could not balance accounts and the industries could not control stocks. It is not surprising that data processing personnel have high status; so much depends on them. They also have high status in relation to librarians; one fascinating quotation states that "it was common to place recently-hired analysts who were still undergoing training in the library, where they generated various partially-implemented KWIC-KWOC systems" (MOTTA, 1980). We can be certain that the opposite procedure, placing librarians in the computer centre to set up systems, was non-existent. A project for an automated library network proposed hiring analysts and librarians, and paying the analysts precisely twice the salary of the librarians (REDE de bibliotecas..., 1981, p.24).

Computers were found mostly in the urbanised, industrialised, southern part of Brazil. 75% were located in state capitals, 85% in the South-East or Southern regions. Two states, S˜o Paulo and Rio de Janeiro, had respectively 43% and 22% of computers; no other state had 10% (COMPUTADORES instalados..., 1979). Excluding mini-computers, IBM had 56% of the market, Burroughs 15%, DEC 9%; the remaining 20% was divided between Honeywell-Bull, Hewlett-Packard, Univac and others. Major suppliers maintained large organisations; Burroughs, for example, had three factories and 32 offices, employing 2,300 people (BURROUGHS no Brasil, n.d.). A 1975 article cited a Burroughs spokesman as saying "Our company's operation in Brazil is the fourth or fifth largest in the world, matching the one in France" (HAWRYLYSHYN, 1975). Burroughs was exporting equipment to a value of US$7.5 million annually. The same article gave IBM's exports as US$54 million; its Brazilian operation was the company's sixth largest and employed 5,000 persons.

As the modern governmental structure of Brazil depends on computers, and as these computers come mainly from IBM and Burroughs, it might begin to seem as if the Brazilian government depends on U.S. computer companies. The Brazilian government was quick to see the danger of foreign domination in such a strategic field, and has been taking firm steps to establish a national computer industry. It is obvious that Brazilian companies cannot simply begin to manufacture large
computers from one day to the next. The solution was to reserve the minicomputer sector of the market for national manufacturers. (For convenience, a mini was defined as any computer sold in the U.S. for less than $30,000). This was a practical solution, advantageous to Brazilian national interests, although it was certain to displease major U.S. computer manufacturers. Market licensing in fact developed from a desire to prohibit entry of the IBM / 32 system; finally five companies were licensed to produce minis for the Brazilian market. All were Brazilian companies, and used technology from Japan, Germany, England and France (KATZ, 1981). This in itself is quite interesting; it means that a non-industrialised country can obtain this type of technology, without going to the United States. Multinational companies failed to receive licenses, despite heavy lobbying which, according to one report, involved "pressure on top government officials, even involving threats to reduce World Bank loans" (TRANSNATIONALS lose..., 1978). IBM and Burroughs accused the Brazilian government of "abuse of economic power", but the decision stood.

If anything, the government has since become stricter. Capre, which was basically controlled by an interministerial council, was replaced by SEI (Secretaria Especial de Informatica - Special Secretariat for Informatics), directly subordinate to the hard-line National Security Council. The change was no accident. The government firmly believed that domination of computer technology was essential to national security. (DIRECTRIZES para a politica ..., 1981). SEI only permitted IBM to manufacture a limited number of a medium-sized computer, the 4331-MG2, after undertaking to export 60% and sell the remainder only to existing customers. IBM would also start to produce high-capacity magnetic disks in Brazil (MÉDIO da IBM, 1980). IBM had withdrawn from India rather than accept that government's conditions; but as one commentator, cited by KATZ (1981, p.14), said, "India was not a large market for IBM". IBM had been in Brazil since 1917, its equipment was used for the 1920 census, the first IBM factory outside the USA was in Rio de Janeiro, and by 1974 IBM Brazil was exporting central processing units for the 370/145 (HISTÓRICO ...n.d.). Olivetti, which had once supplied nearly half of Brazil's minicomputers, was now trying to find Brazilian groups which would take a majority shareholding (MACROPOSIÇÃO..., 1980). By 1982 the press was beginning to run stories on Brazil's own computer "whizz-kids"; for instance the three university teachers who put together 140,000 cruzeiros in 1976 to set up Scopus. By 1981 the company had 410 employees
and a turnover of 1.7 thousand million cruzeiros per year. It manufactured terminals, and similar success stories were told of companies in other computer-related fields (BORGES eletrônicos, 1982).

Meanwhile, the Brazilian minicomputer market went from strength to strength. Figures for June 1980 already claimed that nearly half the employment with computer companies in Brazil was with national companies (NÚMEROS da industria..., 1981). The same article stated that 1,225 Brazilian minis, produced by a total of five companies, had been installed; this is an impressive result, as the first of these had only been installed in 1978. Advertisements for minicomputers now appear in the Brazilian press with frequency; an interesting feature of them is that they are often highly patriotic. One memorable example was headlined "Throw out your chest and open your eyes wide: Brazil is already making agile, versatile and flexible computers" (ESTUFER o peito..., 1980). These stand out, because patriotic advertising is quite rare in the Brazilian press (although government propaganda is common on TV); they show that computer professionals fully understand and are prepared to exploit the fact that their activities are considered essential to the nation. "Computers are like crude oil: it is dangerous to depend on others" (COMPUTADOR & como petróleo..., 1980); the validity of a direct comparison between a technology and a natural resource may be questionable, but the message is clear.

Needless to say, the path of the computer in Brazil has not been entirely smooth; one press report spoke of a US$420,000 computer that was never used (PONTO morto, 1977) and there were doubtless other similar cases. It is difficult to obtain information on this subject, because it is exceptionally rare for an organisation in Brazil to release anything even remotely critical about its activities; probably the inefficient operation of computers is a more serious problem. A survey of 130 industries discovered that most companies used data processing only in the simplest form, for traditional purposes (STEFANH, 1980). There are similarities with the situation in England in 1961, when payroll, stock control and invoicing were the most popular applications (HOLLINGDALE, 1980, p.316). Stephan discovered that computers were used to emit payslips, but not to match production to market trends. Software was expensive, which encouraged inhouse production, thus creating a vicious circle. One most unusual paper actually gets down to describing the everyday problems of a bibliographic information system, where a tape was wiped, destroying more
than six months work; a program was discontinued in error when nearly completed, after running for 3½ hours; 18% of entries had keypunching errors; a specific request for use of a new ribbon, so that the resulting printout could be used as a master for offset printing, was ignored (GOIS, 1980). It is rare to see this type of complaint in print, although the problems seem fairly typical. For instance the researcher once encountered the same problem of lack of ribbon, when a computing centre was asked to produce a printout with a new ribbon, and replied that this could only be done if the library supplied one. The general level of efficiency in the operation of complex mechanisms in Brazil does appear to be below that of industrialised countries. This is quite natural, as this type of efficiency is a result of industrialisation and is defined in terms of industrialised countries. It would therefore be natural to expect that computers would not be operated to full capacity in Brazil.

As this thesis was being written the major new developments seemed to be in the data communication field. A data network was opened in 1980; this used microwaves and would eventually link thirty cities (EMBRATEL lança..., 1980). 80% of the users were banks (DADOS nas ondas, 1980), which confirms what has been said previously about automation in Brazil being on a basic, rather than sophisticated level. This network gave large-scale users dedicated lines; a packet-switching network was, however, being planned for late 1982 (REDE Transdata..., 1980). A later article reported that GTE Telenet, Siemens, NEC (Japan) and SESA (France) had submitted proposals (REDE de pacotes..., 1981). It was estimated that the cost would exceed that of the US$6 million Mexican system. The existence of a public packet-switching network will, obviously, have great impact on the use of information systems.

As far as is reasonable, linkages will be with national data bases. The Brazilian government is very well aware that "information is a commodity. Therefore its trade can be blocked, controlled by governments, taxed or tariffed, and used as a bargaining chip", to quote an analysis in "Datamation" (PANTAGES, 1977). The author of a recent book on the equally recent subject of the "geopolitics of information" approached the problem from the opposite viewpoint, but was equally incisive:

"What is at stake today is nationhood. The repertoire of techniques now available to companies which are essentially uncontrolled by any national entity and are therefore effectively unassailable by any single set of laws is such as to negate the possibility of secure nationhood for any who permit the unquestioned flow of data across their borders" (SMITH, 1980,p.142).
The official views of the Brazilian government are markedly similar to that last quotation:

"Political frontiers, which until recently limited the physical space and protected the intimacy of nations, are beginning to become diffuse. There can be no doubt whatever that the torrent of data that crosses frontiers, not always in a reciprocal manner, is one of the major causes of the aforementioned lack of definition of these limits" (BRÍZIDA, 1980).

Brízida foresees a situation in which political frontiers would be replaced by data nodes:

"The first essential measure is the implantation of the international data node, a switching centre which is capable of converting the various protocols which exist in foreign networks into national standard protocols, also permitting tariffs to be assessed on international traffic" (BRÍZIDA, 1980).

It is also clear that the type of node Brízida has in mind would permit control over all aspects of international traffic, not just over its tariff assessment.

The Brazilian government examines each project involving transnational data flow separately. International timesharing, for instance, is treated negatively, as it involves loss of currency and competition with Brazilian computer bureaux. Links between multinational companies and their Brazilian subsidiaries are also viewed with caution. Bibliographic data bases are treated relatively well. One application "was approved due to its importance to the activities of the party which solicited it, minimal dependence and the transfer of funds would be so small as not to justify investment in a local solution" (RIPPER, 1980. The article did not name the data base or the Brazilian user). In other words, as the request was small, it was approved. Not all data base applications are small-scale, however; one member of the SEI was almost ecstatic about their potential:

"The most relevant symptom of the expansion of teleinformatics is the birth amongst us of a new service sector: data base consultation, which becomes possible when specialised public telecommunications networks exist. Data base services should become one of the major business areas; there are forecasts that the potential return in this sector will equal that of telecommunications and crude oil" (COSTABILE, 1980).

This author was obviously talking about data bases in the widest sense of the term, and although we may not share all his enthusiasm, this is obviously a field which is going to grow. The Brazilian government
has already defined a policy on foreign data bases:

"As information is a resource which has an economic value, the concept of protection or stimulation of a similar national product will be applied or adapted to its case. A tendency has also been noted for cooperative structures in the use of information networks, a tendency that the SEI intends to accompany, stimulating all initiatives which lead to the establishment of data banks in Brazil, and their use, on a reciprocal basis, by other countries. Apart from the development of Brazilian data bases, we intend to maintain in the country local copies of foreign data bases, thus reducing its vulnerability to interruptions in the supply of information" (BRÍZIDA, 1980).

It will be seen later that this is close to what is happening at the moment; important data bases are brought in on tape and searched locally, while peripheral bases are searched via a data link in a controlled manner. The reference to use, on a reciprocal basis, of Brazilian data bases by foreign countries presumably represents a long term aim. At the time the policy statement was being formulated, there were very few truly Brazilian data bases, and even fewer of these would have had any interest for outside users. Of the Brazilian bibliographic or textual data bases, only one was available for on-line searching at a distance, and this was a legal data base, of no interest to non-Brazilians. The researcher knows of very few Brazilian non-bibliographic data bases searchable via terminal. The only one which comes to mind is a data base (or data bank) of Brazilian socio-economic statistics, set up by SERPRO, called Project Aruanda (A quem interessar possa..., 1978). This is of great value in Brazil, but of very limited interest outside. The constant appearance of references to the nation, dependence and vulnerability are natural in a field considered essential for national security and controlled by an organ subordinate to the National Security Council. It is not just Brazilians who take this kind of attitude. As RIGG (1980) pointed out: "On Euronet it is not permitted, on policy grounds, for a European terminal to be linked through to US based computers". It is common to meet Brazilians who are worried that somebody, usually an American, could "turn off the tap". The researcher recently included a lengthy passage in a paper to a Brazilian conference, rebutting this attitude:

"A more healthy attitude would be to state that if the North Americans do not want to sell information to us, we will work things out with the Europeans, Japanese, or even find our own way. It is true that North Americans can cut off our supply of scientific and technological information; they could equally well boycott our coffee, iron ore, etc., and refuse to make further loans or investments in this subcontinent. All these actions are possible, but only make sense in a
context of unimaginable politico-economic convulsions, a situation of semi-warfare. The truth is that all modern politico-economic systems, capitalist or communist, are based on strategies of world-wide market integration. It is of extreme importance for North American capitalism that Latin America remains within its market, within the technological patterns established in Chicago or California. To achieve this, there is nothing better than the export of technological information to Latin America. Turning off the tap would be extremely harmful to North American interests, because it would force Latin America to discover its own technological direction, and thus the subcontinent would become isolated from overseas markets and models. A more convincing scenario would be to turn off the tap of scientific and technological information at the Latin American end. A nationalist leader might well restrict or prohibit access to foreign information, thus simultaneously economising foreign exchange and forcing his countries researchers to develop a national technology". (McCARTHY, 1980).

Recent analyses suggest a global trend for northern nations to switch industrialisation to the southern hemisphere, while the north concentrates on service industries, such as information. The southward transfer of STI would be essential in this context, both as a tool and as a result of such a policy. The speed of southward migration of industry may slow in the immediate future, as microelectronics in the north reduce the advantage of lower wages in the south (KAPLINSKY, 1982). Even so, we are likely to see a very considerable strengthening of Brazilian industry in the short and medium term, and northern nations will want that increase to be in tune with their industrial models.

All indications are that Brazil intends to continue with its firm but gradual policy of strengthening the national computer industry. The attitude towards microelectronics is both extremely confident and nationalistic. One semiconductor company existed, and a university also had experience in producing chips on an experimental basis (SEI vai ditar.., 1981). Although this might seem a fairly weak position from which to start, the "primordial objective" is to dominate the entire process of micro-circuit production, according to Edson Dytz, an SEI official with the rank of colonel, cited in the above-mentioned article. The multinational companies which operate in Brazil will be forced to buy or manufacture locally. Colonel Dytz himself admits that this is a medium or long-term aim; persons in Europe or North America would certainly agree that this is no short-term ambition. The Brazilian government is so interested in this because it is a pivotal area in which Brazil is totally dependent on overseas suppliers. (BRAUN (1982) does not consider dependence in the semiconductor area to be more dangerous that any other type of dependence
forced upon all countries by global commercial relationships and capacities, and thought "it would verge on the fantastic to believe that any small or medium country could build up the full range of industrial and service facilities required to run a modern, self-sufficient computer industry." Chip production would seem theoretically possible in the long term in Brazil; although technology-intensive, it does not require the large quantities of land, people, raw materials or power required for, say, nuclear power stations or automobile factories.

Peter Laurie, in a book on the micro revolution, went so far as to comment that "the chips cost practically nothing, and no doubt will soon be made in the Amazon basin, or wherever the next pool of cheap labour will be found" (LAURIE, 1980, p.177). Brazil is already a major producer of the silicon used as raw material for chips, and chips can be copied; in fact more firms copy chips than make original ones (LAURIE, 1980, p.169).

Nationalistic tendencies can also be seen in the software field, where the development of truly Brazilian software and the implantation of software houses (a rarity until now) will be encouraged (MARTINEZ, 1981). Computer tape is now produced in Brazil (ALEMANHA para... 1980) and magnetic disks will shortly be manufactured (PLANOS da Control Data, 1981). A very obvious and quite fascinating difference between the Brazilian and British or North American market was that word processing is almost unknown in Brazil; minis were sold for their ability to process numbers. The researcher only knew of one company, Polymax, which was marketing a fairly standard word processing unit, with video screen and daisy-wheel typewriter. Presumably companies do not wish to invest in this area because they feel unable to compete with human typists, who are available in large numbers and willing to work for extremely low wages. (The market for washing machines is also very small in Brazil, because of the ready availability of washerwomen). One is reminded of the explanation, in a history of the computer, for the commercial failure of Pascal's adding machine: it did not offer increased profitability, was expensive to buy and "its sole justification would be to make life a bit easier for the drudge accountants, and why waste money on them?" (EVANS, 1981, p.25). On the other hand, word processing would appear to be a field with great potential, offering substantial advantages in Brazil, where the neatness of a document is considered very important, and where both left and right margins are always justified with precision, even in short routine documents. COM fiche are not rare in automated systems in Brazil, although the importation of COM recorders is controlled (they are
considered computer peripherals) there were 48 by 1979 (MICRONews, 1979). Applications are mostly in the financial field.

Brazilian journalists, like those in industrialised countries, constantly write about the marvels of the computerised future and the mighty microchip. A recent example (Alvarengo, 1981) included the obligatory photographs of terminals and microchips passing through the eye of a needle, but also gave examples of how leading politicians were using the computer in their everyday lives; the country's largest political party was also planning to automate its membership list. 1980 microcomputer sales were said to have been 3,000 units, up from 500 in 1979. 150,000 people were said to manipulate some kind of computer every day. The latter figure would be plausible, if it includes persons such as keypunchers; there would be around 10,000 computers in Brazil at that time. 150,000 seems a large number of people, but in terms of Brazil's population it is just over 0.1%. The most notable new product in 1981 was the domestic computer; an April article spoke of 2,000 in existence in Brazil, increasing at a rate of 40 to 50 a month as more were smuggled in (Pereira, 1981). The smuggling was necessary, of course, because the legal importation of all sizes of computers was closely controlled by the SEI. No less than twenty companies were attempting to launch personal computers; by Christmas advertisements for them began to appear in the Brazilian press. One, Microdigital's TK 82, was remarkably similar, in both appearance and specification, to the British Sinclair ZX-81 which was chalking up sales figures of 250,000 at the same time. The most obvious difference was that the Brazilian machine cost about four times as much (NoSSO primeiro computador..., 1981). (In general Brazilian computers cost about twice the price of an identical machine, made in an industrialised country (Katz, 1981, p. 105)). By April of the next year another ZX81 look-alike, the NE Z8000, was being sold under the slogan "computers are now consumer goods" in shops in twenty-five Brazilian cities (COMPUTADOR agora..., 1982). Computer camps were already being held (MÁQUINA lúdica..., 1982).

As well as the personal computer, other advanced products were coming in, or were about to come in. Prestel was demonstrated in 1980 (Mundo telefônico, 1980), and the São Paulo telephone company hoped to offer it by 1983 (TELESP pretende ..., 1980). One bank was advertising,
as already in operation in several branches, a computerised cashier system, which gave current balance and also printed statements on the spot (PODE usar ..., 1981). The equipment was said to be totally national. A Brazilian university had produced the first Portuguese-speaking voice synthesizer (VOZ cibernética..., 1981), while a manufacturer was advertising a system which would give each bank teller a personal, small-scale terminal (ANTES de começar..., 1981).

With such a frenzy of activity it was no surprise to find a careers article placing data processing and micro-electronics top of the list of recommended careers; librarianship was not mentioned (GAMBIRASIO, 1981). An article aimed at computer professionals stated that supply and demand of data processing personnel had been relatively balanced during the sharp recession that had marked the end of the seventies and beginning of the eighties in Brazil, and which had led to major employment difficulties in other professional fields (QUANTO ganham..., 1981). The same article included a comment which sums up in a few words how much status data processing professionals have attained and how much modern Brazil already relies on them for its mechanisms of management and control: the reason for the satisfactory employment situation in data processing was given as:

"... the strategic position occupied by data processing centres ... a sector where the company will think carefully before making a cut, because, due to the economic crisis, executives need more information to be able to take decisions" (QUANTO ganham..., 1981).

The process of the computerisation of Brazil has not been accompanied by a deep examination of the effects of the computer on society. Most comments are related to the fear that the government may misuse the power of the computer, a natural fear in an authoritarian country. It is rare to find anybody who is concerned about the depersonalising affect of the computer, or who thinks that as personal contact is so important in Brazil, more money should be spent on telephones and less on computers. An anonymous African, cited in SMITH (1980) said that:

"The Third World has no choice but to enter this age of history; perhaps the only uncertainty is over the extent to which it will be crippled by the process of modernisation; Western society always seems to have destroyed direct personal relationships and as the computer advanced the West would lose more of the personal sphere in favour of the structured non-emotional world of impersonal interface". (SMITH, 1980, p.146).
The researcher feels that the computer has only minor responsibility for the negative factors of Brazilian society, compared with other items, such as housing conditions, television and street violence. As road, piped water and sewerage networks are inadequate in their coverage, the Brazilian middle classes are forced to jam themselves into crowded apartment blocks. Television has led to isolation and the disappearance of conversation, a process which will be exacerbated as video tape makes quality viewing available at any time. Brazil did not have, or was not allowed to have, a social revolution, so has countless minor social revolutions, especially on the streets after dark, when the have-nots forcibly take possession of the goods of the haves. So Brazilians who, a few years ago, would have lived in a small house with a little garden, and spent the evenings sitting on the pavements talking to their friends, now lock themselves into small flats to watch a limited choice of poor-quality television. Against such a backdrop, the depersonalising effect of the computer is slight. But it does exist, and professionals must work to ensure that the machine is used as far as possible to serve humanity, to decrease boring and repetitive work, to permit creativity and to further human contact.
2 METHODOLOGY

2.1 Original impetus for the study: pilot study.

The researcher had specialised in automation and related topics during an M.L.S. course in the U.S. in 1975-6, and was asked to teach this subject at masters level in early 1977, when lecturing at a library school in Brazil. It became obvious that there was almost no information available about what was actually happening in library and information systems automation in Brazil, although it appeared that the situation was developing fast and professionals were keen to know more. The researcher therefore planned to fill this gap by a simple fact-finding tour, after which the results would be written up and published as journal articles in English and Portuguese. This study took place in February-March 1978, and covered thirty institutions. Data collection methods were the simplest possible: the researcher visited the institutions, asked to have the system explained to him, questioned senior personnel over problems, objectives, etc., and took copious notes. This is an adequate method of collecting basic information on a specific subject and getting it into print fast. It was an area where the researcher had considerable experience, having visited libraries throughout Brazil in 1971-2 to collect material for a book (MCCARTHY, 1975). During 1978, however, the researcher decided to register for a Ph.D. degree at the University of Loughborough. Automation of library and bibliographic information systems was considered an appropriate subject, as the researcher had considerable background in that field. This meant that the results of the 1978 study were never published as such; it will from now on be referred to as the pilot study.

2.2 Previous writing in the field.

An examination of previous writing in the field, is, of course, an essential prerequisite to any study of this kind. In the Brazilian and non-industrialised country context, however, this process was hampered by the fact that the literature of librarianship, like that of most other professional fields in Brazil, was very small. Very little had been written about automation in a library or information context; most of what had been written consisted of
descriptions of specific systems. Such descriptions were of great value when selecting the institutions to be visited and evaluating their systems. They were, however, of a technical nature, and have been discussed when the specific systems to which they refer were described. General papers on library automation in non-industrialised countries or Brazil were rare; it is interesting to note that the pattern in the U.S. seems to have been the inverse. BLACK (1966) complained that recent literature had consisted largely of hortatory articles of the type "Automation is coming"; many of the other papers were very general. KILGOUR (1969) commented on the lack of reports on operational systems for earlier years. One of the rare English-language general surveys of library automation in less-industrialised countries, that written by Eloise van Niel, concluded that:

"Budget priorities are apt to be found in needs to build book collections and to bring library facilities up to national standards ... automation of "housekeeping functions", i.e. acquisitions, cataloguing, circulation and serials records, seems unfeasible in terms of costs, relative collection size, and availability of further staff training." (NIEL, 1974).

It is interesting to note that this author, although in theory discussing automation, digressed into reprography, a more basic need. Similarly, a Brazilian account of an automation project for a major library included a long and enthusiastic account of a machine much simpler than a computer, the Flexowriter (WANDERLEY, 1973). Discussing exactly the same problem with the help of East African examples, Robert F. Munn was highly suspicious of computers, but had a much more positive attitude towards xerox machines. His comments on computers were an excellent summary of the problems faced:

"The computerisation of an operation of any complexity is an extremely expensive and time-consuming process. It requires not only the availability of adequate hardware but the heavy and continuing involvement of skilled programmers. The costs are so great that the computerisation of internal library operations - acquisitions, circulation, etc., - can hardly be justified in any but the largest libraries located in areas where clerical labour is very expensive and skilled computer personnel readily available. Given the present state of the art, it is difficult to see how the computerisation of the internal operations of libraries in the developing countries could be justified on any sort of cost-benefit basis". (MUNN, 1971).
He concluded that "The decision to use computers and other expensive equipment should be made only after the most careful study". It is fascinating to note that the area which he considered most ripe for computerisation, the production of union lists of periodicals, was, as we shall see below, precisely the area in which Brazilian information systems have had the most continuous success. It is even more interesting that a few years later, in 1978, this same author was even more cautious in his attitude towards advanced technology:

"With very few exceptions, developing countries insisted upon the need for the most advanced technology in all areas. Indeed, any suggestions that less expensive and complex approaches would be more useful were generally rebuffed as little short of insulting. It required many years and many costly mistakes before it began to be realised that it makes little economic sense to attempt to transfer technology carefully designed to operate efficiently in countries where capital is plentiful and labour expensive to countries where capital is scarce and labour cheap and abundant. It is by now clear that the effort to bring about massive and direct transfers of advanced library and information technology to the developing countries has not been successful. The time, energy and money expended resulted in very little, at least in concrete terms. Few high technology projects were actually started, still fewer survived the withdrawal of foreign support. Indeed, it is difficult to find a high technology information system which has operated successfully for a significant period of time in any developing country". (MUNN, 1978)

It is perhaps only fair to point out that the developing countries who insisted on the most developed technology may have done so because they had heard that the technology was changing very rapidly. Meanwhile, an information consultant with an address in Peru was even more incisive than Munn:

"All too often some grandiose scheme is proposed which begins with the acquisition of a computer, while leaving somewhat undefined the job to be performed by the fancy equipment. Since funds are unlikely to be available for this initial purchase, the project lives on only as a glittering dream, serving incidentally to pay the salaries of those bureaucrats who sit producing fat "plans", "progress reports", "programmes of action", etc. for the supposed project." (DEXTRE, 1976).

Perhaps Brazilian librarians hesitated to put pen to paper because they were wary of the computer; certainly what early comments do exist are just as cautious, to say the least:
"Computers are purchased or rented, services are organised, but, as precarious operational data are used, the product become insignificant, patchy and unjustified, in terms of quality and social value, with no relation to forecasts and true necessities... A computerised information system only operates when the information has been previously selected and organised to satisfy previously defined necessities; such systems only offer what they have, and not what they ought to have. It is not possible to consume large amounts of money with "data banks" which produce dead files for future discoveries, when the most urgent informational needs are being supplied (when they are supplied) by alternative or complementary sources, when the complementary becomes the essential. To quote a professional, the computer programme is as good as the programmer." (MIRANDA, 1977, p.106-7).

The same author, one of the most incisive and prolific commentators on the Brazilian situation, also criticised the "anomaly" of "the acquisition of extremely expensive and sophisticated mechanical information processes, when conventional manual or semi-automatic methods would operate more economically and satisfactorily" (MIRANDA, 1977, p.107). Discussing the problem on a library level, Jeruza Goncalves de Araujo stated:

"But the introduction of the machine in a document handling context never receives the study it deserves, and we see a proliferation of unused machines decorating large rooms which apparently represent the "future" but in fact show a future which has already failed... Before introducing the computer it is necessary to examine the situation with respect to use and cost, and we can frequently conclude that automation is not justified." (ARAUJO, 1977).

The author did in fact recommend the computer for cataloguing, but on theoretical grounds. When she described her personal experience in the field, she told of an unnamed special library which started to produce an automated information bulletin. Publication was discontinued after a few months, because it was found nobody read the bulletin. Araujo concluded that this was "Frustrating. Highly frustrating. But that is real life in Brazil. Things don't always work better just because we use the computer!" A paper to a library conference by Anna da Soledade Vieira reached similar conclusions:

"The computer is a high-speed logical machine and therefore its use would only be justified in situations where a large amount of data has to be handled rapidly. Is this the case of our libraries? The acquisition of bibliographical material is being limited by government bureaucracy while the level of internal activities (acquisition and processing) is low. As for circulation,
the demand can perfectly well be controlled by manual methods, because the average Brazilian does not read much and illiteracy is still a sad reality at the base of the Brazilian social pyramid" (VIEIRA, 1977).

A 1976 summary of high-technology information systems in Brazil by Tania Maria Guedes Botelho cited comments ascribed to Prof. Wilfred Lancaster that packages such as Medlars could create a demand for documents which were difficult to obtain, and that Brazil might not be ready to absorb that technology. The Brazilian author concluded that:

"The major problem can be said to be the lack of connection (between information system packages) and the economic necessities and global priorities of the country into which they are inserted... The information industry will be an incalculable source of resources, in relation to the global economy, for countries of the post-industrial era. If Brazil, however, is dependent on these countries today to import advanced technology, it will perhaps depend even more tomorrow on the industrialised countries for the importation of information. Thus its technological dependency will simply have been transferred to another field". (BOTELHO, 1976).

These documents represent, as far as the researcher knows, all the general comments by Brazilians on the subject before the field study was undertaken, and they are remarkable in that they are unanimously cautious, to say the least, about the computer in the Brazilian context. There was a superficial good will towards the computer, underlain by a deep current of heavy pessimism. The problem was not the computer itself; they appreciated its capabilities. But they all expressed doubts as to whether it could operate successfully in the Brazilian environment, and felt that Brazil needed development on a more basic level before it started to use computers. Indeed the researcher himself had been of the same opinion at one time, even going so far as to state, after a 1971/2 visit, "I personally think Brazilian librarians should swear a collective oath not to utter the word "computer" until every city of any size has at least passable public lending library service." (MCCARTHY, 1975, p.104). This was clearly more a rhetorical statement than a literal plan of action, but anyone who has read the statements above would be fully justified in asking why a field which was so critically treated in the literature was considered worthy of in-depth investigation. The answer was hinted at in the lines which followed the researchers rhetorical statement,
attempting to explain why collective oaths against the computer were useless:

"But computers are part of life in every developing country because it is excellent business for Western countries to export them. They are textbook examples of the best thing to export: light, easily portable, highly-expensive objects whose manufacture requires many skilled man-hours in a highly technological Western environment. In return, the developing country exports bulky, frequently irreplaceable raw materials, which are taken to advanced countries for processing, thus giving the latter even more employment. Computer sales lead to software sales, and to demands for training, although it is in fact easy to train the small local cadres needed to operate computers. It's nothing like as difficult as training several million illiterate share-croppers in the use of fertilizer." (MCCARTHY, 1975, p.104).

The very rapid developments in computers, libraries and information systems in the late seventies forced the researcher to go beyond simple pessimism to a belief that computers were coming anyway, and in greater numbers and in many more applications than had previously been forecast. Here it is pertinent to cite EVANS (1981, p.13) who compared the industrial revolution and the computer revolution, concluding that, in both cases, once the revolutionary process had started, it was unstoppable. The objective for librarianship was, therefore, to take advantage of an inevitable process, ensuring that the computer would benefit librarianship as much as possible. It was this belief which provided the basic impetus for this study, while the preliminary reading determined the type of study to be carried out. If it was difficult to use the computer within the reality of Brazilian libraries and information systems, the focus of the study should be to identify the problems. Therefore the previously available texts, although few in number, were responsible for the problem-based methodology employed in this study. Other reading was helpful in indicating what types of problem might be found; the researcher found it especially useful to examine the early history of library automation in the U.S. and U.K. to identify papers with this type of approach. Allen B. VEANER (1974) carried out a programme of visits and interviews, similar in concept to the methodology chosen by the researcher. His summary of "major factors which inhibited the application of computers to library problems, 1967-71", had three broad headings: 1) Governance, organisation and management of the computer facility; 2) Personnel in the computer facility; 3) Deficiencies in the library environment. Within each heading, the factors can be
summarised as follows:

1 Governance, organisation and management of the computer facility.
   1.1 The computer centre operated autonomously, with no clear objectives or responsibilities.
   1.2 The president instituted automation then left.
   1.3 Decisions were taken by committees remote from computer development.
   1.4 Lack of long-range planning.
   1.5 Changes in the computing facility.
   1.6 Pricing algorithms were detrimental to the library.
   1.7 Schedules were not kept.

2 Personnel in the computer facility.
   2.1 The library was unable to identify competent personnel.
   2.2 There was an elitist principle that computer personnel were superior to their customers.
   2.3 Analysts were interested in installing systems, not in improving operating systems.
   2.4 The library was feared as being potentially the biggest user of the computer facility.

3 Deficiencies within the library environment.
   3.1 Failure to fully understand the manual system.
   3.2 Librarians did not appreciate the problems of developing new systems.
   3.3 Inability to communicate design specifications.
   3.4 Failure to recognise the computer as a finite resource.
   3.5 Unrealistic performance expectations.
   3.6 Lack of research and development experience and venture capital.
   3.7 Underestimation of the effort required to establish a big system.
   3.8 Insufficient support from top library management. (VEANER, 1974).

Stephen R. SALMON (1976), discussing the problems and failures of library automation projects, defined six major areas of difficulty, three people-related, three system-related: People: computer centre and systems personnel; suppliers of hardware and software; librarians. Systems: poor project planning; poor systems design; poor implementation procedures. Specific problems within each broad category can be summarised as follows:

1 Computer centre and systems personnel.
   1.1 Availability of machine time.
   1.2 Priority given to library projects and processing.
   1.3 Control over decisions to discontinue project.
   1.4 Changes in the computer facility.
   1.5 Ignorance of libraries by systems personnel.
   1.6 Elitism by systems personnel.
   1.7 Fear that the library might become the centre's largest customer.
   1.8 Turnover of computer centre staff.
   1.9 Uncertainty over who had final responsibility for the centre.
2 Suppliers.
2.1 Failure to deliver hardware or software,
2.2 Inadequate servicing, hardware or software.
3 Library staff.
3.1 Failure to budget for research and development.
3.2 Failure to understand developmental process.
3.3 Librarians did not understand existing procedures.
3.4 Talking too much (or too little) about projects.
3.5 Lack of agreement on the final product of cooperative systems.
3.6 Inability to specify requirements.
4 Poor project planning.
4.1 Starting project because of pressure from above, to keep abreast of other libraries, to promote personal reputation, etc.
4.2 Failure to discover whether the product was wanted.
4.3 Unrealistic assumptions as to time, effort and cost of project.
4.4 "Not-invented-here" syndrome - rejection of the experience of others.
4.5 Failure to plan for the termination of special development appropriations.
5 Poor system design.
5.1 Wishful thinking; e.g. acquisitions data can be used for cataloguing; serials will arrive regularly; error rates will be so low there will be no need for editing or revision.
5.2 Poor choice of hardware.
5.3 Inefficient use of software.
5.4 Misuse of hardware or software.
5.5 Faddishness - adopting a common approach which may not be efficient.
6 Poor implementation.
6.1 Failure to explain new system to staff.
6.2 Failure to include manual back-up procedures.
6.3 Failure to document system (SALMON, 1976).

WARHEIT (1971) examined the question of whether library system failures were due to the librarian or to the system. He stated that the library must appoint one person whose sole responsibility would be the automated system because data processing people "knew little about automation in other libraries and did not really understand the library." Sufficient hardware was essential, and the library must ensure priority treatment. It took a long time to develop new systems, and librarians were not accustomed or organised to do so. Adequate fiscal planning and proper investment were essential. Systems were often not as efficient as they could be, due to inadequate skill or knowledge or failure to take advantage of new developments. The "not-invented-here" syndrome was "one of the greatest causes for systems failures in libraries"; this was due to "ignorance, arrogance and sometimes fear". In other cases basic design was good, but planning, scheduling and administration poor.
Ellsworth Mason became famous at this time for challenging pro-computer tendencies with down-to-earth questioning. The most notable of these challenges, "The great gas bubble prick't; or, computers revealed" (MASON, 1971b) actually circulated in Brazil, anonymously translated, in duplicated form. Mason was greatly concerned that the computer was closed to cost-benefit analysis and its application was reducing library service levels. He made a list of "truths" of computer use, which can be summarised as follows:

1. Computers involve librarians in very heavy additional work.
2. Automated systems operate more slowly and cost more than manual systems.
3. Programmes cannot be easily transferred between machines and locations.
4. Cost reductions by sharing or integration are not proven.
5. Computers use money which could be used to improve traditional services.

Mason considered that computerisation would become more expensive in the future, and the byproducts of the process were not worthwhile. The computer covered up weaknesses and made libraries appear to be better than they were: "if your faculty is lousy, computerise and you'll be Harvard". Of the forty-odd computer projects reviewed "not one was begun on the basis of a managerial decision." In another paper at the same time (MASON, 1971a) he stated that most of the forty automation projects he studied "were started for prestige reasons, or to escape the hot breath of their engineering departments or their administration." Mason constantly stressed the status that could be gained by setting up an automated system; a year later (MASON, 1972) he was naming names, stating that the charging system of a major U.S. university was "a prime example of an operation that was computerised as a public relations piece." Mason took his examples from libraries, but also quoted problems in industry and commerce; they even affected book distribution (BRODY, 1966).

Mason was probably the most outspoken commentator on this subject, but many professionals echoed his arguments on cost and service. BIERMAN (1974) was of the opinion that "the continued application of automation to traditional library processes at the individual library level into the long-range future will provide neither large reductions in library costs nor significant increase in
service capabilities." He saw the solution in networking. DIX (1972) said that "at the beginning of the seventies it is difficult to find many computer applications which are performing essential library operations as effectively and at less cost than they were performed by traditional methods or which are giving essential new services at the same cost." MARSHALL (1967) declared that "the simple fact is, with libraries and computers, that we are not going to be able to make a case for computers purely on the cash saving aspect". MELCHER (1971) said that "Many, many companies are today using IBM punched cards and computers, where they should be using McBee Keysort cards and knitting needles, simply because the sales commissions are higher on computers than on knitting needles... It is unpopular and unfashionable these days to do other than bow and scribe when automation is mentioned." He suggested automating slowly, as computers were getting cheaper and programmers better.

"Case studies in library automation" was in part a refutation of Mason's case, but outlines some down-to-earth problems (PALMER, 1973, p.xv):

"Unfortunately, progress in the world of computers in libraries has been hampered by the reluctance of librarians to undertake the necessary planning ... some librarians are afraid to use the computer ... Documentalists believe librarians are conservative and unimaginative ... they avoid applying the term "librarian" to themselves, fearful that this indicates a lesser status". (PALMER, 1973, p.xv).

These various lists must by now have thrown up all significant problems; we may briefly note that AVRAM (1971) spoke of the waste of resources through duplicative efforts, while KILGOUR (1966) said that the programming of bibliographic data without exception took longer, or required more programmers, than originally estimated. BRYAN (1967) stressed the importance of planning, stating that "practically all the difficulties of Florida Atlantic University seemed to be traceable to over-hasty planning." Florida Atlantic University became famous in the early stages of library automation, because it announced huge plans it had difficulty in implementing. BALMFORTH (1971) thought that libraries which had been forced to automate, because of overloading of the manual system, were more successful than those which tried to introduce automation directly in a new library. It is also interesting to note a lack of communication between Britain and America. For
instance Britain used bar-codes and light-pens two years before the U.S. (SALMON, 1975, p.211) and there was little U.S. interest in the British PRECIS indexing system (DYKSTRA, 1978). The disparity was such that KILGOUR (1969) was prompted to say that "British public librarians have been more active in library computerisation than their colleagues in the United States."

This naturally prompts us to examine the general development of automation in the U.S. and U.K.; here it becomes immediately clear that early activities in the U.S. were relatively scattered and small scale; as one 1967 commentator put it:

"Automation in the major academic and public libraries did not become really respectable until the appearance of the King Committee study of the Library of Congress and the Airlie House Conference called by the Library of Congress in May 1963. Since then, a number of major institutions have undertaken studies and started implementing major conversions of both individual library programs and total library systems" (WARHEIT, 1967).

The involvement of the Library of Congress at such an early stage was crucial to the development of automation in U.S., if not the world, because from the end of 1966 LC was distributing machine-readable information from MARC tapes, which rapidly became basic supports for systems of all types. This prompts some interesting comparisons with the Brazilian situation; Brazil had central organisations which established bibliographic formats; in fact several different formats were established. But no bibliographic information was ever made available in these formats, so nobody used them. The Library of Congress had, for decades, been geared to distribute large quantities of bibliographic information quickly and efficiently; in Brazil bibliographic information has never been successfully distributed in any quantity, and elaboration of formats alone could not alter that. In the 1960's U.S. libraries were enjoying generous funding; there was talk of the "Great Society"; an Australian who went to look at American automation concluded that:

"Perhaps the greatest impression made on the Australian visitor by American and Canadian libraries is one of envy for the financial resources which they have available. The supply of money has created enormous libraries and large book funds which have in turn stimulated investigation of new methods ... Perhaps I went to America for the wrong purpose. If I had spent three months studying American fund-raising procedures the most difficult problem in automating an Australian university library might have been soluble" (FIELDING, 1969).
It is scarcely necessary to add that Brazilian libraries are funded on a much lower level than Australian libraries; furthermore, the Library of Congress has for decades had the reputation of being a dynamic, resourceful institution, whereas the central institutions of Brazilian librarianship are far less stable and are frequently unable to play a satisfactory role in library development. In Britain, the British National Bibliography was, if anything, superior to the Library of Congress as a source of national bibliographic information. Perhaps not all the central institutions of British librarianship were as active as BNB, but this was compensated for by the public libraries. In Brazil public libraries are weak, and only one has attempted any automation; another interesting factor is that several major British public libraries were encouraged to automate their catalogues because of mergers following local government reorganisation. There has been no similar event which gave such a forceful impetus to library automation in Brazil.

In the information area in the United States one finds a similar pattern of dynamic, well-established institutions, in receipt of adequate funding; the National Library of Medicine, with its unrelenting progress along the path which led, eventually, to Medline, the first true bibliographic data base, is doubtless the best example. In Brazil information systems are subject to instability and poor funding and are frequently of very recent foundation. Both the Library of Congress and the National Library of Medicine are federal institutions, and deep federal involvement in the library and information area is standard in the United States. BOURNE, writing in 1967 on the trends affecting library automation, cited federal involvement in first place among "significant recent trends and events", and commented:

"This includes the federal involvement in such things as the direct publication or indirect support of primary and secondary journals, support of translation services, support of new library construction, granting of book purchase funds, sponsorship of library research and development projects, sponsorship of library school fellowships, implementation of centralized and regional information and data centres, and establishment of a National Commission on Libraries" (BOURNE, 1967).

A similar list of activities could be drawn up for the British government; the interesting point is that, from the point of view of range of activities, Brazil is on a roughly equal footing. Most of
the items listed by Bourne are the responsibility of Capes (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, the federal agency for post-graduate education, subordinate to the Ministry of Education and Culture). The difference here is one of scale and funding, rather than range of activities.

It is also important to remember that the early literature of library and information systems automation contains several examples of major schemes whose final contribution to the profession was, at the most, marginal. The Western Reserve University semantic-coded approach to indexing was one (BARHYDT, 1965); Project Intrex (OVERHAGE, 1965) another. The same thing seems to have happened in the Soviet Union, where highly-publicised "information machines" never got off the ground (RUGGLES, 1962, p.96-7). Even MARC, which probably contributed more to library automation than any other acronym, had its teething troubles (GRIFFIN, 1968). It would therefore be natural to expect false starts and difficulties in the early days of Brazilian automation.

It is equally clear that these difficulties have been overcome in the U.S.; all the above citations are old, and examination of the current literature of library automation in North America or Britain tends to be depressing, because areas where Brazil has far to go are thrown into sharp relief. For instance MARTIN (1977) speaks of an exhibition where thirty different companies exhibited computer-based or computer-related products. There is no company or agency offering turn-key systems in Brazil; the Brazilian CLSI or ALS has yet to invent its acronym. In 1973 RADWIN hailed the advent of dial-in public packet-switching networks, which had reduced communication costs to one-third previous levels; Brazil should be getting such a network shortly. And the word network reminds us of OCLC, BLCMP, and similar systems, now known as "online bibliographic utilities". America itself still has quite a way to go, of course. MATTHEWS (1980) states that only 7.5% of libraries there use bibliographic utilities, while HEYMANN (1980) states that "we seem to be headed for the integrated on-line catalogue with separate modules to order materials, keep account of financial transactions and keep track of in-process progress..."; in other words library subsystems in the U.S. are still normally separate.
GENNARO (1981) opened a major review of library automation in the United States with a frank statement that:

"Library automation, now entering its third decade, has made enormous strides, but the promise of the 1960's - that it would permit us to replace our expensive, and cumbersome manual bibliographic systems with more powerful, more versatile, and less expensive computer-based alternatives - is still largely unfulfilled. We have learnt that computerising our libraries is more difficult and will take longer than we thought, and that some functions will be carried out locally and others through networks. We are also finding that, although computer-based systems are more powerful and more versatile than the manual systems they replace, they can also be more expensive to operate and maintain - at least during this transition period. They impose much higher standards of accuracy on cataloguing and catalogue maintenance as well as in circulation control and other areas of library operations. While these higher standards are an essential foundation for both networks and local systems, they carry a price - and many libraries are finding it hard to pay that price in the face of crushing budget pressures." (GENNARO, 1981).

The researcher examined a considerable amount of literature, hoping to find useful comparisons with other industrialised countries, such as France, but this was difficult, because general survey articles which might make such comparisons possible were rare. Special attention was paid to Australia, because the researcher felt that, for geographic reasons, it might have developed in a manner parallel to that of Brazil; in fact it appeared to be so much more developed than Brazil that useful comparisons were difficult to make. SCHMIDMAIER, writing in 1975, spoke of around sixty operational systems, and an Australian MARC service. MIDDLETON (1981) is reminiscent of Brazil when he states that most international abstracting and indexing services have a minute Australian component, and describes the huge telephone charges formerly incurred by users of U.S. data bases. But it is now possible to link into U.S. packet switching networks cheaply; Australia has three networks and no less than 18 operational data bases. It will be some time before Brazil is at this level. CHAUVEINC (1971) describes activities in French documentation centres, which use computers to produce indexes of specialised literature. The independent approach, simplicity of output and emphasis on results, rather than means, is similar to that of comparable systems in Brazil, for instance Eletrobras or RFFSA.
The only other industrialised country where fairly close comparisons could be drawn with Brazil was the Soviet Union. In some ways these subcontinental countries are quite similar; both have undeveloped interiors, a population which until recently was largely rural and illiterate, and centralised control and bureaucracy is strong in both. But in the library field they are very different; the Soviet Union is a bookish, print-oriented society, where libraries are considered an important instrument of social policy and are found at all levels of society. Indeed Marxism, a child of the era when industrialisation made print available to the masses, is a print-oriented philosophy, from Marx, journalist and author, through Lenin, who had his own seat in the British Museum, to Mao Tse-Tung, whose followers marched in their millions, carrying his little red book. In Brazil it is rare for a politician to write a book; society is audiovisually oriented, with especially severe political control over television, and libraries have but a vague function within society. It was therefore most interesting to read the conclusion to Michael Heaney's 1979 paper on the Lenin Library, which contained many sentences which could equally well appear in a discussion of automation and the Brazilian National Library. The automation project was behind schedule and there was no certainty it would be completed; "each of the major bodies in Soviet librarianship spent the first decade of automation in relative isolation ... much work must have been duplicated". Cooperation had only recently received attention. One statement about the Soviet national library may, very possibly, be prophetic for its Brazilian counterpart: "increased emphasis now placed on cooperation between libraries, nationally and internationally, may make a substantial amount of the Library's work redundant or cause it to redefine its aims and make consequent changes". Another sentence suggests an objective which deserves considerable attention in the next stage of Brazilian library automation: responsiveness to the needs and demands of smaller libraries.
Comparisons between the situation in Brazil and other less-industrialised countries are difficult, because of lack of documentation. As KEREN (1980) put it:

The literature is frequently ill-defined, difficult to trace, poor in substance, and covers a broad range of topics, from elementary reports on how to operate a library to sophisticated papers on automated indexing. Much attention and many publications have been devoted to the managerial and social aspects of building information systems in LDCs. The literature on these aspects is frequently repetitive, pointing wistfully to "what should be", rather than "how to make it come about" .... The literature reviewed indicates the many problems prevalent in LDCs, but, regretfully, is stronger on highlighting lacunae than on designing adequate solutions". (KEREN, 1980).

DASGUPTA (1978) was extremely frank about automation in India, where the major problem was lack of resources. Also, "the libraries that have computerised ... often have not taken such steps as a result of serious thought. Computerisation has a glamour of its own in the minds of many librarians". Because many librarians were "not confident" about automated services, there was a tendency to form two groups within the profession, traditional and "new-wave" librarians. He also put forward a list of improvements needed in India; these can be summarised as follows:

1. More compatibility between computers. Availability of computers more suitable for library work.
2. Government-sponsored computer networks for specific areas.
3. Appropriate software packages.
4. Indigenous, locally-relevant data bases.
5. A national standard language for bibliographic information interchange.
6. Training of personnel, leading to proper communication between the librarian, computer programmer and systems analysts.
BOURNE (1977) examined the possible role of "computer-based reference services as an alternative means to improve resource-poor local libraries in developing countries". He considered both SDI and retrospective searching feasible, while preferring the former; the major problems he noted were communication, both postally, for SDI, and online, for retrospective searching. Document delivery was another major problem; system output should, if possible, show the location of cited material. ADIMORAH (1976) examined documentation and information services in various countries, searching for the following features: a government authority responsible for documentation, a national documentation centre, mechanised documentation, an association of documentalists and training institutions in documentation. Of the fifteen countries surveyed, only Brazil and India had all five features. MILLER (1978) spoke theoretically about the strategy which should be adopted by international information systems, which should deal with all participating countries on a basis of equality; that is, service should be available to all participants in exchange for their contribution of input. Such a contribution should also give participants the right to influence management decisions and to receive comprehensive systems documentation. CHAN (1979) produced an outspoken article on "Third World libraries and cultural imperialism". As its title suggests, it was heavily critical of the role of developed countries, but was also surprisingly friendly towards computers, which were seen as having an important role in simplified cataloguing. LIM (1980) wrote a detailed study of MARC-based cataloguing in Malaysia, using British Library software on an IBM 370 computer to produce a COM catalogue. This was a cooperative effort, apparently set for long-term success; the major problem was described as the "Inherent distrust of computers by librarians". The second problem was difficulty in adjusting to the rigorous time schedules required for an automated cataloguing system.
The Malaysian librarians were under heavy pressure, as manual cataloguing was continued while the automated system was being set up. The Malaysians also had problems due to limited computer memory and the necessity to partially standardise cataloguing output.

The University of Ibadan library has long been one of Africa's major libraries, and it is natural that it was one of the first to automate (OYEMAKINDE, 1979). It had computerised its serials catalogue on an IBM 370, but similarities with Brazil stopped there; Ibadan was buying in outside technology. Machine readable cataloguing was being undertaken by Blackwell North America, which maintained Ibadan's data base and produced COM fiche, spine labels and book pockets. Not surprisingly, this long-range cataloguing system had run into difficulties:

"We are experiencing some air-freight and postage delays. Coupled with such delay are the financial constraints on the University which have made it impossible for the library to settle Blackwell North America bills. If and when these obstacles are overcome, the library should have solved some of its cataloguing problems". (OYEMAKINDE, 1979).

No Brazilian library would be permitted to get into this situation, because the government prohibits overseas processing of Brazilian data. Ibadan's circulation system was also to be bought in from outside, from Plessey, but this was being approached in a far more cautious manner. Plessey was chosen because it had a Nigerian subsidiary and was installing a system at Lagos, with whom Ibadan would cooperate. A consultant would be invited and a programme appointed for that specific system. Nigeria is an oil-exporting country, and is thus able to buy from overseas; Oyemakinde stated that Ibadan was purchasing about 16,000 volumes or 10,000 titles annually, which would be high figures for Brazil. Another source (ANDE-MUOTTOH, 1979, p.56) points out that automation in Africa occurs mainly in academic libraries; only these have sufficient funding and manpower to sustain automation. Seven systems had been set up in Africa; five of these were periodicals lists. GREAVES (1975) thought that the use of MARC in Nigeria would make both acquisition and cataloguing work much quicker and more accurate; although the article was theoretical, the author considered that MARC would not be far away in the future and that developing countries should begin preparing for it. Another OPEC member, Venezuela, was recently reported to have spent US$200,000 on a
turn-key circulation system (DATAPHASE to install..., 1980). Also in Venezuela, a retrospective national bibliography had been set up as an online data base, in MARC format (SHEPARD, 1980). The number of entries was not given, but a list of 17,000 subject headings, in Spanish and English, was a by-product of the project. It had been undertaken in collaboration with an American university; although such a data base would be of exceptional value, nothing like it is even planned for Brazil. PATRINOSTA (1972) was responsible for a survey of automated activities in South American libraries; very few institutions, however, responded, and much of the information was taken from literature citations. It is therefore necessary to treat his results with caution. He found automation, or automation projects, in 61 institutions in 19 countries; Argentina was said to be first, with twelve applications; Brazil, second, with nine, followed by Colombia (five) and Bolivia (four). The Brazilian applications included four institutions which were still automated in 1980 (Câmara, Bireme, Ibitc, USP/SC), and three which Patrinosto himself described as projects, none of which seem to have gone into operation; the remaining two could not be verified, due to changes in institutional names and addresses; both appeared to have abandoned automation.

WILLIAMS (1981) also collected data by post on the automation of Latin American University libraries, and highlighted three systems, of which two, at the universities of Brasília and Rio Grande do Sul, were Brazilian. The third, at the Autonomous National University of Mexico (UNAM) was described as a fully-integrated online cataloguing and acquisition system. It had been developed independently by UNAM in 1977 and covered the holdings of 130 branch libraries. This would appear to be more sophisticated than most systems operating in Brazil (a later article (LATIN American developments..., 1980) states that UNAM was receiving from 120,000 to 150,000 items annually), but all the other institutions mentioned by WILLIAMS seemed to be at roughly the same level of development as Brazil. For instance the University of the West Indies at Jamaica had an automated union list of serials and various KWOC indexes; the National University of Cordoba, Argentina, had automated serial acquisitions; Costa Rica had an automated catalogue of national publications. Williams wrote to thirty-five institutions, and mentions nine which had some automation, which
suggests that the Brazilian pattern, in which automation was limited to a few major libraries, is general in Latin America. The major difference was that Williams mentioned OCLC several times; the Iberoamerican University in Mexico City was using it, while Puerto Rico, the U.S. Virgin Islands and the three campuses of the University of the West Indies were said to be interested in it. VEENSTRA (1960) suggested that communication with OCLC could best be ensured via a "network such as Amigos or Solinet, or through a library system that already has search capacity. Either of these could provide access to many of the publications cited." Packet switching is essential for this; an early project to link Puerto Rico to OCLC was abandoned when it was discovered that telephone charges would be US$7,000 monthly (SHEPARD, 1980). Two Unisist reports are relevant here: KARLANDER (1977) suggested an Andean network which would reach as far as Brazil; ROMERIO (1978) a Caribbean ring network. Here we may recall WETHERBEE's 1979 comments on networking in the Caribbean:

"The lesson to be learnt from North American experience is this: networks have developed successfully because they meet local needs, are funded by those who use them and are appropriate to the human, fiscal and technical resources of the society". (WETHERBEE, 1979).

From the Brazilian point of view the objections are not technical, but political. Telenet, for instance, linked thirty-three countries in 1981, including Chile and Argentina, but had not been allowed into Brazil. BRÍZIDA (1980) expressed the official position:

"It is vital to avoid the independent installation of appendices to foreign networks, under the conditions that these networks might impose".

This thesis would not be complete without mentioning some major documents which were published after the field study. The most comprehensive of these was SARACEVIC's 1980 report on the "Perception of the needs for scientific and technical information in less developed countries". This fifty-page paper is, without doubt, a basic text for the field, and contains much relevant material; perhaps the most useful, for our purposes, are the conclusions relating to the application of information technology:

"Examples of usage of computers and other information technologies in developed countries had a great impact on the aspirations of librarians, information scientists and officials in LDCs; this impact is so great
that often the expectations are dangerously high and naive, because it is not realized what is entailed and how complex the applications of Information technologies are. However, many computer applications for some or other aspect of STI activities are recorded in LDCs. In many LDCs a nucleus of computer-experienced information specialists exists. Next to appropriate technology and information, further applications of information technology and related networks for STI is a major topic of perceived needs.

Problems/obstacles:
1. Lack of access to computers by STI facilities; consequently still a low degree of experience.
2. Lack of adequate software; low in-house or in-country capacity to adapt or produce needed software; too few attempts to transfer software beyond mere provision. When and where attempted, methods used for transfer did not produce high successes. Inability to evaluate ready-made software.
3. Lack of trained manpower — usually listed as the number one obstacle in applications of information technology.
4. For information retrieval applications: lack of files (data bases) on which to perform them; no (or very small) production of local or regional data bases which are deemed as highly desirable.
5. Great difficulties in acquiring and adapting for domestic use data bases that are commercially available from US and other developed countries. Often it is perceived that undue barriers are put up for doing so. Little interest by data base producers in US toward utilization of data bases in LDCs.
6. Same mistakes committed in applications of information technologies as were in US and other developed countries; little learning from other mistakes.

In a number of instances it is perceived that a number of trading barriers exist for all kinds of aspects related to information technology (software, hardware, network interconnection, data base purchase, data base access etc.). This is a most sensitive issue and the US is often painted as the villain because it has the most developed information technology, networks and information industry. Often these criticisms are couched in a strong ideological framework. The criticism also involves transnational companies." (SARACEVIC, 1980).

MASSIL (1982) was very concerned to determine what technology could be considered appropriate for specific developing countries; his article was in fact partly prompted by LIM (1980), especially Lim's statement that:

"Librarians from the developing countries must always be aware of the problems which automation can lead to, but should not use these problems as an excuse for ignoring developments in library automation, for otherwise they may be permanently saddled with only second class technology". (LIM, 1980).
MASSIL commented that:

"It appears that automation is a development to be taken on board to be assimilated as part of the everyday; that automation is an area of development and research. For an academic library especially, its own contribution to research beyond the services that it provides for its users is to develop and experiment in its own means and methods. Library and information services have to anticipate users needs so that libraries introduce automation as a challenge and an evolutionary development". (MASSIL, 1982).

Recent years have also seen a growth of interest in problems of information transference and policy. NEELAMEGHAN (1981) examined the growth of the information-intensive society and pointed out that:

"Information is not merely an input resource for effective development planning but it is essential to ensure the optimal allocation and utilization of all other resources. Despite this vital character of information vis a vis development planning, very few national development plans have a chapter on information, not even a separate budget line for it ... And yet we reiterate that information is a national resource... National development planning should recognise an "information sector" just as it does other sectors of the economy - for instance, agriculture, industry, science and technology, education, culture, etc.... Information systems - national, regional and global - should be capable of capturing and inventorying technology used in developing countries, disseminate widely information about indigenous technology within and outside the country through cooperative mechanisms, identify national technology needs, alternative technologies and their sources, and provide information support for technology assessment, transfer, choice and adaptation to the application environment." (NEELAMEGHAN, 1981).

ROSENBERG (1981a) was more closely interested in the problems of transference:

"Until recently scientific and technical information consisted of books, reports, journals and the indexes to them. These materials were entirely in the traditional form of print on paper. Now much of this information is in machine readable form and is transmitted electronically. The dissemination of scientific and technical information becomes part of international telecommunications in general. Many governments fear that the communications of their citizens outside their borders is getting out of control, an unpleasant prospect for a government that wishes to control all communications within its sphere of interest. Thus, many governments are trying to control the flow of scientific and technical information as a part of control of telecommunications. This change has had a profound effect on regulations and restrictions on the market. Governments are much more concerned with regulating telecommunications than with regulating books. The recognition of information, as opposed to books, as an item of trade is relatively new and has changed how all nations view information. When scientific
information is seen as an item of trade, the motivation for control becomes economic; countries that do not believe in free trade see the restriction on the flow of information as part of their trade policies." (ROSENBERG, 1981a).

ROSENBERG has also done a considerable amount of research on Brazil (ROSENBERG, 1981b), and has put the above problems into a Brazilian context:

"Any attempt to understand information policy in a developing country must include nationalism as a significant, if not dominant factor... It is not surprising to see great efforts made to keep out foreign influences in the area of data processing... Information is often sold, and therefore is an item of international trade... One of the single strongest political needs for a government in a developing country is to appear independent of the more powerful countries or multinational companies... If complete freedom of data flow were allowed, much of Brazil's commercial data processing would be done outside the country... Access to foreign on-line bibliographic data bases is restricted primarily by the same mechanism of artificially high telecommunication costs... the objective of the policy is to encourage the development of domestic bibliographic utilities for at least the most widely used data bases by leasing the tapes from the originators and setting up a service in the country". The author concludes that "Controls on information flow can be justified on the basis of national security, privacy, economics or nationalism. But the restrictions are often a two-edged sword... Setting information policy requires a country to balance its own self-interest and self-protection with its desire to participate fully in international information exchange". (ROSENBERG, 1982).

It is interesting to conclude this literature review with a recent article by a Brazilian teacher of librarianship, which shows how rapidly Brazilian attitudes to the computer have changed. DIAS (1980) believes that computers will be used more and more frequently, because costs are coming down and systems are becoming more powerful and easier to use, and are being used in increasingly wide areas. Automation improves the efficiency of library systems, and, especially when coupled with telecommunications networks, opens up immense future possibilities. Problems include the automation of libraries in order to use "free" computer time, and the isolation of automated systems. The author concludes that it is fundamental to take advantage of the experience of other countries, both to solve problems and anticipate future difficulties.
2.3. Objectives, hypotheses, etc

The underlying objective of this study was to improve the quality of library and bibliographic information systems in Brazil. It was the belief of the researcher and of the majority of the library profession that automation was of great potential benefit to library and bibliographic information systems; it was equally obvious that these benefits had not yet been fully experienced in Brazil because of the relatively early state of development of library and bibliographic information systems, and also of automation, in that country. Brazil would benefit greatly if her libraries and bibliographic information systems could be automated quickly and easily; in order to do this it was necessary to examine the experience of her automated systems and their personnel and identify the major problems involved. Then planners could pay specific attention to the removal of negative features and problems; this would have a positive influence on library and bibliographic information systems and in turn on Brazilian society and culture as a whole. This study would determine the major current problems of automated library and bibliographic information systems in Brazil; by approaching this central area of concern from a variety of angles a ranked list of specific problems would be drawn up. This list would be of value not only to Brazilians, but also to persons outside Brazil. Less-industrialised countries at a level of development approaching that of Brazil would be interested in the results, so as to be able to avoid problems which had arisen in Brazil. Organisations which wished to support library automation in less-industrialised countries would also find indications of what type of help, such as consultancy, study tours or study grants, would be most effective.

Formulation of a relevant statement of the problem was, therefore, based on three sources: background reading, the pilot study and other personal experience in the field. The general framework was visualised as a central problem area, plus two related problem areas. The central problem was analysed into three sub-areas:

1. What were the motives for automation?
2. What were the problems of automation?
3. What were the results of automation?

This was selected because it was a logical order, similar to the input/processing/output triad used in systems analysis. The
two related problems were defined as:
4 What was the training and experience of relevant personnel?
5 What were the outside influences on automation?

In more detail, these problems were:
1 What were the motives for the automation of library and bibliographic information systems in Brazil?
1.1 Identification of the persons (users; persons in authority over the director of the library or bibliographic information system) who encourage systems to automate.
1.2 Level of activity of the system (e.g. number of transactions per month).
1.3 Influence of:
1.3.1 Desire to gain experience with automated systems.
1.3.2 Desire to use available equipment.
1.3.3 Desire for increased status.
2 What were the problems faced by automated library and bibliographic information systems in Brazil?
2.1 Planning.
2.2 Role of systems analysts, librarians, consultants and the relationships between them.
2.3 Sources of information.
2.4 Financial resources.
2.5 Cooperation.
2.6 Role of the government and central institutions.
2.7 Availability of suitable bibliographic formats or computer equipment.
3 What were the results of the automation of library and bibliographic information systems in Brazil?
3.1 Changes in level and type of service.
3.2 Changes in the image of the service.
4 What was the training and experience of the personnel who developed or operated automated systems?
4.1 Formal education and training.
4.2 Training in the specific area of the automation of library and bibliographic information systems.
4.3 Background reading done by personnel in this field.
4.4 Preference as to further education and training.
5 What were the outside influences which affected the automation of library and bibliographic systems in Brazil?
5.1 The relationship between geographic distance and influence.
5.2 The relative ease of transmission of various types of influence.
The following hypotheses were elaborated for this study:

1 General hypotheses.
1.1 An in-depth analysis of automated library and bibliographic information systems in Brazil will permit the identification of common problems which can be ranked in order of importance.
1.2 Common motives for the automation of Brazilian library and bibliographic information systems can be similarly identified and ranked.
1.3 Common results of the automation of Brazilian library and bibliographic information systems can be similarly identified and ranked.

2 Hypotheses relating to institutions.
2.1 Automation of library and bibliographic information systems in Brazil is attempted with sufficient support in the form of hardware, software and bibliographic formats.
2.2 In Brazil, automated library and bibliographic information systems influence each other in inverse relation to the distance between them.
2.3 In Brazil, there is a direct relationship between the size of libraries and bibliographic information systems and their success in automation.
2.4 Influence is carried between automated libraries and bibliographic information systems in Brazil by personal, rather than documentary channels.
2.5 There is a positive correlation between the specific processes automated by Brazilian libraries, and those automated in the U.S. or U.K.

3 Hypotheses relating to attitudes held by personnel of automated and non-automated systems.
3.1 Personnel of automated systems will hold views on the relative importance of problems which will be similar to those held by personnel in non-automated systems.
3.2 Personnel of automated systems will also hold views on the relative importance of motives and results of automation which will be similar to those held by personnel in non-automated systems.
3.3 The perceived educational needs of personnel of automated systems will be similar to those of personnel of non-automated systems.
3.4 The selection of general library priorities by personnel of automated systems will be similar to that by personnel in non-automated systems.
3.5 Personnel in automated systems will have attitudes towards automation which, when measured on a scale from negative to positive, will be similar to those held by personnel in non-automated systems.

2.4 Definition of basic methodology

There were two basic methods of examining the problems and testing the hypotheses:

1. Direct personal examination with a view to describing the situation.
2. Asking appropriate people for their opinions.

Both had their advantages and disadvantages. Personal examination permitted the detailed, flexible analysis essential in an area of such complexity, but could tend towards a purely descriptive study, while asking other people their opinions would produce subsets of data which could be compared. The results of personal examination could be distorted by the researcher's personal beliefs, while the opinions of other persons could be influenced by a desire to show that automation had been successful in their institution. They might also modify their answers to show they knew the "correct" or "textbook" answer, or to please the researcher.

The two elements were in large measure inseparable. A description has little research content; opinions have little value unless the reader has a clear idea of what is being commented upon. Therefore the researcher felt it necessary to prepare both a description and an examination of opinions. In more-industrialised countries it might be possible to create the general description from background reading, and concentrate research upon opinions. In Brazil this could not be done, due to lack of documentation. Also, Brazilian professionals urgently needed a description of what was happening, as well as opinions.

This decision to combine personal fact-finding with attitude tests determined the general outline of the research methodology. The researcher would personally visit relevant institutions. In fact this was the only practical method of in-depth data collection under Brazilian conditions; postal questionnaires would not be suitable for such a complex situation, and response rate might be low; telephone interviews would not be practicable in Brazil. The conditions at national conferences are not conducive to intensive programmes of
research interviews, and persons other than the researcher could not carry out the interviewing due to the complexity of the subject.

It was also quite clear that data collection instruments would have to be developed; informal questioning might be satisfactory at the pilot stage, but carefully-designed questionnaires would be necessary for a thesis-length study. The considerations above suggested two questionnaires, one institution-oriented and descriptive, the other people-oriented and attitudinal in nature. The people-oriented study could not be a single study, but had to cover two groups of people, those in institutions which had automated and those in institutions which had not automated. In that way comparisons could be obtained and a balance sought between the two sets of opinions. The people in institutions which had automated could be interviewed during the visits the researcher was to make to those institutions. The other group of people could be contacted by post. To sum up, the basic methodology called for the examination of three groups, using two data collection instruments:

1. Automated institutions, studied via a questionnaire on computer usage, applied by the researcher.
2. Personnel in automated institutions, studied via a questionnaire on attitudes and experience, applied by the researcher.
3. Personnel in non-automated institutions, studied via a questionnaire on attitudes and experience, applied postally.

2.5. Universe and sampling.

The definition of the institutional universe, referred to as universe 1, was relatively straightforward:

Universe 1: Those Brazilian institutions which had either
   a) automated a traditional library process, such as
      acquisition, cataloguing or circulation; or
   b) were responsible for the operation of an automated
      bibliographic information system.

The term "automation" was used in the definition, rather than "computer", because this permitted the inclusion of the Câmara system, which used punched card equipment for catalogue production. This was justifiable because the system was a pioneering one, which Brazilian readers would expect to see included in the survey, and because its products were not externally very different from the catalogues produced.
by some fully-computerised systems. The phrase "were responsible for" limited the study of major systems to their central unit only; Medline, for instance, was searched in regional centres, but only the national centre at Bireme, responsible for the whole system, was visited. A "bibliographic information system" was any system which stored and retrieved information about books, periodical articles, reports or similar documents. Data bases, SDI, indexing, bibliographies, etc. were included.

The size of the universe was estimated, on the basis of the pilot study, which had covered thirty institutions, at between 30 and 40 institutions. It was clear that with such a small universe random sampling was out of the question. In these conditions it might even be better to avoid the word sample and state that the researcher's objective was to visit as many of the institutions within the universe as practical limitations permitted. In terms of sampling we can define the sample of institutions selected for in-depth study, referred to as sample 1, as being:

Sample 1: Seventy five % of the maximum probable size of universe 1, chosen according to geographic limitations and significance.

Geographically, the sample was limited to four areas:

1 Brasilia, federal capital.
2 Rio de Janeiro, former federal capital.
3 Sao Paulo, Brazil's largest city, and the state of Sao Paulo.
4 Recife and Joao Pessoa.

Brasilia, Rio de Janeiro and Sao Paulo are all fairly close together in the centre-south of Brazil. The researcher was resident in Joao Pessoa, which was two hours drive from Recife. The pilot study indicated that thirty relevant institutions would be located within these limits. The numeric and geographic limits were also satisfactory in the practical sense, as the researcher was to visit all institutions personally, and thirty was a reasonable number from that point of view. Most were relatively close together in the south of the country, which meant that the sample could be visited in a study tour of four or five weeks, a reasonable period of time in view of the researcher's teaching commitments. Significance simply meant that in cases where a choice was to be made between institutions, the researcher selected, or visited first, that institution which appeared to be the
largest or most significant. In practice exclusions were extremely rare, but the decision-making procedure was essential to the methodology. To choose between two institutions on purely random grounds could possibly have led to the exclusion of a major information system, harming the information-gathering function of the survey. Institutions not visited were contacted by post with a brief questionnaire, so information loss was minimal.

It was necessary to obtain the opinions and measure the experience of two groups of people relative to library automation; this would permit comparison between the opinions of the two groups, and produce balanced results. The two universes chosen for investigation were defined as:

Universe 2: Persons in positions of responsibility in automated libraries or bibliographic information systems in Brazil.

Universe 3: Persons in positions of responsibility in Brazilian libraries which had not automated.

The phrase "in positions of responsibility" was not further defined by the researcher. In all cases the researcher asked to interview, or asked that postal questionnaires be completed by, persons in positions of responsibility, and accepted that the replies had, in fact, come from such persons. In practice this was the only way because of the difference in job descriptions from one institution to another, and it caused no problem because only staff on a fairly high level could respond to questions of such complexity. The automated libraries or bibliographic systems were of course the same as those in universe 1, defined above. It will be noted that universe 2 is not fully comparable with universe 3, because the third did not include bibliographic information systems. This was because the researcher did not know of any non-automated bibliographic information systems. The result was that the third universe was confined to librarians; this in itself was extremely valuable, because librarians were the future market for automated systems, and it was therefore vital to know their views.

Selection of the sample based on universe 2 was relatively simple:

Sample 2: Those persons in positions of responsibility in automated libraries or bibliographic information systems included in sample 1.
Sample 3 was slightly more complex, as it was necessary to draw opinions from a wide range of libraries and it would also be most useful if the number of responses from sample 3 was roughly the same as that from sample 2. As sample 3 was to be contacted by post, it was defined as follows:

Sample 3: Persons in positions of responsibility in a wide range of larger Brazilian libraries which had not automated. The dimension of the sample would be three times the size of sample 2.

A wide range was interpreted both geographically and by type of library; further details of the postal questionnaire are given below. Larger libraries were chosen as it would be inappropriate to send complex postal questionnaires to small libraries, which might not even employ professional staff. Sample 3 was dimensionalised as three times sample 2, because sample 3 was to receive a postal questionnaire. The researcher estimated the response from a postal questionnaire might be around 33%, therefore the number of responses in samples 2 and 3 would be approximately equal.

2.6. Questionnaire design.

The major problem faced during the design of the institutional data collection instrument was the extremely disparate nature of the institutions to be examined, which ranged from large information systems to small special libraries. A special difficulty was posed by the number of different activities sometimes found within the same institution. The questionnaire had to be able to deal with institutions which had one automated process, such as cataloguing, and others which had several, such as cataloguing, circulation and data-base searching. A cataloguing system might also be capable of producing a printed bibliography for outside use, or have an inventory control capability. In certain cases the researcher wanted additional information; for instance it was important to discover how SDI profiles were set or modified, but that question is only relevant to SDI. The solution adopted was to use a questionnaire in three parts, or levels:

1 Questions relevant to all institutions.
2 General questions on automated processes; this part of the questionnaire could be repeated in institutions which had more than one automated process.
3 Specific questions on automated processes of special interest.
This meant that all institutions would answer part 1; all would answer part 2, while those with more than one automated process would answer it more than once; finally many would answer some specific questions from part 3. This was complicated, but the institutions to be examined varied so much amongst themselves it was the only way. It was possible from the practical point of view because the researcher did all interviewing personally and was able to apply the questionnaire correctly.

Part 1, questions relevant to all institutions, was relatively straightforward. Institutions were asked to identify themselves and their computer. Influences were covered in detail, both generally, and in terms of the use of outside data and bibliographic formats. Respondents were prepared for questions on number of volumes, number of periodical titles and requests for documents produced by them, or which had influenced them, by previous written notice. A key feature was a list of eighteen different processes; institutions were asked to select those which had been automated in their case. Also of importance were the three questions about the major problems, motives and results of automation, the basic theme of the research. These were "open-ended" questions, i.e. no list of possible answers was supplied, because one of their objectives was to "fish" for problems not revealed in other parts of the study. Most questions, however, were closed; e.g. when asked to identify channels of information between themselves and other institutions, the respondents were given a list of five different channels. The sequence in which the questions were asked was not crucial in this part; the question as to which processes had been automated and other general questions were placed early so that the researcher could form a clear all-round idea of the institution as early as possible.

The general questions on automated processes in part 2 had to be able to gather data on processes of all types: cataloguing, circulation, SDI, indexing, etc. For this reason open-ended general questions were used, carefully organised according to chronological, systems-analysis principles. Respondents were first asked when the process was automated, and about the manual process it replaced. The next questions dealt with data input, size of files and data output, in that order, reflecting the input/processing/output sequence of systems analysis. Respondents were finally asked about modifications.
to the system. The generic nature of the questions made them suitable for all processes, as all were set up, modified, and had input, data files and output.

The third part of the questionnaire contained questions of special interest, applicable only to specific processes. For instance, institutions with SDI systems were asked how they informed potential users of the service, how profiles were formed or updated, whether the service was free or included a copy service for original documents. These additional questions were only formulated for six major processes: acquisitions, cataloguing, circulation, SDI, data bases and production of indexes or printed catalogues for external use. In no case did the number of questions exceed five, as it was felt that respondents would be getting tired by the time they reached this stage in the interview.

A postal questionnaire was sent to institutions which could not be visited personally. This had to be simple and brief, because response to complex postal questionnaires on this subject would probably be low. It included questions on problems, motives and results, asked for brief numerical information on four major processes (acquisition, cataloguing, circulation, indexing) and for comments. It also contained a request for copies of input forms, samples of output, etc. The researcher considered that examination of such material was the best way to determine how the system operated.

The people-oriented data collection instrument was designed to test attitudes and experience. These were fairly distinct functions, and a two-part questionnaire was designed; attitudes were tested first as these required thought; if the respondents were to tire while answering the first part, this would matter little as the questions on experience in the second part would be easy to answer. The major problem of the first part of this instrument, the attitude test, was to determine the best method to measure attitudes. This took much time and work, which was natural, as it was the heart of the research. It is not practical to simply ask respondents to give their attitudes in their own words; such results would be exceptionally difficult to tabulate, and their classification would probably reflect the researcher's views more than those of the respondents. One can endeavour to discover peoples attitudes through their activities; this is equally difficult to tabulate and requires lengthy study. It had also to some extent
been included here, as the researcher did examine existing systems, which could be said to be the crystallisation of attitudes. Respondents could be asked to comment upon case studies, but these would be difficult to draw up and it would be difficult to tabulate the results. In fact the only practical way to obtain information on attitudes was the standard method of presenting a series of statements to the respondents, and asking them to comment on them in a systemic manner.

Procedures for this are well-established; the respondent is shown a statement, such as "Automated systems are faster than manual systems", which has to be evaluated on a scale with an odd number of points; five-point or seven-point scales are generally used:

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

Respondents are asked to circle the number which most closely represents their opinion; an additional number for "don't know" is often supplied; e.g. if a respondent agreed fairly strongly with the statement the data collection instrument would be marked as follows:

```
Automated systems are faster than manual systems.
```

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

This type of questionnaire is fairly common in the U.S. and U.K., but that does not necessarily mean it would be suitable for Brazilian conditions. The final questionnaire contained sixty statements, which would mean the respondent would have to make sixty different evaluations of this type. This would be a major task, more than the researcher could reasonably ask from respondents, and response could have been low for that reason. Further, Brazilian professionals are not accustomed to answering questionnaires. Little research is done in Brazil, and the few questionnaires which do circulate tend to be structurally simple. The researcher felt that Brazilian respondents might have serious difficulties with a complex questionnaire. Finally, the type of questionnaire in which the respondent has to rate statements might not be very successful in these particular circumstances, because
respondents, especially those unfamiliar with this type of questionnaire, might rank all problems as serious problems. They might do this because that was their opinion, or because they thought this was what the researcher wanted, and by doing so they would be helping. Whatever the reason, they would totally defeat the object of the research, which was to identify the most important problems.

Therefore the researcher, after considerable thought, adopted a slightly different procedure. A list of problems would be presented to the respondents and they would be asked to select the 50% which they considered most important. This had several advantages: it was extremely simple and a person with little or no experience of questionnaires could understand what was required; it was fast and it forced respondents to distinguish between the most important and least important problems. This system was used on five occasions: evaluation of motives, problems and results, and selection of training opportunities and library priorities. These five tables were followed by a table asking what percentage of libraries would be using the computer in ten years time, and finally two straightforward attitude tests in which respondents evaluated, on a positive-negative five point scale, the actual and future impact of computers on libraries. It became rapidly clear that the list of problems had to be longer than the lists of motives and results. It was therefore placed first to give the following logical order, in which respondents had to make a constantly diminishing number of choices:

1. List of twenty problems; respondents asked to choose up to ten of the most important.
2-3 Lists of ten motives and results; respondents asked to choose up to five of the most important.
4-5 Lists of ten training opportunities and library priority areas; respondents asked to choose up to five of the most important.
6-8 Three attitude tests on computers in libraries; respondents asked to select one alternative only.

Placing problems first also meant that the respondents would examine them while fresh. Especial care was taken with the instructions; a typical instruction was:

"What, in your opinion, are the most important problems in the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than ten alternatives from the list below".
"In your opinion" was inserted to stress that the researcher wanted to know the respondent's own opinion, not the correct or textbook opinion, or the opinion of the respondent's boss. The request for the respondent's own opinion also made it unnecessary to offer a closer definition of "most important"; that also depended on personal opinion. The respondent was constantly reminded of the scope of the study, "computers in libraries and bibliographic information systems" so these words did not have to be constantly repeated in the statements. Brazil was constantly specified as the geographic area of the survey; respondents should not take an international view, nor limit themselves to their own systems, but judge on a national level. The researcher had at one time considered testing each set of statements twice, once for Brazil, then again for the specific system on which the respondent worked. This was dropped as too complex, but three open questions, on problems, motives and results, were inserted into the questionnaire on specific institutions.

The selection of statements to be chosen or rejected was especially difficult. For instance the problems had to reflect, in twenty statements, all major problems of automated systems, and had to be brief and not open to misunderstanding. To ensure the most accurate list at this crucial point the researcher discussed the possibilities as widely as possible with professional colleagues; the pre-test was also valuable in this area. It was appreciated that the selection of statements could, even then, be faulty, so the respondents were specifically asked, at the end of each list of statements, whether anything had been omitted. For instance, after the list of problems, they were asked "Is there any other important problem?" This meant that the central area of interest was being approached from three different directions:

1. Lists of problems, etc. for evaluation.
2. Requests for additional problems, etc.
3. Open questions as to the problems, etc., which had affected specific systems.

Thus any possible failure to gather data at one point would be compensated at another point; also data collected from each approach could be examined for consistency.
This first part of the data collection instrument was identical for all respondents, but experience, training, etc. were different for users and non-users of automated systems. Users were asked to answer questions which would reveal their training and experience in detail, such as courses taken, automated systems seen, documents read, years of experience, etc. This section was designed to be answered quickly and responses were generally numeric. As respondents might be people with both great experience and minimal experience, the range of numerical responses was set to approximately double at each stage, e.g.:

Please estimate the number of such documents, selecting one alternative from the list below:
1 1 - 3
2 4 - 9
3 10 - 19
4 20 - 40
5 More than 40

Users were also asked to identify themselves. Non-users were simply asked for information on any library automation course they had attended; they were not asked to identify themselves, as their postal questionnaires were anonymous. Finally, both groups were given a chance to comment; the researcher considers it polite to give respondents a chance to make general comments after replying to structured data collection instruments. It is also a final safety net to pick up information not presented during the structured part of the questionnaire.

2.7. Pretest and data collection.

Pretesting of the data collection instruments posed special problems. It was felt essential to pretest, due to the length and complexity of the structured interviews. Also, as will be seen below, the researcher intended to use some unusual methods of presenting the questionnaire and noting the results. But the researcher was located in North-East Brazil, far from the concentration of automated systems. It was obviously impossible to make a special journey to the South, a round trip of 2,000 miles, just to pretest. The only possibility was to pretest on the two systems located nearby, in João Pessoa and Recife.
This was done two months before data collection took place, and was most useful, because it revealed some problems which were solved before the study tour took place. It also caused a slight problem from the point of view of the methodology, because it is not normal to apply final questionnaires to respondents who have seen them as part of the pretest. To follow this rigorously would in this case have put the researcher in a difficult situation, because the researcher's own university and own region would have had to be taken out of the study. It was felt that as a large section of the data was descriptive, rather than opinionative, the fact that two institutions had seen the data collection instrument at both the pretest and final survey stages would not be critical; the alternatives of not pretesting, or excluding pretested institutions from the final survey, would be worse. To minimise any possible influence of the pretest on the final result in the case of these two institutions, they were surveyed as late as possible, about six months after the pretest.

The major data collection phase was planned with care. It could not take place during the university semester, due to the researcher's teaching responsibilities. University vacations in Brazil run from about mid-December to mid-March, plus another month around July. Data collection was not possible from mid-December until the end of January, the Christmas and mid-summer vacation period. It was also not feasible during carnival, which fell in mid-February. The schedule finally chosen was as follows:

Week 1 (4-10 February): Brasília
Week 2 (11-17 February): São Paulo
Week 3 (18-24 February): Carnival week; visit to São José dos Campos, São Paulo state, scheduled for the end of the week.

The time spent in each city reflected the number of relevant institutions the researcher expected to find. In all cases the most important institutions were visited first. A full day was scheduled for major institutions, a half day for minor ones. Once the schedule had been fixed, letters were sent to each institution, informing them of the researcher's visit, and warning them of certain questions, for instance about the documents which had influenced them, for which they...
might wish to prepare answers. These letters went out at the end of December; no institution refused to participate.

The researcher gave considerable thought to the physical details of the structured interview. The normal procedure would be to travel with a bundle of blank duplicated questionnaires, and have them completed one by one. This, however, had serious disadvantages in the circumstances:

1. Certain features of data collection were incompatible with the idea of a single questionnaire. The most obvious of these was section 2 of the institutional questionnaire, which dealt with specific automated processes. An institution with one such process would reply to this section once; an institution with three (e.g. cataloguing, circulation, SDI) three times. This could possibly be solved by the use of a sub-divided questionnaire, but this would introduce other complications.

2. As Brazil is of sub-continental size all travel had to be by air, and it would be difficult to carry large numbers of questionnaires.

3. Questionnaires are normally in one copy; if this single copy was lost the information would also be lost, and it would be extremely difficult to compensate for such an eventuality.

4. The use of a tape recorder was ruled out, because it might well have inhibited respondents and would have produced numerous tapes, requiring lengthy and difficult analysis.

To avoid these problems the researcher had the questionnaires typed out in a small number of copies and covered with transparent plastic. During the data collection interviews the respondent referred to one copy, while the researcher followed on another. The respondent replied orally, and the researcher noted the question number and reply onto a pad of blank paper. This system was pretested, and found to be satisfactory; it was equally satisfactory during the study tour. Respondents also seemed happy with the system; they did not have to write, and therefore the interviews could be conducted quite rapidly. A sheet of carbon was used, so that two copies of the results could be obtained. The top copies travelled with the researcher, as hand luggage during flights, while the carbons were sent back weekly by registered mail. All top and carbon copies were brought back safely but the researcher continued to be concerned about security; top and carbon copies were never kept in the same building; as each section of the text was written or revised it was xeroxed and the copy sent to the researcher's supervisor.
Questionnaire presentation differed from the norm on another minor point. When it is necessary to branch within a questionnaire the normal procedure is as follows:

1 Have you taken any course which deals with the use of the computer in libraries or bibliographic information systems?
   If you answered no please go direct to question 3.
   If you answered yes please answer question 2 before continuing.

- 2. Please give the title of this course or courses.

3 Have you worked in any other library or bibliographic information system which used the computer?

   The researcher had had a negative experience using this type of instruction with student researchers, who tended to ask all the questions, ignoring instructions to jump direct to some questions in certain circumstances. Therefore, to avoid all possible risk of confusion, the researcher laid out the paths graphically:

   1 Have you taken any course which deals with the use of the computer in libraries or bibliographic information systems?

   NO
   YES
   2 Please give the title of this course or courses.

   3 Have you worked in any other library or bibliographic information system which used the computer?

   This system was well accepted by respondents.

   During the study tour the attitude test was applied to fifty-five persons in positions of responsibility in the institutions which used automation. The researcher therefore decided that Sample 3, persons in positions of responsibility in a wide range of larger Brazilian libraries which had not automated, should be dimensionalised at 160 persons. This would mean that a one-third response would produce roughly the same number of responses for each group. 160 questionnaires were duplicated and despatched with a covering letter and stamped addressed envelope for return in June 1980. Two questionnaires were sent to each of eighty institutions; forty university libraries, twenty public libraries and twenty special libraries were chosen for this. Two were sent to each owing to the difficulty of identifying and finding the
address of 160 large Brazilian libraries; questionnaires were anonymous. The proportion of forty, twenty and twenty roughly represented their relative importance within the profession in Brazil. The researcher chose libraries which he believed not to be automated, and included in the covering letter a request that, if the library was automated, it should pass the questionnaires to a non-automated library and write to the researcher for the questionnaire for automated libraries which could not be visited personally. No library sent such a request. A second postal questionnaire was sent to institutions which were thought to have automated systems. As the researcher investigated every possible hint or rumour about automation, thirty such questionnaires were sent out, in the second half of 1980. In March-April 1982, as the text of the thesis was being finalised, letters were sent to all institutions, requesting information on changes since the field study; a total of forty individual letters were sent.
3 COMPARATIVE ANALYSIS OF INSTITUTIONS

3.1. Computer usage in institutions visited

A total of 31 institutions were visited and studied in depth; they can be categorised as follows: 8 universities or university departments (UnB; FO/USP; IF/USP; USP/SC; UFRJ; Nutes/Clates; PUC; UFPb); 8 governmental institutions (Cimec; Prodase; Câmara; Minter; DNER; Serpro; IME; Sudene); 6 institutions in the energy or nuclear energy fields (IPEN; IEN; Petrobras; CIN; Electrobras; Furnas); 4 national institutions, including the National Library and national documentation centres (BN; Ibict; Binagri; Bireme); 4 research institutes (IPT; INPE; Embrapa; FGV), and one public library (Taubip). These are not the only sub-divisions possible, due to the great complexity of the Brazilian institutions studied. For instance IPT, IPEN and IEN are located on university campuses, but are independent institutions; FGV, INPE and Ibict offer post-graduate courses, but are not universities. It would also be possible to form other categories of organisations in the agricultural field, consisting of Binagri and Embrapa, or of organisations in the nuclear energy field, IPEN, IEN and CIN; the latter could just as well be placed with the national organisations. It could be said that the category "governmental" is arbitrary, because almost all institutions listed were dependent upon government funding.

Comments: In view of these problems it is difficult to compare the Brazilian situation to that of other countries. A 1973 British survey of libraries with operational computer applications located 61 special, 34 public and 33 university libraries with automation; national libraries were excluded from the study (DUCHESNE, 1974). The Brazilian sample included only one public library, reflecting the extreme weakness of that institution in Brazil, as in many other parts of the Third World. It is interesting to note that the governmental, research and energy libraries in the Brazilian survey, those which might be called "special libraries" in the terms of the British survey, total 18. This is about twice the number of automated university libraries; a similar proportion between special and university libraries was found in the British survey. Early automation in the United States also seems to have had some features reminiscent
"Automation, which began in the libraries of the universities, is spreading rapidly to other types of libraries. Special libraries, particularly those related to corporations, were also early entrants in the movement. A few public and school libraries were pioneers, but only recently has interest in automation become widespread in these libraries". (PARKER, 1970).

The existence of automation in several agricultural and nuclear institutions is also to be expected; both were priority areas for the Brazilian government and both were supported by strong international information systems. SARACEVIC (1979) notes that "the extent and number of reported activities in agricultural information in Brazil exceed those from all other countries in Latin America, if not the world", and describes Binagri as "the first national library established in Latin America that is devoted to a specific subject". Nuclear energy has a natural affinity with computers, which are required in all nuclear installations in view of the complex calculations which are necessary. A similar situation arose in the US, where in 1970/71, relatively early from the point of view of library automation, 5, or 38% of the Atomic Energy Commission's libraries had some automation (HENDERSON, 1972). At that time the only US federal government agency to have automation in more than five libraries was the Dept. of Defense (MARKUSON, 1972, p.152).

Computer-related organisations naturally try to use computers in their libraries; installations at USP/SC and PUC were in the computer centre library, Serpro was the federal government data processing centre, and Nutes/Clates a centre for computer assisted instruction. A high technological level could also be observed during the field studies; one institution had installed electronically-operated security doors, opened by a plastic card; another had a coin-operated hot-drinks dispenser. Such mechanisms were extremely rare in Brazil, where personnel can be hired easily and cheaply to guard doors and make coffee.

Central government support for automated library and information services has been shown to be crucial in many contexts, such as Britain, in the case of the British Library, and the U.S., with the
Map 1: Sketch-map of Brazil, showing the 31 institutions visited and studied in detail.
Library of Congress and the National Medical Library. BOURNE (1967) cited federal involvement in first place amongst "significant recent trends and events" influencing the early days of library automation there.

Location of institutions: (in the order in which they were visited)

**BRASÍLIA:** Cimec; Binagri; Embrapa; Prodasa; Câmara; Minter and UnB. Total 7 institutions or 22.6%.

**SÃO PAULO:** Bireme; FO/USP; Taubip; IF/USP; IFT; USP/SC and INPE. Total 8 institutions, of which five were located in the city of São Paulo, the remainder in other cities of the state of São Paulo, i.e. Taubip in São Bernando do Campo; USP/SC in São Carlos; INPE in São José dos Campos; 25.8%.

**RIO DE JANEIRO:** Ibict; BN; UFRJ; IEN; Nutes/Clates; Petrobras; CIN; FGV; DNER; Eletrobras; PUC; Serpro; Furnas; IME. Total fourteen institutions or 45.2%, all in the city of Rio de Janeiro.

**RECIFE:** Sudene. One institution or 3.2%.

**JOÃO PESSOA:** UFPb. One institution or 3.2%.

Brasília has been Brazil's capital since 1960 and is the seat of the federal government; it has a population of 1.2 million. São Paulo is Brazil's chief manufacturing centre, with 12.6 million people in its metropolitan area. Rio de Janeiro was capital before Brasília was constructed and, with nine million inhabitants, is still one of the world's major cities. It is interesting to note that Rio still has the largest number of civil federal civil servants, 30%; São Paulo and Brasília only have 8% each (ARAGÃO, 1982).

3.1.1. Questions relevant to all institutions

**QUESTIONS 1 - 7:** Name of institution; address; telephone; name of person interviewed; position held by person interviewed; date of
interview; approximately how many people work in this library or bibliographic information system?

These preliminary questions were not susceptible to numerical analysis. Responses to the final question, on number of employees, were not standardised, and so were not analysed here, although they have been recorded in the appropriate descriptions of institutions in Appendix A.

**QUESTION 8:** Please identify the documentation which exists for the automated system, basing your reply upon the following list.

Sixteen institutions (51.6%) claimed all the items on the list; four (12.9%) did not answer this question. The results from the eleven institutions which selected specific choices were: sample of output (11 institutions); input form (10); system documentation (8); manual (7); flowchart (6); objectives (5); description published in a periodical, in the proceedings of a conference, or as a report (1).

*Comment:* The systems appear to be adequately documented internally, but attach little importance to the publication of a description of their operations.

**QUESTION 9:** Please indicate up to three books, articles, reports or other documents which had a major influence upon your system.

Thirteen systems (41.9%) did not reply to this question; those that did reply can be divided into three categories: mentioned a document or documents specifically relevant to that system (6 responses); mentioned a bibliographic format (9); mentioned some other type of document (5); (Note: two institutions fell into two of the above categories). Examining these categories in greater detail, we find the following:

System related documents: Binagri mentioned the United Nations Development Programme project document upon which it had been based (Proyecto PNUD/PAO/BRA/72/020); Embrapa had based its SDI on "CURRENT awareness literature service: user's guide. 3.ed. Beltsville, Maryland, US Dept. of Agriculture, 1976."; the IPEN system had been designed on
the basis of papers published in "1968 meeting of European librarians working in the nuclear field: a selection of papers read at the 5th annual meeting of scientific librarians organized by the Centre for Information and Documentation (CID) and the Scientific Information Processing Centre (CETIS) at Stresa (Ispra), Italy, April 24-5, 1968. Luxembourg, Euratom, 1969. (EUR 4256e)"

UFRJ and Furnas had both been based upon "SZWARCFITER, Jaíme Luiz. Uma sistematização do processamento de dados - aplicação em automação de bibliotecas. Rio de Janeiro, COPPE, 1971. 205p. Masters thesis." CIN had been influenced by INIS manuals.

Bibliographic formats: the nine respondents in this category mentioned six formats or similar documents a total of 16 times. Formats cited were Calco (5 times); Unimarc (4); Marc (3); ISBD (2); KWIC/IBM, Canadian Marc (once each).

Other documents: the person responsible for searching the overseas data bases at IBICT listed the periodicals "Online", "Online Review" and "Data Base". The other four respondents who cited items in this category, BIREME, the library subsystem at IPT, DNER and UFPb, gave the following ten monographs or periodical articles:


Comments: Participants in the survey had been given advance notice of this question, in the circular letters the researcher sent out announcing his visits, and therefore the low level of response must indicate a low level of literature use. For a research project, the origin of the monographs and periodical articles can be analysed to identify influences on the respondents. Unfortunately, only ten such items were cited; at the most we can say that the sample contains no surprises; most of the documents, like most of the documents produced on the automation of library and information systems, are in English; several items are advanced textbooks, but periodical articles, conference papers and Unesco documents are also represented.

QUESTION 10: Please identify the processes actually carried out by computer in this institution, basing your reply upon the following list:

Answers to this question fell into two groups: processes in full operation and processes not quite fully operational; there was a total of 85 processes in full operation. (Note: it is necessary to distinguish a process from a system or subsystem. A single system or subsystem may be capable of handling more than one process; for example several cataloguing systems also had an inventory control capacity. Some institutions had separate book and periodical catalogues, others handled these two processes together.)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Process</th>
<th>Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Routine cataloguing of books and similar materials within the institution</td>
<td>17 (20.0%): Câmara; IPEN; IF/USP; IPT; USP/SC; INPE; UFRJ; IEN; Nutes/Clates; FGV; PUC; Serpro; Eletrobras, Furnas; UFPb; Prodasen; Minter.</td>
</tr>
<tr>
<td>2</td>
<td>Bibliographic data base with retrospective search capacity</td>
<td>9 (10.6%): Embrapa; Prodasen; Bireme; IPEN; IPT; Ibict; CIN; IME; Minter.</td>
</tr>
<tr>
<td>No.</td>
<td>Activity</td>
<td>Institutions</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>3</td>
<td>Circulation control</td>
<td>8 (9.4%): IPEN; USP/SC; INPE; UFRJ; Eletrobras; Furnas; Sudene.</td>
</tr>
<tr>
<td>4</td>
<td>System to produce indexes or printed catalogues for external use</td>
<td>7 (8.2%): Cimec; Binagri; Bireme; FO/USP; Ibiot; BN; Prodasen.</td>
</tr>
<tr>
<td>4</td>
<td>Internal system to index periodicals, reports, etc.</td>
<td>7 (8.2%): IPEN; USP/SC; INPE; Eletrobras; Prodasen; DNER; Minter.</td>
</tr>
<tr>
<td>6</td>
<td>Selective dissemination of information</td>
<td>6 (7.1%): Binagri, Embrapa, Bireme, IPT; CIN; IME.</td>
</tr>
<tr>
<td>7</td>
<td>Acquisition of books and similar materials</td>
<td>5 (5.9%): IPEN; INPE; UFRJ; Eletrobras; Furnas.</td>
</tr>
<tr>
<td>7</td>
<td>Inventory control</td>
<td>5 (5.9%): USP/SC; UFRJ; IEN; Serpro; Furnas.</td>
</tr>
<tr>
<td>7</td>
<td>Lists of periodicals held in the institution</td>
<td>5 (5.9%): USP/SC; Minter; IPEN; Serpro; Furnas.</td>
</tr>
<tr>
<td>10</td>
<td>Renewal of periodical subscriptions</td>
<td>4 (4.7%): Serpro; IPEN; INPE; Furnas.</td>
</tr>
<tr>
<td>11</td>
<td>Union catalogue of books and similar materials in various institutions</td>
<td>3 (3.5%): Minter; Petrobras; DNER.</td>
</tr>
<tr>
<td>12</td>
<td>Lists of new acquisitions</td>
<td>2 (2.4%): IP/USP; Eletrobras.</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of periodicals</td>
<td>2 (2.4%): IPEN; Furnas.</td>
</tr>
<tr>
<td>12</td>
<td>Union catalogue of periodicals in various institutions</td>
<td>2 (2.4%): Ibiot; Minter.</td>
</tr>
<tr>
<td>Process</td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Selection of books and similar materials</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td>Cataloguing of special collections</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td>Other processes: system to distribute ISBNs</td>
<td>1</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

**Note:** No system had automated either an internal SDI system with information on new acquisitions, or control of bindery processing.

**Comments:** It is not surprising to find that cataloguing was the most popular automated process, in view of the pivotal nature of the catalogue in the library, the emphasis given to cataloguing in Brazilian library schools, and its affinity with the bureaucratic methods common in Brazilian society. The popularity of internal systems to index periodicals, reports, etc., reflects the lack of published indexes in Brazil. Inventory control is also quite a popular process; this is often a weak area in manual systems. It is also interesting that the union catalogues of books all operate within large institutions; no union catalogue covering the books of various institutions was found, which must reflect the difficulty of organising such a multi-institutional initiative under Brazilian conditions. Bibliographic data bases were well-established, but systems to produce indexes or printed catalogues for external use were only slightly fewer in number, showing the need for information in printed form in Brazil.

It is interesting to compare the above pattern with that of other countries in the initial stages of automation. A 1970 survey of British university libraries (DUCHESNE, 1971) found 69 operational applications, divided as follows: cataloguing: 34%; circulation: 13%; stock records: 11%; subject indexes: 9%; accessions lists: 7%; receipt & check-in: 6%; accounts: 4%; selection: 3%; order: 3%; information retrieval or SDI: 3%; statistics: 3%. The major difference between this and the Brazilian situation was that the Brazilian survey included information systems, and therefore included much more
information retrieval and SDI. Certain other activities rare in British university libraries were undertaken by Brazilian institutions, notably the production of indexes or printed catalogues for external use, and internal systems to index periodicals, reports, etc. Conversely, British university libraries traditionally produce accessions lists; in Brazil such lists are far rarer, and almost entirely limited to special libraries. Bearing these points in mind, there are some important similarities between the two situations.

Cataloguing is the major process; there are slightly more than twice as many cataloguing systems as there are circulation systems. Inventory control or stock records follow closely upon circulation systems; "acquisition systems" in Brazil appear to be more in evidence than "order systems" in Britain, but Britain has a separate category of "accounts" which are presumably mostly linked to the acquisitions function.

In 1972-3 the same author made a wider survey of British activities, covering 135 libraries and 12 information systems (DUCHESNE, 1974). The breakdown by major process was: cataloguing (production of catalogues, accession lists, shelf lists, serial lists, subject and other indexes): 53%; current awareness/IR: 16%; circulation: 11%; acquisition (selection, ordering and receipt of material; includes check-in of periodicals): 9%. Re-arranging the Brazilian results into the same categories, we find remarkably similar results: cataloguing, indexing, union catalogues, etc.: 57.7%; current awareness/IR: 17.7%; circulation control: 9.4%; acquisitions: 14.2%.

HENDERSON's 1972 survey of automation in U.S. federal government libraries, excluding the three national libraries, revealed 115 operational systems, arranged in the following major categories: cataloguing: 23.5%; serials: 21.7%; information retrieval: 12.2%; circulation: 11.3%; bibliographic publications: 8.7%; selective dissemination of information: 6.1%; acquisitions: 6.1%. Sorting the Brazilian results into comparable categories we find close parallels: cataloguing, including union catalogues of books: 23.5%; serials: 15.4%; IR/data bases: 10.6%; circulation: 9.4%; bibliographic publications (indexes or catalogues for external use): 8.2%; abstracting and indexing (internal indexing): 8.2%; selective dissemination of information: 7.1%; acquisitions: 5.9%.
This data enables us to examine hypothesis 2.5, that "there is a positive correlation between the specific processes automated by Brazilian libraries, and those automated in the U.S. or U.K.". Due to the different categories used by the various surveys, it is not possible to calculate a precise correlation, but it is clear that there is a positive correlation between results, and that this hypothesis was proven. This indicates that the views of professionals and the pressures placed upon manual systems must have been similar in all three situations. Despite barriers of time and place, the library and information professions followed roughly similar paths.

Further analysis of data from question 10:

Number of operational processes per institution:

<table>
<thead>
<tr>
<th>No. of processes</th>
<th>No. of institutions</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>UnB; Taubip</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>Câmara; UFPb; FGV; PUC; Nutes/Clates; Sudens; Petrobras; Cimec; FO/USP</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>IF/USP; Embrapa; DNER; Binagri; CIN; IME; BN</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>IPT; IEN; Ibict; Bireme</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>UFRJ; Serpro; Prodasen</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Eletrobras</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>Inpe; USP/SC; Minter</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Furnas</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>IPEN</td>
</tr>
</tbody>
</table>

Note: the two institutions which did not have any operational processes both had systems under test, about to come into operation.

Comments: This indicates a situation in which automation is spread thinly over the institutions surveyed; 20 institutions, 64.5% of the total, have either 1, 2 or 3 processes automated. This is exactly the situation one would expect to find in the early stages of automation. MARKUSON (1972, p.154) contains a table for the number of applications per automated federal library in 1970-1: one application: 20 libraries; two applications: 9 libraries; three applications: 12 libraries; four applications: 8 libraries; five applications: 7 libraries; six or seven applications: one library each. This is quite similar to the
Brazilian situation: 70.7% of the libraries have 1, 2 or 3 applications automated; only a very small minority have more than half-a-dozen automated applications.

Processes not quite fully operational:

Question 10 also revealed 20 processes not yet in full operation in eight institutions. These were systems which were receiving input but which had not yet produced output, or which were in the final stages of testing. Two institutions, UnB and Taubip, had only processes of that nature at the time of the research visit. Taubip requires a special mention: its philosophy was to form a database capable of holding a large variety of types of bibliographical information, and to produce from that database the largest possible number of products. When examined in the light of this survey, which enumerates automated processes, Taubip had capacity for eleven processes, i.e. book cataloguing, inventory control, lists of periodicals, periodicals indexing, union catalogue of periodicals, union catalogue of books, data base with retrospective search capacity and system to produce printed catalogues or indexes for external use. The other seven institutions with processes in this category were more conventional: UnB, BN and IME were setting up cataloguing systems; UnB was setting up a circulation system; Bireme was setting up a periodicals receipt system; BN was preparing a list of its periodicals; Nutes/Clates was setting up a system to index periodicals; Embrapa was setting up a union catalogue of books; Binagri was setting up a data base with retrospective search capacity.

Comment: Inclusion of these twenty not quite fully operational processes would cause little change to the ranking of operational processes given above.

QUESTION 11: Do you intend to automate other processes within the next two years?

Twenty-two institutions (71.0%) replied positively to this question. They were then asked, as question 12, which processes they intended to automate. In six cases the replies did not fit the categories used in question 10; these were: Binagri and PUC intended to
implant integrated automated library systems; three institutions intended to set up systems to control specific types of material; Câmaras: official documents; Bireme: non-conventional documents; Petrobras: technical standards; IME planned to integrate its data base and SDI systems.

In 41 cases the intention to automate could be fitted into the categories used in question 10, giving the following results: S.D.I._ (6 institutions); receipt of periodicals (5); acquisition of books, circulation, internal system to index reports, periodicals, etc. (4 institutions each); inventory control (3); cataloguing of books, lists of new acquisitions, internal SDI with information on new acquisitions, subscription renewal, lists of periodicals in the institution, union catalogue of periodicals (2 institutions each); selection of books, bibliographic data base, system to produce indexes or printed catalogues for external use (one institution each).

Finally, it is possible to make a combined ranking showing the position that would exist if the 31 institutions continued their automated processes, brought into full operation those which were about to come into operation and those they wish to bring into operation:

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Process</th>
<th>No. of institutions</th>
<th>% of processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Routine cataloguing of books and similar materials</td>
<td>23</td>
<td>15.1%</td>
</tr>
<tr>
<td>2</td>
<td>Internal system to index periodicals, reports, etc.</td>
<td>13</td>
<td>8.6%</td>
</tr>
<tr>
<td>3</td>
<td>Circulation</td>
<td>13</td>
<td>8.6%</td>
</tr>
<tr>
<td>4</td>
<td>Selective dissemination of information</td>
<td>12</td>
<td>7.9%</td>
</tr>
<tr>
<td>4</td>
<td>Bibliographic data base with retrospective search capacity</td>
<td>12</td>
<td>7.9%</td>
</tr>
<tr>
<td>6</td>
<td>Acquisition of books and similar materials</td>
<td>9</td>
<td>5.9%</td>
</tr>
<tr>
<td>6</td>
<td>Inventory control</td>
<td>9</td>
<td>5.9%</td>
</tr>
<tr>
<td>6</td>
<td>Lists of periodicals held in the institution</td>
<td>9</td>
<td>5.9%</td>
</tr>
<tr>
<td>6</td>
<td>System to produce indexes or printed catalogues for external use</td>
<td>9</td>
<td>5.9%</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Rank</td>
<td>%</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td>10</td>
<td>Receipt of periodicals</td>
<td>8</td>
<td>5.3%</td>
</tr>
<tr>
<td>11</td>
<td>Other processes</td>
<td>7</td>
<td>4.6%</td>
</tr>
<tr>
<td>12</td>
<td>Renewal of periodical subscriptions</td>
<td>6</td>
<td>4.0%</td>
</tr>
<tr>
<td>13</td>
<td>Lists of new acquisitions</td>
<td>5</td>
<td>3.3%</td>
</tr>
<tr>
<td>13</td>
<td>Union catalogue of periodicals</td>
<td>5</td>
<td>3.3%</td>
</tr>
<tr>
<td>13</td>
<td>Union catalogue of books</td>
<td>5</td>
<td>3.3%</td>
</tr>
<tr>
<td>16</td>
<td>Internal SDI with information on new acquisitions</td>
<td>3</td>
<td>2.0%</td>
</tr>
<tr>
<td>17</td>
<td>Selection of books and similar materials</td>
<td>2</td>
<td>1.3%</td>
</tr>
<tr>
<td>17</td>
<td>Cataloguing of special collections</td>
<td>2</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Comments: There is a very strong correlation between the above ranking and the ranking of operational systems. Using Spearman's rank correlation coefficient, discussed in greater detail in section 4.3.1. below, we find a correlation of 0.9118; when comparing 17 ranks .6176 would be sufficient for significance at the ½% level.

**QUESTION 13:** Was your automated system influenced by any other system which uses the computer?

Thirteen institutions (41.9%) replied positively to this question. They were then asked to answer questions 14, 15 and 16.

**QUESTION 14:** Please identify and locate up to three of the systems which influenced your system.

Answers were as follows: in four cases the Brazilian system imported tapes and had therefore been influenced by the organisation which produced the tapes: Binagri used AGRIS tapes and had been influenced by AGRIS and INIS; Embrapa used Agricola tapes and had been influenced by the U.S. National Agricultural Library; Bireme used Medline tapes and had been influenced by the U.S. National Library of Medicine; CIN used INIS tapes, and had been influenced by that organisation. FO/USP was in a roughly similar position; the format of
its index to Brazilian dental literature followed the pattern of
the U.S. -published "Index to Dental Literature". The system at IEN
had been based on that at UFRJ; the system at Furnas had been
developed in parallel to the UFRJ system because the head of the
library which had pioneered automation at UFRJ had transferred to
Furnas. The system at IPEN had been based upon that at the Scientific
Information Processing Centre (CETIS), a Euratom library at Ispra,
Italy. The information systems at IPT had been influenced by the
Illinois Technology Research Institute, Chicago. The indexing system
set up at Nutes/Clates had been influenced by an unspecified U.S.
system. The systems at Serpro had originally been developed by another
sector of Serpro to control technical manuals. The circulation system
at Sudene had been influenced by that at INPE. The systems at IME had
been influenced by the systems at CIN. In 8 cases the influences had
been from an overseas source; in four cases from a Brazilian source;
one system, IME, had been influenced by a Brazilian system which in
turn had been influenced by a foreign system.

Comments: It is important to note that the majority of systems, 18 or
58.1%, claimed not to have been influenced by any other system; they
had been developed independently. There is no company or agency
offering turn-key systems in Brazil; the Brazilian CLSI or ALS has yet
to invent its acronym. MARTIN (1977) speaks of a conference in the
United States in which thirty different companies exhibited computerised
products; it will be some years before similar scenes occur in Brazil.

QUESTION 15: Please identify the elements which you took from other
systems, basing your reply upon the following list:

Ten institutions (32.3%) replied to this question, selecting
a total of 14 alternatives; answers were: advice, information,
orientation: 5 institutions; everything or nearly everything: 4
institutions; format or input form: 3 institutions; format for output:
2 institutions.

QUESTION 16: Identify the channels between your system and the
others, basing your reply upon the following list:
Ten institutions (32.3%) replied to this question, selecting a total of 20 alternatives; answers were: We sent somebody to visit the other system: 7 times; we sent somebody to work temporarily on the other system: the other system sent documents or programmes: 4 times each; we hired somebody who had worked on the other system: 3 times; the other system sent somebody here to visit or consult: twice.

**QUESTION 17:** Have other institutions requested information about your system?

Twenty-seven institutions replied positively to this question. They were then asked:

**QUESTION 18:** Please estimate how many such requests you have received, selecting one of the levels listed below:

Answers to this question were: four institutions had received 1-3 requests; eight institutions 4-9 requests; eight institutions 10-19 requests; three institutions 20-40 requests; four institutions more than 40 requests.

**Comments:** there is some interest in automated systems, but not a great deal; half of the institutions have received less than ten requests for information.

**QUESTION 19:** Has your automated system influenced any other system?

Ten institutions (32.3%) responded positively to this question. They were then asked to answer questions 20, 21 and 22:

**QUESTION 20:** Please identify and locate up to three of the systems which were influenced by your system.

In two cases the answers confirmed influences already revealed by question 14; UFRJ had influenced IEN and Furnas; CIN had influenced IME. In six cases the answers could not be cross-checked, as the institutions influenced had not been visited: Binagri had influenced Planalsucar, Rio de Janeiro. Embrapa had influenced CEPLAC, in Itabuna, Bahia state. USP/SC had influenced the Educational Foundation of Bauru, São Paulo state, the Federal University of Pará, Belém, Pará state and the São Paulo branch library of Serpro. DNER had influenced the documentation centre of the Ministry of Transport,
Brasília. Eletrobras had influenced the systems of three other electricity companies: Eletrosul (Florianopolis, Santa Caterina state); Light (Rio); and the Brazilian Company for Electrical Energy (Companhia Brasileira de Energia Eléctrica, Niterói, Rio de Janeiro state). PUC had influenced the Projeto Radam, Rio. In two cases influences did not tally with answers to question 14: BN claimed to have influenced FGV, Ibict and Taubip. In one sense this is correct; the Calco format, developed for the National Library, had had widespread influence in Brazil; but Calco is a format, not a system. IPT claimed to have influenced Binagri; Binagri, which processed Agris tapes, admitted to influences from AGRIS and INIS; presumably, from Binagri's point of view, influence from IPT was minor.

There were, therefore, eight systems which had had an undisputed influence on a total of thirteen others within Brazil. Of these thirteen links, six were within the same metropolitan area, another two within the same state, while five links crossed state boundaries. Hypothesis 2.2, that "In Brazil, automated library and bibliographic information systems influence each other in inverse relation to the distance between them", is relevant here. It would be natural to expect such a relationship, and the results of this question do in fact prove this hypothesis. The relationship is fairly strong, but not very strong; it is still easy to find systems which have had an influence over a long distance.

Comments: Again, it is important to note that the majority of systems, 21 (67.7%) had not influenced any other system. Combining questions 14 and 20, we find that 12 systems (38.7%) were totally independent; they had neither been influenced by nor had they influenced any other system.

QUESTION 21: Identify the elements which other systems took from you, basing your reply upon the following list:

Eight institutions replied to this question, selecting a total of twelve alternatives; answers were: everything or nearly everything: 5 institutions; advice, information, orientation: 4 institutions; format or input form: 2 institutions; format for output: one institution.
QUESTION 22: Identify the channels of communication between your system and the others, basing your reply upon the following list:

Ten institutions (32.3%) replied to this question, selecting a total of 22 alternatives; answers were: the other system sent somebody here to visit (8 times); we sent documents or programmes to the other system (6 times); the other system sent somebody to work temporarily here (3 times); we sent somebody to visit or consult on the other system, the other system hired somebody who had worked here (twice each); we sent somebody to work temporarily on the other system (once).

Comments: This is a suitable opportunity to examine hypothesis 2.4, that "influence is carried between automated libraries and bibliographic information systems by personal rather than documentary means". This hypothesis is proven by the results of questions 15, 16, 21 and 22, and also by question 9. Such results are to be expected, as much of Brazilian society and culture still functions on a personal basis.

QUESTION 23: Does your system use data prepared by another system?

Six institutions (19.4%) replied positively to this question. They were then asked, as question 24, to give a brief description of this process. Their replies fell into two categories: five systems imported magnetic tapes for data base or SDI services: Binagri imported AGRIS and IFIS tapes; Embrapa imported AGRICOLA, CAB, IFIS and Biosis tapes; Bireme imported Medline tapes; IPT imported Compendex tapes; CIN imported INIS tapes. (Note: IME replied negatively to question 23, but noted that it intended to import NTIS tapes in the future). The other type of use of data prepared by another system was exemplified by Ibict, which searched SDC in California online.

QUESTION 25: Is the data produced by your system used by another system?

Three institutions (9.7%) replied positively to this question. They were then asked, as question 26, to give a brief description of this process. In all cases the institutions were responsible for inputting locally-produced information into international
information systems: Binagri input information on Brazilian agricultural documentation to Agris; Bireme input information on Latin American bio-medical documentation to Medline; CIN input information on Brazilian nuclear documentation to INIS.

Comments: A remarkable result: no library sends data to another library; no Brazilian institution transfers data to another Brazilian institution. In fact it is easier to transfer data internationally than nationally.

QUESTION 27: Was your bibliographic format influenced by any other format?

Twenty institutions (64.5%) replied positively to this question. They were then asked, as question 28, to specify the format or formats which had influenced them. Responses could be divided into five categories, according to sources of influence: information systems: Binagri had been influenced by the Agris format; Embrapa had been influenced by the CAIN format; Bireme had been influenced by the Medline format; CIN had been influenced by the INIS format. Institutions: IPEN had been influenced by the format used at the Scientific Information Processing Centre (CETIS), Ispra, Italy; IEN had been influenced by the format used at UFRJ; IME had been influenced by the formats of CIN and Ibict; Sudene had been influenced by the format of INPE. Marc-type formats: Seven institutions (Câmara, UnB, Taubip, BN, UFRJ, FGV and UFPb) mentioned a total of ten Marc-type formats; these were: Calco, mentioned 5 times; Unimarc, mentioned 3 times; Marc, mentioned twice. KWIC-type formats: three institutions (USP/SC, Eletrobras and PUC) had been influenced by the IBM/KWIC format. Other formats: FO/USP had been influenced by the format of the "Index to Dental Literature"; the union catalogue of periodicals of Ibict had been influenced by the ISDS format.

Comments: The researcher noted that respondents tended to interpret the word "influence" quite liberally when replying to the question above; in many cases it would not have been possible to detect the influence, even from a close examination of the Brazilian format.
This is, perhaps, a suitable occasion to include a note on the Brazilian bibliographic format, Calco. An in-depth comparative study of formats was not considered appropriate for this thesis, because of its limited intellectual value, and because it would touch on sensitive areas beyond the scope of this study. The original impetus for Calco came from a remarkable Brazilian organisation, known as the Cataloguing Interchange Service, set up as long ago as 1942. This pioneering organisation received cataloguing data from cooperating libraries, and printed catalogue cards. The submitting library received a free set of cards, while sets were also available for sale to other institutions. This system worked successfully for many years, but by the 1970s was becoming unmanageable. The director of the service, Alice Principe Barbosa, prepared the first edition of the Calco format as a masters thesis; the acronym means machine-readable cataloguing (CAtalogayao Legível por COmputador) and the subtitle of the thesis made its objective clear: "an adaptation of MARC II for the implantation of cooperative cataloguing" (BARBOSA, 1972). The manual Cataloguing Interchange Service was discontinued, "so that the Calco Project could begin to operate" (BARBOSA, 1978, p.88). The problem was that Calco, despite a new edition, (BARBOSA, 1973), did not get off the ground; no replacement for the Cataloguing Interchange Service was ever set up, and Calco remained almost unused. There was also a hope that Calco could be transformed into a Latin American standard, and it had in fact been based on the bilingual Canadian MARC with this in mind (FERREIRA, 1979). But Latin America got its own format, Marcal (FAUNCE, 1978); meanwhile, Alice Barbosa died in 1975. The story now becomes even more complex, because the Cataloguing Interchange Service had been part of the Brazilian Institute for Bibliography and Documentation (IBBD) when the former was disbanded; the latter was transformed into Ibict in 1976. The next edition of Calco, however, was not produced by Ibict but by the Ministry of Education and Culture, at the prompting of the National Library, part of the Ministry (FORMATO Calco, 1977). A 1978 document entitled "Instructions for completing forms for Calco cataloguing" was in fact a revised format (INSTRUÇÕES de preenchimento ..., 1978). At the time of this study it was possible to point to only two small-scale implementations of a complete Calco format. The Federal University of Rio Grande do Sul, which had an operational catalogue of 7,500
entries in the 1973 format, and the National Museum, which had begun input in the 1978 format. Neither was studied in detail for this thesis; the first because of its geographic distance, the second because its system was nowhere near operational. One irritating problem was that the formats were difficult to obtain because only a limited number were printed, and then distributed free; they soon went out of print and became unobtainable; this is a common problem with official publications in Brazil. Another oddity was that the examples in the two later manuals showed input in upper-case only, whereas the earlier editions had used both upper and lower-case. Meanwhile, Ibict was publishing its own format, perhaps the most ambitious ever produced in Brazil: three thick volumes, one each for monographs, analytical cataloguing and serials (MANUAL de preenchimento ..., 1978). (These, incidentally, reached a compromise on the upper-case/lower-case question; the last volume had examples in upper-case only, the others in both). They were all marked "for internal use", perhaps prophetically, because nobody had adopted them up to the time of this research.

The most important aspect of all this is not that so many different formats were prepared, but that none came into significant use. Perhaps these manuals are best seen as part of a learning process. They are also an example of the "easy first step" trap often encountered in automated systems; it is relatively easy to write the format but much more difficult to catalogue a large number of books according to that format. Similar problems arose with automatic translation; it was easy to programme a computer to consult a bilingual dictionary, much more difficult to make it translate grammatical structures efficiently. It seems that Calco, like the System for Cataloguing Interchange and attempts at mechanical translation, had been before its time; Brazilian libraries were not yet at a stage where they could take full advantage of a complex format. Despite this there was a clear feeling that Brazil should have its own format; the researcher often received the impression, in informal conversation, that this was motivated more by nationalism than by logic. There is, however, a clear advantage from the government point of view in establishing a separate national format; all foreign bibliographic data will have to be switched into the national format, and only one
institution is likely to maintain the complex suite of programmes essential for such switching, permitting data transfer to be monitored or controlled. Recent developments related to Calco have been quite encouraging; the Federal University of Minas Gerais published an abbreviated format, Minicalco (RIBEIRO, 1981). More importantly, Ibict has now resumed responsibility for Calco, setting up a Calco office in Brasilia (Ibict oficializa ..., 1981). A further set of manuals will be published, but hopefully these will be the definitive edition. Two versions, for full and simplified cataloguing, are being planned.

QUESTION 29: Does your bibliographic format impose any limit to the number of characters which can be used to represent author, title, etc?  
Twenty-two institutions (71.1%) replied positively to this question; that is, they used fixed-field formats. Seven institutions (22.6%) replied negatively; that is, their formats were variable. Two institutions did not reply. As a confirmation that those who replied positively really did use a fixed-field format, the researcher asked the length of the fixed fields for author and title. In 15 cases this information was given in terms of number of characters: Author: 15, 18, 18, 20, 25, 30, 72, 95, 108, 118, 160, 200, 222, 315, 585; median 95; mean 133.4 characters. Title: 53, 108, 122, 144, 150, 160, 180, 200, 225, 240, 296, 300, 300, 315, 585; median 200; mean 225.2 characters.

Comments: The relatively large number of brief author fields (six cases of 30 or less characters) can be explained by the relatively large number of technical libraries amongst the institutions studied, and the use of KWIC-type systems. Summary statistics for the Marc data base show that over a four-year period the average length of individual author entries varied between 26 and 27 characters; titles between 90 and 100 characters (WILLIAMS, 1979). Either the median or the mean Brazilian fixed field would cope well with data similar to that input to Marc. The fact that three Brazilian institutions used a fixed-field format for every one that used a variable field format is a natural result of the relatively early stage of automation of bibliographic data in Brazil.
QUESTION 30: Please identify the computer used by your system.

All institutions replied to this question; two major institutions with access to numerous computers (Petrobras, Serpro), stated that their processing was done on a variety of computers. The 29 institutions which mentioned specific computers made a total of 34 responses, but as use of the same computer by more than one institution was common, only 23 different computers were involved. Fifteen computers (65.2%) were IBM; 4 (17.4%) Burroughs, and 4 (17.4%) others. Eleven of the IBM computers were type 370; there was also one 360, one /3 and two 1130 computers; the Burroughs computers were three 6700s and one 1700; other computers were a PDP 11/34, PDP 15, NCR Century 251 and CDC 6600. In the following three cases the same computer was used by three or more institutions: IBM 370/155 at IPEN; used by IPEN, FO/USP and Bireme; IBM 370/158 at Prodaset; used by Prodaset, Cimec and BN; IBM 370/165 at PUCt used by PUC, CIN, IME and Ibict.

Comments: Once the systems analysts of one institution have learnt to handle bibliographic data, that institution attracts more work of a similar nature, because so few Brazilian computer centres have experience with that type of work. It is interesting to compare the distribution of computer types in this survey with that in Brazil as a whole. The Brazilian situation, in July 1978, excluding mini-computers, was: IBM 55.6%; Burroughs 15.1%; Others 29.3% (COMPUTADORES instalados ... 1979). This is very close to the percentage for different types of computer found in this survey: IBM 65.2% Burroughs 17.4%; others 17.4%. Similar results have been reported from other countries: PALMER (1973, p.213-4), published a volume of North American case studies, which used a total of 18 IBM computers (75%), four Honeywell (16.6%) and two others (8.3%). In 1970 British university libraries used the following types of computer (DUCHESNE, 1971): ICL 68%; IBM 15%; CDC 7%; PDP 8%; others 2%. A 1971-2 survey covering a wider range of British institutions (DUCHESNE, 1974) produced the following results: ICL 51%, IBM 30%; Honeywell 3%; CDC 3%; PDP 3%; Univac 3%; others 7%. From the point of view of manufacturers, there is no resemblance, but the division of the market is similar: there is a dominant manufacturer, a second manufacturer and a group of manufacturers with a small share of the market.
QUESTION 31: Where is this computer located?

Results were analysed for 37 user/computer links, i.e. the 34 cases mentioned under question 30, plus Petrobras, Serpro and the Ibict link to SDC. Results were as follows: same building/adjoining building/same campus: 19 links; 2-15 kilometres, within the same metropolitan area: 13 links; more than 15 kilometres: 5 links. The longer links were as follows: Rio - Brasília (1204 kms) 2 links; Rio - São Jose dos Campos (336 kms) 1 link; João Pessoa - Campina Grande (130 kms) 1 link; Rio - California 1 link.

QUESTION 31: Please identify any equipment, such as terminals or data collection devices, located within the library or bibliographic information system.

Seventeen institutions (54.8%) had no such equipment; of those who claimed equipment, several had more than one item; results were: nine terminals, two terminals under test, three keypunches, one printer and one IBM 407 accounting machine; four institutions also had terminals which connected to the Prodasen system.

Comments: A majority of institutions did not have equipment on their premises, but what equipment was available was relatively advanced; there were three terminals for every keypunch, and no data collection devices less sophisticated than terminals, such as badge readers or bar code readers, were recorded.

QUESTION 33: Identify the programming languages used by your system.

Six institutions failed to reply; those that did reply frequently mentioned more than one language; results were: Cobol, mentioned 17 times; PL/1, seven times; Assembler, five times; Fortran, four times; Algol, twice and others, three times.

Comments: The prevalence of Cobol in Brazil is probably due to the relatively early state of data processing in that country. The first uses of data processing in any country are for commercial, payroll, accounting and similar applications, for which Cobol is highly recommended. It is natural that the first generation of programmers should have Cobol as their most familiar language and should attempt to use it in other applications. SMITH & MEYER (1969, p.7) actually
recommend COBOL, but by 1976 SAFFADY, writing on the suitability of programming languages for libraries, concluded that it was difficult to recommend Cobol, Fortran or Algol. He recommended specialised languages, such as Snobol or Comit, neither of which were mentioned by any Brazilian institution surveyed, and the general language PL/1, in second place in the table above.

This is a convenient opportunity to examine hypothesis 2.1, that "Automation of library and bibliographic information systems in Brazil is attempted with sufficient support in the form of hardware, software and bibliographic formats". There was sufficient hardware in the form of computers, but few data collection devices or other peripherals available in the libraries or information systems. Software support was limited, but doubtless sufficient for the needs of relatively simple automated systems, operating in an environment where it was common to design each individual system from scratch. The situation in relation to bibliographic formats was equally complicated; Brazil had complex bibliographic formats, but these were scarcely used, being too complex for most operating systems. Only the first part of the hypothesis can be considered fully proven.

QUESTION 34: Please identify the most important problems involved in the use of the computer in this library or bibliographic information system.

Twenty-five institutions replied to this question, putting forward a total of 52 specific problems: problems mentioned more than once: errors/lack of standardization/forms badly completed/data incomplete: mentioned six times; computer memory limited: five times; computer access time limited: four times; lack of or rapid turnover of systems analysts: four times; distance to computer: three times; librarians do not understand computers: twice; systems analysts do not understand librarianship: twice; took programmes from elsewhere and had to modify them: twice; telecommunications noisy, deficient: twice; problems inherent in using somebody else's computer: twice.

Problems mentioned once only: people-related problems: user not used to requesting information; user did not believe in service; user not accustomed to printout; user did not understand
profile, keyword, etc.; difficult to control various libraries which input to system; difficult to train library personnel to use system; lack of personnel to file cards produced by automated cataloguing system. Data-related problems: current data entry system incapable of workload; difficult to develop formats which are compatible with library requirements; classification field too short; file is on tape but in card format. Machine-related problems: difficult to import machinery; required to use equipment with insufficient capacity; forced to operate in batch mode; computer small for online system. Other problems: system very limited; computer centre does not always respect timetables; physical size of printouts makes them uncomfortable to use; funding: at first it was free, then they asked us to pay; citations do not include locations of periodicals.

Comments: The answers to open-ended questions of this nature must always be treated with a certain amount of caution; the four complaints against users, for example, all came from the same person. But answers are valuable for two reasons: they provide an indication of the problems at the top of the minds of senior personnel at the time of the survey; they act as a "safety-net", catching problems which might otherwise have received insufficient attention. The most obvious feature of the answers was their breadth and variety; only five were mentioned more than twice. They are in general practical, operational problems; for instance, lack of government guidance, ranked as problem no. 3 by the same group on the attitude test, was not mentioned here. Most of the problems mentioned several times could have been forecast, such as limited computer memory, limited computer access, lack of systems analysts. But the problem ranked no. 1, errors in all their various forms, was a surprise to the researcher. This was a case in which the open-ended question threw into prominence a problem which might otherwise have been underestimated. On reflection it is a natural problem in Brazil. The computer is a very demanding machine, much of Brazilian society is relatively unsophisticated, and library processing generally is totally manual; there is a lack of standardization and highly trained staff. Under these conditions it is natural that input to automated systems should suffer from constant errors.
QUESTION 35: Please identify the most important motives for the use of the computer in this library or bibliographic information system.

Twenty-eight institutions (90.3%) replied to this question, putting forward a total of 56 specific motives: motives mentioned more than once: wanted faster processing: nine times; had large quantity of data: seven times; sought higher productivity/more efficiency/to save time, etc.: six times; had access to computer/was encouraged to automate/had sufficient resources, etc.: five times; computer essential for this activity: four times; had large number of users: three times; did not know what was in the collection: twice; economise personnel: twice.

Motives mentioned once only: users constantly need bibliographies; increase time available for work with users; increase use of the library; started as a test, continued because it worked; students prepare library automation projects as theses, then wish to see them implemented; to rapidly produce nationally-useful bibliographies; necessary to have access to information generated overseas; facilitate interchange between libraries; give better information; necessary to accompany the technology; to unite all units within one methodology; necessary to know the contents of periodicals; to decrease errors; automated system much better than manual; one input generates various outputs; this is a pilot-project, it is hoped it will be used elsewhere; to simplify processing; to automate claims for overdue books.

Comments: The answers vary sharply from the answers given in the attitude test; there, 96.4% of respondents picked "to improve service to users" as a motive, giving that motive top ranking. Here, replying to an open-ended question, "to improve service to users" was not cited as a motive in those words, although a few statements are close to it and many would result in an improvement to service. Respondents to this question were much quicker to cite the motives which ranked in second, third and fourth places on the attitude test: "because manual methods can no longer keep up with the quantity of work"; to increase productivity" and "to use an available computer". Here we see a process similar to that noted in the answers to the previous question; the motives given are practical, operational motives; respondents stay away from philosophy and close to the machine and its capabilities.
QUESTION 36: Please identify the most important results of the use of the computer in this library or bibliographic information system.

Twenty-two institutions (71.0%) replied to this question, putting forward a total of 42 specific results: results mentioned more than once: faster operation/immediate retrieval/fewer delays: eleven times; new products/access to or dissemination of information not previously available: nine times; personnel transferred from processing to readers services/fewer people needed: three times; fewer errors/errors detected more easily/catalogues impeccable: three times; catalogue or library up to date: twice; easier/easier recuperation: twice; no longer necessary to type multiple copies of catalogue cards: twice. Results mentioned once only: reached a reasonable number of users with reasonable success; "No positive result as yet; it has been a very sad experience"; increase in reading done by researchers; non-duplication of data; more collaboration amongst libraries; some users were able to save money as a result of information received; improved data security; national technology created; detailed statistical data available; work rationalised.

Comments: It is interesting to compare these results with the motives cited in response to the previous question. "Faster processing" ranked first in both questions, so we can conclude that this was what users wanted, and that they were not disappointed. "New products/access to or dissemination of information not previously available" was ranked as second result, but is scarcely evident amongst the motives. This appears to be a case in which the result is different from that which users had originally foreseen. The attitude test also produced answers that varied from the results to the open-ended question. Computer users ranked "Better services are offered to users" as no. 1 on the attitude test; this result, in these words, does not appear in the results to the open-ended question. This is another example of the phenomenon noted previously; when answering open-ended questions respondents avoid general answers and keep to practical, operational problems. "Productivity" produced some very interesting results. In the attitude test increased productivity was ranked motive no. 3 and result no. 2 by computer users; i.e. users wanted increased productivity and thought they were getting it. In the open-ended question here productivity was ranked as motive no. 3, but was not
mentioned a single time as a result. This would tend to indicate that increased productivity is in fact achieved less frequently than the attitude test results would suggest. It is encouraging to note that the results were almost all positive; only one respondent took a negative stance; this was a recently-appointed director who had inherited an existing system which was considered antiquated and limited.

**QUESTION 37:** Does your institution maintain a collection of books and periodicals?

Twenty-six institutions (83.9%) replied positively to this question. They were then asked:

**QUESTION 38:** How many books do you have?

Twenty-five institutions replied; results were:

<table>
<thead>
<tr>
<th>No. of volumes</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4,999</td>
<td>3</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>2</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>8</td>
</tr>
<tr>
<td>20,000-49,999</td>
<td>4</td>
</tr>
<tr>
<td>50,000-99,999</td>
<td>4</td>
</tr>
<tr>
<td>100,000-199,999</td>
<td>2</td>
</tr>
<tr>
<td>200,000-499,999</td>
<td>1</td>
</tr>
<tr>
<td>500,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median was 19,624 volumes.

**Comments:** Of the 25 institutions, eight (32.0%) had between ten and twenty thousand volumes; 18 (72.0%) had from ten to just over a hundred thousand volumes (the two libraries in the 100,000 - 199,999 volume category had 100,000 and 100,908 volumes respectively). The message is fairly clear: very small libraries rarely automate; large libraries are rare in Brazil and most face such serious problems, due to their size, that they are unable to automate. Therefore most automation occurs in what can be described, in Brazilian terms, as medium sized (10,000-20,000 volumes) or medium-large libraries (20,000-100,000 volumes).

**Note:** To prepare this table, the researcher first had to draw up a
list of libraries in ranked order by number of volumes. It would, however, be misleading to publish this, or the lists prepared for the five subsequent questions. These would inevitably appear to be score sheets, comparing institutions by collection size, and could give offence, because many institutions were unable to supply all data and would therefore be excluded; library statistics are frequently inaccurate in Brazil, (MCCARTHY, 1975, p.183-91) and the researcher is not satisfied as to the accuracy of certain figures cited; in Britain and North America similar types of library operate at similar levels of efficiency; in Brazil this is not the case; a ranking by size would place inefficient libraries, offering poor services, but which have, or claim to have, large collections, "before" efficiently run libraries with valuable, up-to-date collections. In some cases automation only existed in one departmental library; the parent institution would therefore be represented in these tables by a small part of its total holdings. The researcher does not identify specific institutions by name in this part of the results; holdings are, however, cited in the individual description of those systems. Owing to the presence of a few very large libraries in the sample, the mean holding was very high: only two institutions had more than the mean. Median holdings have been preferred.

Further comments: It is most interesting to combine the previous table, showing number of volumes, with the number of operational processes per institution, calculated from the results to question 10:

<table>
<thead>
<tr>
<th>No. of volumes</th>
<th>No. of institutions</th>
<th>No. of operational processes per institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4,999</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>8</td>
<td>4.4</td>
</tr>
<tr>
<td>20,000-49,999</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>50,000-99,999</td>
<td>4</td>
<td>2.3</td>
</tr>
<tr>
<td>100,000-199,999</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>200,000-499,999</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>500,000 or more</td>
<td>1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

This clearly shows that institutions with 10,000-19,999 volumes were most likely to have the largest number of automated
Of the six systems with five or more automated operational systems each, four fell into this size category. It can therefore be identified as the optimum size for library automation in Brazil; sufficiently large to permit economic processing, not so large as to make input impossible. As has been noted, size is not the only factor here; automation also depends upon relationship to the federal government and to priority advanced technology areas.

Hypothesis 2.3 stated that "in Brazil, there is a direct relation between the size of libraries and bibliographic information systems and their success in automation". It would be reasonable to expect such a relationship, but in fact it does not exist; this hypothesis was not proven.

**QUESTION 39:** How many books did you acquire last year?

Seventeen institutions replied; results were:

<table>
<thead>
<tr>
<th>No. of volumes acquired</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-999</td>
<td>7</td>
</tr>
<tr>
<td>1,000-4,999</td>
<td>6</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>2</td>
</tr>
<tr>
<td>10,000 or more</td>
<td>2</td>
</tr>
</tbody>
</table>

The median number of volumes acquired was 1,808.

**Comments:** These results reflect the weakness of Brazilian libraries in acquisitions, and the relatively small collections held by many of the institutions studied.

**QUESTION 40:** How many books did you purchase last year?

Eighteen institutions replied; results were:

<table>
<thead>
<tr>
<th>No. of volumes purchased</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-299</td>
<td>5</td>
</tr>
<tr>
<td>300-499</td>
<td>5</td>
</tr>
<tr>
<td>500-999</td>
<td>3</td>
</tr>
<tr>
<td>1,000-1,999</td>
<td>1</td>
</tr>
<tr>
<td>2,000-2,999</td>
<td>3</td>
</tr>
<tr>
<td>3,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median was 376 volumes.
Comments: These figures are low; a British or North American librarian would not hesitate to describe them as abysmally low. But in the Brazilian context their chief interest is to show that institutions able to afford computerised library systems, which by definition are expensive, were spending little on library books. The possibility that the library had spent all its funds on computation, leaving nothing for books, can safely be discarded; a Brazilian institutional budget would rarely, if ever, charge computation against specific departments. Some libraries were report or periodical oriented, and did not need many books. The others presumably had not been allocated sufficient funds for book acquisition; in other words the institution maintaining the library gave higher priority to computer systems than it gave to book purchases. The figures also clearly show one reason for the rarity of computerised acquisition systems in Brazil; acquisition levels are so low it can rarely be economic to automate in this area.

QUESTION 41: How many periodical titles do you hold?

Twenty-five institutions replied; results were:

<table>
<thead>
<tr>
<th>No. of periodical titles held</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-499</td>
<td>8</td>
</tr>
<tr>
<td>500-999</td>
<td>3</td>
</tr>
<tr>
<td>1,000-1,999</td>
<td>3</td>
</tr>
<tr>
<td>2,000-2,999</td>
<td>3</td>
</tr>
<tr>
<td>3,000-4,999</td>
<td>4</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>3</td>
</tr>
<tr>
<td>10,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median was 1,589 titles.

Comments: About a third of the institutions fell into the lowest category for periodical holdings. Many of these were special libraries operating relatively efficiently in a specific field with a limited number of periodicals, but even so holdings are low by British or North American standards, although they may be considered reasonable by Brazilian standards.
QUESTION 42: How many periodical titles did you receive last year?

Eleven institutions replied; results were:

<table>
<thead>
<tr>
<th>No. of titles</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-199</td>
<td>1</td>
</tr>
<tr>
<td>200-499</td>
<td>6</td>
</tr>
<tr>
<td>500-999</td>
<td>3</td>
</tr>
<tr>
<td>1,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median was 402.

QUESTION 43: How many periodical titles did you subscribe last year?

Nineteen institutions replied; results were:

<table>
<thead>
<tr>
<th>No. of titles</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-99</td>
<td>4</td>
</tr>
<tr>
<td>100-199</td>
<td>3</td>
</tr>
<tr>
<td>200-299</td>
<td>3</td>
</tr>
<tr>
<td>300-499</td>
<td>3</td>
</tr>
<tr>
<td>500-999</td>
<td>4</td>
</tr>
<tr>
<td>1,000 or more</td>
<td>2</td>
</tr>
</tbody>
</table>

The median was 254.

3.1.2. General questions on automated processes

Note: Questions 1 and 2 of this section of the questionnaire recorded the name of the institution and of the subsystem.

QUESTION 3: When did this subsystem begin to operate?

Answers were obtained for a total of 53 subsystems; results were as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>No. of subsystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967-9</td>
<td>6</td>
</tr>
<tr>
<td>1970-2</td>
<td>10</td>
</tr>
<tr>
<td>1973-5</td>
<td>11</td>
</tr>
<tr>
<td>1976-8</td>
<td>15</td>
</tr>
<tr>
<td>1979</td>
<td>10</td>
</tr>
<tr>
<td>1980 (first two months only)</td>
<td>1</td>
</tr>
</tbody>
</table>

Comments: This breakdown shows a steady increase in the number of automated systems during the four three-year periods from 1967-9 to 1976-8, and there is every reason to believe that, when the final
results are in for the three-year period 1979-81, they will show a similar pattern of increase. For historical reasons it may be useful to list the earliest systems to be established, according to the dates given to the researcher: 1967: Ibict, bibliographies of special subjects. 1968: INPE, indexing of reports; Ibict, union catalogue of periodicals. 1969: Câmara, catalogue; USP/SC, cataloguing and circulation systems. 1970: UFRJ, circulation system; CIN, SDI system.

Brazil can be proud of these figures, because the automation of libraries and information systems is a comparatively recent activity; as late as 1956 we can find "Library Trends" stating that "the most important application of mechanism to information storage today is the microform" (VOIGT, 1956); that author did, however, feel that there were reasonable prospects for what we now call data bases. Even in 1965 the keynote paper to the "Clinic on Library Applications of Data Processing" was adamant that "attempts to automate have been undertaken in only a small number of libraries ... and only for a limited number of operations in those libraries" (GULL, 1966). "Library Science Abstracts" indexed automation from 1956, but "computer" only appeared in the index in 1961. "Computers" had been a heading in "Library Literature" since the 1958-60 cumulation; even so, it was using "Automation: see Mechanisation of Library Processes" as late as 1966.

QUESTION 4: Was this process previously done manually?

Of the 85 fully operative processes, 48, or 56.5%, had never been done manually; the three types of process most likely to have been introduced in automated form were inventory control, internal indexing of reports and similar materials and data bases. None of the five inventory control systems had existed manually; six of the seven internal indexing systems had been developed directly as automated systems; six of the nine data base systems had begun as automated systems. The three types of process most likely to have been manual before they were automated were acquisitions, periodical subscriptions and SDI. Of five acquisition systems, four had existed in manual mode; of four periodical subscription systems, three had been manual before automation; of six SDI systems, four had been started as manual systems.
Comments: It is interesting that the majority of processes had never been manual, but had begun as automated processes. This finding was influenced by the presence of a relatively large number of small libraries which set out from scratch and automated a number of processes; USP/SC, for example, with 3,208 volumes, with six automated processes. The survey also covered indexing and data base systems, which, for obvious reasons, are difficult to operate manually; it is however interesting to note that SDI systems were generally tested manually before being automated. Almost a third of the seventeen cataloguing systems used automation as an opportunity to establish inventory control systems, reflecting the difficulty of maintaining such systems by manual means.

Respondents who had replied positively to question 4 were asked, as question 5, to give a brief outline of the former manual system. This question was answered 27 times; catalogue cards were mentioned 13 times; typing ten times, compilation of retrospective searches or SDI services from abstracts six times and "Newark" style loan systems, using two cards, twice; some respondents mentioned more than one alternative. Production methods mentioned were: duplicators and offset printing machines, twice each; Flexowriter, xerox and letterpress printing, once each.

The same respondents were then asked, as question 6, what advantages the automated system offered over the manual. Twenty-three answered this question; their replies were: better (wider) access/easier retrieval/more information: fifteen times; faster: twelve times; more control: five times; less personnel: four times; less work/typing; automatic claiming: three times each; more coordination; better data security; rationalisation; "Open to revision": once each. (Several respondents cited more than one advantage).

Comments: The results of question 5 show that the majority of previously manual systems went direct from traditional, catalogue card and typewriter, systems, to automation. Only a small number had partly mechanised their systems, using Flexowriter, duplicator, etc., before adopting the computer. This is the pattern one would expect; Brazilian libraries were very traditional in their processing methods,
only a few richer libraries had succeeded in adopting more advanced methods. The lists of advantages tallied well with the list of results obtained by question 36 of the general questionnaire applied to institutions; in both cases more (better) information and speed were ranked in the leading two positions, well ahead of all other suggestions.

**QUESTION 7:** How many months did it take to plan and put into operation this subsystem in its automated form?  

A total of 43 different periods of time were mentioned; results were:

<table>
<thead>
<tr>
<th>Months</th>
<th>No. of subsystems</th>
<th>Months</th>
<th>No. of subsystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>4</td>
<td>13-14</td>
<td>-</td>
</tr>
<tr>
<td>3-4</td>
<td>10</td>
<td>15-16</td>
<td>-</td>
</tr>
<tr>
<td>5-6</td>
<td>5</td>
<td>17-18</td>
<td>3</td>
</tr>
<tr>
<td>7-8</td>
<td>3</td>
<td>19-20</td>
<td>-</td>
</tr>
<tr>
<td>9-10</td>
<td>3</td>
<td>21-22</td>
<td>-</td>
</tr>
<tr>
<td>11-12</td>
<td>10</td>
<td>23-24</td>
<td>5</td>
</tr>
</tbody>
</table>

The mean was 9.7 months.

**Comments:** 32.6% of the subsystems were said to have been set up in four months or less, a result which must reflect both the optimistic nature of the respondents and the relative simplicity of most systems. The most frequently quoted time was twelve months; in the researcher's experience the latter is a realistic time under Brazilian conditions.

**QUESTION 8:** What method of data input is used?  

A total of 49 different methods were mentioned; they were:  
input form: 33 times (includes three cases in which input was prepared on programmers' 80-column work-sheets); magnetic tape: 23 times (in 13 cases information was written onto magnetic tape as part of internal processing; in the other 10 cases the tapes were imported for data base or SDI systems; cards: 19 times (80-column cards were mentioned 14 times; 96-column cards twice; Portapunch cards once and in two cases the type of card was not specified); terminal: five times; mark up title page: twice; teleprocessing: once. (Several respondents mentioned more than one element; e.g. input via completion of input forms which were then keypunched to 80-column cards.)
Comments: This was the type of pattern one would expect in an embryonic automation situation; i.e. there was much filling in of forms and punching of 80-column cards, but little use of terminals. It was common to import tapes for data bases and SDI systems, but there was nothing equivalent to the MARC tape system for book cataloguing.

QUESTION 9: How often is data input to the system?

Specific replies were given to this question in 49 cases; answers were:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily or continuously</td>
<td>9</td>
</tr>
<tr>
<td>Weekly</td>
<td>5</td>
</tr>
<tr>
<td>Fortnightly</td>
<td>8</td>
</tr>
<tr>
<td>Monthly</td>
<td>10</td>
</tr>
<tr>
<td>Once every 2, 3 or 4 months</td>
<td>9</td>
</tr>
<tr>
<td>Six-monthly</td>
<td>6</td>
</tr>
<tr>
<td>Annually or less frequently</td>
<td>2</td>
</tr>
</tbody>
</table>

The median response was monthly.

Comments: It is obvious that systems were operating under relatively little pressure. LIM (1970), writing on cooperative cataloguing in Malaya, stated that "many of the participating librarians had great difficulty in adjusting to the rigorous time schedules required for an automated cataloguing system to run smoothly". This was ranked second amongst problems of automation in Malaya. Clearly, such a problem was unlikely to arise in Brazil, and in fact the researcher cannot recall it ever being mentioned.

QUESTION 10: How many bibliographic entries are stored in machine-readable form?

Twenty-eight institutions gave the dimensions of 38 machine-readable files; results were:

Note: The question asked for the size of machine-readable files, not machine-searchable files. Several of the files mentioned in the responses cannot be searched as a whole; they include data bases which can only be searched in segments, and accumulations of searched SDI tapes.
<table>
<thead>
<tr>
<th>No. of entries</th>
<th>No. and type of files</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4,999</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(5 catalogues; 2 periodical lists; 1 internal indexing file; 1 file for indexing or bibliography for external use; 1 file, similar to a book catalogue, to support a circulation system)</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>(3 catalogues; 1 union catalogue of books; 1 internal indexing file; 1 file for indexing or bibliography for external use)</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(3 catalogues; 1 file for indexing or bibliography for external use)</td>
</tr>
<tr>
<td>20,000-49,999</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>(3 catalogues; 1 union catalogue of books; 1 internal indexing file; 1 data base)</td>
</tr>
<tr>
<td>50,000-99,999</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(2 catalogues; 1 union catalogue of periodicals)</td>
</tr>
<tr>
<td>100,000-199,999</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(1 data base; 1 file for indexing or bibliography for external use)</td>
</tr>
<tr>
<td>200,000-499,999</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(2 data base files (1 also used for SDI); 1 catalogue)</td>
</tr>
<tr>
<td>500,000-999,999</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(2 SDI files; 1 file for indexing or bibliography for external use)</td>
</tr>
<tr>
<td>1,000,000 or more</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(Data base, also used for SDI)</td>
</tr>
</tbody>
</table>

The median was 13,000 entries.

Comments: The most notable feature here is, clearly, the small size of the machine-readable files. Sixteen, or nearly half the files, were under 10,000 entries, a level which would rarely be considered economic for automation in Britain or North America. Half of these sixteen small files were library catalogues, which were more heavily represented at the lower end of the ranking, showing the relatively small size of
Brazilian automated catalogues. If the list had been limited to searchable files several of the larger files would have been omitted; for instance the two SDI files in the 500,000 - 999,999 category had simply been accumulated as a result of SDI activities. Their institutions had no means of searching them as a data base. The largest file, which contained 4.5 million entries, had to be searched in segments. The figures also clearly show the importance, within the Brazilian context, of indexes or bibliographies published for external use; their files are amongst the largest so far formed. In many cases these files too had been simply accumulated; there was no way in which the whole file could be searched or published.

**QUESTION 11:** What method of data output is used?

A total of seventy-eight different methods were mentioned in reply to this question: computer printout: 37 times; printed book or periodical: 12 times; cards: ten times (5 x 3 cards 6 times; larger cards on continuous stationery for SDI 3 times; self-adhesive labels attached to blank 5 x 3 cards once); terminal: nine times; COM: six times; (includes two occasions when COM film was used as a negative for offset printing) magnetic tape: four times. (Many methods of output combined two or more of the above; for instance most printed book catalogues were offset or xeroxed from printout; output might be available both via terminal and printout).

**Comments:** This was the result one might expect in an embryonic situation; printout accounted for almost half the answers, followed by publications and cards. Advanced technology outputs (terminal, COM and tape) occupied the lower rankings, but were fairly well represented. Although Portuguese has numerous accented letters, concern over diacritics and output in both upper and lower case was rare. The researcher examined all the samples of output obtained during the field studies, but could only find four organisations printing in both upper and lower case; all were working with imported systems. SDI output based on INIS and Compendex, distributed by CIN and IPT, was in both upper and lower case, as was the output from FGV, which was beginning to receive MARC tapes. The IPEN cataloguing system, based on an Italian model, also gave upper and lower case output. Other countries pay considerable attention to this problem; in the U.S. an
"ALA print chain", with full diacritics, was developed to replace the standard computer print chain when printing catalogue cards. SIMMONS (1973) commented acidly that "the fact that a report (on the National Serials Data Program) published in 1972 should even consider input in upper case only is indicative of the weakness of this effort".

**QUESTION 12:** How often is data output by the computer?

Specific replies were given in 54 cases; answers were:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>3</td>
</tr>
<tr>
<td>2 or 3 times a week</td>
<td>2</td>
</tr>
<tr>
<td>Weekly</td>
<td>7</td>
</tr>
<tr>
<td>Fortnightly</td>
<td>8</td>
</tr>
<tr>
<td>Monthly</td>
<td>6</td>
</tr>
<tr>
<td>Once every two months</td>
<td>4</td>
</tr>
<tr>
<td>Quarterly</td>
<td>10</td>
</tr>
<tr>
<td>Six-monthly</td>
<td>6</td>
</tr>
<tr>
<td>Annually or less frequently</td>
<td>8</td>
</tr>
</tbody>
</table>

The median response was once every two months.

**Comments:** This clearly demonstrates that the systems studied were operating under little pressure. Nearly half the responses (44.4%) were quarterly or less frequent.

**QUESTIONS 13, 14, 15:** What are the products of the subsystem? How many transactions or operations are processed annually? How many people use this subsystem?

The information given in response to these three questions was used in other parts of the thesis, for instance in the descriptions of specific institutions or activities. It was not, however, susceptible to numerical analysis. The answers to question 13 could not be quantified, while few respondents replied to questions 14 or 15. Answers to no. 14 were very heterogeneous, while those to no. 15 were not reliable; for instance small special libraries, with seats for half-a-dozen readers, would claim all employees of their parent institution as users.
QUESTION 16: Has this subsystem been extensively modified since it began to be processed by computer?

Thirty-five replies were received to this question; 14 (40.0%) were positive, 21 (60.0%) negative.

Comments: Again we find a balanced situation; 60% of the subsystems had not been modified since being set up, which could have been expected as systems were of fairly recent date, and had been operating under little pressure. 40% of the subsystems had been modified, which reflects the experimental nature of all Brazilian automation at that time.

Those who replied positively to question 16 were then asked, as question 17, to give a brief outline of the modifications. Fifteen modifications were cited; format changes were mentioned three times; computer changes, reprogramming and the production of additional reports twice each.

QUESTION 18: Are there plans to modify this subsystem within the next two years?

Thirty-four replies were received to this question; 24 (70.6%) were positive, 10 (29.4%) negative.

Comments: Comparing this result with that of question 16, we see that more respondents wished to modify their system than had already modified it. This is natural; it is much easier to say that one intends to do something than to actually do it. Also when replying to a questionnaire, respondents are likely to reply positively to this type of question, to be seen as a person committed to change and improvement in the eyes of the interviewer. We may conclude that there was a desire to improve existing systems, but that this was not seen as an overwhelming necessity.

QUESTION 19: Those who replied positively to question 18 were then asked, as question 19, to give a brief outline of the modifications desired.

Twenty-four modifications were cited: introduce terminal, improve subject retrieval: six times each; codify formats: four times;
modify output: three times; change computer, introduce new services: twice each; separate files: once.

Comments: Respondents were obviously aware of the impact the terminal was having in other automated areas, and of its impact in library and information systems. The desire to improve subject retrieval is a perennial library objective, and it is natural that it should come to the forefront in these circumstances.

3.1.3. Specific questions on automated processes of special interest

3.1.3.1. Acquisition of books and similar materials

Five acquisition systems, operated by IPEN, INPE, UFRJ, Eletrobras and Furnas, were studied. All these institutions had stated, in answer to a previous question, how many books they had purchased in the last year; the highest figure was 742, the lowest 205, the median 384. All acquisition systems produced printout, and all output data at different frequencies: six-monthly; three-monthly; weekly or monthly; fortnightly; weekly.

Respondents were asked to comment on the operation of their acquisitions system, in relation to the five points below. (1) Claims for items which are late arriving: these were made automatically in two cases, "semi-automatically" in one case, and manually in two cases. One of the latter was specified as an "annual list of outstanding orders, sent to overseas suppliers". (2) Amount of paper documents produced: four institutions commented on this point; three said the automated system produced more paper, one less. (3) Speed with which orders sent out: four institutions commented on this point; three said the automated system was faster, one said it was similar to the manual. (4) Amount of information available on items ordered, but which have not yet arrived: four institutions commented on this point; all considered the automated system better; one respondent went so far as to say it was excellent from this point of view. (5) Number of personnel required for acquisition: four institutions commented on this point; in one acquisition had been previously done by the institution, and was now being done by one member of the library staff. Another used one member of staff, the same as for the manual system;
automation had permitted structural changes and rationalisation.
A third institution claimed to use less staff, the fourth the same
number.

Comments: Acquisition systems were relatively simple, working under
little pressure and were generally considered more effective than
manual systems by their users. Two major points need to be made: it
is easy to design acquisition systems for institutions which purchase
so few books; the most heavily-used system purchased about 750 items
per year. This level, two or three items per working day, would be
insufficient to warrant a separate acquisitions department, let
alone an automated acquisition system, under British or North American
conditions. Second, manual acquisition procedures in Brazilian
libraries can be extremely complex and inefficient, therefore it
is easy to design more efficient automated systems. Acquisition
procedures are not standardised and are dealt with only in outline in
library school; they vary greatly from one institution to another.
Books are considered the permanent property of the institution, and
their purchase may be subject to the same controls as automobiles.
The library may have to send a typed list of books wanted to three
different booksellers; when they have given their quotations another
list is typed, showing the different price and delivery time estimates.
This is used to take purchase decisions and only then are the actual
orders typed out, again in list form. Many libraries do not maintain
card files of books on order, alphabetically by author; as acquisition
levels are so low, such systems can be tolerated; meanwhile it is
relatively easy to design automated systems which will outperform
existing manual systems. This is not frequently done because
acquisition is a minor activity in the Brazilian library context, and
usually has to conform to procedures laid down by those responsible
for financial control of the institution. Library directors have
authority to alter the catalogue, but may find it difficult to modify
purchasing.

3.1.3.2. Routine cataloguing of books and similar materials

Seventeen operational cataloguing systems, at Prodasen, 
Câmara, Minter, IPEN, IF/USP, IPT, USP/SC, INPE, UFRJ, IEN, Nutes/
Clates, FGV, Eletrobras, PUC, Serpro, Furnas and UFPb, were studied,
as were systems under test, about to come into operation, at UnB and Taubip, making a total of nineteen systems.

Seventeen of these institutions stated how many books they had; results were:

<table>
<thead>
<tr>
<th>Size of collection</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4,999</td>
<td>3</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>2</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>7</td>
</tr>
<tr>
<td>20,000-49,999</td>
<td></td>
</tr>
<tr>
<td>50,000-99,999</td>
<td>3</td>
</tr>
<tr>
<td>100,000 or more</td>
<td>2</td>
</tr>
</tbody>
</table>

The median collection was 14,700 volumes.

Seventeen of these institutions gave the size of their machine-readable book file; results were tabulated as follows.

<table>
<thead>
<tr>
<th>Size of file</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4,999</td>
<td>6</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>2</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>3</td>
</tr>
<tr>
<td>20,000-49,999</td>
<td>4</td>
</tr>
<tr>
<td>50,000-99,999</td>
<td>1</td>
</tr>
<tr>
<td>100,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median file size was 12,000 items.

Fixed formats were used for 17 catalogues, variable formats for two. Six institutions stated their formats had been influenced by standard formats; Calco was mentioned five times, Marc and Unimarc three times each and ISBD twice. Printout was the most popular means of output, mentioned by sixteen institutions; catalogue cards were mentioned by nine, terminal and printed catalogues three times each and COM twice. Most institutions output their catalogues in more than one medium, e.g. printout and catalogue cards.

Respondents were asked to comment on their cataloguing system, in relation to the four points below: (1) Number of locations where the catalogue can be consulted: in ten cases the catalogue existed in one copy in the library; in four cases multiple copies were
available in the library, and in one of those cases out-of-date printouts were sent to branch libraries. Two institutions had printed catalogues, and in three the catalogue had a union catalogue role, being available in various libraries within the system. (2) Time required to catalogue books: ten books per cataloguer per day, cited three times, was the only figure mentioned more than once; eight, twelve, ten to fifteen and twenty books per cataloguer per day were each cited once. (3) Use of the catalogue by readers: twelve answers were positive, indicating the catalogue was well accepted; two respondents stated there had been no change, as the catalogue remained the same from the point of view of the user; only the method used to produce the catalogue cards had changed. Two respondents were negative; in one small faculty library the librarian searched the catalogue and relayed the information to users; in another library the printout was not popular and it was thought that cards would be more suitable. (4) Ease of consultation of the catalogue: ten respondents said the catalogue was easy to use, but in three cases they added qualifications, such as "... but in general they ask us" or "users need training". Three thought it was the same as when it was manual, and one said it was difficult to use, and "users complained".

Comments: Although automation frequently permits the distribution of multiple copies, advantage was rarely taken of this. Input was slow, which reflects the form-filling which is done in most systems, and lack of familiarity with automated systems on the part of librarians. But Brazilian manual cataloguing was also highly complex and very slow. Catalogue cards were frequently mentioned; this, of course, means that they had to be filed manually. In practice this is not a major bottleneck under Brazilian conditions, because acquisitions are low. Respondents generally claimed that their catalogues were well-used and easy to use, which is what one would expect, as respondents were very proud of their automated catalogues, into which they had invested large amounts of time and money. The researcher's personal observation, however, is that Brazilian catalogues are rarely easy to use. Also Brazilians generally have little experience in retrieving information from any source, so catalogues, especially classified catalogues, are difficult to use and training is rarely offered.
Presumably automated catalogues were satisfactory partially because many were located in small institutions with relatively sophisticated users. Five automated catalogues used KWIC/KWOC, which is not easy to understand at first sight. It is somewhat beyond the scope of this thesis, but the researcher suspects that KWIC/KWOC may not work effectively in Brazil, where libraries handle documents in a variety of languages, and where Brazilian document titles may lack precision. An attempt to KWIC index a bibliography of official publications was abandoned for precisely this reason (BIBLIOGRAFIA de publicações oficiais ..., 1981, p.10). It is interesting to note that a French Canadian reached a similar conclusion: "This indexing system just does not work in French" (FORGET, 1969).

3.1.3.3. Circulation control

Eight operational circulation control systems, at IPEN, USP/SC, INPE, UFRJ, IEN, Eletrobras, Furnas and Sudene, were studied, as was the system under test, about to come into operation, at UnB. Six of these can be described as special libraries, the other three university libraries. Book collections of these institutions were:

<table>
<thead>
<tr>
<th>No. of volumes</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-9,999</td>
<td>2</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>4</td>
</tr>
<tr>
<td>20,000-49,999</td>
<td>2</td>
</tr>
<tr>
<td>50,000-99,999</td>
<td>-</td>
</tr>
<tr>
<td>100,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median was 15,896.

The number of transactions per year reported by the eight operating systems was tabulated as follows:

<table>
<thead>
<tr>
<th>No. of transactions</th>
<th>No. of institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1,999</td>
<td>3</td>
</tr>
<tr>
<td>2,000-4,999</td>
<td>2</td>
</tr>
<tr>
<td>5,000-9,999</td>
<td>1</td>
</tr>
<tr>
<td>10,000-19,999</td>
<td>1</td>
</tr>
<tr>
<td>20,000 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

The median was 4,056.
Three basic methods of loan control could be identified: completion of forms, punched cards and terminal. Three institutions noted readers numbers, book numbers, etc. on a form and sent it for keypunching. In one of them the first time a book was loaned by the automated system, details of author, title, etc. were also noted for keypunching. Four institutions used 80-column cards; in Eletrobras these were specially designed "Portapunch" cards; one was kept in each book, prepunched with the book-number; it had space to record the readers number and due date for up to four loans. USP/SC used specially-printed 80-column cards, divided into two fields. One section was reserved for punching; the other for writing on the book number, readers number, readers signature, etc. The card was taken to a keypunch and the numerical data punched. Two other systems used a method in which each book contained cards punched with its author and title; a complete set of cards punched with users names, one card for each loan to which the user was entitled, was kept at the issue desk. When a loan was made relevant cards were sorted manually into author-title-borrower order within each date of return. Trays of cards were taken to the computer weekly for the printout to be made. Two systems, one of which was not yet fully operational, typed in data through a terminal.

Respondents were asked to comment on their circulation system, in relation to the three points below. (1) Claims for overdue items: five respondents replied to this question; four had automatic claim capacity, one did not. (2) Amount of information available about items on loan: the two systems which used terminals were receiving more information, and had instant access to the file. One other system noted it had access by author and title; the others did not reply to this question. (3) Number of personnel required for circulation control: four systems used one person, one used two people; of those which did not reply, several were so small they would not have needed to allocate a full member of staff permanently to the task.

Comments: Special libraries predominated; although in Britain and North America circulation is the typical priority area for automation of public libraries, in Brazil the only public library with automation
was automating its catalogue. Circulation control methods were generally simple, in two cases so simple they can be described as punched card rather than automated systems, although online entry was beginning to come into use. In many cases it is clear that circulation was automated to gain experience with the computer or for other motives, not necessity. Most of the circulation levels cited could easily be handled by manual methods.

3.1.3.4. Selective dissemination of information.

Six operational SDI systems, at Binagri, Embrapa, Bireme, IPT, CIN and IME, were studied. Three of these systems could be described as fully-established, the others had been recently implanted or were under test. All searched imported tapes. Binagri searched Agris and IFIS for 2,500 users on a monthly schedule. Embrapa searched Agricola, CAB, Biosis and FSTA for 3,200 users, processing searches whenever the tapes arrived. CIN searched INIS for 1,600 users, on a fortnightly basis. IPT was searching COMPENDEX monthly for 30 users. IME was searching the U.S. "Government Report Announcement and Index" fortnightly for 80 users. IPT and IME services had first been offered to the public in the twelve months previous to this survey. Bireme offered a very limited SDI service, based on Medline, of 69 profiles, quarterly for the Sao Paulo Secretary of Health. This is best viewed as a pilot scheme. This would indicate a total of about 7,500 SDI users in Brazil at that time. This figure must necessarily be an approximation, because some researchers may have used both the agricultural systems, while one small system was only able to cite number of profiles, not number of users.

Respondents were also asked to comment on their SDI systems in relation to the five points below; Bireme did not comment, as its service was pilot in nature. (1) How does the institution inform potential users of the service? All five institutions produced printed leaflets describing their service, and four used congresses as a channel for publicity. Four offered courses, seminars, or gave speeches. One had made a complete mailing list of researchers in its field and had then sent them descriptive leaflets and application forms. (2) How is the users first profile formed? In all cases the user completed a form; this came accompanied by various other documents; in
at least two cases this documentation was so comprehensive it could be called a manual. (3) How are profiles updated or improved? The three fully-established services all had evaluation systems which operated via the computer; the other two were manual. (4) Is there a charge for the service? Four services were free, although two added "so far". The fifth, one of the recently-introduced services, cost Cr$11,000.00 (£110) per annum, after a three-month trial period. (5) What is done to assure the user access to original documents? All services included a system whereby users could request copies, using the appropriate form. In most cases the institutions first checked their own resources, then went overseas. BLLD was mentioned three times; NAL and NTIS once each.

Comments: SDI systems seem to be amongst the best and most efficient users of automation in libraries and information systems in Brazil, and were obviously well appreciated. The figure of about 7,500 users is encouragingly high for Brazil. On the other hand there were relatively few systems, and the major operational systems only covered two areas, agriculture and nuclear energy. There is obviously room for expansion here. Brazilians seem to recognise the importance of SDI; "Revista de Biblioteconomia de Brasília" published a special issue (vol. 2, no. 2, 1978), devoted to SDI. The researcher believes that this was the first time that any Brazilian library periodical had concentrated on a single subject. It is also one of the few subject areas which has had two books dedicated to it, both written by Embrapa staff (LONGO, 1979; NOCETTI, 1980).

3.1.3.5. Bibliographic data base with retrospective search capability

Nine operational data bases were studied, at Embrapa, Prodasen, Minter, Bireme, IPEN, IPT, Ibict, CIN and IME. Embrapa batch-searched 4.5 million entries from Agricola, CAB, Biosis and FSTA; 354 searches had been run in the last twelve months. Prodasen was an online legal data base, with a total of 365,208 entries, of which 64,891 (17.8%) were for books or periodicals; the books subfile was also used to produce a traditional library catalogue. Minter maintained a system which was basically a union catalogue, but which could be searched in batch as a data base; its 38,000 entries included periodical articles as well as books, and some were followed by abstracts.
Most documents dealt with development problems in Brazil. Bireme searched a six year Medline file online, and had had 890 search requests in the last twelve months. IPEN had just begun to offer online researches on the 416,000 entry Energy Research Abstracts file, and reported an initial demand of about forty searches a month. Should this be maintained it would be one of the most heavily-used services in Brazil. IPT was offering online searches of AIDS (Abstract Information Digest Service, Forestry Products Research Society), 100,000 entries, and ABIPC (Abstract Bulletin of the Institute of Paper Chemistry), 12,000 entries. They processed about one search a week on each. Ibict acted as an interface between Brazilian researchers and databases overseas. It had access to 15,000,000 items via SDC; 98 search requests had been received in the last twelve months. CIN offered online searches on the 400,000 entry INIS data base; 360 searches had been run in the previous twelve months. IME had just begun to offer searches of a data base of 42,000 technical standards of use to military engineers.

Seven institutions searched online, two in batch; only two data bases could be described as small, under 100,000 entries, while the rest were over that figure; six files were imported, while three were input in Brazil. The five institutions which had a year or more's experience in searching, and which were able to say how many times their data base was searched, reported a total of about 1,800 search requests in the previous twelve months.

Seven respondents were asked to comment on their data base in relation to the following five points (the Prodasen and Minter systems had elements of a book catalogue, and their representatives had responded to the specific comments on book cataloguing). (1) How does the institution inform potential users of the service? Leaflets were available on five systems; four were publicised through courses, seminars or speeches, while two data bases were run in conjunction with active SDI systems; they would, therefore, benefit from the SDI publicity. Two systems had no current formal publicity activities; these included one important service whose representative simply stated that the service had been "publicised when installed". (2) Who fixes the search parameters? User; librarian; user with librarian were
all mentioned twice; specialist from the subject area with librarian was mentioned once. (3) Who operates the terminal? In four institutions the terminal was operated by librarians; in one by librarians and systems analysts, in another by specialists from the subject area. (4) Is there a charge for the service? Four data bases were free, although three of those four respondents qualified their answer with comments such as "at the moment". Three systems charged; one based its charge on machine time; one charged Cr$250.00 (£2.50) for each two-year file segment searched; Ibict charged a flat Cr$5,000.00 (£50) per search, but this of course included communication charges to SDC in California. (5) What is done to assure the user access to the original document? All institutions had systems to supply documents to users; in many cases a large proportion of documents were already held by the institutions; searches were next made in Brazil, then overseas; BLLD was mentioned twice, NAL once.

Comments: Data bases were quite varied in nature, which is natural as they can be defined in various ways. If we limit ourselves to online data bases with more than 100,000 entries, five were found, of which two had been established just before the survey. This was obviously an incipient field and researchers were only just beginning to use them. The 1,800 recorded search requests indicate a good start for Brazil, but there is obviously plenty of room for expansion; few areas had been covered and not all systems were attempting to offer their services widely. Librarians will be encouraged that, although sometimes considered of low status in Brazil, they were generally considered capable of operating terminals. Institutions were divided on the subject of charging users. Brazilians were not used to using information, let alone paying for it, and even in highly-industrialised countries Medlars usage slumped dramatically when charges were introduced (CORNING, 1972).

3.1.3.6. System to produce indexes or printed catalogues for external use

Seven operational systems to produce indexes or printed catalogues for external use were studied, at Cimec, Binagri, Prodasen, Bireme, FO/USP, Ibict and BN. Cimec produced a six-monthly catalogue of Brazilian theses (Banco de Teses), growing by about 3,000 entries
Binagri produced the Brazilian agricultural bibliography (Bibliografia Brasileira de Agricultura) annually, and specialised agricultural bibliographies on a continuing basis, for a total of about 10,000 entries per year. Prodasen produced two year printed cumulations of the book catalogue of the Senate library, which was growing at the rate of approximately 3,500 entries per annum. Bireme produced two volumes each year of its Latin American medical bibliography (Index Medicus Latino-Americano), totalling 2,500 entries. FO/USP published the Brazilian dental bibliography (Bibliografia Brasileira de Odontologia) every two years, with about 500 entries per year. Ibict published various specialised bibliographies, on mathematics, chemistry, physics, etc. (Bibliografia Brasileira de Matemática, etc.) on a schedule of one every three months; annual input was about 14,000 entries. BN published the national bibliography (Boletim Bibliográfico) quarterly, totalling 7,000 entries per year. The total annual input to these bibliographies and catalogues was therefore about 40,500 entries.

Six respondents were asked to comment on their systems in relation to the four points below (the Prodasen system had elements of a system for routine book cataloguing, and its representative responded to the specific comments on book cataloguing). (1) How is this publication arranged internally? Three catalogues were arranged alphabetically by subject, two in accession number order, with indexes (in one of these the index was in classified order; the other was a series of bibliographies, some organised by KWIC, others by KWOC); the sixth catalogue was classified. (2) How many copies are produced? Ibict 150; Bireme 500; FO/USP 750; Binagri 1,000; BN 2,000; Cimec 5,000. (3) Is there a charge for this publication? All institutions distributed a considerable proportion of their publications, sometimes the majority, free of charge. One only distributed free, while the other five had priced their publications for those occasions when they
did not wish to donate. (4) How is this publication distributed? All publications were mailed to selected institutions with similar aims, or distributed within the parent organisation, or exchanged for other publications. For example Binagri publications were distributed throughout the Ministry of Agriculture, the dental bibliography to all dental schools.

Comments: The annual total of over 40,000 entries was relatively high by Brazilian standards, but many systems were very small, or produced catalogues published in very limited numbers. The problem seemed to be one of distribution rather than production; the systems seem capable of producing the catalogues or indexes, but users were not accustomed to buying them, therefore most were distributed free.

3.2. Computer usage in institutions not visited

Section 6.2. describes seven institutions which could not be visited in some detail, and offers brief outlines of another five; some of the later were very small systems, and in a couple of cases it was not possible to be certain that they were still operating. However, for the purposes of this section all twelve will be discussed. There were four university institutions, producing three catalogues and a periodicals list. Of the eight other institutions, five had definite, strong links to the Federal Government, while one was a state-level organisation. Three operated in high technology areas (computing, television, alcohol production) and three in areas given priority by the government (transport and mineral resources). Three were using the computer to index, while three were operating data bases. Some systems were large and well-established, others small and embryonic. In their basic features the twelve systems not visited were little different from the 31 visited. They could, of course, be expected to differ in their geographic spread, as they were the systems the researcher was unable to visit. Even in this, however, they tended to resemble previous results. Five of the institutions were in Rio, one in the interior of São Paulo state. Thus only 50% were in places which the researcher did not visit; three were further south, (two in Porto Alegre, one in Curitiba), one further north, in Belém, and the other two were in rural areas of Minas Gerais and Bahia.
Map 2: Sketch-map of Brazil, showing the twelve institutions which could not be visited for in-depth study.
Institutions not visited were also asked to comment on motives, problems, results and influences on their system. Eight institutions gave usable replies: UFRGS, RFFSA, CPRM, Rede Globo, Planalsucar, Federal University of Para, Bauru Educational Foundation and CEPLAC; questions and answers were as follows:

QUESTION 1: What were the most important motives for the automation of your library?

A total of 17 motives were given; faster, more speed, etc., was cited 7 times; better retrieval or new products, 4 times; manual system unable to cope or more control, 3 times. To accompany development of university, had computer, and to use training were mentioned once only. It is interesting to note that this was the only occasion that "to use training" was cited as a motive for automation.

QUESTION 2: What were the most important problems in the automation of your library?

A total of 13 problems, all different, were mentioned: deciding format for output; errors; programming delays; printout too heavy to be easily consulted; adapting cataloguing to the computer; keypunching; relations between the library and the D.P. Centre; teleprocessing; analysts dimensioned system inadequately; controlling network; lack of computer memory; lack of computer time; limitations of KWIC indexing.

QUESTION 3: What were the most important results of the automation of your library?

A total of 15 results were cited in response to this question; more or better information was cited 4 times; economy, better use of staff, time, book collection 4 times; faster 3 times; more interaction with the user twice. Blurring of departmental boundaries and more statistics were mentioned once each.

QUESTION 4: What were the other systems or bibliographic formats which influenced your system most?

USP/SC had influenced two systems, CALCO and Predicasts one each. Two systems had not been influenced by another, two did not answer.
Comments: These results were very similar to those for the institutions visited.
Note: It is clear that it would be repetitive to comment in detail on each of the four occasions that the attitude test results appear in this chapter. The researcher has, therefore, commented in detail in 4.1 and 4.2 on the users, and the comparison between the users and non-users; elsewhere comments have been limited to items of special interest.

4.1. Attitudes and experiences in the automation field: users: guided interview with senior staff of institutions which use computers.

Note: This interview was conducted with a total of 55 respondents.

4.1.1. Attitudes

**QUESTION 1:** What, in your opinion, are the most important problems in the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than ten alternatives from the list below:

Fifty-five respondents made a total of 407 selections;

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>74.6</td>
<td>There is a lack of librarians with experience with computers.</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>67.3</td>
<td>There is a lack of persons from the field of computing with experience in libraries or bibliographic information systems.</td>
</tr>
<tr>
<td>3</td>
<td>36</td>
<td>65.5</td>
<td>There is a lack of official guidelines and government policy.</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>63.6</td>
<td>It is difficult to obtain financial resources.</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>54.6</td>
<td>There is a lack of library networks or cooperation between bibliographic information systems.</td>
</tr>
</tbody>
</table>
Few libraries or bibliographic information systems have experience of the computer. There are attempts to introduce the computer without adequate planning. The level of libraries and bibliographic information systems in Brazil does not yet permit the computer to be effectively used. Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system. Brazil attempts to copy foreign models, inappropriate for its reality. There is a lack of consultants with experience in this field. There is a lack of opportunities for education or training. There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form. Little information is available about computer use. It is difficult to obtain appropriate programmes and bibliographic formats. It is difficult to obtain access to a computer. There is a lack of prepared systems which can be purchased and installed immediately. Librarians are afraid of the computer. The level of activities in libraries or bibliographic information systems does not justify the use of the computer.
Utility has a low priority amongst the objectives of libraries or bibliographic information systems.

Comments: The ranked attitudes show a clear feeling that the principal problem is one of lack of experience; the problem ranked no. 1, selected by 74.6% of the respondents, is that there is a lack of librarians with experience with computers; ranked in second place we find a lack of persons from the field of computing with experience in libraries or bibliographic information systems; in sixth place, few libraries or bibliographic information systems have experience of the computer. It is also interesting to note that the respondents do not consider lack of opportunities for education and training, or lack of information, as major problems; they were ranked nos. 12 and 14 respectively. One reason for this may be dependent upon the statement ranked no. 3: there is a lack of official guidelines and government policy; this was selected by 65.5% of respondents and shows that the vast majority were very concerned about the vacuum at the centre of their profession. As the government is the ultimate source of most library funding in Brazil, a lack of policy can be linked to the problem ranked as no. 4: difficulty in obtaining financial resources. It might be argued that all librarians and computer personnel constantly complain about this, but it must have been a very serious problem in Brazil to be ranked so high, selected by two-thirds of the respondents. Lack of networking and cooperation was ranked no. 5; this shows a good deal of sophistication on the part of respondents, who are obviously aware that individual systems cannot automate successfully in isolation. Just under half the respondents thought that there were attempts to introduce the computer without adequate planning, ranked no. 7, which shows that this problem is relatively serious in Brazil.

The two statements relating to the level of systems in Brazil drew conflicting replies. "The level of libraries and bibliographic information systems does not yet permit the computer to be effectively used", statement no. 19 in the original guided interview, was rated no. 8, selected by 43.7% of respondents. Its sister-statement, "The level of activities in libraries or bibliographic information
systems does not justify the use of the computer", statement no. 2 in the interview, was rated no. 17. This would indicate that respondents believe that, in many cases, libraries and systems are not ready for the computer, but that the problem is not in the quantitative level of activities. This is interesting from the point of view of the outsider looking in, because it is precisely this low quantitative level of activities in Brazilian libraries (few books, few loans, few acquisitions) which appears to be a major difference between Brazilian and British or North American libraries. The Brazilians, obviously, see things differently; they consider their libraries are quantitatively ready for automation and locate the problems elsewhere.

Over a third of the respondents thought that Brazil attempted to copy foreign models inappropriate for its reality; it is interesting to compare this with the finding elsewhere in this research that many systems were developed independently. It is even more interesting to note that, ranked equal no. 9 with the statement on foreign models is the statement "Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system", To a certain extent the statements are contradictory, but received equal ranking.

"There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form" was ranked no. 13. The relatively low ranking is perhaps due to the fact that it is the only statement relevant only to libraries, not to information systems. It is, obviously, a major problem; it was only after the establishment of the MARC system that library automation in North America really got off the ground. It is interesting to speculate how this statement would have been rated, had it been followed by the words "... similar to the MARC tape service available in the US and other foreign countries". SMITH (1975, p. 180) discusses differing responses to statements when they are attributed to well-known personalities. As a matter of policy the researcher avoided mentioning specific institutions and services in statements included in attitude tests.
Programmes and bibliographic formats were not seen as major problem areas, ranking no. 14, although there had been considerable difficulty about this time in fixing upon a nationally acceptable format. Access to a computer, ranked as no. 16, was definitely not seen as a problem, presumably because all the people being interviewed here had already gained access to one. There was little agreement with the statement "Librarians are afraid of the computer"; the researcher had noted some signs of this amongst library science students, but is is obvious that it was discounted as a problem at a higher level. It is also possible that this statement was rejected because "afraid" was considered too strong a term. LIM, describing the Malaysian situation in 1980, after the preparation of this attitude test, spoke of the "inherent distrust of computers by librarians"; a statement of this nature might have received more support. The other statement ranked as no. 17, "There is a lack of prepared systems which can be purchased and installed immediately" is very interesting to the outsider looking in. The availability of turn-key systems, offered by companies established for that specific purpose, contributed immensely to the spread of automation amongst North American, and, to a lesser extent, British libraries. Presumably turn-key systems have a similar potential impact in Brazil, but respondents do not recognise that possibility. The low ranking of this statement might indicate this is a case where, as people are unfamiliar with something, they do not realise how useful it might be to them. The same process may have contributed to the relatively low ranking of the statement on the lack of an institution which disseminates bibliographic data in machine-readable form.

**QUESTION 2:** Is there any other important problem?

Sixteen respondents (29.1%) replied positively to this question; they were then asked, as question 3, to identify the problem or problems. They cited a total of 33 problems, which can be classified as follows:

Problems which, when analysed, basically related to statements already included in the attitude test: two problems related to the statement ranked no. 2, that systems analysts do not understand
libraries; two problems related to the statement ranked no. 5, on lack of cooperation; one problem related to the statement ranked no. 7, on inadequate planning; two problems related to the statement ranked no. 14, on the difficulty of obtaining programmes and formats; two problems related to the statement ranked no. 17, that librarians fear the computer.

Problems related to the computer: two problems related to lack of communication between librarians and systems analysts; "bibliographic data is far more complex than most data handled by the computer"; lack of contact between indexers and users of data bases; "everybody wants to make their own system", lack of telecommunications; "to permit effective information transfer between institutions they must be on the same level on the scale "how-to-do; know-how; know-why; self-sufficiency""; "the many attempts at automation that have gone wrong create barriers".

Problems relating to users: seven problems related to the problems users had due to not appreciating the value of information, not using libraries or reading.

General problems: two problems related to lack of standardisation; "librarians do not give sufficient attention to users"; "the training of librarians at bachelors level is inadequate"; physical conditions and illumination of libraries are inadequate.

Language problems: short life-span of Brazilian periodicals; Brazilian scientists publish overseas; a national library system cannot function, must be regional.

Comments: The answers to "open-ended" questions of this type are not susceptible to strict statistical analysis and must be treated with a certain amount of caution. They do, however, fill out the attitude tests, bringing to light facts which might otherwise have received insufficient attention, and suggesting ways in which the tests might be improved.
For instance, it is clear that respondents felt it necessary to bring up general problems of librarianship (9 times) and of users (7 times). That is, almost half of the 33 problems raised were general problems, not computer-related problems. This indicates that respondents perceive an intimate relationship between automation and the environment in which it is to be applied. The large amount of concern expressed for users could indicate that a statement of the type "Users have not yet reached a level where they can benefit fully from the automation of libraries or bibliographic information systems", had it been included in the attitude test, would have received some support. A statement on lack of standardisation, a problem raised by two respondents, might also be considered for inclusion.

The eight problems related to the computer are mostly relatively minor, although some, such as lack of telecommunications and complexity of bibliographic data, might be worth including in a fully comprehensive attitude test. The problem "Everybody wants to make their own system", is a nuance on the problem ranked as no. 9: "Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system". There is an important difference between "wants to" and "necessary to". It is probable that the statement would have been better if it had been worded in a more general manner, e.g. "Each library or bibliographic information system plans its computerised system independently".

Two respondents raised the problem of lack of communication between librarians and systems analysts; the researcher had deliberately not included a question of that nature, because it would not determine which group was responsible for lack of communication. Instead two distinct questions, on the experience of librarians with computers and of systems analysts with libraries, were included. In fact these were rated almost equally, which indicates that the problem could just as well have been expressed in terms of lack of communication.

Two comments were similar to the statement ranked no. 17: "Librarians are afraid of the computer", but both were expressed less forcibly. It is possible that, had that statement been worded in a more
neutral manner, e.g. "librarians have a negative attitude towards the computer", it would have been selected by a larger number of respondents.

**QUESTION 4:** What, in your opinion, are the most important motives for the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than five alternatives from the list below.

Fifty-five respondents made a total of 178 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>53</td>
<td>96.4</td>
<td>To improve service to users.</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>81.8</td>
<td>Because manual methods can no longer keep up with the quantity of work.</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>72.7</td>
<td>To increase productivity.</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>20.0</td>
<td>To use an available computer.</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>18.2</td>
<td>To improve the image of the library or bibliographic information system.</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>10.9</td>
<td>To gain experience with processes which use the computer.</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>9.1</td>
<td>Because directors of libraries or bibliographic information services want to introduce the computer.</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>7.3</td>
<td>Because persons in authority over directors of libraries or bibliographic information systems want to introduce the computer.</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>5.5</td>
<td>Because librarians want to introduce the computer.</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1.8</td>
<td>Because the users want libraries or bibliographic information systems to use the computer.</td>
</tr>
</tbody>
</table>

**Comments:** There was absolutely no doubt in the respondents minds that the motive of automation was to improve service to users; the 96.4% score of this statement is the highest in this set of interviews.
There was equally little doubt that the computer was used "because manual methods can no longer keep up with the quantity of work", ranked no. 2, selected by 81.8% of the respondents. This is very interesting to the outsider looking in, as it would appear that, numerically, the level in most Brazilian libraries is so low that automation is scarcely necessary. There are two possible explanations; either the Brazilians perceive the level of activities in their libraries as being high, or their manual methods are not efficient and are therefore unable to cope, even with a relatively low level of activities. An increase in productivity was rated third; it is interesting to note that the three most highly ranked motives provide almost a "text-book" answer to the question as to motives for computer use.

There is a wide gap between these three statements, chosen by 72.7% or more of the respondents, and the statement ranked fourth, chosen by 20.0%. This was "To use an available computer"; it indicates that cases where institutions purchase a computer, then expect the library to use it, exist in Brazil, but are not so common as to cause great concern. Some systems use the computer to gain a better image, ranked as no. 5, but again, this is not very common, although it is mentioned in the literature as being practised by major institutions. GRIFFIN (1971) wondered why so many libraries which subscribed to the early MARC tapes did not use them. He concluded that "there is probably some prestige associated with being a subscriber library". Brazilian respondents also rejected the possibility that automation is undertaken just to gain experience with the computer, ranked no. 6.

The remaining statements, ranked 7, 8, 9 & 10, had been inserted to attempt to discover the source of the motivation for automation. In fact so few respondents selected one of these statements that it is not possible to reach any definite conclusion. In any further research in this field the researcher will make this a separate question.

QUESTION 5: Is there any other important motive?

Twelve respondents (21.8%) replied positively to this
question; they were then asked, as question 6, to identify the motive or motives. They cited a total of 16 motives, which can be classified as below:

   Six motives were basically related to the necessity for better dissemination of information or access to it; these included some specialised comments, such as "Subject access to the contents of periodicals is required" or "SDI is the most effective, regular and rapid means of dissemination of information". Four motives were to share resources or participate in networks; two motives were to minimise errors; one motive was related to the motive ranked no. 1 on the attitude test, to improve service. Other motives: offer more products; rationalise work; "there is insufficient qualified manpower for manual services".

   Comments: The motive mentioned six times, better dissemination of or access to information, is, if analysed strictly, identical to the motive ranked as no. 1, to improve service, because the end-product offered by libraries and bibliographic information systems is access to information. But it is obvious that several respondents would have liked to have things spelt out more clearly.

   It is interesting that as many as four respondents should have mentioned networking or cooperation as a motive; this was ranked fairly low (no. 6) as a result in the responses to question no. 7. This would indicate that cooperation is a motive for automation, but less common as a result. It is natural to find errors mentioned here, as they had been brought up so frequently in the open-ended question on problems in the questionnaire applied to institutions.

   QUESTION 7: What, in your opinion, are the most important results of the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than five alternatives from the list below.

   Fifty-four respondents made a total of 232 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>92.6</td>
<td>Better services are offered to users.</td>
</tr>
</tbody>
</table>
2 36 66.7 Productivity increases.
3 35 64.8 New services are offered.
4 32 59.3 Librarians are freed from large quantities of routine work.
5 29 53.7 Information is processed more rapidly.
6 22 40.7 There is an increase in cooperation between systems.
7 16 29.6 Libraries or bibliographic information systems bring their work up to date.
8 10 18.5 An improvement in the image of the library or bibliographic information system.
9 1 1.9 There is little change in libraries or bibliographic information systems.
9 1 1.9 Money is saved.

Comments: There is no doubt about the major results of automation: better services and increased productivity, ranked no. 1 and no. 2. In question 4 the same items were ranked 1 and 3, as motives for automation, so we can see that respondents feel that automation is adopted for these reasons, and that those who automate are not disappointed in this respect. It is interesting that the motive ranked no. 2 in question 4 "Because manual methods can no longer keep up with the work", is not so clearly mirrored in question 7. Its equivalent result, "Libraries or bibliographic information systems bring their work up to date", is ranked low, as no. 7. The reason for this can be seen from the respondents' own replies: they never catch up with their work because they offer new services. This is a perceptive analysis by the respondents of the dynamic relationship between library and bibliographic information services and automation: the automation of existing services is not always justifiable, but automation permits new services to be introduced.

There is general agreement on the beneficial aspects of automation, as shown by the statements ranked nos. 4, 5 and 6: librarians are freed from large amounts of routine work, information is processed more rapidly and there is an increase in cooperation. A much smaller group of respondents selected improvement in image.
as a result; this was ranked no. 8. Only one person selected the statement that automation brings little change; it would, theoretically, be possible to argue that, because Brazilian librarians are relatively competent at technical services, library automation reinforces a strong area, and therefore has little overall effect. This is especially true of certain cataloguing systems which produce cards for an existing card catalogue and whose very existence may not be noted by library users. However true this may be in theory, the respondents obviously discounted the possibility of little change. They also discarded the possibility that money would be saved, a statement selected by one respondent. This shows a realistic and widespread awareness of the fact that whatever else automation may bring, it will not bring economy. As Richard de GENNARO (1975) said when summarising American experience:

"The actual cost savings of the localized systems that characterised the last decade were either minimal or non-existent. The first really significant savings that have come to libraries from computerisation have come from the OCLC system and its affiliates in the area of personnel costs in cataloguing and technical services".

As Brazil had nothing like OCLC, one can assume that cost savings there too were either minimal or non-existent.

QUESTION 8: Is there any other important result?

Eight respondents (14.5%) replied positively to this question; they were then asked, as question 9, to identify the result or results. They cited a total of ten results, as follows:

One comment was similar to the result ranked no. 3, on new services; one comment was similar to the result ranked no. 8, improved image; duplication of work is avoided; the level of librarians improves; interchange of information is possible; "the nature of routine work changes; instead of typing, personnel fill in forms"; total cost increases because more services are offered; duplication at the time of purchase is avoided; national technology is created in this area; "great expectations were created, but not satisfied".

Comments: Fewer additional results were cited than either problems or motives, and the results themselves are very variegated. This may
be caused by the embryonic nature of automation in this field in Brazil; i.e. few results are in as yet. On the other hand, certain comments, such as "the nature of routine work changes; instead of typing, personnel fill in forms", show considerable sophistication and experience on the part of the respondents. The result that "Duplication at the time of purchase is avoided" needs some explanation. Most Brazilian acquisition systems are very crude, and do not offer librarians access to an alphabetical list of items on order. Automated systems, however, normally do offer this facility.

**QUESTION 10:** In your opinion, which of these alternatives would be most effective in informing Brazilian professions about the use of computers in libraries or bibliographic information systems? Please select not more than five alternatives from the list below.

Fifty-five respondents made a total of 213 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Alternative selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
<td>63.7</td>
<td>Stimulation of the production of further relevant documents, written by Brazilians.</td>
</tr>
<tr>
<td>2</td>
<td>31</td>
<td>56.4</td>
<td>Study tours of relevant installations in Brazil.</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>54.6</td>
<td>Courses in Brazil, given by Brazilian teachers.</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>45.5</td>
<td>Study tours of relevant installations in North America or Europe.</td>
</tr>
<tr>
<td>5</td>
<td>22</td>
<td>40.0</td>
<td>Translation into Portuguese of relevant documents, originally published in North America or Europe.</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>34.6</td>
<td>Courses in Brazil, given by teachers from North America or Europe, with simultaneous translation.</td>
</tr>
<tr>
<td>7</td>
<td>18</td>
<td>32.7</td>
<td>Consulting by Brazilian experts.</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>27.3</td>
<td>Better access to documentation already published in North America or Europe.</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>16.4</td>
<td>Consulting by experts from North America or Europe.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>16.4</td>
<td>Opportunities to study in North America or Europe.</td>
</tr>
</tbody>
</table>
**Comments:** The researcher had not expected that the stimulation of the production of documents should have been rated most effective. On reflection, however, it is an obvious and very intelligent choice. There was at that time almost nothing available in Portuguese on automation of libraries or bibliographic information systems. The most readily available documents were the MARC-style formats which, although necessary as a foundation, are of limited value as a guide to processing. There was no library automation textbook, nor were there many articles available on the subject. The next two choices, study tours and courses in Brazil, are eminently practical. It is interesting to note that the top three ranking items could all be provided for relatively little expense, with purely Brazilian resources. Foreign influences are represented by the next three items, study tours in North America or Europe, translation of documents from there or courses by teachers from there, with simultaneous translation. It is interesting to note that, whether judging Brazil or overseas, respondents always put study tours before courses. It is also important to note that the other possibility for North America or Europe, going there to study, is ranked very low, as no. 9. This presumably indicates that respondents feel that the type of course they could take overseas would be largely irrelevant to their needs.

Consultants, whether from Brazil or overseas, are also ranked very low, as nos. 7 or 9. It may be that the Brazilian situation requires assistance on a more basic level, or that respondents are not familiar with consultants and their benefits. Consultants were almost non-existent in this field in Brazil at this time. Another area which also provokes little enthusiasm is better access to documentation already published overseas, ranked no. 8. The major reason for this must be the difficulty most Brazilians have in reading foreign languages, because the same documentation, when translated, ranks as no. 5.

Six respondents offered different alternatives, a possibility permitted by the list of alternatives. Two insisted that the researcher should note that the undergraduate course for librarians should include library automation; the researcher did not consider this a true alternative to this question, as it dealt only with the problems.
of educating or informing persons who are already professionals. This shows the depth of feeling amongst Brazilian professionals on that subject. The other suggestions were: open seminars, e.g. on SDI; internships in national organisations with automated services; better divulgation of Brazilian services; training by Brazilian professionals who have visited installations in Brazil and overseas.

**QUESTION 11**: Imagine that you are director of a large Brazilian library. Which of these activities would you give priority? Please select not more than five alternatives from the list below. Fifty-three respondents made a total of 233 selections:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>77.4</td>
<td>Reference and information service.</td>
</tr>
<tr>
<td>2</td>
<td>34</td>
<td>64.2</td>
<td>Selection and acquisition of books.</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>56.6</td>
<td>The periodicals collection.</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>50.9</td>
<td>Cooperation with bibliographic information systems.</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>50.9</td>
<td>Cooperation with other libraries.</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>47.2</td>
<td>Cataloguing and classifying of books.</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>28.3</td>
<td>Circulation.</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>26.4</td>
<td>Use of the computer.</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>26.4</td>
<td>Indexing of periodicals.</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>11.3</td>
<td>Use of audio-visual media.</td>
</tr>
</tbody>
</table>

**Comments**: This question seems to have been generally successful in pinpointing the weak spots in Brazilian libraries. Reference and information services are poor, and urgently need to be improved; computer-based bibliographic services have some role here, but the most important element is the human element, and the librarian-user relationship. Book stocks urgently need upgrading; this, however, is an area in which the computer is of relatively little value. The item ranked third, the periodicals collection, is in the same category; the computer can only be of peripheral value here, controlling receipt and producing lists; the actual formation or strengthening of a periodical collection is an intellectual and financial activity.
Cooperation with bibliographic information systems which use the computer, ranked no. 4, obviously implies automation. But the other activity also ranked at no. 4, cooperation with other libraries, may be helped by the computer, but does not necessarily need the assistance of that machine. In the United Kingdom library cooperation was very strong before automation came into existence. In Brazil there is no tradition of library cooperation and no reason to believe that automation will suddenly change that situation.

Cataloguing and classifying of books was ranked next, as no. 6, which is surprising when we reflect that other parts of this research showed that cataloguing systems were by far the commonest automated systems in Brazilian libraries. Cataloguing is an eminently computerisable area, as is circulation, ranked no. 7. The use of the computer itself was ranked no. 8, which is in line with the rest of the answers and shows that, although the respondents use the computer, they are still capable of taking a balanced, detached view of library priorities.

Indexing of periodicals was ranked no. 9, and audio-visual last. This runs contrary to the personal opinion of the researcher, who feels that these are important activities which urgently need more attention in Brazil. Presumably respondents felt that it would be better to reach a stage where the basic library activities, book and periodical collections, are operating smoothly before taking on new tasks.

The questionnaire permitted respondents to indicate other areas of priority, but only three did so, indicating four heterogenous activities: bring any existing service into the library; rationalise services; evaluate users and their necessities; permanent user training programme.

**QUESTION 12**: In your opinion, what percentage of major Brazilian libraries will use the computer regularly in ten years time? Please select one alternative only from the list below.

Fifty-five respondents replied; results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>% of libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>40.0</td>
<td>0-25</td>
</tr>
<tr>
<td>10</td>
<td>18.2</td>
<td>26-50</td>
</tr>
</tbody>
</table>
Comments: Respondents obviously do not believe that computers will be much in evidence in major Brazilian libraries ten years from now. The researcher, personally, had not expected the forecasts to be so low; he would have selected a much higher level, around 75%. After all, the question does refer to major libraries, and ten years is a long time in the field of automation. But the conservative estimates of the respondents may well be more accurate; after all, they are more familiar with Brazil, have more experience of just how difficult it is to establish automated systems there. They obviously believe that it will continue to be very difficult to implant automated systems. It is interesting to note that the performance of the Brazilian economy in the period between the application of the questionnaire and the writing-up of the results gave grounds for the most pessimistic forecasts.

**QUESTION 13:** What, in your opinion, has been the influence of the computer on libraries and bibliographic information systems in Brazil up to now? Please select one alternative from the list below.

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>7.3</td>
<td>Highly positive</td>
</tr>
<tr>
<td>28</td>
<td>50.9</td>
<td>Positive</td>
</tr>
<tr>
<td>6</td>
<td>10.9</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td>4</td>
<td>7.3</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highly negative</td>
</tr>
<tr>
<td>13</td>
<td>23.6</td>
<td>Impossible to evaluate</td>
</tr>
</tbody>
</table>

Comments: Respondents were positive about automation, but not overwhelmingly so. Less than 10% selected the "highly positive" alternative, nearly a quarter opted to say nothing. And four went so far as to say that it had been negative; this was the same number as had chosen the "highly positive" rating. In view of the early stage and somewhat uneven state of automation in this area in Brazil, these seem realistic attitudes.
QUESTION 14: In the next ten years, what will be the influence of the computer on libraries and bibliographic information systems in Brazil? Please select one alternative.

Fifty-five respondents replied; results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>29.1</td>
<td>Highly positive</td>
</tr>
<tr>
<td>29</td>
<td>52.7</td>
<td>Positive</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>10</td>
<td>18.2</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>

Comments: Another lukewarm response. Admittedly, respondents are more positive to automation over the next ten years, but even so, for every three who rated it highly positive, five would not go beyond positive, and two felt unable to forecast. As in the response to question 12, little confidence is shown in the future. And ten years is a very long time in terms of computer development, and Brazil is a country undergoing very rapid change.

4.1.2. Experience and training

QUESTION 15: Please indicate the subjects of your academic qualifications, identifying foreign qualifications.

Fifty-five respondents replied to this question; results were:

<table>
<thead>
<tr>
<th>No. of qualifications claimed</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Total no. of qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>36.4</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>29</td>
<td>52.7</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>9.1</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1.8</td>
<td>5</td>
</tr>
</tbody>
</table>

Total 98

There were 13 foreign qualifications, from the following countries: 3 qualifications each: USA, India; 2 qualifications each: Costa Rica, France; 1 qualification each: Uruguay, Denmark, Chile.
The 98 qualifications were divided by level as follows: Bachelors: 63 qualifications; intermediate between bachelors and masters: 20 qualifications; Masters: 15 qualifications.

The subjects of the bachelors degrees were as follows: Librarianship: 33 degrees; Mathematics, Electrical engineering: four degrees each; Business administration, Economics, Agronomy, Psychology, Social communication: two degrees each; Agronomic engineering, Botany, Geology, Social service, Chemical engineering, Philosophy, Computational sciences, Naval college, Operational electronic engineering, Telecommunications engineering, Civil engineering, Letters: one degree each.

The subjects of the intermediate qualifications were as follows: Scientific documentation: six qualifications; Librarianship, Data processing: three qualifications each; Systems analysis, Informatics: two qualifications each; Agricultural information, History, Programming languages, Course for teachers of librarianship: one qualification each.

The subjects of the masters courses were as follows: Information science: four degrees; Computation, Informatics: two degrees each; Librarianship (i.e. American MLS), Applied computing, Economic development, Communication science, Engineering, Systems engineering, Biomedical engineering: one degree each.

Comments: Persons with numerous academic qualifications are still fairly rare in Brazil, so the respondents to the questionnaire were relatively well qualified by Brazilian standards; the majority of the 55 respondents had two or more degrees; fifteen had masters degrees. There were no Ph.D.s, but that degree is still a rarity in Brazil. It is natural that such a highly-qualified group would include persons with foreign qualifications; the geographic spread of such qualifications is very wide, including both industrialised and non-industrialised countries. Qualifications at a level between bachelors and masters degrees are popular in Brazil, where they are called especialisation courses. It is natural that two thirds of the respondents should have a bachelors degree in librarianship; it is
remarkable, however, that there is no consistency in the qualifications held by those respondents who could be described as systems analysts. There were eleven bachelors degrees in mathematics and relevant areas of engineering; beyond this the field was extremely variegated. This is a natural result of the newness of systems analysis in Brazil. Most professional activities are controlled by law in Brazil; for instance it is illegal to practice librarianship without a bachelors degree in librarianship, or journalism, without a journalism degree; even secretaries have legislation regulating entry to their profession. Systems analysts had not, up to that time, been regulated by federal legislation, although professionals in the field were keen that it should be so regulated. As a result of the lack of regulation and the novelty and rapid expansion of the field, many persons from other areas had become systems analysts. For instance, one of the persons most deeply involved with developing a national format for interchange of bibliographic data had been a medical doctor; the medical field was relatively saturated in Brazil and he felt there were better opportunities in systems analysis. Many people enter the field of systems analysis by taking a higher qualification in the field; examination of the subjects of the degrees and qualifications held by respondents will show that as the level becomes higher librarianship becomes less common (three times at intermediate level and only once at masters) whereas qualifications related to systems analysis become relatively more common (eight at intermediate and six at masters). Strongly in evidence amongst the higher qualifications were those given by Ibict; the six intermediate qualifications in Scientific documentation and four masters degrees in Information science all came from that institution.

**QUESTION 16**: Have you taken any course which deals with the use of the computer in libraries or bibliographic information systems?

Thirty-three respondents (60.0%) replied positively to this question. They were then asked, as question 17, to give the title of the course or courses, identifying overseas courses. A total of 48 activities were cited: 13 internal seminars, training courses, etc.; 6 one or two week external courses; 13 external courses of three weeks or more (including seven overseas courses); 13 courses as part of bachelors, intermediate or masters qualifications
(including two overseas courses); 3 respondents had taught library automation.

Of the eleven courses as part of bachelors, intermediate or masters qualifications claimed as having been given in Brazil, seven were at Ibict, two at the "Sociologia" library school, São Paulo, one at the University of Brasília and one was not specified.

The thirteen external courses of three weeks or more were located geographically as follows: Overseas: National Library of Medicine (USA): four courses; Case Western Reserve University (USA): two courses; France: one course. In Brazil: Universidade Santa Ursula (Rio); Fundação Getulio Vargas (Rio); Associação Paulista de Bibliotecários (São Paulo): two courses each.

Comments: From one point of view it is satisfactory that 60% of the respondents had taken courses in the use of the computer in library or bibliographic information systems. From the other point of view it is distressing that, as all respondents are working at a high level in the field, as many as 40% had no formal training in the area. This reflects the embryonic nature of the field, and the lack of opportunities for formal study. Much of the training is relatively sketchy: internal seminars or courses or one or two week external courses. Overseas courses totalled nine (18.8%) which shows that a reasonable amount of foreign influence was coming into Brazil via this channel; it is even more important to note that two-thirds of these courses had been given in the United States, four at the National Library of Medicine and two at Case Western Reserve University. The NLM was closely linked to Bireme while Case Western had many ties to Brazil; it offered training especially for students from non-industrialised countries (SARACHEVIC, 1977); Saracevic, incidentally, taught several times at Ibict. It is also important to note the geographic location of the Brazilian courses; seven of the eleven courses given as part of bachelors, intermediate or masters courses had been given at Ibict in Rio; four of the six external courses of three weeks or more had also been given in Rio, giving this city singular educational advantages in this field. During the first ten years of its existence, Ibict offered an annual library automation course, taught in English
by Prof. LaVahn Overmyer of Case Western University (OVERMYER, 1973, 1982).

**QUESTION 18:** Excluding this institution, have you worked in any other library or bibliographical information system which used the computer?

Fifteen respondents (27.3%) replied positively to this question. They were then asked, as question 19, to identify and locate these libraries or systems; results were: of the fifteen positive respondents, twelve cited one place, three two places. There were a total of thirteen locations, mentioned a total of eighteen times: Ibict: five times; Prodasen: twice; Serpro (Rio), Binagri, INPE, Ceplac, FO/USP, Universidade da Associação de Ensino de Ribeirão Preto, Centro Brasileiro de Pesquisas Físicas, Biblioteca da Bolsa de Valores (Rio), CIN, CNRS, NLM: mentioned once each; the last two institutions are overseas.

**Comments:** The exceptionally strong positions of Rio de Janeiro (mentioned nine times) and, within Rio, of Ibict, are immediately obvious. As before, there was some foreign influence, but it was limited in scope.

**QUESTION 20:** Excluding the institutions where you have worked, have you seen other libraries or bibliographic information systems which use the computer? You may include brief visits, systems demonstrated at conferences, etc.

Forty-nine respondents (89.1%) replied positively to this question. They were then asked, as question 21, to estimate the number of these systems, by selecting one alternative from a list. Results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of 49 positive respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>49.0</td>
<td>1 - 3 systems</td>
</tr>
<tr>
<td>15</td>
<td>30.6</td>
<td>4 - 9 systems</td>
</tr>
<tr>
<td>8</td>
<td>16.3</td>
<td>10 - 19 systems</td>
</tr>
<tr>
<td>1</td>
<td>2.0</td>
<td>20 - 40 systems</td>
</tr>
<tr>
<td>1</td>
<td>2.0</td>
<td>More than 40 systems</td>
</tr>
</tbody>
</table>

The same respondents were then asked, as question 22, to
estimate the proportion of these systems seen in Brazil, by selecting one alternative from a list. Results were as follows:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of 49 positive respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>46.9</td>
<td>All in Brazil</td>
</tr>
<tr>
<td>7</td>
<td>14.3</td>
<td>Over 66% in Brazil</td>
</tr>
<tr>
<td>7</td>
<td>14.3</td>
<td>33% - 66% in Brazil</td>
</tr>
<tr>
<td>10</td>
<td>20.4</td>
<td>Less than 33% in Brazil</td>
</tr>
<tr>
<td>2</td>
<td>4.1</td>
<td>All overseas</td>
</tr>
</tbody>
</table>

Comments: Almost all respondents had seen an automated system other than their own in operation; but a residue of ten per cent, of a group of people who by definition have posts of responsibility in automated systems, had their experience limited to their own system. Of the forty-nine respondents who had seen a system other than their own, roughly half had seen three or less systems, all situated in Brazil. It is interesting to note that it is easier to find people who have seen a large proportion of foreign systems, than to find people who had seen a large number of systems. When overseas, librarians are frequently participating in courses or study tours which give opportunity to visit institutions; in Brazil the same librarians may have difficulty in persuading their superiors that they need to take a few days away from work to simply visit other institutions. In Britain it is common to hold Library Association regional or group meetings in libraries; the speech, meeting or discussion is usually followed by a visit to the library. Such events are rare in Brazil; professional meetings are more likely to be held at night, in a restaurant or university classroom, and rarely include visits. Even when national library conferences are held in Brazilian cities, organised visits to local libraries are rarely programmed. Anybody who visits a major US library conference will see demonstrations of numerous systems, especially turn-key systems. But turn-key systems had not yet appeared in Brazil and only one or two other systems had been demonstrated at congresses; add to these factors the geographic size of the country and it is easy to see why Brazilians had visited relatively few automated systems.

QUESTION 23: Have you, in the last twelve months, read any documents on the use of computers in libraries or bibliographic information systems?
Fifty-one respondents (92.7%) replied positively to this question. They were then asked, as question 24, to estimate the number of such documents, by selecting one alternative from a list. Results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of 51 positive respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>29.4</td>
<td>1 - 3 documents</td>
</tr>
<tr>
<td>12</td>
<td>23.5</td>
<td>4 - 9 documents</td>
</tr>
<tr>
<td>11</td>
<td>21.6</td>
<td>10 - 19 documents</td>
</tr>
<tr>
<td>7</td>
<td>13.7</td>
<td>20 - 40 documents</td>
</tr>
<tr>
<td>6</td>
<td>11.8</td>
<td>More than 40 documents</td>
</tr>
</tbody>
</table>

The same respondents were then asked, as question 25, to estimate the proportion of these documents produced in Brazil, by selecting one alternative from a list. Results were as follows:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of 51 positive respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>19.6</td>
<td>All in Brazil</td>
</tr>
<tr>
<td>4</td>
<td>7.8</td>
<td>Over 66% in Brazil</td>
</tr>
<tr>
<td>6</td>
<td>11.8</td>
<td>33% - 66% in Brazil</td>
</tr>
<tr>
<td>22</td>
<td>43.1</td>
<td>Less than 33% in Brazil</td>
</tr>
<tr>
<td>9</td>
<td>17.7</td>
<td>All overseas</td>
</tr>
</tbody>
</table>

The same respondents were then asked, as question 26, to cite the titles of three periodicals, if periodical articles had been included amongst their reading. Thirty-one respondents replied, mentioning 27 titles a total of 73 times; i.e. each respondent cited an average of 2.4 titles. In ranked order, titles were:

2. Ciência da Informação: cited 7 times;
3. Revista de Biblioteconomia de Brasília: cited six times;
4. Journal of the ASIS: cited five times;
5. Annual Review of Information Science and Technology, Library Resources and Technical Services, Information Storage and Retrieval: cited four times each;
Comments: Here we note a relatively weak picture; four respondents had done no reading in the preceding twelve months; the majority (52.9%) had read between one and nine documents. More foreign influence was noted here than in other results; a clear majority (60.8%) had done all or more than two-thirds of their reading in overseas sources. This is natural because almost all documentation on automation of libraries and bibliographic information systems has been published outside Brazil. The periodical titles also reflect a weak picture; only thirty-one respondents (56.4%) could name periodicals in which they had read articles. The top-ranking periodical is, naturally, Journal of Library Automation; Brazilian periodicals are ranked in second and third places, while the Journal of the ASIS was ranked fourth. Program, the British library automation periodical, was the only notable absentee from the list; apart from this the standard of selection was satisfactory and no obviously irrelevant titles were cited.

QUESTION 27: Do you consider that your knowledge about the use of computers in libraries or bibliographical information systems was influenced by experience or developments in any foreign country? Fifty-four respondents replied to this question; 31 (57.4%) replied positively. They were then asked, as question 28, to indicate the country or countries which had had most influence on them. Results were: the 31 positive respondents named ten countries or regions a total of 50 times, an average of 1.6 countries per respondent: U.S. (28 times); France (7); U.K. (6); Canada (3); Austria, Holland, Italy, Norway, West Germany and "Europe" (once each).
Comments: It comes as no surprise to see the USA heading the list, mentioned more times than all the other countries put together. It is interesting that France was mentioned more times than the UK, because the researcher's impression is that the UK is much in advance of France in library and information services generally, and also in the automation of these services. Perhaps France's superior position in this table was due to the presence of a French systems analyst, working on an information system in Rio, also France had made determined efforts to publicise Pascal and the CNRS information system in Brazil. (DUSOUPLIER, 1976). As a contrast, West Germany would seem to have a lower position than its library automation would deserve. The presence of some small countries in the table may be due to visits from isolated systems analysts or consultants; for instance the researcher was told that on one occasion a Norwegian systems analyst had helped on a Brazilian system. It is also necessary to remember that a relatively high proportion of respondents, 23 (42.6%), claimed not to have been influenced by any foreign country. It is interesting to note that this is the same proportion as stated that all the systems they had seen, apart from the one in which they worked, were in Brazil.

**QUESTION 29:** Within the field of the use of the computer in libraries or bibliographic information systems, have you written an article, made a speech, taught a course or done anything similar?

Thirty-seven respondents (67.3%) replied positively to this question. They were then asked, as question 30, to cite up to three such activities. They claimed a total of 71 activities, or 1.9 activities each, subdivided as follows: 22 persons had made a speech; 17 had taught a course or seminar; 16 had presented a conference paper; 14 had written an article; 2 had written a relevant thesis.

Comments: These results prove, first, that the persons interviewed are active in the field of automation. One of the main aims of the research was to interview persons working at a high level in the field, and these results show that this was achieved. Secondly, the respondents were in general interested in disseminating information about their activities, and preferred oral to written channels.
QUESTION 31: How many years of experience do you have in libraries or bibliographic information systems which use the computer?

Fifty-five respondents answered this question. Results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Years</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3.6</td>
<td>1</td>
<td>6</td>
<td>10.9</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>1.8</td>
<td>2</td>
<td>7</td>
<td>12.7</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>20.0</td>
<td>3</td>
<td>3</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>18.2</td>
<td>4</td>
<td>1</td>
<td>1.8</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>14.6</td>
<td>5</td>
<td>1</td>
<td>1.8</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>5.5</td>
<td>6</td>
<td>1</td>
<td>1.8</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>1.8</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: The median experience was five years, the mean 5.96; these are not very high figures, but are not exceptionally low either, bearing in mind the newness of the field; just over a third of the respondents (34.5%) had eight or more years experience.

4.1.3. Identification

QUESTIONS 32, 33 & 34: What is your name? What is your institution? What is your present function?

Note: The results of these questions were not suitable for analysis. A list of names and institutions is presented in section 7.7.

QUESTION 35: Into which alternative does your age fall?

Fifty-four respondents replied to this question; results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.9</td>
<td>25 or under</td>
</tr>
<tr>
<td>31</td>
<td>57.4</td>
<td>26 - 35</td>
</tr>
<tr>
<td>13</td>
<td>24.1</td>
<td>36 - 45</td>
</tr>
<tr>
<td>8</td>
<td>14.8</td>
<td>46 - 55</td>
</tr>
<tr>
<td>1</td>
<td>1.9</td>
<td>56 or over</td>
</tr>
</tbody>
</table>

Comments: The distribution of ages clearly reflects both the newness of the field and the relative youth of the Brazilian population in general.
QUESTION 36: What is your nationality?

Fifty-five respondents replied; fifty were Brazilians; the other nationalities represented were French, Uruguayan, U.S.A., Indian and Chilean.

Comments: It is rare to find foreigners working in Brazilian library or bibliographic information systems. The fact that nearly ten per cent of the sample was foreign indicates that foreigners are concentrated in this advanced-technology field. In other words, in a significant number of cases Brazil was gaining access to technology by hiring foreigners. It is interesting to note that three foreigners, the Chilean, Uruguayan and Indian, were from countries not listed as influences in question 28; the technology they were introducing was not the technology of their home countries.

QUESTION 37: What is your sex?

Fifty-five respondents replied to this question; 35 (63.6%) were female; 20 (36.4%) male.

Comments: The library profession in Brazil is overwhelmingly feminine; only about 5% of librarians are male (McCARTHY, 1975, p.45). The relatively high number of males amongst the respondents is due to the systems analysts, a profession which has a much higher proportion of males. Brazil is a masculine-dominated society, and the systems analysts were from a high-status profession, and were most likely to be male, while the librarians were from a low-status female profession. But it is impossible to evaluate the impact of sex alone, as it is only one of a number of influences in a complex situation.

4.1.4. Comments

QUESTION 38: If you wish to speak about any other aspect of the use of the computer in libraries or bibliographic information systems in Brazil, please make your comments now.

Thirty-five respondents made a total of 86 comments at this stage; results were:

Comments made more than once: sixteen comments referred to lack of training, experience, information etc. In eleven cases librarians were specifically mentioned; in two cases systems analysts were mentioned and the remaining three comments were general (e.g. "It is difficult to find personnel with experience"). Eleven
comments referred to lack of resources, infrastructure or size of libraries from the point of view of automation; Brazilian reality did not permit automation; automation was too complicated, etc. Four of these comments specifically mentioned the small size of libraries as an obstacle (e.g. "Automation functions only in relatively large systems"). Seven comments referred to lack of collaboration between librarians and analysts. Seven comments referred to lack of planning or definite objectives, disorganisation and confusion amongst institutions responsible for planning. Six comments stated that we should decide carefully when to use the computer, when it is the best alternative, not use it as a typewriter, etc. Five comments related to lack of understanding or awareness of the potential benefits or importance of the computer. Four comments referred to the necessity for better cooperation, more integration, a national library system, etc. Two comments referred to fear of the computer.

Comments made once only: machine-related comments: "We need to use terminals, batch operation is too complex"; "The computer does not forgive; it requires meticulous work"; "We had to adapt ourselves to the programmes"; "A library requires a large file because it produces a large volume of information"; "A library needs its own computer, but this is impossible in a company"; "An online loan system requires a disc for the library alone, but few can obtain this"; "An automation project cannot be theoretical; it is necessary to study and visit other systems".

Other comments: "We need support from higher levels"; "The prospects for automation are good"; "People have the will to automate"; "Brazil is in the early stages of automation"; "We are highly satisfied with our system"; "The computer should stimulate the analysis and evaluation of information"; "Users need to be trained in information methodology"; "Our system operates as a laboratory"; "This system is good because it was set up by an engineer; engineers are trained to get things done; analysts produce solutions for other peoples' problems, thereby creating other problems"; "The major problem of librarianship is lack of recognition, from its existence to the necessity of documentary information"; "Users prefer non-formal
information channels"; "We should stimulate information use, which in turn will stimulate library and information system use"; "Calco is too complicated and is constantly being modified"; "Foreign databases are multiplying without control and being imported without planning"; "University libraries do not operate as systems, being departmentalised"; "Systems should be made for users, not for librarians"; "The most important gap is the lack of school and public libraries"; "We should first make our superiors aware of information problems, then introduce automation"; "The computer is little used in libraries"; "The computer should be used to rationalise outdated methods"; "The computer will demand change and progress".

Comments: There is obviously a close similarity between the comments made several times here and the problems ranked in the first positions in question 1: lack of experience, infrastructure, collaboration between librarians and analysts and lack of planning. The six comments that we should decide carefully when to use the computer, were not clearly reflected in the list of problems in question 1. It is possible that a statement of the type "The computer is used in situations where it is not the best solution for the problem", would have received support, had it been included. The five comments that the potential benefits or importance of the computer were not understood, was another statement not clearly reflected in the list of problems. Comments tended to be specific rather than general, and to be positive, or at least neutral, in attitude towards automation, rather than negative.

4.2. Attitudes and experience in the automation field: non-users: postal questionnaires distributed to senior staff of libraries which did not use computers.

Notes: A total of 160 questionnaires were distributed to 80 libraries, two questionnaires to each, with a request that they be completed by senior staff. Forty university, twenty special and twenty public libraries were contacted; these proportions roughly reflect the importance of each type of library as a source of employment for professional librarians. Eighty-six questionnaires (53.8%) were returned; the researcher considered this an excellent response, as
postal questionnaires have a poor reputation for response in Brazil (MCCARTHY, 1975, p. 126-7) and the questionnaires were rather complex. The questionnaires returned had been correctly completed, and it was obvious that respondents had taken considerable care over their answers. This, in itself, shows considerable sophistication on the part of the respondents.

4.2.1. Attitudes

QUESTION 1: What, in your opinion, are the most important problems in the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than ten alternatives from the list below:

Eighty-six respondents made a total of 620 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
<td>75.6</td>
<td>There is a lack of librarians with experience with computers.</td>
</tr>
<tr>
<td>1</td>
<td>65</td>
<td>75.6</td>
<td>There is a lack of persons from the field of computing with experience in libraries or bibliographic information systems.</td>
</tr>
<tr>
<td>3</td>
<td>62</td>
<td>72.1</td>
<td>It is difficult to obtain financial resources.</td>
</tr>
<tr>
<td>4</td>
<td>42</td>
<td>48.8</td>
<td>There are attempts to introduce the computer without adequate planning.</td>
</tr>
<tr>
<td>4</td>
<td>42</td>
<td>48.8</td>
<td>The level of libraries and bibliographic information systems in Brazil does not yet permit the computer to be effectively used.</td>
</tr>
<tr>
<td>6</td>
<td>39</td>
<td>45.4</td>
<td>Few libraries or bibliographic information systems have experience of the computer.</td>
</tr>
<tr>
<td>7</td>
<td>38</td>
<td>44.2</td>
<td>Brazil attempts to copy foreign models, inappropriate for its reality.</td>
</tr>
<tr>
<td>Page</td>
<td>Column 1</td>
<td>Column 2</td>
<td>Percentage</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>8</td>
<td>36</td>
<td>41.9</td>
<td>There is a lack of library networks or cooperation between bibliographic information systems.</td>
</tr>
<tr>
<td>9</td>
<td>35</td>
<td>40.7</td>
<td>There is a lack of official guidelines and government policy.</td>
</tr>
<tr>
<td>10</td>
<td>33</td>
<td>38.4</td>
<td>There is a lack of opportunities for education or training.</td>
</tr>
<tr>
<td>11</td>
<td>32</td>
<td>37.2</td>
<td>Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system.</td>
</tr>
<tr>
<td>12</td>
<td>23</td>
<td>26.7</td>
<td>Little information is available about computer use.</td>
</tr>
<tr>
<td>13</td>
<td>22</td>
<td>25.6</td>
<td>There is a lack of consultants with experience in this field.</td>
</tr>
<tr>
<td>14</td>
<td>17</td>
<td>19.8</td>
<td>It is difficult to obtain access to a computer.</td>
</tr>
<tr>
<td>14</td>
<td>17</td>
<td>19.8</td>
<td>Utilization has a low priority amongst the objectives of libraries or bibliographic information systems.</td>
</tr>
<tr>
<td>16</td>
<td>14</td>
<td>16.3</td>
<td>The level of activities in libraries or bibliographic information systems does not justify the use of the computer.</td>
</tr>
<tr>
<td>17</td>
<td>13</td>
<td>15.1</td>
<td>There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form.</td>
</tr>
<tr>
<td>18</td>
<td>11</td>
<td>12.8</td>
<td>It is difficult to obtain appropriate programmes and bibliographic formats.</td>
</tr>
<tr>
<td>19</td>
<td>7</td>
<td>8.1</td>
<td>Librarians are afraid of the computer.</td>
</tr>
<tr>
<td>19</td>
<td>7</td>
<td>8.1</td>
<td>There is a lack of prepared systems which can be purchased and installed immediately.</td>
</tr>
</tbody>
</table>
QUESTION 2: Is there any other important problem?

Six respondents replied positively to this question; they were then asked, as question 3, to identify the problem or problems. They cited a total of seven problems, which could be classified as follows:

Six problems basically restated problems already included in the list of problems; "the level of libraries and bibliographic information systems does not yet permit the computer to be effectively used", was referred to twice, the problems ranked no. 3, 14, 16 and 18 were referred to once each. The remaining problem was really a result, "automated systems are more expensive".

QUESTION 4: What, in your opinion, are the most important motives for the use of the computer in libraries or bibliographic information systems in Brazil? In this case please select not more than five alternatives from the list below.

Eighty-six respondents made a total of 293 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80</td>
<td>93.0</td>
<td>To improve service to users.</td>
</tr>
<tr>
<td>2</td>
<td>71</td>
<td>82.6</td>
<td>To increase productivity.</td>
</tr>
<tr>
<td>3</td>
<td>62</td>
<td>72.1</td>
<td>Because manual methods can no longer keep up with the quantity of work.</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>30.2</td>
<td>To improve the image of the library or bibliographic information system.</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>24.4</td>
<td>To use an available computer.</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
<td>15.1</td>
<td>To gain experience with processes which use the computer.</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>11.6</td>
<td>Because persons in authority over directors of libraries or bibliographic information systems want to introduce the computer.</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>7.0</td>
<td>Because librarians want to introduce the computer.</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>4.7</td>
<td>Because directors of libraries or bibliographic information systems want to introduce the computer.</td>
</tr>
</tbody>
</table>
Because the users want libraries or bibliographic information systems to use the computer.

QUESTION 5: Is there any other important motive?

Two respondents replied positively to this question; they were then asked, as question 6, to identify the motive or motives; results were: "The computer facilitates the work of the librarian"; "An increase in access to a large volume of information".

QUESTION 7: What, in your opinion, are the most important results of the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than five alternatives from the list below.

Eighty-six respondents made a total of 369 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>79</td>
<td>91.9</td>
<td>Better services are offered to users.</td>
</tr>
<tr>
<td>2</td>
<td>66</td>
<td>76.7</td>
<td>Information is processed more rapidly.</td>
</tr>
<tr>
<td>3</td>
<td>58</td>
<td>67.4</td>
<td>Productivity increases.</td>
</tr>
<tr>
<td>4</td>
<td>43</td>
<td>50.0</td>
<td>Librarians are freed from large quantities of routine work.</td>
</tr>
<tr>
<td>5</td>
<td>40</td>
<td>46.5</td>
<td>There is an increase in cooperation between systems.</td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>40.7</td>
<td>New services are offered.</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
<td>27.9</td>
<td>An improvement in the image of the library or bibliographic information system.</td>
</tr>
<tr>
<td>8</td>
<td>23</td>
<td>26.7</td>
<td>Libraries or bibliographic information systems bring their work up to date.</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>1.2</td>
<td>Money is saved.</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>-</td>
<td>There is little change in libraries or bibliographic information systems.</td>
</tr>
</tbody>
</table>

QUESTION 8: Is there any other important result?

Three respondents replied positively to this question; they were then asked, as question 9, to identify the result or results. In two cases the respondents offered comments, rather than results:
"Services will only improve when they are offered by professional librarians"; "Money is saved only when the system is well-designed and processes a large volume of work". The only result cited was: "Modernisation of the mentality of librarians".

**QUESTION 10:** In your opinion, which of these alternatives would be most effective in informing Brazilian professionals about the use of computers in libraries or bibliographic information systems?

Please select not more than five alternatives from the list below.

Eighty-six respondents made a total of 349 selections; results were:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>87.2</td>
<td>Courses in Brazil, given by Brazilian teachers.</td>
</tr>
<tr>
<td>2</td>
<td>63</td>
<td>73.3</td>
<td>Study tours of relevant installations in Brazil.</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
<td>65.1</td>
<td>Stimulation of the production of further relevant documents, written by Brazilians.</td>
</tr>
<tr>
<td>4</td>
<td>47</td>
<td>54.7</td>
<td>Translation into Portuguese of relevant documents, originally published in North America or Europe.</td>
</tr>
<tr>
<td>5</td>
<td>45</td>
<td>52.3</td>
<td>Consulting by Brazilian experts.</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
<td>24.4</td>
<td>Better access to documentation already published in North America or Europe.</td>
</tr>
<tr>
<td>7</td>
<td>19</td>
<td>22.1</td>
<td>Courses in Brazil, given by teachers from North America or Europe, with simultaneous translation.</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>16.3</td>
<td>Study tours of relevant installations in North America or Europe.</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>7.0</td>
<td>Consulting by experts from North America or Europe.</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>3.5</td>
<td>Opportunities to study in North America or Europe.</td>
</tr>
</tbody>
</table>

**Comments:** Here a definite insularity is visible; Brazilian activities, or translation into Portuguese, are ranked as the top five alternatives,
selected by more than half the respondents. Overseas activities are relegated to the bottom five positions, selected by a quarter of the respondents or less. This insularity is much more sharply expressed than in the responses given by the computer users. Three respondents offered different alternatives, a possibility permitted by the list of alternatives: "Teachers much have practical experience of the field"; "The government must be made aware of the importance of libraries"; "Modify the curriculum of the undergraduate course in librarianship".

QUESTION 11: Imagine that you are director of a large Brazilian library. Which of these activities would you give priority? Please select not more than five alternatives.

Eighty-six respondents made a total of 403 selections:

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78</td>
<td>90.7</td>
<td>Reference and information services.</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>75.6</td>
<td>Selection and acquisition of books.</td>
</tr>
<tr>
<td>3</td>
<td>46</td>
<td>53.5</td>
<td>The periodicals collection.</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>46.5</td>
<td>Cooperation with other libraries.</td>
</tr>
<tr>
<td>5</td>
<td>38</td>
<td>44.2</td>
<td>Cataloguing and classifying of books.</td>
</tr>
<tr>
<td>6</td>
<td>38</td>
<td>44.2</td>
<td>Circulation.</td>
</tr>
<tr>
<td>7</td>
<td>38</td>
<td>44.2</td>
<td>Indexing of periodicals.</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
<td>37.2</td>
<td>Cooperation with bibliographic information systems which use the computer.</td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>20.9</td>
<td>Use of the computer.</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>11.6</td>
<td>Use of audio-visual media.</td>
</tr>
</tbody>
</table>

Two respondents offered different alternatives, a possibility permitted by the list of alternatives. Both suggested formal user training.

QUESTION 12: In your opinion, what percentage of major Brazilian libraries will use the computer regularly in ten years time? Please select one alternative only from the list below.
Eighty-six respondents answered; results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>% of libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>32.6</td>
<td>0 - 25</td>
</tr>
<tr>
<td>12</td>
<td>14.0</td>
<td>26 - 50</td>
</tr>
<tr>
<td>6</td>
<td>7.0</td>
<td>51 - 75</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>76 - 100</td>
</tr>
<tr>
<td>40</td>
<td>46.5</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>

QUESTION 13: What, in your opinion, has been the influence of the computer on libraries and bibliographic information systems in Brazil up to now? Please select one alternative.

Eighty-six respondents answered; results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2.3</td>
<td>Highly positive</td>
</tr>
<tr>
<td>32</td>
<td>37.2</td>
<td>Positive</td>
</tr>
<tr>
<td>12</td>
<td>14.0</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>40</td>
<td>46.5</td>
<td>Impossible to evaluate</td>
</tr>
</tbody>
</table>

QUESTION 14: In the next ten years, what will be the influence of the computer on libraries and bibliographic information systems in Brazil? Please select one alternative.

Eighty-six respondents answered; results were:

<table>
<thead>
<tr>
<th>No. of respondents</th>
<th>% of respondents</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>17.4</td>
<td>Highly positive</td>
</tr>
<tr>
<td>30</td>
<td>34.9</td>
<td>Positive</td>
</tr>
<tr>
<td>2</td>
<td>2.3</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>39</td>
<td>45.4</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>

Comments: The proportion of respondents who felt unable to make forecasts was very high, almost half in questions 12, 13 and 14. Such a high level must surely indicate lack of confidence in the computer rather than lack of knowledge.
4.2.2. Training and comments

Note: This part of the questionnaire, consisting of two questions only, has no direct counterpart in the structured interview with senior staff of systems which used the computer. To avoid possible confusion, the two questions have been lettered A and B rather than numbered.

QUESTION A: If you have taken any course on the use of computers in libraries or bibliographic information systems, please state the title of the course. Please also state where you took the course.

Note: Omit courses which dealt only with the computer, programming or systems analysis; only list courses which combined elements of computing with librarianship or information science.

Twenty-three respondents (26.7%) replied to this question, citing a total of 27 courses, or 1.17 courses per respondent. Results were:

By level of course: twelve short courses; eight courses taken as part of a bachelors degree; five courses taken as part of a qualification intermediate between bachelors and masters; two courses taken as part of a masters degree. Brazilian library schools: São Carlos: four courses; IbiCT; three courses; Federal University of Minas Gerais: two courses; Santa Ursula University, Campinas, Brasilía, Paraíba: one course each.

Short courses in Brazil: Rio de Janeiro state: five courses (including two courses on Calco and one given in the city of Niteroi); São Paulo: three courses (including two on Bireme/Medline); Rio Grande do Sul, Pernambuco, Maranhão: one course each.

Combining the last two sections, library school courses and short courses, the total number of courses per state was:

Rio de Janeiro: nine courses; São Paulo: 8 courses; Minas Gerais: two courses; Federal District, Rio Grande do Sul, Pernambuco, Paraíba, Maranhão: one course each.

Overseas courses: University of Illinois; Battelle Memorial Institute, Columbus, Ohio; "France: Grenoble and Paris".
Comments: Opportunities for training in the field are obviously limited; the respondents were senior staff in major libraries, but only about a quarter had some kind of training, and about half the training was via short courses. Rio de Janeiro was the most frequent location for training courses, followed closely by São Paulo. In fact, the school most frequently cited for training was in São Carlos, in the interior of São Paulo state. There are many universities in the interior of São Paulo, and it is natural that their staff should obtain training at São Carlos. As one of the objectives when selecting the sample was to contact a relatively large number of libraries, the interior of São Paulo was well represented in the sample. Three respondents had studied overseas; a reasonable number, in these conditions.

QUESTION B: Please use the space below for any other comment you consider relevant.

Nine respondents made a total of ten different comments which, when analysed, were: six comments were of the type "there are no resources/no infrastructure/we must solve basic problems first/ the computer is outside our reality". "To automate one should work out priorities and make a feasibility study first". "It is difficult to obtain copies of documents cited by information systems". "Automated systems are less capable of meeting the special needs of individual users". "Although the influence exercised by the computer over libraries and bibliographic information systems in Brazil has been, up to now, positive, we fear that, due to the "inactivation" (inativação) of some systems implanted in university libraries, there may be no stimulus in the next ten years".

Comments: The message here is plain enough: "The use of computers in Brazilian libraries is far outside our reality. The majority of our libraries are struggling to survive budget cuts and can hardly keep their stocks up to date. We should first think about better budgets, better salaries, more public or community libraries which could attend more to the necessities of Brazilians..." The same respondent concludes by suggesting that the researcher should study the lack of public libraries in Brazil or the non-existence of school libraries. The final comment appears a little strange to the
researcher, who is not aware of a university library which had "inactivated" its automated system. Perhaps the respondent was referring to projected systems which did not get off the ground. It is normal that comments on anonymous, postally-administered questionnaires will occasionally be difficult to understand.

4.3. **Comparison between attitude test results of users and non-users of the computer.**

Note: It is not possible to make immediate comparisons between the attitude test results of users and non-users. This is because respondents were invited to select up to five (or ten) alternatives from each list; normally they selected less than five or ten, and in no one case did both groups select the same number of alternatives each. Let us imagine a case in which, for a particular list of alternatives, computer users selected an average of four alternatives and non-users an average of three alternatives each. It would not be possible to directly compare the percentages of each group which had selected a particular statement. It is necessary to adjust the percentages, and this has been done, in the following tables, by adopting the number of selections made by the users as a standard, and adjusting the percentage selections of the non-user group to the level they would have reached, had the non-users made the same number of selections as the users. In this manner the percentage scores of both groups become fully comparable.

Column headings used in this section have had to be abbreviated as follows: **USERS:** Percentage of the computer user group which selected that statement. **NON-USERS:** Percentage of the non-user group which selected that statement, adjusted to be fully comparable with the percentages of the user group. **DIFFERENCE:** Result of subtracting the figure in the non-user column from the figure in the user column. A positive result indicates that the statement was selected by more users than non-users; a negative result shows that the statement was agreed to by non-users, more than by users.

Rankings have been made on the basis of the figure in the "DIFFERENCE" column; the statement which provoked the largest
positive difference has been ranked no. 1, the statement which provoked the largest negative difference has been ranked last. The effect of this is that each list of statements can be divided into three roughly-defined areas: 1) Beginning: statements which were selected by users more frequently than by non-users; 2) Middle: statements selected by roughly the same proportion of respondents in each group; 3) End: statements selected more frequently by non-users than by users.

**QUESTION 1:** What, in your opinion, are the most important problems in the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than ten alternatives from the list below:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Users</th>
<th>Non-users</th>
<th>Difference</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65.5</td>
<td>41.8</td>
<td>23.7</td>
<td>There is a lack of official guidelines and government policy.</td>
</tr>
<tr>
<td>2</td>
<td>54.6</td>
<td>43.0</td>
<td>11.6</td>
<td>There is a lack of library networks or cooperation between bibliographic information systems.</td>
</tr>
<tr>
<td>3</td>
<td>16.4</td>
<td>8.4</td>
<td>8.0</td>
<td>Librarians are afraid of the computer.</td>
</tr>
<tr>
<td>4</td>
<td>16.4</td>
<td>8.4</td>
<td>8.0</td>
<td>There is a lack of prepared systems which can be purchased and installed immediately.</td>
</tr>
<tr>
<td>5</td>
<td>34.6</td>
<td>26.3</td>
<td>7.7</td>
<td>There is a lack of consultants with experience in this field.</td>
</tr>
<tr>
<td>6</td>
<td>20.1</td>
<td>13.1</td>
<td>7.0</td>
<td>It is difficult to obtain appropriate programmes and bibliographic formats.</td>
</tr>
<tr>
<td>7</td>
<td>21.8</td>
<td>15.5</td>
<td>6.3</td>
<td>There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form.</td>
</tr>
<tr>
<td>8</td>
<td>49.1</td>
<td>46.6</td>
<td>2.5</td>
<td>Few libraries or bibliographic information systems have experience of the computer.</td>
</tr>
<tr>
<td>9</td>
<td>16.4</td>
<td>16.7</td>
<td>-0.3</td>
<td>The level of activities in libraries or bibliographic information systems does not justify the use of the computer.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>36.4</td>
<td>38.2</td>
<td>-1.8</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>18.2</td>
<td>20.3</td>
<td>-2.1</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>47.3</td>
<td>50.1</td>
<td>-2.8</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>74.6</td>
<td>77.6</td>
<td>-3.0</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>43.7</td>
<td>50.1</td>
<td>-6.4</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>32.7</td>
<td>39.4</td>
<td>-6.7</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>20.0</td>
<td>27.5</td>
<td>-7.5</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>36.4</td>
<td>45.4</td>
<td>-9.0</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>67.3</td>
<td>77.6</td>
<td>-10.3</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>63.6</td>
<td>74.0</td>
<td>-10.4</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>5.5</td>
<td>20.3</td>
<td>-14.8</td>
</tr>
</tbody>
</table>

Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system.

It is difficult to obtain access to a computer.

There are attempts to introduce the computer without adequate planning.

There is a lack of librarians with experience with computers.

The level of libraries and bibliographic information systems in Brazil does not yet permit the computer to be effectively used.

There is a lack of opportunities for education or training.

Little information is available about computer use.

Brazil attempts to copy foreign models, inappropriate for its reality.

There is a lack of persons from the field of computing with experience in libraries or bibliographic information systems.

It is difficult to obtain financial resources.

Utilization has a low priority amongst the objectives of libraries or bibliographic information systems.

**Comments:** The statement ranked no. 1, of lack of official guidelines and government policy, was the one on which there was most difference between the two groups. Users strongly felt the lack of policy; non-users felt it much less. This is presumably a major reason for the
continuing lack of official direction: only those closely connected with the field appreciate the problem, therefore it is impossible to form a large pressure group which might be successful in changing the situation. The same can be said about the statement ranked no. 2, although with less force, as the difference between the two groups is lower. The computer users saw the lack of networking and cooperation as a major problem; the non-users take it less seriously. But the non-users are the very people whose cooperation would be needed to make networking operate efficiently, therefore it is difficult to improve the situation.

The statement ranked no. 3, that librarians are afraid of the computer, received more agreement from the users, only some of whom were librarians, than from the non-users, all of whom were librarians. This is perhaps natural; the strong wording used for this statement has already been commented on and may well have led to its rejection by librarians. The four statements ranked nos. 4, 5, 6 and 7 are all roughly similar. They indicate that the user group was more aware of the lack of turn-key systems, consultants, programmes, formats and a Brazilian MARC than the non-users. As all these are relatively technical aspects of automation, such results can be readily understood.

Moving to the other end of the list, we find ranked as no. 20 "Utilization has a low priority amongst the objectives of libraries or bibliographic information systems". This was selected by far more non-users than by users; it is another example of the type of vicious circle we noted at the beginning of the list: the non-users give the user of the computer a relatively low priority, but the non-users are in fact the market for computer services, so automated services do not spread as rapidly as they might.

Non-users were more likely to select the statement on the difficulty of obtaining financial resources; they were all senior library staff who have to struggle daily with lack of finance. Similarly, non-users were more likely to select the problem that there was a lack of systems analysts with library experience, as they were less likely to have met such people. Information and training were the subject of the statements ranked nos. 16 and 15. Non-users perceived
a greater need for information and training than users; this is a natural situation as the users, by definition, are more likely to have had some training and to be in touch with developments. Finally, the statement ranked as no. 14 reinforces what the non-users said in the comments they made on their questionnaires; non-users are more likely than users to believe that Brazil is not ready for library automation. It is important to note that they do not consider the problem to be one of quantitative level of activities; the relevant statement, no. 9 on this list, was the statement on which the two groups agreed most closely. The problems, for the non-users, were elsewhere, presumably in the general level of Brazilian society and libraries or their infrastructure.

**QUESTION 4:** What, in your opinion, are the most important motives for the use of the computer in libraries or bibliographic information systems in Brazil? In this case please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Users</th>
<th>Non-Users</th>
<th>Difference</th>
<th>Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>81.8</td>
<td>68.5</td>
<td>13.3</td>
<td>Because manual methods can no longer keep up with the quantity of work.</td>
</tr>
<tr>
<td>2</td>
<td>96.4</td>
<td>88.4</td>
<td>8.0</td>
<td>To improve services to users.</td>
</tr>
<tr>
<td>3</td>
<td>9.1</td>
<td>4.4</td>
<td>4.7</td>
<td>Because directors of libraries or bibliographic information systems want to introduce the computer.</td>
</tr>
<tr>
<td>4</td>
<td>1.8</td>
<td>-</td>
<td>1.8</td>
<td>Because the users want libraries or bibliographic information systems to use the computer.</td>
</tr>
<tr>
<td>5</td>
<td>5.5</td>
<td>6.6</td>
<td>-1.1</td>
<td>Because librarians want to introduce the computer.</td>
</tr>
<tr>
<td>6</td>
<td>20.0</td>
<td>23.2</td>
<td>-3.2</td>
<td>To use an available computer.</td>
</tr>
<tr>
<td>7</td>
<td>10.9</td>
<td>14.4</td>
<td>-3.5</td>
<td>To gain experience with processes which use the computer.</td>
</tr>
<tr>
<td>8</td>
<td>7.3</td>
<td>11.1</td>
<td>-3.8</td>
<td>Because persons in authority over directors of libraries or bibliographic information systems want to introduce the computer.</td>
</tr>
<tr>
<td>9</td>
<td>72.7</td>
<td>78.4</td>
<td>-5.7</td>
<td>To increase productivity.</td>
</tr>
<tr>
<td>10</td>
<td>18.3</td>
<td>28.7</td>
<td>-10.5</td>
<td>To improve the image of the library or bibliographic information system.</td>
</tr>
</tbody>
</table>
Comments: The statement ranked no. 1, on manual methods, was selected by a much higher proportion of computer users than of non-users. This indicates that the non-users, all of whom are senior staff in large libraries, are more satisfied with manual methods than the user group; therefore they are less likely to switch to automation. Improvement in service to users was ranked no. 2, again selected by more users than non-users. Obviously, the non-users have a concept of library service which does not, necessarily, include computer use. It is interesting to compare the statements ranked nos. 3 and 8, which are mirror images of each other. The users feel that library and system directors want to introduce the computer. The non-users, a group which doubtless includes a considerable number of library directors, feel that it is people in authority over them who wish to automate. Turning to the end of the list, we find that non-users feel that some people automate to improve the image of the library or system, an attitude which is rejected by users. Examining the statement ranked no. 9, we find the most fascinating difference thrown up by this table. Non-users are more likely to associate increased productivity with automation than users!

**QUESTION 7:** What, in your opinion, are the most important results of the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Users</th>
<th>Non-users</th>
<th>Difference</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64.8</td>
<td>40.8</td>
<td>24.0</td>
<td>New services are offered.</td>
</tr>
<tr>
<td>2</td>
<td>59.3</td>
<td>50.1</td>
<td>9.2</td>
<td>Librarians are freed from large quantities of routine work.</td>
</tr>
<tr>
<td>3</td>
<td>29.6</td>
<td>26.8</td>
<td>2.8</td>
<td>Librarians or bibliographic information systems bring their work up to date.</td>
</tr>
<tr>
<td>4</td>
<td>1.9</td>
<td>-</td>
<td>1.9</td>
<td>There is little change in libraries or information systems.</td>
</tr>
<tr>
<td>5</td>
<td>1.9</td>
<td>1.2</td>
<td>0.7</td>
<td>Money is saved.</td>
</tr>
<tr>
<td>6</td>
<td>92.6</td>
<td>92.0</td>
<td>0.6</td>
<td>Better services are offered to users.</td>
</tr>
<tr>
<td>7</td>
<td>66.7</td>
<td>67.5</td>
<td>-0.8</td>
<td>Productivity increases.</td>
</tr>
</tbody>
</table>
There is an increase in cooperation between systems.

An improvement in the image of the library or bibliographic information system.

Information is processed more rapidly.

Comments: It is best to comment this table starting from the end, because the results of the statement ranked no. 10 tie up very closely with the final comment made on the last table. Non-users are much more likely to think that information is processed more rapidly than users. Over three-quarters of the non-users selected this statement, ranking it no. 2, but only about half of the users; ranking it way down at no. 5. The conclusion, once again, is inevitable: those who have not tried automation think it results in much faster processing of information, than those who have tried it. Or, inevitably, those who automate gain much slower information processing than they thought they would gain.

The statement rated no. 9 here reflects the statement rated no. 6 in the last table. Non-users believe that automation improves the image of the library or system; users are less likely to agree. Perhaps this is because users avoid the idea that they might have automated to improve their image. Moving to the front of the list, to the statement ranked no. 1, we find sharp differences over the introduction of new services. Computer users appreciate that one of the major advantages of automation is that it brings new services to the library; non-users are much less likely to realise this. Here is an obvious point to be stressed when telling librarians about the computer. A similar conclusion can be reached after examining the statement ranked no. 2: users know that automation frees librarians from routine work; non-users are less likely to realise this and therefore training could enlighten them. It is also clear that the opinions on this table are far more polarised than on the previous two tables. This is perhaps because the problems and motives have been around for a long time, whereas the results are still coming in and are far from clear.
**QUESTION 10:** In your opinion, which of these alternatives would be most effective in informing Brazilian professionals about the use of computers in libraries or bibliographic information systems? Please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Users</th>
<th>Non-Users</th>
<th>Difference</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45.5</td>
<td>15.5</td>
<td>30.0</td>
<td>Study tours of relevant installations in North America or Europe.</td>
</tr>
<tr>
<td>2</td>
<td>34.6</td>
<td>21.1</td>
<td>13.5</td>
<td>Courses in Brazil, given by teachers from North America or Europe, with simultaneous translation.</td>
</tr>
<tr>
<td>3</td>
<td>16.4</td>
<td>3.3</td>
<td>13.1</td>
<td>Opportunities to study in North America or Europe.</td>
</tr>
<tr>
<td>4</td>
<td>16.4</td>
<td>6.7</td>
<td>9.7</td>
<td>Consulting by experts from North America or Europe.</td>
</tr>
<tr>
<td>5</td>
<td>27.3</td>
<td>23.3</td>
<td>4.0</td>
<td>Better access to documentation already published in North America or Europe.</td>
</tr>
<tr>
<td>6</td>
<td>63.7</td>
<td>62.1</td>
<td>1.6</td>
<td>Stimulation of the production of further relevant documents, written by Brazilians.</td>
</tr>
<tr>
<td>7</td>
<td>40.0</td>
<td>52.2</td>
<td>-12.2</td>
<td>Translation into Portuguese of relevant documents, originally published in North America or Europe.</td>
</tr>
<tr>
<td>8</td>
<td>56.4</td>
<td>69.9</td>
<td>-13.5</td>
<td>Study tours of relevant installations in Brazil.</td>
</tr>
<tr>
<td>9</td>
<td>32.7</td>
<td>49.9</td>
<td>-17.2</td>
<td>Consulting by Brazilian experts.</td>
</tr>
<tr>
<td>10</td>
<td>54.6</td>
<td>83.2</td>
<td>-28.6</td>
<td>Courses in Brazil, given by Brazilian teachers.</td>
</tr>
</tbody>
</table>

**Comments:** Here again we note marked differences between the attitudes of the two groups, which shows that they have very different educational requirements. The non-users want training in Brazil, by Brazilians, in Portuguese, while the users take a somewhat more cosmopolitan attitude. So the statements selected by non-users more frequently than by users, ranked 10, 9, 8 and 7, all have a Brazilian or Portuguese orientation: courses in Brazil, with Brazilian teachers; consulting by Brazilian
experts; study tours in Brazil and translations into Portuguese. The statements ranked 1, 2, 3, 4 and 5, training opportunities which were selected more by users than by non-users, all have an overseas orientation: study tours overseas; foreign teachers, study opportunities or consultants. Study tours overseas, ranked no. 1, produced the largest difference between the two groups found in these tables, thirty percentage points. It is surprising that it should be precisely this statement that produced the widest difference; as foreign travel is a luxury and status symbol in Brazil, one might have expected a larger number of non-users to be interested in it. But the non-users are not interested in any training opportunity outside Brazil, even if it includes a tour to North America or Europe.

**QUESTION 11:** Imagine that you are director of a large Brazilian library. Which of these activities would you give priority? Please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Users</th>
<th>Non-Users</th>
<th>Difference</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50.9</td>
<td>34.9</td>
<td>16.0</td>
<td>Cooperation with bibliographic information systems which use the computer.</td>
</tr>
<tr>
<td>2</td>
<td>50.9</td>
<td>43.6</td>
<td>7.3</td>
<td>Cooperation with other libraries.</td>
</tr>
<tr>
<td>3</td>
<td>26.4</td>
<td>19.6</td>
<td>6.8</td>
<td>Use of the computer.</td>
</tr>
<tr>
<td>4</td>
<td>56.6</td>
<td>50.2</td>
<td>6.4</td>
<td>The periodicals collection.</td>
</tr>
<tr>
<td>5</td>
<td>47.2</td>
<td>41.5</td>
<td>5.7</td>
<td>Cataloguing and classifying of books.</td>
</tr>
<tr>
<td>6</td>
<td>11.3</td>
<td>10.9</td>
<td>0.4</td>
<td>Use of audio-visual media.</td>
</tr>
<tr>
<td>7</td>
<td>64.2</td>
<td>70.9</td>
<td>-6.7</td>
<td>Selection and acquisition of books.</td>
</tr>
<tr>
<td>8</td>
<td>77.4</td>
<td>85.1</td>
<td>-7.7</td>
<td>Reference and information services.</td>
</tr>
<tr>
<td>9</td>
<td>28.3</td>
<td>41.5</td>
<td>-13.2</td>
<td>Circulation.</td>
</tr>
<tr>
<td>10</td>
<td>26.4</td>
<td>41.5</td>
<td>-15.1</td>
<td>Indexing of periodicals.</td>
</tr>
</tbody>
</table>

**Comments:** Computer users generally prefer system-oriented or structure-oriented priorities, when compared with non-users. Ranked nos. 1, 2 and 3 we have cooperation with systems, cooperation with libraries and use of the computer. Non-users generally prefer priorities of immediate value to library users; ranked nos. 10, 9 and 8 we find indexing of periodicals, circulation and reference. Of the ten areas, circulation and reference are the two which imply most librarian-public contact;
periodical indexing can be viewed, not as a dry intellectual task, but as something which will greatly benefit library users.

The position of periodical indexing in this table was in itself very interesting; it was rated no. 10, i.e. it was selected by non-users, and was the statement which provoked one of the widest differences between the two groups. It is easy to see why it should have been given high priority by non-users, all of whom were librarians: periodical indexes are rare and of poor quality in Brazil, so the public has no access to most of the information published in periodical form in that country. It is more difficult to understand why computer users were less likely to select this statement; after all, much of information system and data base work is, simply, periodical indexing. Perhaps computer users did not think it necessary because it was already being done by the data bases they were setting up. Another possibility is that the use of the word "indexing" caused confusion; the researcher has noted on occasion in Brazil a tendency to limit the meaning of the word "index" to book-form indexes. This would explain the difference in opinion: non-users, all of whom were librarians in non-automated libraries, would be very glad to have access to printed periodical indexes. Computer users, more modern in their approach, see little point in setting up printed indexes when these will perhaps be replaced shortly by data bases. Another very important point is that non-users want indexes, a product which information systems are in an excellent position to supply; the obstacle is that the systems apparently do not appreciate the potential demand.

Continuing to analyse the table, we can note briefly that it is not surprising to find computer use ranked no. 3, selected as a priority more frequently by computer users. Cataloguing and classifying was selected more by computer users, perhaps because many of them were engaged in producing automated catalogues, the activity most frequently computerised in Brazil. Circulation, as has been said previously, may have been selected more by non-users as it is an area in which the librarian comes into contact with the public, and the non-users, all librarians, gave more attention to such areas. This is in itself a negation of the traditional view of the Brazilian librarian as a process-oriented individual, little interested in public service. This table
seems to show the opposite: the librarians (non-users) are more service oriented; the computer people (users) more process oriented; after all it is basically processes that are automated; human relations cannot be automated.

**QUESTION 12:** In your opinion, what percentage of major Brazilian libraries will use the computer regularly in ten years time? Please select one alternative only from the list below:

<table>
<thead>
<tr>
<th>Users</th>
<th>Non-users</th>
<th>Difference</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.0</td>
<td>32.6</td>
<td>7.4</td>
<td>0 - 25%</td>
</tr>
<tr>
<td>18.2</td>
<td>14.0</td>
<td>4.2</td>
<td>26 - 50%</td>
</tr>
<tr>
<td>7.3</td>
<td>7.0</td>
<td>0.3</td>
<td>51 - 75%</td>
</tr>
<tr>
<td>1.8</td>
<td>-</td>
<td>1.8</td>
<td>76 - 100%</td>
</tr>
<tr>
<td>32.7</td>
<td>46.5</td>
<td>-13.8</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>

**QUESTION 13:** What, in your opinion, has been the influence of the computer on libraries and bibliographic information systems in Brazil up to now? Please select one alternative:

<table>
<thead>
<tr>
<th>Users</th>
<th>Non-users</th>
<th>Difference</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.3</td>
<td>2.3</td>
<td>5.0</td>
<td>Highly positive</td>
</tr>
<tr>
<td>50.9</td>
<td>37.2</td>
<td>13.7</td>
<td>Positive</td>
</tr>
<tr>
<td>10.9</td>
<td>14.0</td>
<td>-3.1</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td>7.3</td>
<td>-</td>
<td>7.3</td>
<td>Negative</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>23.6</td>
<td>46.5</td>
<td>-22.9</td>
<td>Impossible to evaluate</td>
</tr>
</tbody>
</table>

**QUESTION 14:** In the next ten years, what will be the influence of the computer on libraries and bibliographic information systems in Brazil? Please select one alternative:

<table>
<thead>
<tr>
<th>Users</th>
<th>Non-users</th>
<th>Difference</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.1</td>
<td>17.4</td>
<td>11.7</td>
<td>Highly positive</td>
</tr>
<tr>
<td>52.7</td>
<td>34.9</td>
<td>17.8</td>
<td>Positive</td>
</tr>
<tr>
<td>-</td>
<td>2.3</td>
<td>-2.3</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>18.2</td>
<td>45.4</td>
<td>-27.2</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>

**Comments:** Computer users were generally more optimistic and more positive about computers than non-users in questions 12, 13 and 14.
As has already been noted, computer users were neither very optimistic nor very positive; non-users were even less optimistic and positive. The other major difference was that non-users were far more likely to select the "impossible to evaluate" alternatives than users. To some extent this could be caused by lack of information, but the questions are opinionative rather than technical in nature. The researcher suspects that respondents may have been influenced by the Brazilian tendency to avoid criticism and conflict situations.

As it is not considered proper or professional in Brazil to criticise others, respondents with negative or "neither positive nor negative" positions might well select "impossible to forecast".

4.3.1. Examination of hypotheses

We are now in a position to examine our hypotheses on attitude tests and to check for correlations amongst the data. Hypotheses 3.1 to 3.4 stated that personnel of automated systems would be shown to hold views similar to persons of non-automated systems when selecting from the lists of problems, motives, results, educational needs and library priorities. It is clear that, as two groups of unequal size were requested to select up to five alternatives from ten (or ten from twenty), and the raw scores were later converted into percentages, the scores of the two groups cannot be validly compared. We can, however, compare the ranked order in which each set of alternative was placed by each group. Spearman's rank correlation coefficient is probably the best-known method of doing this, and employs the formula

$$r_s = 1 - \frac{6\sum D^2}{n(n^2 - n)}$$

where \( n \) = number of pairs of ranks, and \( D \) is the difference in ranks for each pair. We can illustrate this below, where

- \( U \) = User-group ranking of statement
- \( NU \) = Non-user group ranking of statement
- \( D \) = Difference between each pair

<table>
<thead>
<tr>
<th>Statement</th>
<th>( U )</th>
<th>( NU )</th>
<th>( D )</th>
<th>( D^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement 1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Statement 2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Statement 3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

\[\sum D^2 = 8\]
The result will fall between +1 (exact positive correlation) and -1 (exact negative correlation); a result close to 0 would indicate a lack of correlation. Spearman's rank correlation coefficient, \( r_s \), is known as \( \rho \) (rho) in some texts; the bottom line of the equation can also be written \( n(n^2 - 1) \); formula and tables used here are taken from NEAVE (1979).

Applying the Spearman formula to the ranks attributed by each group to the problems, we find that \( r_s = .8819 \), a strong positive correlation, well above the level needed for significance at the \( .1\% \) level, with 20 pairs of ranks, .5699. Examining the motives, \( r_s = .9394 \), a very strong and positive correlation, again well above the level needed for significance at the \( .1\% \) level with 10 ranks of pairs, .7939. For results, \( r_s = .8636 \), a strong positive correlation, again significant at the \( .1\% \) level, .7939. Correlation is lower with the rankings of the educational questions, \( r_s = .7909 \), just less than the level that would be needed for significance at the \( .1\% \) level, but well within the limits for significance at the \( 1\% \) level, .7455. On library priorities correlation was \( r_s = .8788 \), again significant at the \( .1\% \) level, .7939.

We can therefore conclude that hypotheses 3.1 through 3.4 were proven. The very high correlations were to be expected as there was not a great difference between the two groups; the personnel in automated systems were either librarians or persons who had contact with librarians; the personnel in non-automated systems were all librarians. Automation had in many cases been limited to replicating manual systems, and Brazil has not yet reached a stage where it has had a deep and significant impact on library work as a whole. We may also note that the correlation was highest for motives, which supports the researcher's comment that rankings here were similar to a textbook answer. Correlation was lowest for education, that is, those who already worked in an automated library or information systems had slightly different perceptions of educational needs from those who were outside the automated environment.

Question 12, on the percentage of libraries which would use the computer in ten years time, produced a rank correlation of \( r_s = .9000 \); this was a high positive correlation; when five pairs of
ranks are compared a correlation of .9000 is significant at the 5% level. Precisely the same result, \( r_s = .9000 \), was calculated for question 13, rating the influence of the computer as positive or negative; here we have six pairs of ranks, so the result is significant at the 2½% level, .8857, but not at the 1% level, .9429. The follow-up to that question, rating the influence of the computer over the next ten years, had a correlation of \( r_s = .7857 \), which was not significant; a correlation of .8286 would be necessary for 5% significance. These last two results were very interesting; the two groups agreed about the effect the computer had had, but the users were significantly more confident about the future than the non-users. This not only proves hypothesis 3.5, but also reinforces the view that automation had, in fact, been a success.

When preparing the research project, the researcher had planned to subdivide the personnel in automated systems into two sub-groups, librarians and systems analysts; this idea was dropped because it was not possible to safely identify a subgroup of systems analysts of valid size. Neither was it possible to safely identify a subgroup of personnel from information systems.

4.4. Combination of the results of the attitude tests of the two groups.

Note: To calculate percentages and ranks for this section, the replies of each group were given equal weight. The percentage score of each statement is, therefore, the mid-point between the percentages of the user group and the non-user group which selected each alternative.

**QUESTION 1:** What, in your opinion, are the most important problems in the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than ten alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>%</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>76.1</td>
<td>There is a lack of librarians with experience of computers.</td>
</tr>
<tr>
<td>2</td>
<td>72.5</td>
<td>There is a lack of persons from the field of computing with experience in libraries or bibliographic information systems.</td>
</tr>
<tr>
<td>Rank</td>
<td>Percentage</td>
<td>Statement</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td>3</td>
<td>68.8</td>
<td>It is difficult to obtain financial resources.</td>
</tr>
<tr>
<td>4</td>
<td>53.7</td>
<td>There is a lack of official guidelines and government policy.</td>
</tr>
<tr>
<td>5</td>
<td>48.8</td>
<td>There is a lack of library networks or cooperation between bibliographic information systems.</td>
</tr>
<tr>
<td>6</td>
<td>48.7</td>
<td>There are attempts to introduce the computer without adequate planning.</td>
</tr>
<tr>
<td>7</td>
<td>47.9</td>
<td>Few libraries or bibliographic information systems have experience of the computer.</td>
</tr>
<tr>
<td>8</td>
<td>46.9</td>
<td>The level of libraries and bibliographic information systems in Brazil does not yet permit the computer to be effectively used.</td>
</tr>
<tr>
<td>9</td>
<td>40.9</td>
<td>Brazil attempts to copy foreign models, inappropriate for its reality.</td>
</tr>
<tr>
<td>10</td>
<td>37.3</td>
<td>Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system.</td>
</tr>
<tr>
<td>11</td>
<td>36.1</td>
<td>There is a lack of opportunities for education or training.</td>
</tr>
<tr>
<td>12</td>
<td>30.5</td>
<td>There is a lack of consultants with experience in this field.</td>
</tr>
<tr>
<td>13</td>
<td>23.8</td>
<td>Little information is available about computer use.</td>
</tr>
<tr>
<td>14</td>
<td>19.3</td>
<td>It is difficult to obtain access to a computer.</td>
</tr>
<tr>
<td>15</td>
<td>18.7</td>
<td>There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form.</td>
</tr>
<tr>
<td>16</td>
<td>16.6</td>
<td>The level of activities in libraries or bibliographic information systems does not justify the use of the computer.</td>
</tr>
<tr>
<td>16</td>
<td>16.6</td>
<td>It is difficult to obtain appropriate programmes and bibliographic formats.</td>
</tr>
<tr>
<td>18</td>
<td>12.9</td>
<td>Utilization has a low priority amongst the objectives of libraries or bibliographic information systems.</td>
</tr>
<tr>
<td>19</td>
<td>12.4</td>
<td>Librarians are afraid of the computer.</td>
</tr>
<tr>
<td>19</td>
<td>12.4</td>
<td>There is a lack of prepared systems which can be purchased and installed immediately.</td>
</tr>
</tbody>
</table>

**QUESTION 4:** What, in your opinion, are the most important motives for the use of the computer in libraries or bibliographic information?
systems in Brazil? In this case please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>%</th>
<th>Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>92.4</td>
<td>To improve service to users.</td>
</tr>
<tr>
<td>2</td>
<td>75.6</td>
<td>To increase productivity.</td>
</tr>
<tr>
<td>3</td>
<td>75.2</td>
<td>Because manual methods can no longer keep up with the quantity of work.</td>
</tr>
<tr>
<td>4</td>
<td>23.5</td>
<td>To improve the image of the library or bibliographic information system.</td>
</tr>
<tr>
<td>5</td>
<td>21.6</td>
<td>To use an available computer.</td>
</tr>
<tr>
<td>6</td>
<td>12.7</td>
<td>To gain experience with processes which use the computer.</td>
</tr>
<tr>
<td>7</td>
<td>9.2</td>
<td>Because persons in authority over directors of libraries or bibliographic information systems want to introduce the computer.</td>
</tr>
<tr>
<td>8</td>
<td>6.8</td>
<td>Because directors of libraries or bibliographic information services want to introduce the computer.</td>
</tr>
<tr>
<td>9</td>
<td>6.1</td>
<td>Because librarians want to introduce the computer.</td>
</tr>
<tr>
<td>10</td>
<td>0.9</td>
<td>Because the users want libraries or bibliographic information systems to use the computer.</td>
</tr>
</tbody>
</table>

QUESTION 7: What, in your opinion, are the most important results of the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>%</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>92.3</td>
<td>Better services are offered to users.</td>
</tr>
<tr>
<td>2</td>
<td>67.1</td>
<td>Productivity increases.</td>
</tr>
<tr>
<td>3</td>
<td>65.3</td>
<td>Information is processed more rapidly.</td>
</tr>
<tr>
<td>4</td>
<td>54.7</td>
<td>Librarians are freed from large quantities of routine work.</td>
</tr>
<tr>
<td>5</td>
<td>52.8</td>
<td>New services are offered.</td>
</tr>
<tr>
<td>6</td>
<td>43.7</td>
<td>There is an increase in cooperation between systems.</td>
</tr>
<tr>
<td>7</td>
<td>28.2</td>
<td>Libraries or bibliographic information systems bring their work up to date.</td>
</tr>
<tr>
<td>8</td>
<td>23.2</td>
<td>An improvement in the image of the library or bibliographic information system.</td>
</tr>
</tbody>
</table>
Money is saved.
There is little change in libraries or bibliographic information systems.

QUESTION 10: In your opinion, which of these alternatives would be most effective in informing Brazilian professionals about the use of computers in libraries or bibliographic information systems? Please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>%</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>69.0</td>
<td>Courses in Brazil, given by Brazilian teachers.</td>
</tr>
<tr>
<td>2</td>
<td>63.2</td>
<td>Study tours of relevant installations in Brazil.</td>
</tr>
<tr>
<td>3</td>
<td>62.9</td>
<td>Stimulation of the production of further relevant documents, written by Brazilians.</td>
</tr>
<tr>
<td>4</td>
<td>46.1</td>
<td>Translation into Portuguese of relevant documents, originally published in North America or Europe.</td>
</tr>
<tr>
<td>5</td>
<td>41.3</td>
<td>Consulting by Brazilian experts.</td>
</tr>
<tr>
<td>6</td>
<td>30.5</td>
<td>Study tours of relevant installations in North America or Europe.</td>
</tr>
<tr>
<td>7</td>
<td>27.9</td>
<td>Courses in Brazil, given by teachers from North America or Europe, with simultaneous translation.</td>
</tr>
<tr>
<td>8</td>
<td>25.3</td>
<td>Better access to documentation already published in North America or Europe.</td>
</tr>
<tr>
<td>9</td>
<td>11.6</td>
<td>Consulting by experts from North America or Europe.</td>
</tr>
<tr>
<td>10</td>
<td>9.9</td>
<td>Opportunities to study in North America or Europe.</td>
</tr>
</tbody>
</table>

QUESTION 11: Imagine that you are director of a large Brazilian library. Which of these activities would you give priority? Please select not more than five alternatives from the list below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>%</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>81.3</td>
<td>Reference and information services.</td>
</tr>
<tr>
<td>2</td>
<td>67.6</td>
<td>Selection and acquisition of books.</td>
</tr>
<tr>
<td>3</td>
<td>53.4</td>
<td>The periodicals collection.</td>
</tr>
<tr>
<td>4</td>
<td>47.3</td>
<td>Cooperation with other libraries.</td>
</tr>
<tr>
<td>5</td>
<td>44.4</td>
<td>Cataloguing and classifying of books.</td>
</tr>
<tr>
<td>6</td>
<td>42.9</td>
<td>Cooperation with bibliographic information systems which use the computer.</td>
</tr>
<tr>
<td>7</td>
<td>34.9</td>
<td>Circulation.</td>
</tr>
<tr>
<td>8</td>
<td>34.0</td>
<td>Indexing of periodicals.</td>
</tr>
</tbody>
</table>
9 23.0 Use of the computer.
10 11.1 Use of audio-visual media.

**QUESTION 12:** In your opinion, what percentage of major Brazilian libraries will use the computer regularly in ten years time? Please select one alternative only from the list below:

<table>
<thead>
<tr>
<th>% of respondents</th>
<th>% of libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.3</td>
<td>0 - 25</td>
</tr>
<tr>
<td>16.1</td>
<td>26 - 50</td>
</tr>
<tr>
<td>7.2</td>
<td>51 - 75</td>
</tr>
<tr>
<td>9.9</td>
<td>76 - 100</td>
</tr>
<tr>
<td>39.6</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>

**QUESTION 13:** What, in your opinion, has been the influence of the computer on libraries and bibliographic information systems in Brazil up to now? Please select one alternative:

<table>
<thead>
<tr>
<th>%</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.8</td>
<td>Highly positive</td>
</tr>
<tr>
<td>44.1</td>
<td>Positive</td>
</tr>
<tr>
<td>12.5</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td>3.7</td>
<td>Negative</td>
</tr>
<tr>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>35.1</td>
<td>Impossible to evaluate</td>
</tr>
</tbody>
</table>

**QUESTION 14:** In the next ten years, what will be the influence of the computer on libraries and bibliographic information systems in Brazil? Please select one alternative.

<table>
<thead>
<tr>
<th>%</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.3</td>
<td>Highly positive</td>
</tr>
<tr>
<td>43.8</td>
<td>Positive</td>
</tr>
<tr>
<td>1.2</td>
<td>Neither positive nor negative</td>
</tr>
<tr>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td>-</td>
<td>Highly negative</td>
</tr>
<tr>
<td>31.8</td>
<td>Impossible to forecast</td>
</tr>
</tbody>
</table>
CONCLUSIONS

As this has been a complex study, based on in-depth research, it is not possible to produce a single list of conclusions. This chapter therefore begins with conclusions related to motives (5.1), continues with results and the actual state of automated libraries and systems (5.2), and then examines the problems (5.3), before concluding with suggestions (5.4).

5.1. Motives

This research showed that the major motives for automation amongst Brazilian libraries and information systems were, in ranked order, to improve service to users, increase productivity, and because manual methods were no longer able to keep up with the quantity of work; both users and non-users of the computer gave similar responses to the attitude test. When this was asked of institutions as an open question, results were quite similar, the most popular responses being that they wanted faster processing, had a large quantity of data, and sought higher productivity or efficiency. These are all textbook motives for automation; secondary motives, such as improving the image of the library or system, using an available computer or gaining experience, were given a much lower ranking. When we examine actual levels of activity, we find quantity of data to have been a major motive only in the information systems. Many of these were set up specifically to import and make available to Brazilian users such data bases as Medline, Compendex and Agris; it is obvious that such an operation requires a substantial investment in computing, in order to be able to disseminate the information on the tapes. This research located seven files, used for data base searching or accumulated from tapes searched in SDI systems, of more than 100,000 machine readable items. Large-scale data bases and SDI systems had been the major development in the information field in the decade preceding this survey, and it is natural that Brazilians should wish to benefit from them. There was, however, a clear government policy to severely limit the use of overseas bases, forcing the importation of the most useful files on tape, for searching in Brazil. There are therefore two levels of motive here; there was a large amount of data, and government policy required that
data to be imported raw, rather than be searched overseas.

Libraries however, are a different matter; they were rarely so large that manual methods would not function adequately. The average Brazilian library was quite small, around 3,200 volumes, according to a survey including all libraries over 300 volumes, and the institutions surveyed for this thesis had a median of 20,000 volumes; they were acquiring a median of 1,800 volumes per annum, of which 400 had been purchased. (A large proportion of the books accessioned by Brazilian libraries consisted of donations and exchange material). The eight libraries which had circulation control systems reported a median of 4,000 transactions a year, or about one loan every half hour every working day. As the figures for level of activity are so low, yet the attitude tests are so adamant that automation is undertaken because manual methods are no longer able to cope, the most likely conclusion in the case of the libraries is that the manual methods were themselves very inefficient. Manual methods in general in Brazil are notoriously inefficient and library processing is no exception; acquisition systems, normally involving competitive tender, are the major example. In other words, libraries suffer from inefficient manual systems, identify the problem as the level of activity, rather than the system itself, and proceed to set up a more efficient automated system. This would seem to be confirmed by the attitude tests, which showed that respondents were very positive about the results of automation, and the open-ended question to institutions, which provoked 42 comments, only one of which was negative. It is also relevant that all libraries in Brazil use identical manual systems; for instance circulation is always controlled by the Newark system; therefore there is little stimulus to think in terms of improved manual systems.

Attitude tests were unable to determine whether the stimulus for automation came from within the institutions or from above, from university vice-chancellors or company presidents, although the researcher favours the latter on the basis of personal observation. Librarians are not normally computer oriented by training, and would be unlikely to call in systems analysts spontaneously. Certainly, automation was not carried out because of pressure from users. It
was however possible to draw up a profile of the institutions most likely to automate. They were institutions which were (a) operating in fields to which the government gave high priority; (b) closely linked to the federal government; (c) operating at a relatively high technical level; (d) located in the most developed part of the country. The government has specific priority areas, of which agriculture and energy, especially nuclear energy, are the most important. Both these areas are well-served by information systems; agriculture and nuclear energy both have two systems each, while major electricity companies have automated libraries. Systems can also be found in other relatively high priority areas, such as transport, medicine and education. The federal government plays a crucial role in Brazilian development, as little private risk capital is available and the country has a tradition of centralised state control. Modernisation has been one of the federal government's major objectives in recent years, and computers are seen as an essential element, both in the process of modernisation and in the maintenance of control over an increasingly complex society. It is perfectly natural to find automated systems in a high-technology environment such as research institutes in the engineering and aerospace fields, it is also found in the small special libraries attached to computer centres. Brazil suffers from great regional inequalities, and it was again natural to find automated systems crowding together into three cities: Rio de Janeiro, former federal capital, still employing more civil servants than any other city, had most systems; many of the training courses in library automation had also been given in that city. São Paulo, the largest and most developed city in Brazil, and the new federal capital, Brasília, were the other two main centres. Within the above limits, there was considerable variety amongst the institutions which maintained automated library or bibliographic information systems: they ranged from universities to research institutes to national documentation centres. Public libraries, always a grey area in Brazilian librarianship, were almost absent.

The relationship between size and automation is more complex; it is necessary to examine not only collection size, but also institutional size and the nature of the institution. A large
institution whose primary purpose falls within a government priority area, and which maintains a small library, may well be able to automate its library; electricity companies with small special libraries are prime examples of this. A large institution whose primary purpose is to offer a library service will frequently be so weighed down by its collection, an inadequate building, staff structure, etc., that it will have much more difficulty in automating; the national and state libraries are excellent examples of this. On the other hand, a large institution whose primary purpose is to offer an automated information system, and which is not burdened by having to operate a large library simultaneously, may well succeed in doing so. A small institution will only have an automated library or information system if it is working within a high-technology area or using computers intensively; computer centre libraries are relevant examples.

5.2. Results

Brazilian respondents were positive about automation, which proves that they were satisfied with the results received. When asked to evaluate the influence of computers on libraries and information systems up to now, answers were positive; when forecasting progress over the next ten years, results were even more positive. Other attitude tests showed that Brazilian professionals considered the most important results of automation to be the following:

1. Better services are offered to users
2. Productivity increases
3. Information is processed more rapidly
4. Librarians are freed from large quantities of routine work
5. New services are offered
6. There is an increase in cooperation between systems

Here the positive nature of the attitudes is extremely marked; the possibility, included in the attitude test, that automation had caused little change, received no support and was ranked last. When institutions were asked to consider systems which had been operating manually, and cite the advantages which automation bought, only one uncertain response was received; the twenty-two
others were very positive. Again, when institutions were asked to cite results in answer to an open question, they spoke first of speed and new products; only one of the thirty-one institutions offered a negative comment. It is important to note that 65% of computer users selected the result "New services are offered", but only 40% of non-users. In other words, non-users do not understand, as much as they might, that automation brings new opportunities; this is a point which needs to be stressed in training courses. This was underlined in the research by the finding that more than half the automated processes studied had been set up in automated mode; inventory control, internal indexing and data base systems were the most likely to have been set up directly in automated form.

The actual development of automation can be described as follows. Automation had begun in 1967 and had been growing steadily ever since; there were about forty institutions with automated systems at the time of the field study. 31 of them were studied in depth and were found to have 85 automated processes actually in operation. Under Brazilian conditions, in a profession which is considered peripheral by most people, this is a creditable achievement, and indicates that automation has taken a firm hold, and can be expected to grow. The most popular processes for automation were, in ranked order, routine cataloguing of books and similar materials (automated 17 times by the 31 institutions studied in depth); bibliographic data base (9 times); circulation control (8 times); system to produce indexes or printed catalogues for external use (7 times); internal system to index periodicals, reports, etc. (7 times); SDI (6 times); acquisition of books and similar materials; inventory control; lists of periodicals held in the institution (5 times each).

By far the most popular process for automation was routine cataloguing of books and other materials, automated 17 times in the 31 institutions studied in detail. This reflects not only the pivotal nature of the catalogue in a library, and the great emphasis placed on this area by Brazilian library schools, but also the fact that this had become in many cases a bureaucratic bottleneck, because of the complex methods and standards followed. In Brazilian libraries an average of over 30% of the collection has not been catalogued; in the
many closed libraries this means that these books are not available to the public. Automation of cataloguing can appear to offer a solution to this problem, not only because of its inherent speed, but also because it permits the establishment of new methods and simplified cataloguing systems. Automated cataloguing is generally seen as a simple replacement for the card catalogue; in more than half the cases output was onto cards, and the catalogue was in general only available in the library in only one copy.

The next most popular library system was a circulation system. Manual circulation in Brazil is always based on the Newark system, usually with two cards for each book, which are signed by the reader and filed in the library when the book is loaned. As circulation figures are relatively low, simple automated systems generally perform satisfactorily. Automated systems do still require the user to sign a piece of paper, so that the library has proof of the loan. The third priority was internal indexing systems, as many automated libraries were at special libraries, which frequently organise their own indexes, due to the lack of published indexes. Manual indexing systems in special libraries normally involve the typing of cards for insertion in a catalogue; uniterm, optical coincidence or edge-punched systems are rare in Brazil; therefore there is every possibility that the automated system will perform better than the manual system. Acquisition systems were a fairly low priority, because Brazilian libraries on average grow at a rate of only 6% per annum, and only a small proportion of that growth, 20% in the case of the institutions surveyed here, is by purchase.

Information systems had become firmly established in Brazil; many of the most important foreign tapes, such as Agricola, CAB, AGRIS, INIS, ERA, Medline and Compendex were being imported, and the first purely Brazilian bases were also in operation. Amongst the systems which can be considered typical of the information field, data bases were the most numerous in terms of number of systems, although their recorded usage was well below that of the fewer, but more intensively used, SDI systems. Low demand for data bases can be ascribed to a number of factors; it is especially important to note
that foreign data bases are often not relevant in Brazil. An obvious example is ERIC, which is an excellent data base for North American education. Due to obvious cultural factors, education in Brazil is totally different and therefore most of the content of ERIC is of doubtful or peripheral value in Brazil; it was not, in fact, being imported. Material in foreign data bases is usually in English; many Brazilian researchers, especially in the nuclear field, are fully at home in that language, but others are less fluent. The major international systems do now have Brazilian input, but this is still infinitesimal, in relation to the data base as a whole. Brazilian researchers may not be accustomed to using information, and this will limit use, especially under Brazilian conditions where it was usually necessary to fill in a complex search request form and post it off. British and North American researchers, who can discuss problems with search librarians, perhaps running a sample search immediately, have a definite advantage here. Some Brazilian systems charged their users; researchers who are not used to requesting information will be even less willing to pay for it, and an unsatisfactory result will almost certainly mean that the user will never try the system again. Data bases were also new to Brazil, and there was considerable variety amongst the institutions and types of service offered.

Selective dissemination of information systems had a recorded use about four times that of data bases. This is to be expected, because SDI systems are far better suited to the Brazilian environment than data bases. Researchers are not accustomed to using information, so the information system sends them regular packets, each of a digestible size. There is also strong evidence that the institutions themselves give more attention to SDI; two institutions publish their SDI on very smartly printed concertinas of cards, which are a pleasure to use, unlike the ugly printout which is the product of so many systems. This is especially significant in Brazilian culture, where a product has to look good to be accepted as good. There was also a tendency, with systems which had both a data base and an SDI service, to publicise the SDI more. SDI services were more likely to be free than retrospective services, and all had full backup. A majority of the systems had evaluation processes which were themselves operating via the computer; all distributed forms, so that
the user could request a copy of the original document. It must be remembered that SDI and retrospective search services, with about 10,000 users per annum, in a country with 120 million inhabitants, had not yet begun to operate at their potential capacity. It is essential that the use of these services should become as widespread as possible to counter any tendency that automated systems might be used to serve only an elite.

A most significant feature of Brazilian information systems was the considerable number of institutions which used the computer to publish printed indexes or catalogues for external use; this is another case where an automated system was producing a traditional product. Many libraries needed information in printed form, and were not yet ready to use more sophisticated methods; such publications were, therefore, making a significant contribution, indexing a total of more than forty thousand items annually. They were, however, fragmented, of varying frequency, and faced distribution problems. Most were low-circulation items which were distributed free.

There were close parallels between the types of process chosen for automation in the early days of library automation in Brazil and in the U.K. and U.S.; cataloguing, for instance, was the most automated process in all three countries. It is also interesting to note that GROSCH (1977) spoke of four generations of library systems; the first three were "simple list-oriented punched card systems ... specific application-oriented batch processing systems ... online interactive computer-based systems". Examples of all these could be found in Brazil; Grosch's fourth generation systems, "data base management systems hosted on flexible, modular, low cost mini to midicomputer hardware", have yet to arrive in Brazil. In 1977, when Grosch wrote that paper, only one such system existed in the U.S. PEAKE (1981), discussing library automation in Australia, divided the field into three phases, punched cards, inhouse computer-based systems and cooperative computer-based systems. It is clear that almost all Brazilian library systems fall into the second category. This phase, of inhouse computer-based systems, has four sub-phases; most Brazilian library systems are of the first sub-phase, of systems developed in individual libraries or adapted in an individual library from programmes developed in another library. Characteristics of this phase are
given as isolation, energy and enthusiasm of systems staff, development of knowledge and skill, undercapitalisation and operation in batch and/or online mode. All this is highly reminiscent of the Brazilian situation; there were no examples of the later sub-phases: developed for individual libraries as a cooperative effort or adapted as a cooperative effort from programs developed in another library; developed commercially and marketed to an individual library (turnkey systems); individual library sharing central computing facility systems on an individual basis.

HAYES & BECKER included a characterisation of automated libraries and information systems in the United States around 1967 in their "Handbook of data processing for libraries" (1970, 1974). It is interesting to compare their statements, line by line, with the situation in Brazil in 1980:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All traditional library services are operational.</td>
<td>A few local automated clerical systems are operational, in libraries which are closely connected to the federal government and which operate in high-priority or high-technology fields.</td>
<td>All traditional library services are operational.</td>
</tr>
<tr>
<td>A few local automated clerical systems are operational, but only on a limited basis and usually at major resource libraries.</td>
<td></td>
<td>A few local automated clerical systems are operational.</td>
</tr>
<tr>
<td>Printed book catalogs cover the holdings of only a limited number of local libraries and are available only at a limited number of points. Machine stored catalogues are virtually nonexistent.</td>
<td>Printed book catalogues are rare in Brazil; one is produced via the computer.</td>
<td>Machine stored catalogues are few, small, and suffer from lack of standardisation.</td>
</tr>
<tr>
<td>Access to the collections at other libraries by the users of one library is provided only by the interlibrary loan procedures, and involves an average access time of much more than a week.</td>
<td>Interlibrary loan systems have traditionally been informal in nature; a national photocopying system for periodical articles is being perfected.</td>
<td></td>
</tr>
</tbody>
</table>
Development activities:
The creation of a variety of specialised information centres is a major developmental activity, primarily under funding from federal agencies. The automation of clerical processes is another major developmental activity at many libraries.

Experimental activities:
The automation of information services is an experimental activity in several specialised information centres. The use of more direct methods of circulation amongst libraries, including the use of facsimile transmission, is an experimental activity among several libraries.

Speculative activities:
Automated information services as a general part of the library, the connection of computers into a network, the storage of large databases in direct access memory, and the use of consoles for communication with large data bases are all still speculative.

This type of comparison makes it clear that Brazilian libraries are relatively similar to their U.S. counterparts at that time, while the major difference is that Brazil has major, fully-operational bibliographic information systems, which did not exist in the U.S. at an early stage of library automation.
We cannot make direct comparisons of this nature between Brazil and a highly-industrialised country like the United States, without addressing ourselves to the question as to whether in fact Brazil needs automated libraries and information systems. It could be argued that Brazil still has major problems of hunger, inadequate housing, illiteracy or low education, and should solve these before it goes on to "advanced" techniques, such as automation. This is, in many ways, an inviting proposition, but the inevitable cost of a programme of basic development only would be isolation from the rest of the world, which would continue to use advanced technology in constantly increasing quantities. It would be placed in a situation somewhat similar to that of Mainland China; today the differences between countries of the world are more frequently measured in technological, rather than political, terms. There is no indication that Brazilians in general wish to cut themselves out of international commercial links; on the contrary, the strengthening of such links has been a major concern of all federal governments over the last 15 years. Certainly it would be as inadvisable as it would be impossible for the library and information field to attempt to take an anti-technology stance. With more than eight thousand computers installed, and a flourishing computer industry, Brazil is clearly well along the road to automation. With 20% of its workforce in industry, producing a million cars a year, and with a gross GNP amongst the top ten, in world terms, it is equally clear that Brazil has an established technological base.

We must remember that automated library and information systems are not only products of industrialised societies, they are also tools which in themselves promote industrialisation. A fully industrialised society cannot exist without an informed population and an efficient information system. The BRANDT report (1980, p.197) is specific about the central role which information systems have to play in the developmental process. Should the library and information field now spurn automation, it will simply alienate itself even more from the mainstream of society. The researcher already considers that sufficient harm has already been done by the library's failure to offer audiovisual materials, despite the intensely oral and visual nature of Brazilian society. In fact, the researcher has
warned Brazilian librarians about the dangers of letting data bases fall totally under the control of systems analysts (McCarthy, 1979).

In this respect library and information services are no different from other professions in the modern world; it is quite clear that no profession in Brazil, or indeed in any other country within the western commercial bloc, is able to ignore the computer; the only problem is to decide the relative priority which should be accorded to automation. It is equally clear that, just as societies function simultaneously on different levels, they must also develop on several levels. In other words, Brazil should develop not only computers and factories, but also food distribution systems for the poor, basic housing and education, etc., thereby aiming for development over a broad spectrum, in a steady, balanced manner. Librarians and information personnel should work to improve school libraries, public libraries, national bibliographies and data bases. This was, in fact, clearly shown in the results to this study, where respondents offered the following as the four major priorities of a large Brazilian library, in ranked order: reference and information services; selection and acquisition of books; the periodicals collection; cooperation with other libraries. The researcher thoroughly agrees with this; in fact it is close to one of the programmes he suggested for Brazilian libraries, the four R's: Referência, Revistas, Redes & Recursos audiovisuais, or, in English, reference, periodicals, networks and audiovisual resources. Respondents ranked use of the computer ninth, out of ten possibilities. Brazilian libraries should choose the improvement of basic services as their chief aim, while continuing to maintain some interest in automated systems. In most libraries this will be a pilot project, for experience.

In many places, this is happening, as much as a result of necessity as of policy. The recent recession has affected Brazil quite hard, and it appears that very little finance is available to libraries for other than basic necessities. In other words, libraries are struggling to maintain services and acquisitions, and are forced to limit automation and other projects of a long-term developmental nature.
5.3. **Problems**

This research produced the following list, in ranked order, of the major problems faced by automated libraries and bibliographic information systems in Brazil:

1. Lack of experienced personnel.
2. Lack of financial resources.
3. Lack of official guidelines and government policy.
4. Lack of networks and cooperation.
5. Lack of adequate inhouse planning.
6. Lack of experienced libraries and systems.
7. Low level of libraries.
8. Lack of precision in input and operation.
9. Use of inappropriate foreign models.
10. Variation in library requirements.
11. Lack of education and training.
12. Lack of consultants.
14. Lack of computer memory.
15. Lack of access to computers.
16. Lack of a national bibliographic centre.
17. Lack of appropriate programmes and formats.
18. Lack of turn-key systems.
19. Lack of telecommunications links.

The above list was based on a combination of the results of the attitude tests applied to both users and non-users of automation in Brazilian libraries and systems (as in section 4.4 of this thesis). The problems ranked at numbers 8, 14, 18 and 19 were not included in the attitude tests, but were additional problems which were noted during other parts of the research. The rankings they have been given above are, as far as it is possible to judge, the rankings they would have been given, had they been included in the attitude tests. The major problems are examined in detail below; for convenience similar problems have been grouped together. It will be immediately noted that respondents gave general or structural problems priority over purely technical problems.

5.3.1. **Experience, training, education and information.** (Note: this section deals with lack of experienced personnel, lack of
consultants and lack of information, the problems ranked nos. 1, 6, 11, 12 and 13).

It comes through very forcefully that respondents considered that the lack of experience amongst personnel was the major problem. Respondents also made a very clear distinction between lack of experience and lack of education; the latter was ranked much lower. It is understandable that Brazilians should lack experience in automation; the first automated system in Brazil began in 1967 and there has been steady, but not explosive or exponential growth. About forty institutions set up automated systems in about a dozen years, which means, of course, that the number of places in Brazil where one could get practical, hands-on experience of automation was always very low. Under 30% of senior personnel in automated libraries and bibliographic information systems had worked in another automated system. More than half of those personnel admitted to having seen three automated systems or less, excluding the system on which they worked; this was in reply to a question which specifically invited them to include brief visits and systems seen at conferences amongst the systems they had seen. In fact it is quite rare to visit other systems in Brazil; library schools are rarely able to arrange study tours, while associations of librarians rarely meet in libraries. A librarian might also be inhibited from asking time out from the library to visit other libraries. For obvious geographic reasons, it is onerous for Brazilians to travel to see automated systems overseas; even so, half of those who had seen a system, other than the one on which they worked, had seen a foreign system. This would indicate, not only that there are more automated systems outside Brazil than inside, but also that overseas stays, with no work ties and often including study tours, are more conducive to visits.

The median length of experience with automated systems was five years, which is reasonable, although still on the low side, when we remember that the respondents were senior personnel. A more serious problem would seem to be that the five years were generally spent in one system, and that was itself usually a fairly simple system. Mobility has always been very low amongst Brazilian professionals, especially librarians, for a variety of reasons, both practical and
social. It is rare to advertise vacant positions other than locally; the payment of interview and removal expenses would be even more exceptional. As much in Brazil still operates on a personal basis, people who move to another city lose the support of their network of friends and relatives; most librarians are women, and married women seem to find it especially difficult to move in pursuance of their career aims. Most librarians spend their entire careers in one city; such moves as do occur are generally to a large city in the south, which concentrates rather than spreads, automation experience. Nor can experience be communicated by consultants; as the field was so new and contained so few professionals, there were very few consultants; the researcher can only think of one or two.

The attitude tests distinguished between the experience of librarians with computers, and of systems analysts with library and information systems. Respondents, however, ranked the two problems almost equally; in other words, both groups were equally at fault and what was occurring was basically a problem of communication and interchange between two professions. This type of problem was also noted in answers to open-ended questions, and has been a constant feature of automation in all parts of the world. In Brazil it seems to have been exacerbated by the relative positions of the two professions. Librarians in Brazil are members of a profession which does not have a clear function within society; libraries are considered peripheral, and therefore receive appropriately low funding and status. Automated systems, on the other hand, are essential to the government of Brazil; without them, centralised government of a subcontinent with a population of 120 millions would be impossible. Systems analysts and other computer personnel are also in a profession intimately linked with the future, and with progress; theirs is a higher-status, well-financed profession. So the meeting of the librarian and the systems analyst is not a meeting of equals; it is a meeting between relatively low status librarians and relatively high status systems analysts, in which the latter already have an advantage, because they are being called in to "modernise" the library system. (The fact that the library profession is almost entirely female, while systems analysts are much more evenly distributed from this point of view, and Brazil is still a strongly "macho" society, is probably not a very significant
factor, compared to the other differences between the two professions).

Neither group will have much information about the activities of the other. Systems analysts will come from the normal Brazilian background of low library use; they will probably have used a university library, although their technically-based course may not have required intensive library use. They may have belonged to a public library as a child, perhaps have had access to a school library, but are unlikely to still be regular library users. Brazilian librarians take university courses which normally include little or no computer use, mathematics, statistics or other technical subjects, but which concentrate on learning and following rules; they may not even have been taught how to train others in library use. Such library education is static, rather than dynamic; it does not teach how to analyse, evaluate and improve systems. Indeed the concept that the ordinary librarian could modify a system, rather than just follow established rules, is normally firmly discouraged in library courses. But it is exactly these qualities which will be needed by the librarian when facing automation. It is also worthwhile examining the situation faced by Brazilian librarians who do wish to improve an existing system. As library systems are highly standardised throughout the country (the only manual circulation system known in Brazil is the Newark system, for instance), there is no awareness of the possibility of improved manual systems, nor is there any group of professionals experienced in obtaining information on, designing and installing improved manual systems, even if those responsible for funding were to agree to the establishment of an improved manual system. If, on the other hand, librarians wish to set up automated systems, they find themselves in a totally different situation; they will be considered by their superiors to have shown initiative and entire profession of trained personnel, systems analysts, will offer its support and assistance.

When we examine specific training for library automation, we note that as many as 40% of senior personnel in automated systems had no formal training in library automation, and very often this training was limited to short courses, often of one or two weeks only, or internal seminars and training courses, such as those held
for all personnel when an automated system is being introduced. It was not yet common for a Brazilian library school to offer a library automation course; only eight out of thirty schools were named by respondents, when asked where they had studied this subject; some of those eight only taught library automation sporadically. Presumably there is little encouragement to offer more courses when professionals working in the field consider practical experience far more important than education. As long as automation in Brazil was at a preliminary or experimental stage, the role of formal education was also automatically limited.

No textbook on library automation has been published in Brazil, where there are in fact few textbooks for librarianship as a whole. More than half of senior personnel in automated systems read less than one document on the subject a month, and most of this reading had to be done in overseas sources. Most such personnel did two-thirds or more of their reading in foreign publications. This was because Brazil published little of relevance, apart from MARC-style manuals, which were of very limited value, because most systems analysts found them too complex. In fact formats were very simple; three institutions used fixed formats for every one which used a variable format. Programming was done in the most generally available language, COBOL, although this was not the most suitable for bibliographic work. The systems which have been set up are generally the simplest possible, and, in libraries, usually replicate existing library systems.

The importance of experienced personnel is underscored by the finding that several computers are used for more than one system; this indicates that potential users of bibliographic information systems seek out computer centres which already have experience in this type of work. It is scarcely surprising that when, at the end of the questionnaire, respondents from automated libraries were allowed to make their own comments, they overwhelmingly cited the problem of experience and training. This seems to be the key factor in Brazil; financial resources and government planning will not be effective unless the human resources are able to allocate the finance correctly and implement the plan. This is clearly reflected in the
results, especially in the anomalous finding that, although respondents were highly positive about automation, they would not expect more than 25% of major libraries to automate in the next decade. And as long as automation is confined to a small, immobile cadre of personnel with little formal training and only local hands-on experience, there can be little hope for rapid progress.

5.3.2. Finance, standards and equipment. (Note: this section deals with lack of financial resources, low level of libraries, lack of precision in input and output, lack of computer memory and lack of access to computers, the problems ranked nos. 2, 7, 8, 14 & 15).

The problem of finance was ranked in second place on the attitude tests; it is also a problem which was immediately apparent during the field study. Brazilian libraries and information systems are, of course, poorly funded in general; although there are occasional quality services in showpiece buildings, most appear rather drab, with severe furnishings and worn books. As libraries do not have a central or clearly defined role within society, there is no reason for society to fund them well. There is an easily-observable difference between Brazilian cities, which often look modern and busy, full of recent cars and well-dressed people, and Brazilian libraries, often little-visited, with a limited number of old books and very few periodicals. When these libraries automated, they also do so with limited resources; perhaps the most telling statistic was that over half the institutions had no in-house computer equipment. Of nine institutions with circulation control systems, two used terminals, while the rest did not have any electronic data capture devices in the library, relying on filling in forms, or filing punched cards. There was no specialised library equipment, such as light pens to read bar codes, or ALS badge readers, and as far as the researcher knows no manufacturer had ever tried to offer such a system to libraries; it was clear that there was no money to be made from the library market.

Another salient point was the exceptional simplicity of Brazilian systems; in general only the cheapest solutions were adopted. Almost all library catalogues used fixed formats; printout was the most frequently mentioned form of output. It was rare to make an
additional copy of the catalogue for consultation in another location; printed indexes were produced in few copies, a median of less than a thousand, in one case as few as 150. Data input involved a lot of form-filling and punching of 80-column cards; it was not common to use a terminal. The appearance of the finished product was generally very poor, a very significant point in Brazil, where outward appearances are considered to be of vital importance. The only systems which could be said to have a high-quality final product were two SDI systems, which sent their users smart concertinas of printed cards; SDI systems are probably the most popular and successful automated systems.

The low level of libraries naturally means that the catalogues of these libraries are full of errors, placed there by poorly trained personnel and typists. In fact, manual catalogues can operate satisfactorily with patchy input; for instance manual filers will usually file cards with minor typing errors in their subject headings in the correct location in the catalogue. Once an automated system is established, however, this type of flexibility vanishes; as Brazilian librarians will normally have no experience of the operation of precision systems of this nature, they will at first be at a loss when the problem arises. And librarians all over Brazil are now preparing input to automated information systems such as Agris or the Minter system, as well as to library catalogues and indexing systems. This explains why, when institutional respondents were asked to cite their problems in response to an open question, they mentioned errors more than any other problem.

A further implication of the low level of libraries is the low level of library users; this is a significant point, because poorly-trained users will have difficulty in benefitting from advanced information systems. On a lower level, students who are not accustomed to books with indexes, library catalogues or reference books will need considerable training before they are able to handle KWIC indexes. On a higher level, researchers may require considerable orientation before they are able to fill in the often complex forms used to request SDI or retrospective search services. (Many users would doubtless retort that they would gladly learn to use an advanced information system, but that librarians showed no signs of organising one for their subject area).
Lack of computer memory is a perennial problem in the bibliographic information field, because of the large size of bibliographic files. Brazilian computer centres, accustomed to handling largely numeric data in relatively small files, often have insufficient memory to enable them to comfortably handle the large files needed for bibliographic work. On a lower level, some institutions may still find it difficult to gain access to a computer, or to get as much computer time as they would like.

5.3.3. Policy and planning. (Note: this section deals with lack of official guidelines and government policy and lack of adequate inhouse planning, the problems ranked nos. 3 & 5).

There is no effective national planning in the library and information field in Brazil, because this is still a very peripheral concern to a government fully preoccupied by the myriad pressing problems of a rapidly developing society. This lack can also be clearly demonstrated by an examination of what has actually happened in the libraries and systems. The most glaring disparity is the existence of certain fields with two information systems, as in agriculture and nuclear science, while other fields, such as education, the social sciences and humanities, are without information. In many ways this is a continuation of a Brazilian tradition; duplication of services is quite common, for instance amongst the libraries of a university, where a department and a research institute in the same field would have separate libraries, even if next door to each other; or in the public library service, where a single city might have a state library, municipal library and workers social services library, all offering public library services.

Even with a relatively simple one-off activity, the production of a national bibliographic format, there was a complex chain of events in which several institutions participated, several formats were produced, and no format became widely adopted. Brasília, being a new capital and an architectural showpiece, might be expected to be a showpiece for libraries; in fact it has no national library, but three major libraries, for the Chamber of Deputies (Câmara), Senate and University; the first two are located within the same complex of buildings. When automation was introduced, it came to each one separately, under
different forms; one set up a data-base which included a library catalogue file and a periodical index, the other a punched-card based catalogue, while the third did nothing for many years, then mounted a fully-integrated library system. The lack of planning inherent in the original city plan was carried on into the automation of its libraries; as a result the same complex of buildings contained, for many years, two library catalogues, one based on the most advanced online data base technology, the other on a primitive punched card system.

When we examine the chain of systems which influenced other systems, we discover no clear pattern of planned transfer of information from one institution to another; the events are closer to a random process. There is some evidence that influence is more likely over a short geographic distance, rather than a long distance. It would be natural to expect such a result, but even this was not decisively shown. Of the influences discovered between Brazilian systems, nearly 40% were influences which reached across state boundaries, and in several cases were over distances of a thousand kilometres or more. An engineering library in the Federal University of Rio de Janeiro influenced a nuclear science library, on the same campus, but not part of the university. The person responsible for automating the engineering library moved to an electrical generating company, Furnas, which was also automated along similar lines. Automation has become established amongst special libraries of electricity supply companies, but not amongst industrial libraries. Some universities have set up comprehensive systems, while most have done nothing. The universities which have attempted automation could almost have been selected at random; they are of various types and scattered all over the subcontinent. A computer centre library in the interior of São Paulo state was automated independently; the Federal University of Pará, 2,500 kilometres to the north, sent two librarians to study the system in depth and implant it in Pará. There was no obvious reason why the city of São Paulo, with a population of 8.5 millions, the largest and most industrialised in Brazil, should offer so few systems, while they were well-established in various places in the state of which São Paulo was capital.
It is clear that the central organisations of Brazilian librarianship and information science, specifically those which might have had the greatest impact on automation and documentation, were notoriously weak. It would, of course, be both invidious and inappropriate to a study of this nature to name specific institutions, but it was significant that the weak organisations were those most directly under the control of the Federal government, those through which the government would be expected to communicate its plans to the profession. But the central institutions were not offering leadership or transmitting any coherent messages about library automation. They also suffered from constant changes of director; such high-level changes are common in Brazil; they are, in fact, the principal mechanism for alleviating the effects of authoritarianism. But a change in director also means a change in policy, while the library and information fields, being continuous services which can be expected to improve and strengthen over a period of time, need stable direction and at least medium-term planning.

The only specific government policy which had significant impact on the situation described in this thesis was the strong discouragement of the use of overseas bibliographic data bases, which forced Brazilian institutions to import them on tape for local searching. It was policy, within the area of computing, to avoid overseas processing and the use of overseas data bases. This nationalist policy, chosen out of a determination to avoid dependence in the crucial area of computing, deeply influenced information science, but it was not a policy specifically directed at information science. In the same way, developments in the microfilm field were doubtless influenced by restrictions on the importation of COM recorders; but they were not affected because of policy towards microfilm, but because they were considered computer peripherals. It is also difficult to equate such negative policies of import control with positive planning, especially as the national documentation centre was given the peripheral role of searching foreign data bases which were not worth importing, rather than the central role of importing and searching major data bases. But perhaps, under Brazilian conditions, this is as near as we can come to policy; Brazil is not a centrally-planned economy; it could, perhaps, be described as a system of bureaucratic and pragmatic nationalism. The bureaucratic
element ensures that detailed written plans or projects are prepared for all activities; the pragmatic element enables these to be jettisoned or modified immediately, should this appear expedient. The nationalistic tendency means that the country will attempt to follow the route which the ruling class consider best suited to national interests. It could be argued that such pragmatism is the most positive feature of Brazilian planning, and one of the factors which contributes to Brazil's relatively high level of success as a newly-industrialised nation. It could even be argued that the existence of two information systems in each of the priority areas of agriculture and nuclear science is not an example of poor planning, but of excellent planning, because such an arrangement ensures that personnel will receive at least some service, and that this should be of high standard, because the two institutions will be competing. But it is difficult to believe that such a Machiavellian solution was reached deliberately, especially in a field where lack of purpose seems to dominate. Certainly the various information systems involved were at pains to stress that they were not competing, but had somewhat different missions, albeit in the same field.

Lack of in-house planning is a natural corollary to the lack of national planning; most Brazilian libraries are in some way subordinate to the government; major universities are federally funded; public libraries are generally subordinate to either state or local government; even electricity generating companies are basically state companies. It would be culturally illogical to find carefully planned microsystems within an unplanned macrosystem, and indeed there were strong indications that lack of in-house planning was, indeed, a major problem. This is conclusively proven by the fact that it was ranked fifth by respondents, although, by its very nature, this is not an area which could be probed in depth by this research. Questions about the existence of written objectives and flowcharts, and the time taken to automate systems, lead into this area, but were generally inconclusive. The type of information which would be useful verges on the anecdotal, and would therefore not be appropriate for a study of this nature, even if respondents could be asked to communicate such facts in any systematic manner. In an earlier publication the researcher told of a librarian in a Centre for Economic Studies who single-handely ran the Centre's library and
produced a computerised list of current journal contents (MCCARTHY, 1975, p.71). Cases such as this, where persons with much enthusiasm and little experience of automation suddenly start a major automation project, without thinking through the consequences, do not appear to be uncommon, according to personal observation and the relatively high ranking given to the statement on lack of in-house planning.

It would therefore appear conclusive that lack of planning is a major negative factor in the automation of Brazilian libraries and information services; the complexity of automation, the non-commercial nature of the application, the relatively high investment needed and at stake and the traditional isolation and lack of direction of institutions all make this a field where definite central planning and guidance are essential. In fact one of the more encouraging recent developments is that the Brazilian government also appears to have reached similar conclusions. The Third Basic Plan for Scientific and Technological Development, for the period 1980/85, dated September 1980, devoted a lengthy section to scientific and technological information (TERCEIRO plano ..., 1980, p.18). This spoke of the importance of STI, the necessity of trained personnel and the establishment of information systems. The two specific suggestions made were legislation to control foreign data banks and a strengthening of Ibict.

5.3.4. Cooperation and isolation. (Note: this section deals with lack of networks and cooperation, variation in library requirements and lack of appropriate programmes and formats, the problems ranked nos. 4, 10 & 17).

There was considerable evidence that automation was being done in isolation; nearly half the respondents failed to reply to a question asking them to indicate documents which had influenced their systems, despite having had advance warning of that question. There were no textbooks on library automation in Brazil; in fact there were few textbooks for librarianship as a whole. Published articles were few in number and were usually system descriptions which did not include the wider discussion of the problems of automation the librarian needs. Only about 40% of the institutions studied admitted
having been influenced by another system; nearly 40% appeared to be totally independent; that is, they had neither been influenced by, nor had influenced any other system. Automated systems did receive requests for information about their systems, but half had received less than ten such requests. The isolation of individual systems was underlined by the finding that only six systems, less than 20%, used data prepared by another system; in all cases these were foreign data bases. Only three, less than 10%, passed data produced by them to another system; these were all inputting local information into international information systems. Thus we are forced to conclude that exchange of bibliographic data at a library level was non-existent, and that information systems found it much easier to cooperate internationally than within Brazil. It was also clear that no Brazilian institution had developed to a level where it had significant data to offer. There was no nationally-agreed format for bibliographic interchange; manuals for several complex formats had been produced, but none had been accepted in its entirety by more than a couple of institutions and none had been used to input any significant quantity of data. There was therefore no impetus to adopt any particular format, because such an adoption would not make data available to the adopting institution. There was, however, a firm belief in the necessity of a specifically Brazilian format, and LC MARC data was beginning to be converted to local format, which can be seen as a hopeful sign for the future.

Attitude tests showed that at least 40% of respondents thought that automation resulted in more cooperation between libraries and systems (although it is fascinating to note that personnel from automated systems were less likely to believe this than personnel from non-automated systems). The fact is that Brazilian libraries have traditionally been very isolated; this is due to a variety of reasons, such as lack of staff mobility, geographic distance and the opening of thirty library schools, compounding immobility by permitting future librarians to study while at home. It is impossible to take students on lengthy study tours, and visits to other libraries, either directly, or incidentally, as a location for meetings, rarely feature in the activities of associations of librarians. Such activities are, anyway, infrequent in many states, so librarians may not meet with
each other frequently. The first printed periodicals in the field are not yet a decade old, and mostly contain only dry research results; widely circulated, information oriented publications are yet to appear. Conferences are perhaps the most satisfactory means of breaking isolation, but these are few and of brief duration.

Networking has never been popular in Brazil, where inter-library loan often means sending the reader or a messenger to another library with a note, and where a national photocopying scheme is only now getting off the ground. Even in cases where union catalogues existed, there were often of largely symbolic value, because the participating libraries did not loan to outsiders. They might sometimes blame technical reasons, such as geographic distance or lack of a trustworthy postal service, for lack of networking, but the true reasons seem to have been institutional and bureaucratic. There was, therefore, almost total non-cooperation, both on official and personal levels, and the appearance of the computer, on the fringe of the library world, could not be expected to bring about immediate alterations to this situation. The systems analysts themselves had little motive to collaborate, and several reasons to be tempted to design a new system in each case. Geographic distance to suitable systems and lack of information may in fact mean that it is easier to start from the beginning; this was also true in the early days of automation in the U.K.: "In the majority of instances the library's computer design will have to be created from scratch" (KIMBER, 1968, p.7). There is also the psychological factor that a new system may bring greater intellectual satisfaction and look better on the analyst's curriculum vitae; this is what BRONG (1970) described as the "not-invented-here" syndrome. And, as we have seen, the kind of pressure which might force a systems analyst to copy, in order to save time and get a major system operating quickly, may not be present in Brazil, where statistics for the level of activities indicate that it is rare to automate because one is forced to do so.

Should analysts decide that they wished to copy other systems, it would still be difficult to do so, because there is little tradition of taking programmes and formats from one place and implanting them in another. How would payment be made for such
software? Would sufficient documentation be available? Would somebody from the supplying library have to act as a consultant, and if so, how would that person be paid? What if the purchaser has difficulty in making the software work? This type of transaction bristles with practical difficulties. Librarians may not encourage systems analysts to copy, because the former often believe that their libraries have unique requirements, which can only be met with custom-made systems. In the acquisition field this is probably true; other areas show considerable variation of details within a basic standard system. When libraries are combined it is common for it not to be considered possible to interfile their catalogues, although all entries are on standard-size catalogue cards. Something similar appears to have happened in the U.S., where OCLC produces catalogue cards in a great variety of styles. Such failures to standardise can only lead to difficulties when cooperative automation is attempted.

5.3.5. Foreign models. (Note: this section deals with the use of inappropriate foreign models, the problem ranked no. 9).

The problem that Brazilian systems followed inappropriate foreign models was rated quite highly, to the surprise of the researcher, who did not consider this to be a major problem. On the other hand, the researcher was presumably making judgements on the basis of largely foreign attitudes, so perhaps is unable to view this problem with the necessary detachment. It is noticeable, however, that when the systems were asked who had influenced them, only 40% replied. The others were therefore claiming to be in-house systems; this is possibly close to the truth, as many Brazilian systems look home-made. Of thirteen cases in which influence was admitted, nine were cases of overseas influence, but six of these cases occurred because the Brazilian institution was importing foreign tapes for SDI or retrospective searching. To call that influence inappropriate is to call the data bases inappropriate and a strong case could in fact be made, that because of cultural and lingistic differences, foreign data bases are of little value in Brazil. For instance, as most of the data bases were in English, they would have been inaccessible to the majority of Brazilian users, who are not fluent in English. It was presumably this that respondents had in mind when they selected the statement that "Brazil attempts to copy foreign models, inappropriate for its reality".
Of the three influences which did not involve the importation of tapes, two were minor, and the other, at IPEN, was a system which worked well and seemed to be a case of successful transnational implantation. An alternative solution is that Brazilians in general believe that their country suffers from importing inappropriate foreign films, television series and records, which lead to the destruction of national culture and the weakening of traditional values. They therefore selected this problem, although it is not entirely relevant to the specific field in question. Such general questions are, of course, beyond the scope of this thesis, but it is probable that this was at least a contributory factor.

5.3.6. Other problems. (Note: this section deals with lack of a national bibliographic centre, lack of turn-key systems and lack of telecommunications links, the problems ranked nos. 16, 18 & 19.

These problems were rated low, possibly because Brazilian professionals do not appreciate certain developments, through lack of familiarity with them. The researcher had included the statement "There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form." This was ranked 15 out of 20. It is however quite clear that it was the existence of LC MARC and BNB MARC tapes which did so much to facilitate library automation in the U.S. and U.K. Here it would seem that as Brazilian professionals are not familiar with these services (about half the personnel working with automation had seen only Brazilian systems; only six had taken courses in the U.S. and none in the U.K.) they did not appreciate their potential impact. Efforts in this field in Brazil had concentrated entirely upon the intellectual effort of writing manuals for complex bibliographic formats, rather than examining the practical problems of setting up large-volume automated shared cataloguing systems.

The second area was represented by the statement "There is a lack of prepared systems which can be purchased and installed immediately". Again, we know from U.S. and U.K. experience that automation only became common at library level when CLSI and ALS began to sell their turn-key systems. In Brazil absolutely nobody sells turn-key systems, nor is there any sign of their development; those who wish to
automate must go it alone, with all the problems this entails. Again, it would seem obvious that turn-key systems would do much to improve library automation in Brazil, but Brazilian respondents do not agree. They could, possibly, have rejected a Brazilian MARC tape service, on the grounds that it was too complex and sophisticated in relation to Brazilian development, but turn-key systems cannot be criticised for that reason. One is forced to the conclusion that both services are of great potential in Brazil, but that senior personnel do not realise their importance, because they are not familiar with them.

A somewhat similar situation may have occurred with lack of telecommunication links; at that time it was a real, everyday problem only for a small number of information systems, but it was an underlying problem for many more, insofar as it made networking and communication more difficult. But it is also clear that the main obstacle to cooperation was lack of desire, rather than a lack of technical means. So this is another chicken and egg situation, similar to that noted above, that users would not be able to use complex systems, but libraries were not able to offer them anyway. It is clear that in these cases we are facing problems whose solution requires a systems approach.

5.4. Suggestions

It is clear that, as the respondents pinpointed the major problem as lack of experience, rather than lack of training, education, finance, planning, etc., the major recommendation must aim to solve the specific problem of lack of experience. This is not a simple problem to solve; hands-on contact over a length of time is essential to build up the level of experience necessary for the operation of complex systems. In the U.S. and U.K. it is normal to import such experience, by hiring personnel who have already worked on a system similar to that which it is hoped to implant. In Brazil, however, this option is greatly reduced, because staff mobility is low, especially in librarianship. Most librarians spend their entire career in one city; even if they wanted to move, the practical and personal difficulties are normally unsurmountable. Such movement as does occur is normally towards a more industrialised city, which is, of course, the wrong direction, from the point of view of spreading automation.
Internships offer some possibilities, but also many of the same difficulties; to be effective they have to be of two to six months duration, and librarians who find it difficult to move permanently, for family reasons, also find it difficult to spend such a period away from home.

One thinks, inevitably, of the overworked proverb of Mohammed and the mountain, which is not as inappropriate as it might seem for these circumstances. Intending librarians are unwilling or unable to travel to another city to study, so a large number of library schools are opened. Library science teachers are frequently (in some schools almost entirely) married women, unable to travel to a city where a masters-level course is given; they fervently support attempts to establish additional masters-level courses because these represent their only possibility for promotion. In other words, the only feasible solution is to take the experience to the personnel, by encouraging a number of small-scale automation projects, which can spread practical experience around the country. Such initiatory projects, stimulated by seed money from a central institution, should, whenever possible, involve cooperation between libraries, systems and library schools, and should include the services of an experienced consultant. This would not require a very large investment; indeed there is no point in suggesting projects which require a high level of finance, because this will not be available in these recessionary times. Nor is automation the major priority of library and information systems at the moment; this series of initiatory, exploratory and limited projects would aim basically to build up a cadre of experienced personnel throughout the country, who could confidently proceed to in-depth automation at a later date, when finance and/or technology permit.

The type of project favoured by the researcher would be an ongoing (rather than retrospective) book cataloguing system, which could offer additional products, such as accessions lists and SDI on new acquisitions. These would offer the additional advantage of making users aware that the library was automating. Another area is the production of printed indexes to periodicals, for which there is a massive demand, which is almost entirely unfilled. By operating within a small, carefully-defined area, a medium-sized institution
has an opportunity to both produce a valuable printed index, and lay the foundations for a future data base. A printed product is essential at this stage of Brazil's development, and this research has proven a high latent demand for such services; they might generate some sales revenue, but would doubtless bring an even higher return through exchanges with other libraries.

Networking and cooperation are essential for this stage of Brazil's development, and all automation projects should reflect this. Seed money should be much more readily available for projects which will aid two or more libraries or systems or institutions, and whenever possible the library automation teacher from the local library school should be involved. For instance, various organisations in a state capital, such as the state library and federal university library, could set up an automated system for information relevant to the state. This could either be retrospective, history and book oriented, or current, newspaper oriented, or both. Such initiatives are very rare (even in manual form), lend themselves well to automation, and would have great impact. True cooperation could also solve the problem of the parallel services in the agricultural and nuclear fields. If the various institutions involved were to work closely together, the problems of duplication would be minimised, without losing the stimulus to competition provided by the existence of two separate systems. Neither would the users have the fear that the collapse of a single institution would leave them without information. On a more mundane level, the state and university libraries could cooperate on a cataloguing or a circulation system. While preparing this thesis, the researcher attended a speech by a director of IBICT, who spoke of a plan for a library network involving federal universities which had Burroughs 6700 computers. That director was replaced shortly afterwards, and the researcher does not know of any attempt to put this into practice, but it is the type of idea which could be successful. There is also considerable scope for the automation of state and regional union catalogues, several of which exist, but which have minimal impact on the profession. Here a reasonable first step might be the production of regional bulletins of acquisitions, which are unknown in Brazil, and which could possibly lead to cooperative acquisition, as well as greatly stimulating the interlibrary loan of recent books.
There will also have to be a fairly high level of control over projects; careful preparation and supervision of projects is normal in Brazil, so this should not cause problems. Projects will have to be vetted for feasibility, impact, cooperative content, appropriate technological level, and originality. This will require the attention of qualified personnel from the central institution which finances the projects; qualified personnel are in fact already available. Each project must include the services of a qualified consultant, perhaps from the central institution, perhaps from an established automated library or system. This would mean that a cadre of highly-experienced consultants would rapidly be built up. There should also be an insistence on the publication of detailed descriptions for any system which has received central funding. The work done on the development of that system should be seen as a national resource, and the institution should also agree to accept interns and visitors.

It is fairly easy to identify organisations which could distribute and control the seed money for such projects; Ibict is the obvious choice; the National Book Institute may well be interested in the public library aspect, and the Ministry of Education and Culture the university library angle. It would also seem essential to strengthen the central institutions of librarianship and information science, so that they can offer a reasonable level of leadership to the profession; they require relatively stable policies and directors. In fact, stability and the following of continual policies are probably more important than the details of the plans to be followed. For instance, one institution has spoken several times of regional offices, but has not yet opened one; the researcher does not know whether regionalisation is a better format than centralisation, for that particular institution, but the present uncertainty seems to be the worst possible choice.

It is possible to be fairly specific about the means of improving education and training, because respondents were asked to rate various opportunities for further education. It is best to examine the two groups separately; those from automated systems chose, as the five most popular out of ten alternatives:
1 Stimulation of the production of further relevant documents, written by Brazilians.
2 Study tours of relevant installations in Brazil.
3 Courses in Brazil, given by Brazilian teachers.
4 Study tours of relevant installations in North America or Europe.
5 Translation into Portuguese of relevant documents, originally published in North America or Europe.

Personnel from non-automated systems, however, ranked these alternatives rather differently:
1 Courses in Brazil, given by Brazilians.
2 Study tours of relevant installations in Brazil.
3 Stimulation of the production of further relevant documents, written by Brazilians.
4 Translation into Portuguese of relevant documents, originally published in North America or Europe.
5 Consulting by Brazilian experts.

The differences are quite natural; those already in automation preferred less formal education channels and were more international in outlook. Examining these points, in the order in which they were selected by those from automated systems, we note that stimulation of the production of documents, although perhaps an unexpected first choice, would in fact do much to end the information famine in which senior personnel in Brazil operate. Obvious candidates for publication would be a textbook on library automation, another on bibliographic information systems, and a brief guide to automated systems in Brazil. Articles and conference papers are also necessary, not just on specific systems, but also on the general problems of automation. It is obviously too early to publish a full-scale Brazilian periodical, solely devoted to automation, but a newsletter, similar to the British VINE (Very Informal Newsletter on library automation) would be useful. Currently, the stimulation of the production of publications in Brazil is a rather patchy area. There is quite strong motivation to produce conference papers, not only for professional advancement, but also because institutions may then offer financial support to attend the conference. Journal articles may also enrich curricula, but do not bring any financial return. Writing a book may bring a satisfactory reward, if it is published by the National Book
Institute, which even holds competitions for manuscripts in librarianship. Other publishers in the field are less stable and less able to guarantee distribution. University teachers, who would be the group of professionals most likely to produce publications in the field, may not feel highly motivated to produce the type of publication that is needed, as they may be too preoccupied with teaching, administration and formal research to write a textbook, let alone edit a newsletter. Grant money, in the form of regular monthly salary supplements, may well be available for approved research projects, whereas the financial return from writing a textbook will be much more delayed and uncertain. Financial considerations are very important in the Brazilian university context; until recently teachers were paid a small stipend and expected to earn the bulk of their money outside. High rates of inflation, over 100% per annum during long periods, force university teachers to adopt a similar strategy, and to give consultancy, additional courses and funded research projects a higher priority, compared with writing for publication.

Here it is clear that we have an area, considered of vital importance, in which a small amount of government money could have a major impact. The existence of the basic texts in the automation field could be guaranteed by contracts between central institutions, such as the National Book Institute or Ibict, and specific authors, or even groups of authors, for textbooks on library automation and bibliographic information systems, written with Brazilian examples for a Brazilian audience. A further publication, a descriptive list of automated Brazilian systems, already exists in this thesis. Grants could also be made to established Brazilian journals which wish to publish special issues devoted to automation; a part of such grants could be used to recompense contributors. The production and distribution of a newsletter for the field could be financed; the organisation producing the newsletter could also maintain a collection of documents relevant to automation.

The high level of demand for study tours of relevant institutions in Brazil clearly reflects the difficulty, experienced by many professionals, of getting out into the field to see operating systems. Such visits are essential to the process of information
transfer for automation, because systems are by their nature complex, and it is often difficult to understand them without seeing them operate. But there is little tradition of study tours or programmes of visits in Brazil, and they could be organised for high-level personnel with great advantage. The demand for courses in Brazil, by Brazilian teachers, is fairly self-explanatory, and is another demand which could fairly easily be met by judicious finance from above. The aims should be to teach a course in library automation to all library school students, and to ensure that courses in documentation reflect automated systems. There are signs that the first aim will shortly be met by new minimum curriculum requirements now under discussion. It is also important to ensure that library automation is taught in such a way as to stimulate the students and inform them of Brazilian progress. There is a sad tendency in Brazilian library schools to turn all courses into cataloguing courses, e.g. audio-visual courses teach how to catalogue a/v materials, and documentation courses teach how to write citations at the end of articles and theses. It would be disastrous if library automation courses were to concentrate on how to complete the input forms for the national format for bibliographic interchange.

Study tours of relevant institutions in North America or Europe are already offered to some extent by organisations such as the British Council, and are an excellent field for this type of foreign assistance. This is not an area where the Brazilian government needs to spend its limited foreign exchange. The translation of foreign documents into Portuguese is, perhaps, another area where foreign institutions can be of assistance; it is a relatively low-priority area for Brazil, because of the difficulty in finding foreign documents which are sufficiently relevant to Brazil to make them worth translating. But if relevant documents can be found, some element of financial assistance must be offered if they are to be translated, because translation is especially devoid of other rewards. It requires deep knowledge of both languages and the special subject; it is not always intellectually stimulating, and it is not attractive to university teachers, because it is not part of their academic duties, nor does it result in publications, in the full sense of original works written by the teacher which will enrich a curriculum vitae.
Moving to the area of equipment, there is a considerable amount which can be done by a central organisation. One obvious project is to evaluate the suitability of Brazilian microcomputer and/or word processing equipment for a small or medium-sized library. Levels of activity are often so low as to make use of such equipment a practical possibility; it could be tested by a library with the help of federal funding. A more complex project, but with greater potential impact, would be the formation of a company to develop turn-key systems for Brazil; this would need initial cooperation between a major university, which could offer a library in which the system could be tested, plus advice on the librarianship aspects, and a Brazilian equipment manufacturer, who would develop the data capture devices. The researcher assumes that the national format for bibliographic interchange will be finalised at about the time this thesis is defended, thus closing a long-drawn-out and convoluted story. It is essential that the new format be offered for sale, because documents offered for free distribution only frequently become unobtainable within a short time in Brazil.

It is appropriate to conclude this thesis with suggestions for further study. The existence of this thesis, together with ROSENBERG's studies of information systems users (ROSENBERG, 1981b, 1981c) means that the automation field has been quite deeply studied in recent years. There is, however, a need for an in-depth examination of the teaching of library automation in Brazil, covering both curricula and the training and experience of library automation teachers. In the medium and long term future there will be a need for more detailed examination of specific automated areas, such as library catalogues, internal indexing systems in special libraries, library circulation systems and the needs of users of specific information systems. There could also be regular censuses of automated activities, measuring not only processes automated, but also number of transactions, number of information system users, searches, profiles, etc. This research effort should be accompanied by a strong effort to make current experience and knowledge available to the library and information profession as a whole. A Portuguese language version of the results of this thesis would be an obvious first step. A textbook on library automation is also needed, as are introductory texts on data base searching and bibliographic formats. A newsletter
on library automation, similar to the British VINE, would also be valuable. It is also necessary to remember that, to preserve balance, research must also be directed at other fields. It is appropriate to quote from the conclusions of Miranda’s book on library planning in Brazil: “What we need, first of all, is mapping, and not detailed plans” (MIRANDA, 1977, p.114). And there is more than enough mapping to be done. Only one state has surveyed its public libraries in depth, and only a three-page résumé of that survey was ever published. The researcher is unable to recall in-depth studies of special libraries, mobile libraries, the libraries set up by workers social organisations, or the libraries of smaller universities, such as the important network of Catholic universities. "Cinderella areas", such as school libraries, libraries for special groups (such as the blind), bibliotherapy, audiovisual materials, or library services for the humanities, fare even worse. Bibliographic and collection development projects are easy to think of, and when we come to the field of action research, setting up a service or system and evaluating its impact, the possibilities are literally endless, because so few systems or services exist in Brazil today. Perhaps the most exciting feature of library and information system research today, is that so much remains to be done, and almost every investigation is a new investigation.
APPENDIX A DESCRIPTION OF INSTITUTIONS

6.1 Descriptions of institutions visited.

Note: These descriptions are based on visits made in 1980; where necessary they have been updated to 1982.

6.1.1 Cimec

Cimec (Centro de Informática do Ministério da Educação e Cultura), in Brasília, was the department of the Ministry of Education and Culture responsible for data processing. It maintained a bibliographic information system, the "Catalogue of the Thesis Bank" (Catálogo do Banco de Teses); it also collaborated with the National Library on various other systems, discussed in detail with that institution. The catalogue included all theses defended in Brazil, plus any relevant foreign theses. Forms were distributed to all Brazilian post-graduate courses; these were completed by the authors of the theses, and included an abstract. Forms were keyboarded at Cimec, and the magnetic tape taken to Prodasen. Data was output as COM fiche, which were then enlarged and used as a master for offset printing. Each six-monthly volume had about 600 pages and included about 3,000 theses; the total in the four volumes issued prior to 1980 was 11,925 theses. The text was divided according to more than 40 academic areas, and many areas were also sub-divided. This provided subject access to the data, as the system did not use subject or title indexes or descriptors. 5,000 copies were produced, all for free distribution, mostly to institutions of higher education. Before this system was set up the only sources of information on Brazilian theses were occasional lists produced by individual universities.

6.1.2 Binagri

Brazil's national agricultural library, Binagri (Biblioteca Nacional de Agricultura) was established in 1978, inheriting automated information programmes which had previously been the responsibility of Embrater, the government agency for agricultural extension and
assistance (CHASTINET, 1979). (The information programme itself is sometimes known as Snida, the National System for Agricultural Information and Documentation). Binagri occupied a modern, three-storey building near the centre of Brasília, where it employed 130 people on Agris-based information services. Strong efforts were also being made to set up a system of state agricultural libraries; they had already been established in four states. The SDI service, known as BIP/AGRI (Personalised Bibliographies in Agriculture) had started in 1975; by 1979 it had 3,403 users, with a total of 4,200 profiles (ROBREDO, 1977, 1979). The system searched both Agris tapes, with approximately 15,000 entries per month, and IFIS (International Food Information System), with 1,000 entries per month. The SDI normally operated on a monthly schedule; there were two entirely separate methods of processing: the original system, called Medusa, operated only on Agris codes and was run on a Burroughs 6700 at the Ministry of Agriculture in Brasília. A new system was coming into operation at the time of this study; this was called Textpac, permitted retrieval by free text searching, and was run on the IBM 370/145 owned by Embrapa. It was intended to run the two systems concurrently because retrieval using Agris codes had proved satisfactory for 60% of users (CHASTINET, 1978). Binagri did not offer retrospective searching at the time of the field study, but this lacuna had been remedied by 1982; its system was known as Saiba (Automated System for Agricultural Bibliographic Information). Attitudes of the users of the Binagri system were examined in Rosenberg's in-depth study of Brazilian information system users (ROSENBERG, 1981b).

Publication of bibliographies in hard copy was the other major Binagri activity, and fell into three categories: the "Brazilian Agricultural Bibliography", specialised national bibliographies and specialised international bibliographies; all were offset from printout and spiral bound. The "Brazilian Agricultural Bibliography" was an annual publication; the first volume had been published in 1978, in 2,000 copies. This contained a list of papers in registration number order, followed by indexes of names and Agris codes. The specialised national bibliographies included all national documentation on specific subjects, such as rice, cocoa, coffee, etc. The lists of references had KWOC and author indexes; eight titles had been produced, with a print run of between 500 and 2,000 copies each (ROBREDO, 1980).
The international bibliographies, or "Bibliographies by product or areas of interest" were printouts from Agris tapes of all references relevant to specific subjects. There were seventeen different titles, such as Soy-beans, Cattle, Fertilizers, etc., some consisting of a series of volumes, totalling several hundred pages. These were intended for back-up use, making a mass of information available, and were not indexed. Production was limited to about 300 copies each.

A Binagri initiative which had had great impact on the profession was its courses to teach librarians how to complete Agris input forms. 300 librarians from 100 institutions had received such training; they had put over 12,000 Brazilian documents into Agris. Two other information systems, which were not bibliographical in the strict sense of the word, can be briefly mentioned. Binagri had made an extensive survey of Brazilian legislation relating to agriculture, and had entered it into the Prodasen database; searches were made on a Prodasen terminal located in Binagri. The production of guides to research in progress was a major activity; Caris (Current Agricultural Research Information System) tapes were being imported and a "Brazilian Guide to Current Agricultural Research" (Bracaris) had been published.

6.1.3 Embrapa

Embrapa (Empresa Brasileira de Pesquisa Agropecuaria) was the Brazilian agency for agricultural research, with 6,000 staff, including 2,500 researchers. They were supported by a network of libraries which included three general information centres, 22 specialised centres dealing with particular products, such as maize or cotton, and 24 information centres at state level. They employed a total of 77 librarians and 154 other staff; automation activities were the responsibility of the Department of Information and Documentation at Embrapa's headquarters in Brasília. This employed 19 librarians and 60 others, and operated SDI and retrospective search services on Agricola and other imported tapes; a considerable amount of work was also being done on a union catalogue of periodicals, an acquisition and cataloguing system for books, and a system to control the results of internal research. Embrapa was frequently
considered the largest information system in Brazil; it was certainly the best documented. The SDI system, set up in 1977, was the major Embrapa automated information system; Agricola (Agricultural Online Access) produced by the National Agricultural Library of the United States, was the original and major tape received. CAB (Commonwealth Agricultural Bureau), FSTA (Food Science Technology Abstracts) and Biosis (Biological Information System) had also been operational at the time of the field study, in 1980, when they were growing at the rate of half a million references per annum. By 1982 Chemical Abstracts and Scisearch (Institute for Scientific Information) were also available. This was probably the best-publicised of the Brazilian systems; it even had a tape-slide presentation devoted to it (FIGUEIREDO, 1979). At the time of the field study there were 3,200 users, with a total of 6,000 profiles. Embrapa considered, however, that the large number of profiles hid inefficiencies, such as several researchers on the same project using different profiles. So by 1982 the number of profiles had been reduced to 1,500, although the number of users had risen to 3,500. By that time 200 searches were also being made for other countries in the southern cone of Latin America (MACHADO, 1982). Users of the SDI were asked to complete a request form; the researcher was given a copy of the third edition of the manual which guided them in this (FIGUEIREDO, 1980); its preface stated that ten thousand copies of previous editions had been distributed. Profiles were entered via terminal (GOIS, 1980a, 1980b) and run on Embrapa's own IBM 370/145 (upgraded to a 370/158 by 1982) using software based on that of the National Agricultural Library; output was printout; a total of 1.6 million references had been distributed in 1979. Each package of printout sent to a user was accompanied by an evaluation form, which was itself analysed by computer (NOCETTI, 1979). No charge was made for SDI; access to original documents was assured by a network of Embrapa and cooperating libraries, a total of 160 sources. Inter-library loan was still at a fairly rudimentary stage in Brazil, and Embrapa was making considerable efforts to establish an efficient system (BETTIOI, 1978; NOCETTI, 1980a); 200,000 photocopies were being supplied annually (MOTTA, 1980).
Retrospective searching was clearly subsidiary or "complementary" (NOCETTI, 1980b) to SDI. Even so, the file available for retrospective searching totalled 4.5 million citations in 1980; by 1982, with the addition of Chemical Abstracts and Scisearch, it had grown to 7.3 million. In 1980 searches were carried out in subfiles in batch mode, although it was expected to move to online operation in the near future; 354 searches had been carried out in 1979. Output was printout, and no charge was made. Other products of retrospective searching were brief special subject bibliographies, produced for distribution at conferences. The union catalogue of periodicals and the acquisition and cataloguing of books were both implanted after the field study (GOIS, 1981a, 1981b). Embrapa libraries took a total of 10,000 periodical subscriptions; a detailed catalogue was essential in order to save foreign exchange spent on ordering copies from overseas. The acquisition and cataloguing system covered the 10,000 volumes purchased annually by Embrapa; purchasing had already been centralised; books were distributed to branches accompanied by computer-produced catalogue cards, and were reported to Embrapa's automated union catalogue. Embrapa also maintained an automated system to control the results of research projects (FRESNEDA, 1981). This was not, strictly speaking, within the scope of this thesis, especially as many of the 3,700 project results were confidential. But the system was interesting as an example of an automated system handling report material held on microform. Attitudes of the users of the Embrapa system were studied in Rosenberg's in-depth research on Brazilian information system users (ROSENBERG, 1981b).

6.1.4 Prodasen

Prodasen (Centro de Informática e Processamento de Dados do Senado Federal) was the data processing centre of the Federal Senate. It was a large and wealthy organisation; it employed a total of 183 staff, including all levels, and had offices in an annexe to the Senate building in central Brasília; its architect-designed computer room, circular, with glass walls and metal roof, was especially impressive. Prodasen's major commitment was to the Brazilian legislator; it operated a major legislative data base, with online search capacity. Its library activities were secondary, but
still considerable; they consisted basically in the cataloguing of
the Senate's library and in the production of an index to its
periodicals. Library systems were being upgraded at the time of
this research, and were beginning to be used by other libraries,
which gave the system a cooperative or union catalogue function.

The official title for Prodasen's data base activities
was Sicon (Sistema de Informação para o Congresso Nacional, Informa-
tion System for the National Congress). In daily usage, everybody
referred to it as simply Prodasen. It consisted of four major files:
legislation proper passed since 1946; 180, 789 items; legislation in
process and suggested legislation which was not finally passed,
compiled since 1972; 62,108 items; decisions of the Supreme Tribunals;
49,036 items; speeches made by senators since 1973; 8,384. A paper
published shortly after the field study cited a grand total of
311,000 items on file (MOTTA, 1980). These were held on an IBM 370/158
and could be searched via a network of terminals. At the time of
the field study there were 118 terminals, of which 38 were located
outside the Senate; most of the latter were in ministries; several
terminals were located out of Brasília; for instance the Legislative
Assemblies of Rio Grande do Sul and São Paulo had terminals, as did
the Federal Universities of Paraíba and Rio Grande do Sul. Any person
could install equipment and pay to search the system, although only
large government or government-related organisations had done so.
Equipment installed at remote locations consisted of video terminal,
modem and line printer; the user was normally permitted to use the
system for two hours daily, at set times. The search system adopted
was IBM's Stairs/Aquarius.

The Senate Library contained 87,163 volumes of books and
pamphlets; 3,653 had been acquired in 1979; periodical holdings were
3,350 titles, of which 500 were current subscriptions; members of the
public were allowed to consult the collection. Library materials were
recorded in two files; the library file with 38,739 entries for
books and pamphlets, and the periodical file, with 26,152 references
to articles in periodicals held by the library. The library file was
searchable by subject headings, the periodical file had its own
thesaurus. As the library had four terminals, it could search its
own catalogue online. Another facility offered by the system,
equally rare under Brazilian conditions, was that the library produced a printed catalogue, offset from printout. This contained author and UDC subject sequences, and was the only widely available printed Brazilian library catalogue. Catalogue cards, loan cards and spine labels were also produced by the system; this latter facility was shared by the library of the Supreme Federal Tribunal, which was inputting its book stock to the library file, which was thus becoming a union catalogue. A further four organisations, the Chamber of Deputies, the Armed Forces General Staff, the Ministry of Mines and Energy and Binagri, were also inputting data to various Prodasen files; it was thus tending to become a general government system. Prodasen appeared to be expanding; a new annex was being constructed, and new equipment had been obtained. The most spectacular new acquisition was an IBM 3800 laser printing system, which printed out 13,000 lines per minute; an entire page was printed in a single operation; print quality was much superior to that of impact printers. One result of this was that system manuals were being held in machine-readable form and printed out as required. It is not surprising to find such an advanced system handling legislative information in Brazil, because Brazilian culture and society is often legalistic in nature. Italy, probably the European country which most resembles Brazil, was also notable for legal data bases (TEDD, 1979). LANCASTER (1976) stated that "it is probably true that the legal profession led the field in free text searching for many years"; he was talking about North America, but the comment could equally well be applied to Brazil. Apart from its data base activities, Prodasen is also relevant as the computer centre which undertook processing for other systems, such as Cimec and BN. Since the field study it has also collaborated on an index to official publications and an index to the government gazette (Diario Oficial da União).

6.1.5 Câmara

The library of the Chamber of Deputies (Câmara dos Deputados) was, in role and size, the major legislative reference library in Brazil; it was located in the National Congress building, in the administrative heart of Brasília. The Chamber of Deputies, the Senate and many related institutions, including the Senate library, were found in the same complex of buildings. Its major
objective was library service to federal deputies and senators, but it also offered in-house reading facilities to other governmental authorities, diplomats, lawyers, university teachers and post-graduate students, and cooperated with inter-library loan arrangements within the city of Brasília. It was founded in 1866 and had a first-class collection in politics and the social sciences; its 399,000 volumes placed it amongst the ten largest libraries in Brazil; in 1979 2,944 books were acquired and a total of 5,086 periodical titles were held. The books were all purchased; it is an interesting insight into Brazilian attitudes to libraries that the Chamber of Deputies had never voted legal deposit rights for its own library. Services were of high standard; in-depth reference service was offered, extensive files of clippings and non-book materials maintained, there was a programme to microfilm periodicals and rare materials. Flexowriters were operating in this library as early as 1963 (CAVALCANTI, 1970) and the then director was much in favour of simplified cataloguing (CAVALCANTI, 1971). The system operating at the time of the field study had been designed by an American consultant and established in 1971. It is necessary to point out that this was a mechanised, rather than a computerised system. It was designed to operate with peripheral computer equipment and it was what is known as a unit record system; such systems were relatively common in the early days of library automation, but have now been totally superseded (SALMON, 1975, p.15-21). It was decided to include it in this survey because of its historical importance and its similarity to fully-computerised systems. It is also important to note that the consultant established a system capable of operation at a very low level of technology, with a minimum of support and equipment, and which could function solely on what was available within the library.

The first step in the cataloguing process was the marking up of the title page in pencil; the book was then taken to one of two key punches, in the library itself, where 80 column cards were punched. Preliminary sorting and listing of cards was done on a card sorter and an IBM 407 Accounting Machine, located in the library. The catalogue proper was produced in the Computer Canter of the University of Brasília; this was a simple printing operation which did not involve use of the CPU. Production was on an annual basis, a top copy and two carbon copies of the printout were made; one went to the cataloguing room, the others
were shelved in the reading room. There was a total of over sixty volumes, in pre-1977 and current sequences, for a total of about 75,000 entries; about 3,000 additions were made each year. The library also had a terminal for the Prodasen system, operated by the Senate; the very existence of Prodasen was, of course, of great significance to the Chamber of Deputies. Both libraries were located in the same complex of buildings and served the same user group; the Senate library had an online catalogue and a printed catalogue, produced by the most modern technology, while the Chamber was still in the punched card era. Since the field study the Chamber had started to input data to Prodasen; the entire catalogue had been entered as it stood, and was being corrected. A printout in a single alphabetical order had also been produced.

6.1.6 Minter

In Brazil the Ministry of the Interior, Minter had responsibility in the areas of development, especially regional development, and housing; (unlike Ministries of the Interior in many countries, it had no police or security function). It was in charge of a heterogenous group of institutions, such as regional development agencies, the National Housing Bank and the territories in the interior which had not yet achieved statehood. Many of these were very large, and enjoyed considerable autonomy; information services therefore operated as a cooperative network, with coordination from Brasilia. The Ministry maintained a System of Information for Planning, Coordination and Control (Siplan); this had eight subsystems; the one of direct interest to us was the Subsystem for Documentary Reference whose purpose was to provide bibliographic control of Minter documentary production (NEVES, 1977). This subsystem, which in library terms most resembled a union catalogue, had been set up in 1972, and had been growing steadily every since. At the time of this research ten institutions, of which five were regional development agencies, were participating; a further two institutions were in process of entering the network. These were located in all parts of the country; one of the most notable features of this network was its wide geographic coverage. Participants completed input forms with details of materials they wished to enter into the system; the majority of entries were for Minter publications, but some institutions entered other documents
available in their libraries; monographs, periodical titles and periodical articles could all be included. In most cases these were straightforward bibliographical entries, but one institution added annotations to entries for its material. Processing was done on the IBM 370/158 of the National Housing Bank, in Rio de Janeiro, and the final product was on printout. Each participant received a printout of its own contribution to the system; union catalogues were also produced, on demand. It was also possible to search the complete file, in batch mode, for items on specific subjects; this gave the system an additional data base capacity. The total file consisted of 32,000 items, and was growing at the rate of 8,000 per annum. The organisation responsible for the largest number of entries, the Superintendency for the Development of the Southern Region (Sudesul) input 1,600 entries in 1979. The system was maintained via meetings, twice a year, of the librarians involved.

6.1.7. UnB

The library of the University of Brasília has usually been considered the finest academic library in Brazil. It was the first major, fully-centralised university library; it occupied an excellent and striking modern building and had a fine collection: 400,000 books and 7,000 periodical titles. It was natural that such a library should be interested in automation; during the pilot visit in 1978 information was obtained on a limited, one-off project: the library had received a large donation of books and the computer had been used to produce a handlist. By 1980 considerable advances had been made and the library was in the process of implanting Brazil's first large-scale, fully-integrated library system. At the time of the field research nothing was actually operating, although by 1982 the entire system had been implanted. It is important to note that the automated system was one result of a detailed Organisation and Methods study which defined a new structure for the library (BARRETO, 1980). The automated system covered acquisition, cataloguing and circulation; data entry was via terminal (COELHO, 1982). At the time of the field study details of 350,000 items had been transcribed from the card catalogue onto input forms, keypunched and fed into the computer. The catalogue used by readers would continue to be on cards, now produced by computer, as it was felt that terminals would not be able to manage the
high number of library users, 2,500 to 3,000 per day. To borrow a book, a reader filled in a brief form and took it, with the book, to a librarian at a terminal. The reader's number and the book number were entered directly via the terminal, while the form, which carried the reader's signature, was filed as proof of the loan, and was returned to the reader when the book was returned. Books could be reserved, and were then trapped online. The system automatically produced letters to readers with overdue materials, while persons in debit with the library were identified both online and by hardcopy lists.

6.1.8  Bireme

The Regional Medical Library, Bireme (Biblioteca Regional de Medicina) was the center of Brazil's medical library network. It was set up in 1967 by the Pan-American Health Organization, as a resource for the South American continent (NEGHME, 1975). It occupied a spacious, four-storey building, specially constructed for it next to one of São Paulo's largest medical schools. It maintained a major periodicals collection; 6,862 titles, of which 3,253 were current and 1,212 had been subscribed in 1979; xerox copies of periodical articles were distributed to medical libraries all over South America. The book collection was secondary, but reached a total of 30,000 volumes; the library was a pioneer in the provision of audio-visual materials, and a total of four automated services could be distinguished. The most important and best-established was the provision of on-demand searches of the Medline data base; a very small subsystem offered SDI searches of the same data base. A totally different system, using a different computer, was used to produce a South American edition of Index Medicus; the same computer was also used to produce a periodicals receipt system. The Medline system became operational in 1974; tapes were sent monthly from the National Library of Medicine in Maryland and were processed on the IBM 370/155 of IPEN, about ten kilometres away. The system operated for a total of about six hours each week; searches were carried out online from two terminals at Bireme, or from three terminals in the cities of Rio de Janeiro, Belo Horizonte and Salvador. Users filled in request forms in which they outlined their problems at considerable length; online searches were done by librarians, the results were printed offline at IPEN, sent to Bireme and distributed
by post. A total of 890 searches had been carried out in 1979. The backfile was divided into two-year subfiles; each segment searched cost Cr$250 (£2.50). Interchange with the National Library of Medicine was a two-way process; Bireme not only received tapes, but also helped prepare input to Medline. It was responsible for the indexing of 39 South American periodicals; two copies of each were received, and one copy was sent on to the NLM with completed indexing sheets, MESH headings and translations of the titles of the articles.

Attitudes of the users of Bireme's system were examined in Rosenberg's in-depth study of Brazilian information system users (ROSENBERG, 1981b). Medline at Bireme was basically an on-demand system; there was one small SDI subsystem, but this is best described as a pilot system; four times a year, 69 profiles were searched on behalf of the Secretariat of Health of the state of São Paulo.

The "Index Medicus Latino-Americano" (IMLA) was Bireme's own initiative (PIEGAS, 1979); its first volume had appeared in 1979. It covered 220 South American medical periodicals, all published in Spanish or Portuguese. Two volumes appeared each year; the first had included 1,025 references, the second 1,500. Details of relevant articles were copied onto input forms, fed into Bireme's own PDP 11/34 via terminal, and output as printout. This was then used as a master for offset printing; 500 copies of each volume had been produced; the first volume had been donated, while a charge of Cr$1,000 (£10) was made for later volumes. A system of online retrieval of subject bibliographies had also been tested. By 1982 IMLA was firmly established, with a backfile of 11,100 items (NOWINSKI, 1982), and online searches of this file were being carried out regularly at Bireme. African countries were planning to produce an African equivalent of IMLA (PIEGAS, 1981). The periodical receipt system was at a preliminary stage during the field study, but had become fully operational by 1982. Data entry and file updating was via terminal, using a method somewhat similar to that of IPEN; processing was done on the PDP 11/34. The catalogue was available on printout, which was much appreciated by users, who had not had access to the former Kardex; it could also be consulted online.
The library of the Faculty of Dentistry of the University of São Paulo was Brazil's major dental library; due to an agreement with the Regional Medical Library, Bireme, it was responsible for dental information over the whole of South America. It had 1,589 periodical titles, of which 236 had been subscribed in 1979; the book collection was just over ten thousand volumes and the library had a total of 23 staff on all levels. It maintained an extensive publishing programme, and was also responsible for a "Brazilian Dental Bibliography", which covered articles in Brazilian dental periodicals, and articles by Brazilians in foreign periodicals. The first volume of this covered 1966/7, and had been produced manually; later volumes were produced by computer at IPEN, about ten kilometres away. Volumes 2 to 4 had been produced on an IBM 1620, later volumes on an IBM 370/155; a volume covered a period of two years, and was produced whenever funding became available; each contained around 1,000 entries on about 200 pages, and the total machine-readable file was about 5,000 entries. Production was by offset from computer printout, and arrangement was similar to that of the U.S. "Index to Dental Literature". Seven to eight hundred copies of each were produced; all Brazilian dental schools received a free copy, while the remainder were sold at Cr$50 (50p) each. The index was of great importance, because the U.S. "Index to Dental Literature" covered few Brazilian titles and "Indice de la Literatura Dental Castelana" no longer included Portuguese-language items.

6.1.10 Taubip

The municipality of São Bernardo do Campo, on the southern outskirts of the city of São Paulo, contained most of Brazil's car factories and many other industries. As a result it was a relatively rich city; per-capita income from local taxes was said to be the highest in Brazil. The city's Division of Libraries and Documentation was responsible for bibliographical resources in the public library and also in municipal offices, a total of 100,000 volumes. 70% of these were in the library system, which consisted of five branches and a central library; the latter was located in a modern, centrally
located building, with a collection of 46,000 volumes. The city also had a major computer centre, with an NCR 251 and much peripheral equipment, even a COM recorder. It was therefore natural that São Bernardo should be the site for the first attempts to apply computers to public library work; its system was called Taubip (Total Automação de Bibliotecas Publicas - Total Automation of Public Libraries). A 1976 pilot project, which involved the processing of 500 titles, was reported to a 1977 librarians conference (LEITE, 1977). At the time of the field research the definite system had been developed and was being tested; it was planned to implant it in mid-1980. The basic philosophy of the system was to form a data base capable of holding information about various materials and formats, and to use this data base to generate the maximum number of outputs. Also, the data base was not limited to one library; although it had begun in São Bernardo, it was hoped that other public libraries would use it.

The data base could accept information on books, periodical sets, periodical articles and audiovisual materials; abstracts could be included when desired. A comprehensive, 120 page manual had been written to orientate input (TAUBIP: manual..., 1978). A test entry of two hundred documents was under way at the time of the field research; the major subsystem was for cataloguing, which would continue to be on cards. Every library in the future network would receive a microfiche of the holdings of the entire network, and cards for its own holdings. Lists of new acquisitions would be produced and distributed to schools, libraries and other institutions. Periodical articles would be analysed by students who had received money to pay for their university education from the municipality, and who would repay their debts by indexing and abstracting for the library. This system had been tested, and the researcher was informed that it worked satisfactorily. Retrospective searches of the data base would be possible, using key-words. At the time of the field research, descriptions of the system were being published in librarianship journals, in the hope that other libraries would be attracted to participate. (SISTEMA TAUBIP ... 1979; LEITE, 1980).
The Institute for Energy and Nuclear Research (IPEN; until 1979 known as the Instituto de Energia Atomic) was located on the campus of the University of São Paulo, although it was independent of that university. It was one of Brazil's major research institutions in the nuclear and related fields; its library had a staff of 25, including 14 librarians, a collection of 300,000 microfiche, 15,896 volumes of books and 1,660 periodical titles, of which 580 were current subscriptions. IPEN maintained a major computer centre, with an IBM 370/155, and the library had adopted an integrated library system (FERRAZ, 1978, 1979) which covered acquisitions, cataloguing and circulation of both books and periodicals; this had originally been implanted in a Euratom library at Ispra, Italy, the Scientific Information Processing Centre (CETIS). Other automated systems included retrospective searching of a database and KWIC indexing. Implantation of the catalogue began in 1975; the total file contained 12,000 entries and was growing at the rate of about 900 entries per year. Data was input via a video terminal and catalogues were in printout form. The library director was a strong supporter of library catalogues on printout, which she considered were used much more than card catalogues (FERRAZ, 1980). Descriptors were not translated into Portuguese, but appeared in English; this caused no problems as the users were accustomed to working in an international framework and about 5% of the Institute's staff were from overseas. The acquisition system had been set up in 1979, and was integrated with and similar to the cataloguing system; it operated on a weekly frequency, and a copy of the list of books in process of acquisition was on display in the reading room. The circulation system had also been set up in 1979. The borrower brought the book to the issue desk, where readers number, book number and return date were entered into a terminal. The reader signed a card kept in the book, and this was filed at the counter. The system was handling 6,800 loans per annum and all circulation data was immediately available via the terminal; daily printouts of books on loan were also produced. The periodical receipt system also operated online; the librarian keyed a four-character alpha-numeric code into the terminal; the system replied by showing the complete holding of that title on the screen, divided into logical units; the current year normally occupied the last line. The librarian selected the line
which needed to be altered and included the newly arrived part. The system included the library's holdings of 1,660 titles, and handled about 800 new parts per month; information was available via the terminal, and a new cumulated printout was produced every fortnight.

Retrospective searches were offered in the Energy Research Abstracts data base, formerly known as Nuclear Science Abstracts, with a total of 416,000 entries. This service was just beginning during the field research, having been implanted at the end of 1979; tapes had been imported from the US and were being searched via Stairs/Aquarius; about 40 searches a month were being run. Finally, the library produced KWIC indexes; this too was a new development, having started in 1979. At the time of the field research KWIC indexing had been used in two applications: the list of current periodicals, offset from printout and issued in three hundred copies, and a list of specialised bibliographies produced by the library, published as part of the library's bulletin.

6.1.12 IF/USP

The library of the Institute of Physics, on the campus of the University of São Paulo, was a well-equipped and organised academic library with 19,624 books, of which 600 had been purchased in the preceding year; it kept 631 periodicals, of which 368 were current subscriptions. The staff totalled ten, to serve 3,400 registered readers. Two processes had been automated, book cataloguing and the production of bulletins of new acquisitions. Both were relatively simple systems, and had been set up in 1975. The cataloguing system replaced the traditional typing of 12.5 x 7.5 cm cards; data was keypunched and processed on the Institute's 360/44, located in an adjoining building, then printed out onto self-adhesive labels slightly smaller than catalogue cards; the labels were then attached to blank cards. There were 4,000 entries in the machine-readable file and about a thousand additions were being made annually. The bulletin of new acquisitions used the same data as the cataloguing system; a printout was made and A4 size copies produced by offset. Bulletin production was six times a year; an annual cumulation was also produced. Five hundred copies were printed for free distribution;
this no doubt contributed greatly to the image of the Institute and its library, as library bulletins are relatively rare in Brazil.

6.1.13 IPT

The Institute of Technological Research of the State of São Paulo (IPT) was one of Brazil's major technological research institutions; it was a complex of buildings located on the campus of the University of São Paulo, although it was an independent organisation, registered as a limited company. Its Division of Systems Economy and Engineering was responsible for three separate bibliographic information systems, all processed on its Burroughs B1727; the major system offered an SDI service based on Compendex; two other, smaller tapes were searched retrospectively and a library catalogue was also automated. The SDI system was made available to the public in 1979, although planning had started two years before that date (FREUND, 1977, 1978). Compendex tapes, based on Engineering Index, were received monthly from the USA; each tape contained about 8,000 entries, and a backfile to 1973 was maintained. Users could choose between individual profiles, group profiles or standard profiles; the latter consisted of one subdivision from Engineering Index. Prices charged during the first quarter of 1980 for a twelve month subscription to the service were: personal profiles CR$11,520 (£115.20); group profiles CR$10,400 (£104); standard profiles CR$5,760 (£57.60). Prospective users were allowed to use the service free of charge for three months, to enable them to evaluate its usefulness; at the time of the field research fifty profiles were being run. Output was in the form of large cards printed on continuous stationery; abstracts, etc., were, of course, all in English. Retrieval of original documents had been established as a service in January 1980; a search charge of CR$120 (£1.20) per reference was charged, plus cost of copying or obtaining from BLLD or elsewhere.

Retrospective searches were carried out on two other tapes imported from the USA; AIDS, the Abstract Information Digest Service of the Forestry Products Research Society and ABIPC, the Abstract Bulletin of the Institute of Paper Chemistry. The systems had come into operation in 1979; AIDS had a total file of 12,000
entries, growing at the rate of 4,000 entries annually. ABIPC had a file of 100,000 entries, with 1,300 additions monthly. Files were updated twice a year, and each file was searched on average once a week. The search system had been developed in the Division, and was not unlike Lockheed's Dialog. The cataloguing system was used by the Division's library, which had 3,000 books and 60 periodical titles, of which 20 were current subscriptions. The system had been originally developed for a list of new acquisitions; the input form was retained for the library catalogue. This contained 2,000 entries, was updated six times a year, and was output onto printout in KWOC order.

6.1.14 USP/SC

The interior of the state of São Paulo consists of rich, rolling agricultural land, developed in the latter half of the last century, when immigrants were brought in from Europe to cultivate coffee. São Carlos is typical of the cities in this region, prosperous because of its agricultural production, and also because of its relative proximity to São Paulo, the most modern city in Brazil, 238 kilometers away along a fast four-lane highway. São Carlos has 75,000 inhabitants, many of Italian descent, and is a university centre, with several institutions of higher education. The most important of these is the School of Engineering, part of the University of São Paulo, on a fine campus on the edge of town, a school with an excellent reputation and an active computer centre. The computer centre's library was of high quality, although relatively small: 3,208 volumes, of which 229 were acquired in 1979; 173 periodical titles, of which 34 were subscribed in 1979, and a staff of two, a librarian and a clerk. The city's other institutions of higher education included a library school, the first in the interior of the state and also the first in Brazil to teach library automation; this combination of factors led to the automation of the computer centre library in 1969 (HAMAR, 1969; MACHADO, 1971). The system controlled circulation, plus cataloguing of the general and special collections, inventory control, listing and indexing of periodicals. All systems were based on 80 column cards and run on the computer centre's IBM 1130 in Fortran; they were developed at a time when the library was new, so there was a direct implantation of automated
systems. For the circulation system each loanable book included, in a pocket, a specially-printed 80 column card. The right hand side of the card was printed as a form to accept written circulation data. When a loan was made the library staff wrote the reader's number, and the dates of loan and return; the reader signed the card. The card was then sent to a key-punch, where the numeric data written on the right was punched into the left of the card. A daily list of books on loan was produced; in 1978 1,760 books were loaned to 743 registered readers.

The other systems all operated along similar lines, using fixed fields and influenced by the IBM package for KWIC indexing. For instance the cataloguing system used one card for authors; up to three could be listed, with a maximum of 20 characters for each name. Input was done on a monthly basis; the catalogue proper, however, was produced annually, in printout, in a KWIC index format. A bound, reduced-size xerox was placed in the library. The total number of entries in machine-readable form was 2,142; there was a separate volume for each year. The special collections cataloguing capacity consisted in the production of separate catalogues for IBM and Burroughs manuals, using the system outlined above. The list of periodical titles, which had 173 entries, was input monthly, with annual cumulations. The periodical indexing system consisted of a list of periodical articles in accession number order, plus a KWIC index to titles and an author index. This was produced annually; nineteen computer journals were covered. Indexes were cumulated every three years, and the total file consisted of 9,131 items. This was the only index to computer technology and use produced in Brazil; one copy was made, for display in the library. This system has, because of its pioneering nature, attracted attention; it has directly influenced several other libraries in São Paulo state and the library of the Federal University of Pará, in Belém, in the north of Brazil. This latter was one of the most carefully-organised attempts to transfer systems from one place to another; during 1977 two librarians from Belém spent six months in São Carlos, becoming thoroughly familiar with the system and returning with complete programmes and manuals.
The Institute for Space Research (Instituto de Pesquisas Espaciais - INPE) was located in São José dos Campos, a city situated between Brazil's largest cities, Rio de Janeiro and São Paulo. This was a high-technology institution, whose library was located in a well-designed, separate building, with 15,000 books, 22,000 reports and 1,000 periodicals, of which 422 were subscribed in 1979, serving a total of 700 users. The Institute was highly automated and its Burroughs 6700 was used for a variety of purposes; in such an atmosphere it was natural that the library was one of the most thoroughly computerised in Brazil; five separate automated subsystems could be identified: selection and acquisition of books and periodicals; cataloguing; circulation; periodicals holding list and indexing of reports. The selection and acquisition system had been operating since 1976 (GOIS, 1980); a list of books suggested was produced every six months, and distributed to the departments, which made the final selection. The same subsystem was then used to produce lists which were sent to suppliers. Periodical subscriptions were renewed by the same method, on an annual basis. The cataloguing system was based on a masters thesis (VASCONCELLOS, 1976) and had also been described in two conference papers (BERSANO, 1977; GOVEDICE, 1977). It had been implanted in 1975; input forms were completed, keypunched and fed to the computer on a weekly basis. The public catalogue, on cards, included author, title, series and subject sequences; it was interesting to note that the latter was arranged according to English language subject headings; accession number and UDC number sequences were also maintained, for use by the librarians. About 280 entries were made monthly, for a total file of about 9,000 (19,300 by 1982). The circulation system was set up in 1972; to record a loan, a library assistant wrote, on a special form, transaction number, date of loan and return, book number, author, title and user's number. The users signed the forms, which were sent for keypunching daily. The computer produced daily lists; 1,200 loans were recorded each month. By 1982 this system had been replaced by an online system operating via a terminal installed on the circulation desk.
The computer centre of INPE had since 1973 been responsible for the production of the union catalogue of Brazilian periodicals, published by the national documentation centre, IBICT. As a result all the software necessary for the production of a periodicals list was available in the institution, and was also used for the production of an internal periodicals list. This came out twice a year, had 1,074 entries, and was produced in eighteen copies, xeroxed from printout. Reports and similar materials were indexed by a system which had been set up in 1968; at the time of the field research about 22,000 reports were held; output was printout, with sequences of authors, institutions, series and two subject approaches, one by KWIC, the other by broad subject headings.

6.1.16 Ibict

Brazil's national documentation centre was founded in 1954, as the Brazilian Institute for Bibliography and Documentation (IBBD). In 1975 it suffered major changes, being renamed the Brazilian Institute for Information in Science and Technology (Ibict), becoming responsible for national planning in the information field (Miranda, 1977, p.59-63). Ibict was a relatively young organisation at the time of the field research, and not all aspects of its policy had been completely defined; in fact at that time a new director was taking command and Ibict was in process of moving; its departments had been scattered amongst various buildings in central Rio de Janeiro; a new building, designed to hold all departments, had been constructed a little way out of the centre, in a semi-residential area. (This reorganisation continued during the writing-up of this thesis; major departments of Ibict were moved to Brasília, where they would be closer to the centre of power and better able to influence policy; the director at the time of the field study was soon replaced by another, and a third director had apparently taken office by 1982). Despite this it was possible to identify three major areas of relevance to this thesis: the production of special subject bibliographies and a union catalogue of periodicals, and searches of foreign data bases via a telecommunications link. Naturally, being a national documentation centre, Ibict was also responsible for a number of other activities, such as a proposed integrated library system, ISDS, a publications programme, courses and conferences.
Ibict has produced bibliographies of Brazilian literature in special subject areas since 1968, using the computer and KWIC or KWOC formats. The system started slowly, but in 1972, after a format change (ZAHER, 1971), published bibliographies for twelve different subject areas: the Amazon, Botany, Agriculture, Social Sciences, Law, Documentation, Engineering, Physics, Mathematics, Medicine, Chemistry and Zoology. Publication has never been entirely regular; in 1975-6 no volumes were published; in 1977 all twelve were again published, and in the last complete year before the field research, 1979, seven volumes. Data for this series of bibliographies was taken from periodicals received by Ibict and other libraries linked to it; input forms were keypunched at Ibict and taken to the IBM 370/165 computer of the Pontifical Catholic University, about ten kilometres away, in another part of Rio de Janeiro. 14,210 entries had been made in 1979, and the total file contained 145,087 entries. Most volumes consisted of a numerical sequence of entries, followed by a KWIC index; in four cases (Medicine, Social Science, Law and Documentation) the index operated on the KWOC principle. An average of 150 copies, offset from printout, was produced of each volume.

A union catalogue of periodicals in Brazilian libraries had been produced by Ibict in automated form, since 1968 (ZAHER, 1970). Thirteen regional centres collected data; the majority sent in their information already punched into 80 column cards, while four used magnetic tape. The file was updated quarterly, and consisted of 71,000 entries; 6,000 new entries or alterations were made annually. A variety of outputs were available; printouts of titles within broad subject areas were produced, as were printouts of titles within each region, for the use of the regional centres. The entire file was available on COM fiche; 50 copies were produced; COM fiche had been introduced in 1978: before then the only access to the entire file was via a printout kept in Ibict in Rio. Data was also supplied on tapes to various regional centres; three states then produced their own printed regional catalogues. Other printed catalogues were also produced; Petrobras, the government oil company, had its own, as did university libraries in North-East Brazil.

Ibict acts as an interface between Brazil and foreign data bases, searching data bases which it is not economic to import.
This service began in 1978; that is, of the three major automated services it is the one that postdates the change from IBBD to Ibict. At the time of the field research daily searches were being made on the data bases available via the Systems Development Corporation, in California; this permitted access to a total of 15 million references. In 1979 343 searches had been processed, as a result of 98 requests from 45 organisations. Brief details of the first 106 searches had been published (CATÁLOGO de pesquisas bibliográficas... 1979). Metallurgy was the subject most in demand; two thirds of the 106 searches had been made at the request of two metallurgical companies. It was expected that costs would drop, but at the time of the field research private companies or institutions were charged Cr$5,000 (£50) per search, with a maximum of thirty minutes terminal time and 100 citations. A major part of the cost, obviously, was the telecommunications charge. Searches were made for individuals only if the quota of institutional searches was not filled; individuals had to pay the same charge per search. While this thesis was being written up Ibict offered training courses on online searching, and also a seminar on non-bibliographic data bases for businessmen.

Ibict had at one stage done a considerable amount of work on a MARC-style bibliographic format based on Unimarc (MANUAL de preenchimento ..., 1978). Like the other complex formats developed in Brazil, this was little used. Being a national documentation centre, Ibict was also responsible for a variety of other activities. It was the Brazilian centre for the International Serials Data System, and had published a pamphlet explaining how the system would work in Brazil (SISTEMA internacional de dados .... 1978). Ibict published the Brazilian edition of UDC, which included a computer produced index (OLIVEIRA, 1973), a list of Brazilian subject headings, and the periodical "Ciência de Informação" (Information Science). Courses in information science, at post-graduate and masters level, had been offered successfully and continuously since 1970; these included library automation courses given by a professor from Case Western University (OVERMYER, 1982). Ibict also occasionally organised conferences; for instance in 1979 it sponsored the Second Brazilian Meeting on Information Science (2a. Reunião Brasileira de Ciência de Informação). Ibict's library contained the finest collection on
library and information science in Brazil; in 1982 they were negotiating for the tape of Library and Information Science Abstracts. A 1981 article by CARVALHO was highly optimistic about the future of Ibict after its move to Brasilia. The Third Basic Plan for Scientific and Technological Development had included an item on information for science and technology; Ibict had five main areas of activity, a national system for STI, the development of basic resources for STI, the supply of STI, bibliographic control over national production in science and technology, and international exchange in STI.

The text of the plan itself (TERCEIRO plano..., 1980) confirms the government's recognition of the importance of Ibict; information is cited as an "instrument of action", alongside planning, finance, standards and international cooperation. And the major recommendation of the information section is that Ibict should be strengthened and given "material and institutional conditions to carry out the function of decentralised coordination of STI activities in Brazil".

6.1.17 BN

Brazil's National Library, (BN), in the centre of the city of Rio de Janeiro, has had a chequered history (MCCARTHY, 1975, p.122-4), and at the time of the field research was facing considerable difficulties. It had approximately 3.5 million volumes in a cramped and out-of-date building, and work on a long-awaited annexe had yet to begin. The library had, however, taken the first steps towards automation; the national bibliography was produced via computer; there was a project for a detailed cataloguing and control system, and a periodical catalogue, part of that project, was being prepared. The library also acted as Brazilian centre for the ISBN system. The production of the national bibliography of Brazil has faced constant problems (HALLEWELL, 1973). The National Library was responsible for the publication of the "Boletim Bibliográfico" (Bibliographical Bulletin), which contained details of Brazilian books and similar materials, but its publication had been constantly interrupted. The note on the verso of the title page of 1979 issues stated that publication began in 1918, and was interrupted in "1922-1930; 1932-1937;
1939-1944; 1946-1950; 1968-1972". It had been produced via the computer since volume 21, 1976. (The fact that the periodical had begun in 1918 and reached volume 21 by 1976 is itself an indication of its production problems). Information was copied from catalogue cards onto input forms, which were sent to Cimec in Brasília. Data was transferred to magnetic tape, which was processed by Prodasel. The formatted tape was sent to a COM bureau in São Paulo which produced microfilm, which was used as a negative for offset printing. 2,000 copies of each issue were printed; about 1,800 were distributed free. Entries in the "Boletim Bibliográfico" were simplified, but the National Library had a project for a full-scale information system, based on the Calco (Catalogacao Legivel por Computador - machine-readable cataloguing) format, developed in Brazil (FORMATO Calco, 1977). This detailed, MARC- style format, had been perfected by Cimec and the National Library. The project had been planned in detail, but the only activity was the preparation of a holdings list of periodicals; the library had 400,000 volumes; details of 183,000 had been transferred to input forms, preparatory to the production of a printed list. The National Library was the agency responsible for the distribution of ISBNs in Brazil; Brazil's prefix was 085. Eighty-seven publishers had joined the ISBN system, and it was estimated that 10% of books published in Brazil carried an ISBN. By 1982 this library had a new director, an experienced professional librarian with Unesco experience, who had obtained a building nearby as an annexe, which should solve the most pressing problem, that of space. It was also hoped that the automation project would go ahead.

6.1.18 UFRJ

The Federal University of Rio de Janeiro (UFRJ) was one of Brazil's major universities, located on a spacious campus on the outskirts of the city. The major automated system there was set up in 1970/1 in the library of the Coordination of Post-Graduate Programmes in Engineering (Coppe); it was the practical application of a master's thesis for that institution (SZWARCFTER, 1971). This covered acquisition, cataloguing and circulation; the Coppe library had been renamed the library of the Centre of Technology (CT) and the system had also been extended to the library of the Centre for Mathematics and Natural Sciences (CCMN) in an adjoining building. It had also influenced the systems of the libraries of the Institute
for Nuclear Energy, IEN, and Furnas, both of which are dealt with separately. The Technology library, with 46,000 volumes, of which 3,189 had been purchased in 1979, and 2,395 periodical titles, of which 851 had been subscribed in 1979, was considerably larger than the Mathematics library, which had 11,000 volumes, of which 205 had been purchased in 1979, and 550 periodicals, of which 171 had been subscribed in 1979.

Input to the acquisition system was weekly, and output was on printout, with most reports also being produced on a weekly schedule; claims were issued automatically for overdue items. Technology had about 3,000 items on order at any one time; Mathematics had two to three hundred. The cataloguing system currently in use was the second, introduced in 1978; the original system had been based on unit record equipment. The Technology library had a backfile of 40,000 items, and was adding about 5,000 each year. A complete new cumulation was produced on printout every month. Two copies were taken; one was the public catalogue, the other was kept in the cataloguing room; back issues were sent to branch libraries. The system in the Mathematics library had started in 1979 using a more complex format, and had catalogued 7,000 items; it produced catalogue cards.

The loans' system operated only in the Technology library; each book included an 80-column card punched with its author and title; a series of 80-column cards, punched with readers' names, was kept at the issue desk. Readers had one such card for each book they were entitled to borrow. To record a loan book, cards and reader cards were manually interfiled. Weekly lists were produced; the list of overdue items was produced in two copies, one of which was cut up and sent to readers to remind them to return their books. The system handled 18,000 loans of books each year, plus 9,000 loans of periodicals.

6.1.19 IEN

The Institute for Nuclear Energy (IEN) was an independent institution located on the campus of the Federal University of Rio de Janeiro, on the outskirts of that city. Its library had 7,800 books, of which 200 had been purchased in 1979; it had 311 periodical titles, of which 220 had been subscribed in 1979; almost all the materials in the collection were in English. Since 1974/5
two automated subsystems had been in operation, cataloguing and circulation, closely based on the systems evolved by the Centre of Technology (formerly Coppe) on the same campus. All systems were run on a CDC 6600 computer in the centre of the city, via a telecommunications link. In the cataloguing subsystem data was input three times a year, and each time a complete new cumulation was produced. Output was in printout; 7,800 items had been entered, 304 in 1979. The loans system operated with 80 column cards; cards kept in pockets in the books were manually matched with cards punched with readers names, which were kept at the issue desk. The system could also claim overdue items. 157 borrowers had been registered in 1979; they had borrowed a total of 1,242 items.

6.1.20 Nutes/Clates

The Nucleus and Latin-American Centre for Educational Technology for Health (Nutes/Clates) was located in the Health Sciences Centre of the Federal University of Rio de Janeiro. It specialised in using modern technology for training students in the health sciences and it had an extensive programme of computer assisted instruction, operated on a PDP 15 computer, with twelve terminals. It also maintained a small library, consisting mostly of audio-visual materials; this was catalogued by the computer; Nutes/Clates was also setting up a system to index periodical articles. Input to the catalogue was via terminal, the file could be interrogated online, while a printed catalogue had been produced annually since 1976. This was offset from printout, spiral bound and produced in 200 copies; the total file consisted of 571 items. The indexing system was in the test stage during the field research; details of fifty periodical articles had been entered.

6.1.21 Petrobras

The Research Centre of Petrobras, Brazil's state oil company, was located on the outskirts of Rio de Janeiro, near the Federal University. Its Sector of Divulgation and Technical Information (Sediv) was the centre of a network of 36 libraries, with a total of 43,132 books and pamphlets (49,168 by 1982), all of which had been entered into a union catalogue. This had been set up by
Petrobras in 1972; books and pamphlets were purchased locally, and the branch requested a set of catalogue cards from Sediv. If the item had been previously catalogued, Sediv supplied cards; if not, the branch library was asked to do the cataloguing. This was submitted to Sediv, which produced the cards, and also input the data to the union catalogue, held on a Petrobras computer in the centre of the city, about ten kilometres away. Data was output on COM fiche; a complete cumulation was made each January, and three supplements were produced during the year. The union catalogue of periodicals was produced by a totally different system, by Ibict as a sub-set of the national union catalogue of periodicals; Petrobras libraries held a total of 2,718 titles.

6.1.22 CIN

The Centre for Nuclear Information (CIN) of the National Commission for Nuclear Energy, in Rio de Janeiro, was the Brazilian node of INIS, the International Nuclear Information System, whose headquarters were in Vienna. Nuclear energy was a high-priority area for the Brazilian government, and this system, operated by thirty people, offered both SDI and retrospective search services. All services were based on INIS at the time of the field study; the Centre indexed Brazilian papers on nuclear energy, sending approximately 100 entries a month to Vienna. Full INIS tapes were received fortnightly, with about 2,500 entries on each. The SDI system was set up in 1969-70; the tapes received from INIS were compared with profiles stored on punched cards; an IBM/3 located in the Centre was used for this. There were 1600 users, who had a total of 1900 profiles; they had filled in a complex form, on which they specified both areas of interest and descriptors, and applied weights to each. Output was in the form of "concertinas" of cards, printed in a continuous strip and joined by perforations. Cards were slightly larger than A6 size, and bibliographic information was in English. Response cards enabled users to rate the information received and to request photocopies or microfiche. The final card carried the user's name and address, so that the concertina could be stapled shut and mailed. When the system was founded the Centre surveyed authors and institutions in the field, and sent out letters and an instruction manual (MANUAL de instrucoes ...(SDI), n.d.). A monthly newsletter, "Cinforme" was also published, and staff
frequently described their services at conferences and in periodicals (MARCHESI, 1977; BARREIRO, 1978, 1979). To improve profiles users could be given a group of document profiles, from which they were asked to identify relevant items (SAYÃO, 1980). The Centre maintained a file of 300,000 fiche of non-conventional literature; xeroxes of periodical articles were sought in cooperating libraries; locations were indicated automatically by the computer, as part of the subsystem which handled the response cards. By 1982 the letters to cooperating libraries requesting xeroxes were themselves being produced by computer.

Retrospective searching began in 1975; the retrospective file held 400,000 entries, on the IBM 370/165 at the PUC, about 15 kilometres away. Communication was via four terminals located in the Centre; 360 searches had been processed in 1979. The SDI system used weights, but retrospective searching was by Boolean logic, entered via terminal (MANUAL de instruções ... (SUPRIR), n.d.). The entire search formulation was worked out and entered in one operation at the beginning of the search; all CIN software had been developed at the Centre. The result of the search was given on printout; bibliographic citations and abstracts were printed on the left, while the right-hand side formed a perforated stub which users were asked to detach and return with their judgement of the document's relevance. Considerable developments had taken place between the time of the field study and the writing up of the thesis. Inspec tapes had been obtained for the SDI services, and European Nuclear Documentation System tapes, with a total of 1.3 million entries, had been added to the data base available for retrospective searching. Data was being sent to INIS in Vienna on magnetic tape (BARREIRO, 1980); that data was also being published in Brazil as the Brazilian Bibliography of Nuclear Energy, which had first appeared in 1981.

6.1.23 FGV

The Getulio Vargas Foundation (FGV) was one of Brazil's major research institutions in the area of economics and business administration; it also offered post-graduate courses, of high reputation, in these subjects. Its headquarters in the city of Rio de Janeiro included a library with 98,014 books, of which 1,100 had been purchased in 1979, and 2,804 periodical titles, of which 417 had
been subscribed in 1979. There were 2,500 registered borrowers, but a much larger number of people read in the library, due to the quality of its collection. At the time of the research the library was in the early stages of automating its book catalogue, using a Marc-style format. The first products of the new system had become available in 1979, replacing an earlier, Flexowriter-based, system. Bibliographical information was entered onto detailed input forms, according to a Marc-style format, specially developed for the Foundation (SISTEMA de registro..., 1979; SISTEMA Bibliodata..., 1982). Processing was done on the Foundation's IBM 370/145, and output was on standard catalogue cards, which were interfiled in the library's existing catalogue. New acquisitions were being catalogued under the new system, while a gradual recataloguing of the old stock was being undertaken; 6,000 items had been entered into the machine-readable file. The Foundation had been receiving LC Marc tapes since the end of 1979; the library was also preparing an automated list of subject headings, based on LC. There had been considerable development in the period between the field study and the typing of this thesis. The cataloguing system had begun to produce a microfiche accession register; an acquisition control system was operative, and the list of subject headings was available both on cards and on microfiche. LC cataloguing data was being distributed on microfiche (LATORRE, 1982).

6.1.24 DNER

Brazil's National Road Department (DNER) was, in view of the geographic extension of the sub-continent, and its emphasis on road transport, one of the most important sectors of the Ministry of Transport. Its Documentation Centre was in a suburb of Rio de Janeiro, and was responsible for an information system which combined elements of a database and a union catalogue (DIAMANT, 1980). Two different types of material were stored in the same file: books held by DNER libraries and legislation issued by the DNER. Details of 8,000 monographs, held by the thirteen libraries maintained by the DNER throughout Brazil, were stored. The entire collections of the DNER's Central Library and of its Institute for Road Research Library were included, as were 2,600 laws, regulations and standards issued by the DNER. All information was held in an IBM 370/148 computer located in the same building as the Documentation Centre; searches could be made online.
via terminals in the Documentation Centre, the Central Library and the DNER's law library; both the latter were located about five kilometres away in the centre of Rio de Janeiro. The data base system used was Stairs/Aquarius and indexing was controlled by a thesaurus of terms relating to roads (MICROTESAURO... 1979). The system had come into use in 1978 and approximately 500 searches were being made annually; output in the form of printout could be supplied when required. The system did not include periodical holdings; IBICT was producing a special periodicals catalogue for DNER, as a sub-set of the national union catalogue of periodicals.

6.1.25 Eletrobras

Eletrobras was one of Brazil's major electricity companies, and maintained a technical library in the centre of Rio de Janeiro, with 17,811 books, of which 1,403 had been purchased in 1979, and 314 periodicals, of which 190 had been subscribed in 1979. It had access to an IBM 370/148, on which it ran five separate systems: acquisition, cataloguing, bulletin of new accessions, circulation and indexing of periodicals. The acquisition system had been set up in 1976; data was keypunched from input forms once every three months. Output was on printout; a list of outstanding orders was produced annually and sent to overseas suppliers. A total of 314 books had been ordered via this system in 1979. The traditional card catalogue had been replaced by an automated catalogue in 1973. Input forms were keypunched monthly, and a new cumulation produced every quarter. Output was in the form of printout, and format was similar to that of a KWOC catalogue. Reports and pamphlets were included in the machine readable file, which contained a total of 25,000 entries. Two copies of the printout were taken, both being kept in the library; the catalogue was also output to COM, again for internal use only. The bulletin of new accessions had been set up in 1973. It was produced monthly, and consisted of a list of books, pamphlets and reports, with an author index. Eighty copies were produced directly on the computer's printer.

The circulation system, adopted in 1975, operated with "Portapunch" equipment. Each loanable item contained an 80 column card, prepunched with its accession number, on which various fields recorded reader's number and date due. The reader took the book to the
issue desk, where the library assistant pushed out the holes for day of return, month of return, and reader's number. Each card could record up to four loans, after which the system automatically produced a new card. Cards were processed every fortnight, producing printouts with lists of books on loan; the system automatically sent claims for overdue items; 4,234 items had been circulated in 1979. The indexing system, set up in 1976, covered Brazilian literature on electrical energy, or literature on electrical generating in Brazil, published overseas. Input forms were keypunched and fed to the computer quarterly. A new cumulation was produced every quarter on printout; format was similar to that of a KWOC catalogue. Between 500 and 800 entries were made each year, and the total file consisted of 2,473 entries. Four additional copies of the printout were distributed to other electricity companies free of charge; a COM printout was also produced, for internal use.

6.1.26 PUC

The Pontifical Catholic University of Rio de Janeiro was the first institution in Brazil to have a computer; in 1959 it imported a valve-operated Burroughs B205 (NOS e o computador, 1978). In 1980 it had an IBM 370/165 housed in a large building marked "Rio Datacenter". The computing library was a small but busy room on the fourth floor; it had a librarian and two clerks who maintained a collection of 5,630 books and reports, plus 202 periodical titles, of which 101 were current, for a total of 423 users. Its cataloguing system had been fully automated since 1971. The cataloguing proper was done in the University's central library; data was received on traditional catalogue cards and copied out again for the computerised system. The catalogue was in printout form, with a KWOC-style index; there was a total of 4,005 entries in the machine readable file.

6.1.27 Serpro

The Federal Government's data processing service, Serpro, (Servico Federal de Processamento de Dados) was the largest single data processing agency in Brazil. It was therefore natural that the library at its centre in Rio de Janeiro had an automated cataloguing
and periodical subscription system. The cataloguing system had originally been set up in 1972 (AUTOMAÇÃO ... 1973). Six times a year the system produced a new library catalogue on printout, organised by KWOC. The entire library collection, 14,000 items, was in the machine readable file. The periodical subscription system had been established in 1975; six times a year the system produced a complete list of periodicals, including, for each title, data such as renewal date, number of copies, departments to which copies should be circulated, etc. The library had 380 current periodicals, and all were in the automated system. At the time of the research visit the library was in process of being packed up and moved to Brasília.

6.1.28 Furnas

Furnas (Furnas Centrais Elétricas S/A) was one of Brazil's major electricity companies, and had its headquarters in Rio de Janeiro, where its library had 11,343 books, of which 400 had been purchased in 1979; 530 periodical titles had been subscribed in the same year. It maintained several automated systems, not dissimilar from those of the Federal University of Rio de Janeiro; a former head of the Coppe library, which pioneered automation at that university, had transferred to Furnas. The systems had been set up in 1971, and all operated via Furnas' own IBM computing facility. Four basic systems could be identified: acquisition, cataloguing, circulation and periodicals receipt. The acquisition system operated on a two week cycle, and produced printout. The cataloguing system included slides and photographs, and for this reason the number of entries in the machine readable file, 22,543, was considerably higher than the number of books in the library. Input was monthly, and a new cumulation was run off every three to six months. This was on printout; three copies of the catalogue were made; one was kept in the central library, the others sent to branch libraries in other cities. Every time a loan was made a form was completed with the accession number of the item borrowed and the reader's number; this was then keypunched; in 1979 a total of 10,537 loans had been recorded. The periodicals receipt system required each periodical to have an accession number. Every time a periodical part was received, that number, plus the year, month, volume and number of the periodical part, was input to the computer. Lists of overdue parts were produced quarterly; the system also
produced data to help with the renewal of subscriptions, and lists of periodicals in alphabetical and subject order.

6.1.29 IME

The Ministry of the Army was establishing its Centre for Scientific and Technical Information at the Military Institute for Engineering (IME) in Rio de Janeiro. Work had begun on this in 1979, and was still in a very preliminary stage at the time data was collected. The system at that time was serving only four military installations in Rio de Janeiro; it would be extended when more firmly established. Both SDI and retrospective searching in a data base had commenced, and the beginnings of a cataloguing system had also been set up. The data base contained brief details of 42,000 US military standards, specifications, handbooks, etc., held on an IBM 370/165 at the Pontifical Catholic University, in another part of Rio de Janeiro. All items had been classified by the US Government's Federal Supply Classification, and at the time that was the only element by which searches could be conducted, although there were plans to institute free-text searching of titles at a later date. Output was printout; at the time there were only a hundred users, responsible for about ten searches a month. All standards in the data base were held by the Brazilian Army.

The SDI system was also based on US data, in this case the fortnightly issues of the "Government Report Announcement and Index". These listed about 700 reports each, and the titles of these were keypunched and processed on the IBM/3 at the Centre for Nuclear Information, in another part of Rio de Janeiro. There were approximately 80 users, who received "concertinas" of cards joined by perforations. Each card contained the reference number and title of a report; all titles were in English. The cataloguing system was still in an ambrionic stage; 300 items had been input, in an INIS-based format. These were all documents produced at the Military Institute for Engineering.

6.1.30 Sudene

Sudene (Office of the Superintendent for the Development of the North East) was one of the regional development bodies
subordinate to the Ministry of the Interior, located in a modern skyscraper on the outskirts of the city of Recife. The library contained, in 1980, 46,906 books, of which 2,265 had been acquired in 1979; in the same year 169 periodicals were subscribed and the total number of periodicals was 679. The library input Sudene documents into the Agris system and also into the information dissemination system set up by the Ministry of the Interior; it had also developed its own automated circulation system. The latter was announced in a 1977 conference paper (MARQUÉS, 1977) and came into full operation in 1978. Machine-readable records for the circulation system were created at the moment the book was first loaned, when the librarian noted author and title on a form. The circulation operation itself consisted in the librarian writing, on the appropriate form, a sequential transaction number, one for each loan, together with the book's accession number, and the borrower's identity number; the borrower signed the form. By 1980, 4,162 items had been circulated under this system; this was, therefore, the size of the file available in machine-readable form. In 1979, 3,878 loans were recorded.

6.1.31 UFPb

The Federal University of Paraíba (UFPb) was the Brazilian university which had most rapidly expanded in the late 1970s; on its campus in João Pessoa library services had been centralised, producing a library of 100,908 volumes, of which 12,812 had been acquired in 1979; 3,206 periodical titles were held, of which 656 were current subscriptions. The library had also taken the first steps towards automation, computerising its catalogue (SILVA, 1980; DUTRA, 1981). The computerised version was implanted in May 1979, although some testing had previously been carried out with a simpler format. The definitive version used a variable format, a scaled-down Calco; data was transcribed onto forms, keypunched and transmitted to the university's main computer, an IBM 370/145, on its Campina Grande campus, 100 kilometres away. Output was in the form of standard-sized catalogue cards, printed on the João Pessoa campus via the telecommunications link and manually filed into the Central Library's catalogue. 15,000 items had been transcribed into the machine-readable file, 10,000 of them in 1979. The automated entries greatly improved the standard of the catalogue, as the original manual cataloguing was frequently inaccurate and of
poor quality. Format improvements had taken place since the time of the field studies; the complete Calco had been adopted.

6.2 Descriptions of institutions not visited

6.2.1 UFRGS

The researcher had been aware of substantial automation activity at the Federal University of Rio Grande do Sul (UFRGS), but had been unable to visit it personally, as it was located in Brazil's southern-most state. It was endeavouring to set up an integrated library and information system, and had decided to start by automating the cataloguing, as this was the area of greatest urgency; 60,000 books were awaiting cataloguing (SCHREINER, 1980). First steps were taken between 1975 and 1977, when a list of the university's theses was produced as a pilot project. The system was considered satisfactory and maintained for cataloguing; therefore UFRGS adopted an early version of CALCO, but this was stated to be compatible with later editions (SCHREINER, 1979; MENDONCA, 1980). Input was via forms and floppy disk to a Burroughs B6700; catalogues could be produced on printout or on COM. By mid-1980 7,419 books had been catalogued by this system (16,081 by 1982); input was running at about 370 items per month. Including its departmental libraries, the university had a total of 411,000 volumes. The other elements of the integrated system were to be acquisition, circulation and information retrieval, but as Schreiner (1980) said: "The volume of monograph acquisitions does not yet justify the automation of this sector, and the reference service and circulation control can be handled satisfactorily by the manual system".

6.2.2 RFFSA

The library of Brazil's federal railway company, Rede Ferroviária Federal S.A. (RFFSA), was located in Rio de Janeiro and operated automated indexing and cataloguing systems. The library had about six hundred users and automation was via an IBM/3; they were hoping to move up to a 370/148. Automated indexing had begun in 1975; 15,000 items had been processed from 220 periodicals. Major output was a quarterly bibliography on railway affairs, called "Lista de
artigos selecionados". This was reproduced from printout; each issue totalled over 150 pages. A complete cumulation, on printout, was available for reference in the library. The library had 10,100 books, of which 3,450 had been processed for the automated cataloguing system, set up in 1976. Current input was just under a thousand books a year, and the catalogue, on printout, was kept in the library. The library had also been responsible for setting up two non-bibliographic automated systems, an addressing system for the distribution of the RFFSA's publications and an indexing system to its official-administrative decisions (atos administrativos). By 1982 the IBM 370 had arrived and the book catalogue and the index of administrative decisions were available online.

6.2.3 CPRM

The Mineral Resources Research Company (CPRM) maintained a special library at its Rio de Janeiro headquarters, with about 300 periodical subscriptions, 2,000 books and 500 pamphlets. Periodical indexing had been automated on an IBM 370/145; since 1977 17,000 items, from 121 periodicals, had been indexed. The system was of interest because access to the list of articles in numerical order was via both KWIC and KWOC. A KWIC index to titles was formed using stopwords, regardless of the language of the title; the sample sheet sent to the researcher was mostly in English, with a few Portuguese and a couple of French items. There was a separate KWOC index, in which the entry words were always in Portuguese, selected by an indexer; an author index was also available. The file was growing by about 350 items a month; output was quarterly, with annual cumulations.

6.2.4 Globo

Brazil's major TV network, Rede Globo da Televisao, used a NOVA 3 mini-computer to recuperate information. As might be expected in television, most of the information required was in image form: videotapes, films, slides and news photographs, but the system also indexed press clippings, books and periodicals. The system had been automated in 1976 and had a total of 150,000 entries; 10,000 enquiries were made monthly via six terminals. Entry of a keyword or name would retrieve the titles of all relevant material; full indexing and
technical details of each title could be called up if desired; searches could be limited to certain types of material, for faster retrieval. An online system had been essential because television personnel needed immediate access to materials, and relatively thorough indexing was necessary because materials were generally subdivided by form and then stored in accession number order. Indexing of visual material had been difficult, and the problem of false drops so great that descriptors were arranged in groups. For instance, a film on coffee, cocoa and beans which dealt with the profitability of beans, but not of the other crops, would have "coffee; cocoa; beans" as one group of descriptors, and "beans; profit" as another group. The computer would analyse each group separately. This was a highly specialised system, but it was also obviously successful; as a result of it the library had been given responsibility for storing and indexing the network's videotapes and sound discs and tapes (FIGUEIRA, 1980).

6.2.5. Planalsucar

Brazil has recently made major efforts to reduce her dependence on imported oil, especially through the production of alcohol from sugar cane, and Planalsucar (Plano Nacional de Alcool e Açúcar) has been a key institution in this drive. The special library at Planalsucar headquarters in Rio de Janeiro mounted an automated system, offering SDI and retrospective searching over a total of 8,000 documents in various libraries of the six-location network. The system went online in 1979; a PDP 15 computer was used and communication with the network libraries was via telex. Two of the five outlying libraries were in Northeast Brazil, the others in São Paulo state. The system was growing by about 2,000 documents a year, and had about 250 users.

6.2.6 UFPa

The automation of the Central Library of the Federal University of Pará, in the north of Brazil, was of interest for several reasons. First, it represented one of the few attempts to implant an operating Brazilian system in a different library, and of all such attempts this was the one in which the greatest distance was involved. Two Librarians from Pará spent six months in 1977 at the Computer Centre of the University of São Paulo at São Carlos,
São Paulo state, 2,500 kilometres to the south; Pará represented the first and only automated application in the north of Brazil. Collaboration had been facilitated by the fact that both systems used IBM 1130 computers. Another point of interest is that the university only automated its loan system, running counter to the general tendency to give priority to the cataloguing system. Perhaps the KWIC-based São Carlos system was not considered wholly suitable for the 64,000 volume Pará library. The circulation system, based on punched cards, was implemented in 1978, and was handling around 40,000 loans a year, for a total of about 10,000 users.

6.2.7 Bauru

The central library of the Bauru Educational Foundation, a small university in the interior of São Paulo state, had adopted the system developed by the library of the Computer Centre of the University of São Paulo in São Carlos. Cataloguing and circulation had been automated, starting in 1973. The catalogue contained 28,000 items in its machine-readable file, the entire library book collection; the file was growing by about a thousand items a year. The automated circulation system had been discontinued in 1977.

6.2.8 Other systems

Some other systems, about which only very limited information was available, can be dealt with briefly. The Cocoa Research Centre (Centro de Pesquisas do Cacau - Ceplac), a dynamic organisation located in the centre of the cocoa-producing area of the interior of Bahia state, had automated its accessions list; it had 12,000 books and 3,000 periodical titles and served a thousand users. The Institute for Road Research (IPR), located near Rio de Janeiro, maintained a data base formed by DIRR (Documentation Internationale de Recherche Routière) tapes, plus local input (SISTEMAS de processamento..., 1980, p.37). The data base was organised by Stairs for online retrieval. The library of Sudesul (Superintendência para o Desenvolvimento do Sul - Superintendency for the Development of the South), in Porto Alegre, Brazil's southern-most capital, was a major contributor of cataloguing and indexing to the Miner system, but also operated a small automated system to distribute, on printout, details of duplicates
available for exchange and items wanted (ROZADOS, 1979). During a 1977 visit, the researcher had seen a small automated periodicals list at the Federal University of Viçosa, a dynamic university in the interior of Minas Gerais, but it was not possible to discover whether it was still operating at the time of the field study. The Parana state data processing company, Celepar (Companhia de Processamento de Dados do Paraná) was beginning to automate its library, including both books and periodical articles in an online data base (COSTA, 1979). A terminal was operating at the national library conference, held in Curitiba in 1979; at that time the system was embryonic, as the file held less than a hundred entries. The library of the National Museum, Rio de Janeiro, was preparing a catalogue of its 16,000 books and 25,000 pamphlets. Computing was to be done by the Federal University of Rio de Janeiro, of which the museum was a part. At the time of the field study details of some books had been transcribed onto input forms, but no input had been done, so this was not considered an operational system. This was almost the only institution to have adopted the complete Calco format without changes; both printout and cards were to be produced. Several other institutions were working on automation projects at the time, but had not produced any positive results; the Federal University of Minas Gerais was perhaps the most important of these (JUNQUEIRA, 1979). The Systems Development Centre (Centro de Desenvolvimento de Sistemas — CDS) in Brasilia used a Univac 1100/10 to produce catalogue cards for a microfilm collection of 300 Brazilian theses, distributed to 50 libraries (ARAUJO, 1979). This appears to be an example of a "one-off" system, a system produced for one specific purpose, and not used again.

There were also several cases of systems which had been set up or tested and then, apparently, dropped; this was to be expected, considering the largely experimental nature of library automation in Brazil. A 1969 paper (published in 1972) described an automated catalogue, based on 80 column cards, at the Admiralty library in Rio de Janeiro (FROTA, 1972). The researcher never saw any other reference to this system, nor was it possible to confirm whether it still existed. The Aerospace Technical Centre, in Sao José dos Campos, Sao Paulo State, had an automated book catalogue at a very early date (SIQUEIRA, 1972). The system was in full operation at that time,
because the published report reproduced several pages from the catalogue, which was on printout, in dictionary format. The Centre was the type of high-technology institution where one might expect to find an automated catalogue; it was next to INPE, the Institute for Space Research, which had one of the most heavily automated libraries in Brazil. The researcher visited the Centre at the time of the field study, but it had reverted to a traditional catalogue. Lemme (Legislacao do Ministério de Minas e Energia - Legislation of the Ministry of Mines and Energy) was a legislative retrieval system, but involved several of Brazil's major librarians, and was reported in librarianship journals (VICENTINI, 1972, 1973). It is of interest because it used UDC as a retrieval tool; it was therefore exploring a totally different direction from that taken by other automated retrieval systems, which perhaps explains why it ran for a one year trial period only. The Ministry of Mines and Energy is now a major Prodasen user. In 1972 the researcher noted an automated system at the Centre for Economic Studies and Research of the Federal University of Rio Grande do Sul (MCCARTHY, 1975, p.71). One librarian single-handedly ran a 5,000 volume research library and produced a computerised index to journal contents; it was similar in format to an automated Uniterm index. Not surprisingly, the system did not survive. A student at the Pontifical Catholic University in Rio de Janeiro had set up an online data base as his masters thesis (CARVALHO, 1975). The data base contained details of about a thousand periodical articles on computing, and was known as SCAP (Conversational System for Periodical Articles). It was available online from 1974 until it was disactivated in 1976. The researcher heard of a similar system which had operated for a short time at the Federal University of Rio Grande do Sul, called SIRI (Sistema de Recuperacao de Informacao - Information Retrieval System).

6.3. Developments since 1980

Of the 31 institutions studied in detail, eight reported major developments between the field study and the typing of this thesis. UnB, INPE and FGV reported major improvements to their existing library systems; CTN was importing new data bases, as was Embrapa, which had also set up a union catalogue of periodicals. Binagri had added retrospective searching to its SDI capacity, and
Bireme had set up a periodicals receipt system. It was clear that institutions were developing steadily, and improving their systems. Activity outside the institutions studied in detail was mostly bibliographic in nature; automatic indexing of the government gazette (Diario Oficial da União) had been begun, (Motta, 1980), as had a bibliography of government publications, the first of its kind (BIBLIOGRAFIA de publicações oficiais, 1981); both were indexed by Prodasen. A São Paulo publisher also began production of a microfiche list of books in print (CATÁLOGO brasileira de publicações, 1981).

During the same year the researcher acted as a consultant for a periodical indexing system at the Pontifical Catholic University in Recife. Due to the lack of published periodical indexes in Brazil, the library manually indexed periodical articles on standard-sized catalogue cards. As the library had access to the University's Burroughs B1700 and wished to gain experience with automated systems, a simple indexing system was evolved, with output on printout. It was hoped to publish this in future; as there was no other index to the university's periodicals all titles useful to undergraduates were indexed. (As very few systems exist in Brazil, there is a tendency for those which do succeed to cover a wide area; successful information systems offering SDI also tended to obtain tapes beyond their central area of interest). A preliminary project for a network of university libraries in North-East Brazil was issued (REDE de bibliotecas..., 1981); this spoke of four DEC10 computers, in Salvador, Recife, Fortaleza and Belém, linked by telecommunications, which would offer a complete library system to all major university libraries of the region. It remains to be seen whether and in what form such an ambitious scheme will get off the ground. Serpro had turned a KWIC/KWOC index on management and economics into an online data base (Botelho, 1980). Finally, an automated indexing programme was being tested at the University of Brasília (Robredo, 1980).
7.1. Preliminary letter sent to institutions visited

The Director

Dear Sir,

I believe that your institution is one of the most advanced in the country in terms of computer use. I am therefore pleased to inform you that you have been selected to take part in a research project on "Automation of library and bibliographic information systems".

This research is being carried out by myself, Mr. Cavan McCarthy, lecturer at the Federal University of Paraíba; I have wide experience both in Brazil and in automation. My objective is to survey principal libraries and bibliographic information systems which use a computer; identify and rank their major problems and, based on these findings, make suggestions to facilitate future automation. The project is being oriented by Anthony J. Evans, Ph.D., of the University of Loughborough, England. The results will be translated into Portuguese and published in Brazil, which will result in the name and pioneer efforts of your institutions becoming much better known.

I will visit your institution on the day mentioned on the attached sheet, and will interview the professional staff responsible for the automated system. Further details of these interviews can also be found on the attached sheet. At the moment I only wish to emphasize that this research is limited to libraries and bibliographic information systems. I am not interested in confidential systems or information, because my enquiries are for research purposes.

I would like to remind you that your participation in this research will be of great value; not only for the development of automation in Brazil, but also for your own institution. Your pioneering activities will be made known via a research publication,
which will contribute greatly to improving the already high reputation of your institution.

Yours sincerely

Cavan McCarthy

Note: The above letter was accompanied by a duplicated sheet containing spaces for the name of the institution, date and time of the visit, and specific subjects which would be examined. The latter was useful for large organisations which might be uncertain as to exactly what the researcher wished to examine. This was followed by the text below:

1 The researcher's visit will have two distinct stages: during the first stage, the director or a person working at a high level within the system will be interviewed to determine the general outline of the automated system. In the second stage the researcher will rapidly interview all professionals, from librarianship, information science, computation or systems analysis, who work, or who have worked, in the development or operation of the automated system. These interviews will define experience and attitudes. It would be most useful if professional staff who previously worked on the system could attend for interview on the appropriate day.

2 The researcher will request you to identify the three documents which had most influence on your system.

3 If possible, the researcher would like to take away samples or xerox copies of the following:
   a) publications which include a description of the system
   b) input forms
   c) samples of output
   d) manuals, flowcharts, objectives, etc.
When visiting institutions such as libraries which maintain collections of books and periodicals, the researcher will ask:

a) How many books do you have?

b) How many did you acquire last year?

c) How many did you purchase last year?

d) How many periodical titles do you hold?

e) How many did you receive last year?

f) How many did you subscribe last year?

Note: These documents were accompanied by copies of letters of introduction prepared by Dr. Evans, thesis advisor, and by the researcher's Head of Department.

7.2. Computer usage in institutions visited: text of a guided interview with a member of the administration of the library or bibliographic information system.

7.2.1. Questions relevant to all institutions.

1. Name of the institution

2. Address

3. Telephone

4. Name of the person interviewed

5. Position held by person interviewed

6. Date of interview

7. Approximately how many people work in this library or bibliographic information system?

8. Please identify the documentation which exists for the automated system, basing your reply upon the following list:

1. A description published in a periodical, in the proceedings of a conference, or as a report.

2. Objectives


4. Flowchart

5. System documentation

6. Input form

7. Sample of output

8. Other (please identify):

Note: If possible please supply copies of available documents.
(9) Please indicate up to three books, articles, reports or other documents which had a major influence upon your system.

(10) Please identify the processes actually carried out at this time by computer in this institution, basing your reply upon the following list:
1. Selection of books and similar materials.
2. Acquisition of books and similar materials.
3. Routine cataloguing of books and similar materials within the institution.
4. Lists of new acquisitions.
5. Internal SDI system with information on new acquisitions.
6. Cataloguing of special collections.
7. Circulation control.
8. Inventory control.
9. Control of bindery processing.
10. Renewal of periodical subscriptions.
11. Receipt of periodicals.
12. Lists of periodicals held in this institution.
13. Internal system to index periodicals, reports, etc.
14. Union catalogue of periodicals in various institutions.
15. Union catalogue of books and similar materials in various institutions.
17. Bibliographic data base with retrospective search capacity.
18. System to produce indexes or printed catalogues for external use.
19. Other (please identify):

(11) Do you intend to automate other processes within the next two years?

NO; DON'T
KNOW

YES
↓
(12) Which?

(13) Was your automated system influenced by any other system which uses the computer?

NO

YES
↓
(14) Please identify and locate up to three of the systems which influenced your system.
(15) Please identify the elements which you took from other systems, basing your reply upon the following list:
1 Everything or nearly everything.
2 Format or input form.
3 Flowchart.
4 Programmes.
5 Format for output.
6 Advice, information, orientation.
7 Other (please identify):

(16) Identify the channels of information between your system and the others, basing your reply upon the following list:
1 We sent somebody to visit the other system.
2 We sent somebody to work temporarily on the other system.
3 We hired somebody who had worked on the other system.
4 The other system sent somebody here to visit or consult.
5 The other system sent documents or programmes.
6 Other (please identify):

(17) Have other institutions requested information about your system?

| NO; DON'T KNOW | YES |

(18) Please estimate how many such requests you have received, selecting one of the levels listed below:
1 1 - 3
2 4 - 9
3 10 - 19
4 20 - 40
5 More than 40.

(19) Has your automated system influenced any other system?

| NO; DON'T KNOW | YES |

(20) Please identify and locate up to three
of the systems which were influenced by your system.

(21) Identify the elements which other systems took from you, basing your reply upon the following list:
1. Everything or nearly everything.
2. Format or input form.
3. Flowchart.
4. Programmes.
5. Format for output.
6. Advice, information, orientation.
7. Other (please identify):

(22) Identify the channels of information between your system and the others, basing your reply upon the following list:
1. We sent somebody to visit or consult on the other system.
2. We sent somebody to work temporarily on the other system.
3. The other system hired somebody who had worked here.
4. We sent documents or programmes to the other system.
5. The other system sent somebody here to visit.
6. The other system sent somebody to work temporarily here.
7. Other (please identify):

(23) Does your system use data prepared by another system?

NO

YES

(24) Please give a brief description of this process.

(25) Is the data produced by your system used by another system?

NO

YES

(26) Please give a brief description of this process.
(27) Was your bibliographic format influenced by any other format?  
NO  
↓  
(28) Which format?  
YES  
↓  
(29) Does your bibliographic format impose any limit to the number of characters which can be used to represent author, title, etc?  
(30) Please identify the computer used by your system.  
(31) Where is this computer located?  
(32) Please identify any equipment, such as terminals or data collection devices, located within the library or bibliographic information system.  
(33) Identify the programming languages used by your system.  
(34) Please identify the most important problems involved in the use of the computer in this library or bibliographic information system.  
(35) Please identify the most important motives for the use of the computer in this library or bibliographic information system.  
(36) Please identify the most important results of the use of the computer in this library or bibliographic information system.  
(37) Does your institution maintain a collection of books and periodicals?  
NO  
↓  
YES  
↓  
(38) How many books do you have?  
(39) How many did you acquire last year?  
(40) How many did you purchase last year?  
(41) How many periodical titles do you hold?  
(42) How many did you receive last year?  
(43) How many did you subscribe last year?  

7.2.2. General questions on automated processes.  

Note: This part of the interview may be repeated various times to collect data on different processes within the same institution.  

(1) Institution  
(2) Subsystem  
(3) When did this subsystem begin to operate?
(4) Was this process previously done manually?
   NO; DON'T  YES
   KNOW

   (5) Please give a brief outline of the manual system.

   (6) What advantages does the automated system offer over the manual?

(7) How many months did it take to plan and put into operation this subsystem in its automated form?

   Note: The following questions deal with the operational aspects of this automated subsystem. Please base your replies on its operation at this moment.

(8) What method of data input is used?

(9) How often is data input to the computer?

(10) How many bibliographic entries are stored in machine-readable form?

(11) What method of data output is used?

(12) How often is data output by the computer?

(13) What are the products of the subsystem?

(14) How many transactions or operations are processed annually?

(15) How many people use this subsystem?

(16) Has this subsystem been extensively modified since it began to be processed by the computer?
   NO; DON'T  YES
   KNOW

   (17) Please give a brief outline of these modifications.

(18) Are there plans to modify this subsystem within the next two years?
   NO; DON'T  YES
   KNOW

   (19) Please give a brief outline of these modifications.

   Note: If this subsystem is amongst those listed below, please reply to the specific questions indicated:

   Acquisition of books and similar materials (question no. 20)
Routine cataloguing of books and similar materials (no. 21)
Circulation control (no. 22)
Selective dissemination of information (no. 23)
Bibliographic data base with retrospective search capability (no. 24)
System to produce indexes or printed catalogues for external use (no. 25)

7.2.3. Specific questions on automated processes of special interest.

(20) Acquisition of books and similar materials.
Please comment upon the operation of this subsystem, in relation to the factors listed below. If this subsystem was previously manual, compare the performance of the manual and automated systems.

a) Claims for items which are late arriving.
b) Amount of paper documents produced.
c) Speed with which orders are sent out.
d) Amount of information available on items ordered, but which have not yet arrived.
e) Number of personnel required for acquisition.

(21) Routine cataloguing of books and similar materials.
Please comment upon the operation of this subsystem, in relation to the factors listed below. If this subsystem was previously manual, compare the performance of the manual and automated systems.

a) Number of locations where the catalogue can be consulted.
b) Time required to catalogue books.
c) Use of the catalogue by readers.
d) Ease of consultation of the catalogue.

(22) Circulation control.
Please comment upon the operation of this subsystem, in relation to the factors listed below. If this subsystem was previously manual, compare the performance of the manual and automated systems.

a) Claims for overdue items.
b) Amount of information available about items on loan.
c) Number of personnel required for circulation control.
(23) Selective dissemination of information.
   a) How does the institution inform potential users of the service?
   b) How is the users first profile formed?
   c) How are profiles updated or improved?
   d) Is there a charge for the service?
   e) What is done to assure the user access to original documents?

(24) Bibliographic data base with retrospective search capability.
   a) How does the institution inform potential users of the service?
   b) Who fixes the search parameters?
   c) Who operates the terminal?
   d) Is there a charge for the service?
   e) What is done to assure the user access to the original document?

(25) System to produce indexes or printed catalogues for external use.
   a) How is this publication arranged internally?
   b) How many copies are produced?
   c) Is there a charge for this publication?
   d) How is this publication distributed?

7.3. Attitudes and experience in the automation field: users.
text of a guided interview with senior staff of institutions which use computers.

7.3.1. Attitudes

(1) What, in your opinion, are the most important problems in the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than ten alternatives from the list below:
   1 Few libraries or bibliographic information systems have experience of the computer.
   2 The level of activities in libraries or bibliographic information systems does not justify the use of the computer.
   3 Little information is available about computer use.
There is a lack of librarians with experience with computers.
There is a lack of persons from the field of computing with experience in libraries or bibliographic information systems.
There is a lack of opportunities for education or training.
Utilization has a low priority amongst the objectives of libraries or bibliographic information systems.
It is difficult to obtain financial resources.
It is difficult to obtain appropriate programmes and bibliographic formats.
There is a lack of official guidelines and government policy.
Librarians are afraid of the computer.
There are attempts to introduce the computer without adequate planning.
Requirements are so varied that it is necessary to plan from the beginning in each library or bibliographic information system.
Brazil attempts to copy foreign models, inappropriate for its reality.
There is a lack of consultants with experience in this field.
There is a lack of prepared systems which can be purchased and installed immediately.
There is a lack of library networks or cooperation between bibliographic information systems.
It is difficult to obtain access to a computer.
The level of libraries and bibliographic information systems in Brazil does not yet permit the computer to be effectively used.
There is a lack of an institution which disseminates bibliographic data on recently-published books in machine-readable form.

(2) Is there any other important problem?
NO
YES

(3) Please identify this problem or problems

(4) What, in your opinion, are the most important motives for the use of the computer in libraries or bibliographic information systems in Brazil? In this case please select not more than five alternatives from the list below:
(1) Because manual methods can no longer keep up with the quantity of work.
(2) To gain experience with processes which use the computer.
(3) To use an available computer.
(4) To improve the image of the library or bibliographic information system.
(5) To increase productivity.
(6) To improve service to users.
(7) Because persons in authority over directors of libraries or bibliographic information systems want to introduce the computer.
(8) Because directors of libraries or bibliographic information services want to introduce the computer.
(9) Because librarians want to introduce the computer.
(10) Because the users want libraries or bibliographic information systems to use the computer.

(5) Is there any other important motive?

NO  YES

(6) Please identify this motive or motives.

(7) What, in your opinion, are the most important results of the use of the computer in libraries or bibliographic information systems in Brazil? Please select not more than five alternatives from the list below:

1. Librarians are freed from large quantities of routine work.
2. An improvement in the image of the library or bibliographic information system.
3. Better services are offered to users.
4. Productivity increases.
5. There is an increase in cooperation between systems.
6. Libraries or bibliographic information systems bring their work up to date.
7. New services are offered.
8. Information is processed more rapidly.
9. There is little change in libraries or information systems.
10. Money is saved.
(8) Is there any other important result?

[NO] [YES]

(9) Please identify this result or results.

(10) In your opinion, which of these alternatives would be most effective in informing Brazilian professionals about the use of computers in libraries or bibliographic information systems?
Please select not more than five alternatives from the list below:
1. Courses in Brazil, given by Brazilian teachers.
2. Courses in Brazil, given by teachers from North America or Europe, with simultaneous translation.
3. Opportunities to study in North America or Europe.
4. Study tours of relevant installations in Brazil.
5. Study tours of relevant installations in North America or Europe.
6. Translation into Portuguese of relevant documents, originally published in North America or Europe.
7. Consulting by Brazilian experts.
8. Consulting by experts from North America or Europe.
9. Stimulation of the production of further relevant documents, written by Brazilians.
10. Better access to documentation already published in North America or Europe.
11. Other (please identify):

(11) Imagine that you are director of a large Brazilian library.
Which of these activities would you give priority? Please select not more than five alternatives from the list below:
1. Selection and acquisition of books.
2. Cataloguing and classifying of books.
4. Use of audio-visual media.
5. Use of the computer.
6. Reference and information services.
7. The periodicals collection.
8. Indexing of periodicals.
9. Cooperation with bibliographic information systems which use the computer.
10. Cooperation with other libraries.
11. Other (please identify):
(12) In your opinion, what percentage of major Brazilian libraries will use the computer regularly in ten years time? Please select one alternative only from the list below:

1. 0 - 25%
2. 26 - 50%
3. 51 - 75%
4. 76 - 100%
5. Impossible to forecast

(13) What, in your opinion, has been the influence of the computer on libraries and bibliographic information systems in Brazil up to now? Please select one alternative:

1. Highly positive
2. Positive
3. Neither positive nor negative
4. Negative
5. Highly negative
6. Impossible to evaluate

(14) In the next ten years, what will be the influence of the computer on libraries and bibliographic information systems in Brazil? Please select one alternative:

1. Highly positive
2. Positive
3. Neither positive nor negative
4. Negative
5. Highly negative
6. Impossible to forecast

7.3.2. Experience and training.

(15) Please indicate the subjects of your academic degrees, identifying any foreign qualifications.
(16) Have you taken any course which deals with the use of the computer in libraries or bibliographic information systems?

NO

YES

(17) Please give the title of this course or courses, identifying any foreign courses.

(18) Excluding this institution, have you worked in any other library or bibliographic information system which used the computer?

NO

YES

(19) Please identify and locate these libraries or systems.

(20) Excluding the institutions where you worked, have you seen other libraries or bibliographic information systems which use the computer? You may include brief visits, systems demonstrated at conferences, etc.

NO

YES

(21) Please estimate the number of these systems, selecting one alternative from the list below:

1 1 - 3
2 4 - 9
3 10 - 19
4 20 - 40
5 More than 40

(22) Estimate the proportion of these systems which you saw in Brazil, selecting one alternative from the list below:

1 All in Brazil
2 Over 66% in Brazil
3 33% - 66% in Brazil
4 Less than 33% in Brazil
5 All overseas.

(23) Have you, in the last twelve months, read any documents on the use of computers in libraries or bibliographic information systems?
(24) Please estimate the number of such documents, selecting one alternative from the list below:
1  1 - 3
2  4 - 9
3  10 - 19
4  20 - 40
5  More than 40

(25) Estimate the percentage of these documents which was produced in Brazil, selecting one alternative from the list below:
1  All in Brazil
2  Over 66% in Brazil
3  33% - 66% in Brazil
4  Less than 33% in Brazil
5  All overseas

(26) If these documents included periodical articles, please cite the titles of three of these periodicals.

(27) Do you consider that your knowledge about the use of computers in libraries or bibliographic information systems was influenced by experience or developments in any foreign country?

(28) Indicate the country or countries which had most influence on you.

(29) Within the field of the use of the computer in libraries or bibliographic information systems, have you written an article, made a speech, taught a course or done anything similar?

(30) Please cite up to three such activities.
(31) How many years of experience do you have in libraries or bibliographic information systems which use the computer?

7.3.3. Identification.

(32) What is your name?
(33) What is your institution?
(34) What is your present function?
(35) Into which alternative does your age fall?
   1  25 or under
   2  26 - 35
   3  36 - 45
   4  46 - 55
   5  56 or over
(36) What is your nationality?
   1  Brazilian
   2  Other (please identify):
(37) What is your sex?
   1  Feminine
   2  Masculine

7.3.4. Comments.

(38) If you wish to speak about any other aspect of the use of the computer in libraries or bibliographic information systems in Brazil, please make your comments now.

7.4. Attitudes and experience in the automation field: non-users: letter and postal questionnaire sent to senior staff of libraries which did not use the computer.

7.4.1. Letter:

The Library Director

Dear Sir,

I am a lecturer in the Department of Library and Information Science of the Federal University of Paraiba, and I am
preparing my doctoral thesis on "Automation of library and bibliographic information systems" for the University of Loughborough, England.

As part of my research I applied an attitude test about automation to key personnel who work in libraries or information systems where the computer is already used. Such research could, of course, give a false impression of the Brazilian situation, because most libraries do not yet use computers. I therefore wish to apply the same test in libraries where computers are not being used. For the purpose of this research, I consider that a library uses computers when it has a process, such as cataloguing, circulation or acquisitions, totally automated; collaboration with an automated information system (Medline, Agris, Ibict's union catalogue of periodicals) is not considered computer use. I believe that your library does not yet use computers, and therefore request your help.

I enclose two questionnaires: I would be grateful if they could be completed by professional librarians in senior posts in your library. The form can be completed by ticking the appropriate boxes; it is also totally anonymous. Please return the questionnaires in the stamped, addressed envelopes enclosed.

I will be very grateful for your cooperation in this simple task, which will take a few minutes of your time but which will be of great assistance to me. My thesis will identify the problems caused by automation and the opinions of non-users will help to define these problems with greater precision. The results will be published and will assist Brazilian library planning in the future.

If, however, your library already has a process (such as cataloguing, acquisition, circulation) totally automated, please pass the enclosed questionnaires to a library without automation. Please also write to me, requesting a copy of the special questionnaire for automated libraries.

Thank you for your help,

Yours sincerely

Cavan McCarthy
7.4.2. Questionnaire:

Note: The attitude test questionnaire, as applied to non-users, used the same text as that applied to users and translated in section 7.3. above. For that reason it has not been repeated here. The attitude test consisted of questions 1 - 14; users responded verbally to a further 24 questions, but in the postal questionnaire sent to non-users these 24 questions were reduced to the two questions below. They were lettered A and B to distinguish them:

A If you have taken any course in the use of computers in libraries or bibliographic information systems, please state the title of the course. Please also state where you took the course. Note: Omit courses which dealt only with the computer, programming or systems analysis; only list courses which combined elements of computing with librarianship or information science.

B Please use the space below for any other comment you consider relevant.

7.5. Computer use in institutions which could not be visited: letter and postal questionnaire requesting information.

7.5.1. Letter:

The Director

Dear Sir,

I teach in the Department of Library and Information Science of the Federal University of Paraíba, and am preparing a doctoral thesis on the "Automation of libraries and bibliographic information systems in Brazil" for the University of Loughborough, England.

To prepare this thesis I have already visited thirty relevant institutions, in Brasilia, Rio de Janeiro, São Paulo and the Northeast. Unfortunately, limitations of time and funds and the geographic size of Brazil do not permit me to visit all relevant
institutions. For this reason I am using the post to communicate with institutions which I am unable to visit but which, apparently, use computers.

This research is a significant pioneer study for Brazil, and will survey the most significant libraries and bibliographic information systems which use computers, identify and rank their major problems and formulate suggestions to facilitate future automation. The results will be translated into Portuguese and published in Brazil, producing a valuable document which will publicise the achievements and pioneering activities of the first Brazilian institutions to use computers.

I have been informed that your institution uses computers; if this is so, I would be grateful if you would participate in this stage of the research. Please send me examples of the documents used and produced by your automated system, and please also reply to the questions on the attached questionnaire. Using these samples and responses, I can include your system in my research. Further details are contained in the questionnaire.

This stage of my research only includes institutions where some library or bibliographic information system process is fully automated at the moment. I am not interested in projects or plans, only in what actually exists and operates now. If your library has no process operating on the computer at this moment, please ignore this questionnaire, or pass it to an automated library.

Many thanks,

Yours sincerely,

Cavan McCarthy
7.5.2. Questionnaire:

Note: The original questionnaire left spaces for respondents to note their replies. Such spaces have been suppressed in this translation.

1 IDENTIFICATION
1.1 Name of library
1.2 Address
1.3 Name of the person responsible for completing the questionnaire
1.4 Position held by the person responsible for completing the questionnaire
1.5 Number of books
1.6 Number of periodicals
1.7 Number of users
1.8 Computer used

2 GENERAL PROBLEMS
2.1 What were the most important motives for the automation of your library?
2.2 What were the most important problems in the automation of your library?
2.3 What were the most important results of the automation of your library?
2.4 What were the other systems or bibliographic formats which influenced your system most?

3 SAMPLES
In this section it is not necessary to reply to questions.
3.1 Select samples of the documents used in your automated systems. It is especially important to include samples of input forms, and of system products such as printouts, cards, catalogues, reports, etc. They can be either originals or copies, as long as they are sufficient to give the researcher a clear idea of how the system operates. Internal manuals, if they exist, are of major importance.
3.2 If your library has more than one automated system, please group the documents according to the different systems, clip
SPECIFIC QUESTIONS

Please reply to the questions which are relevant to the automated systems of your library.

ACQUISITION

4.1.1 What year was acquisition automated?
4.1.2 How many books were purchased by the automated acquisition system in the last twelve months?

CATALOGUING

4.2.1 What year was the catalogue automated?
4.2.2 What is the total number of books that have been catalogued by the automated system?
4.2.3 How many books were catalogued by the automated system in the last twelve months?

CIRCULATION

4.3.1 What year was the circulation system automated?
4.3.2 How many loans were made by the automated system in the last twelve months?

INDEXING

4.4.1 What year was indexing automated?
4.4.2 What is the total number of entries in your automated index?
4.4.3 How many periodicals are examined for indexing?

COMMENTS

Please use the space below for any additional information which you consider relevant to a description of your automated system.

7.6. Letter requesting information on developments between the field study and the defence of the thesis.

The Director

Dear Sir,

As you will remember, I visited your institution in 1980, while collecting data for my doctoral thesis on "The automation of libraries and bibliographic information systems in Brazil". On that occasion I interviewed ... (the name of the person interviewed and
the main automated systems were noted here).

This thesis, for the University of Loughborough, England, is almost complete; it will include brief descriptions of the automated activities of each relevant institution. Naturally, these descriptions will be based on data collected in 1980, and in some cases may be already out-of-date. I would therefore be very grateful if you could inform me of any important developments or changes which might have occurred in your system since 1980.

Yours sincerely,

Cavan McCarthy

7.7 List of persons interviewed during the field study.

CIMEC: Carlos Shigueo Namura; Paulo Frederico da Silveira Penna; João Carlos Angelini. BINAGRI: Yone Chastinet; Paulo Roberto A. Lobo. EMBRAPA: Ubaldino Dantas Machado; Milton A. Nocetti; Charles Mettel; Quazi Khallur Rahaman; Evanir Pimenta Figueiredo; Carlos Henrique Bôto Góis. PRODASEN: Silvio Ary Romaz Nunes; Maria Eliza Nogueira Loddo; Maria Lúcia Lemos. CAMARA: Heris M. Joffily. MINTER: Neuza Dourado Freire. UnB: Maria Josefa Marins Gradim. BIREME: Luíza Maria Rodrigues Cepeda; Ofélia A. Sepulveda; Maria Helena Piegas. FO/USP: Ceres Werneck da Silva. TAUBIP: Rosa Maria Barbero Fischetti; Miriam Salvadore Nascimento; Alfredo Américo Hamar. IPEN: Terezine Arantes Ferras; Irene Josefa de Sousa. IF/USP: Ronice Albamonte Arruda. IPT: Mari Katayama; Maria Aparecida Machado. USP/SC: Norma Machado Porcimunca. INPE: Hulda Olail de Carvalho; Arry Carlos Buss Filho; Iberê Teixeira. IBICT: Jairo Queiroz Pereira; Themis Victory Ferreira Gomes; Isaura de Souza; Rita de Cassia Monteiro de Castro. UFRJ: Maria de Fatima Pereira Raposo; Marcos Roberto Borges. PETROBRAS: Rosemary Salgado. CIN: Julio Cesar Rausch; Gilda Gama de Queiroz. FGV: Nezeth Lazara Cohen; Eugene Decourt. DNER: Maria Inez Maranhão Gomes Ferreira; Phillipe Damian. ELETROBRAS: Antonella Ferrazi; Maria Marta Reis. PUC: Rosane Teles Lins Castilho. SERPRO: Ivete Vasconcellos de Souza;
Note: As mentioned in the preface, this bibliography uses the Brazilian style of entry. This means, for instance, that periodical articles are entered in the format: AUTHOR. Title. Periodical title, vol. (issue): pages, date; therefore 10(4): 139-48 refers to vol. 10, issue (or fascicule) 4, pages 139-48.


ANTES de começar a fabricar computadores, a Digirede aprendeu... Veja, (693): 60, 16 dez. 1981.

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