INVESTIGATIONS OF THE LIBRARY USAGE AND INFORMATION NEEDS OF CLINICAL MEDICINE AND RELATED DISCIPLINES

by

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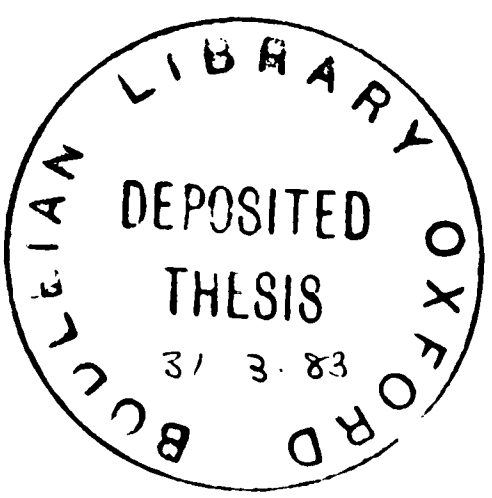
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Investigations of the library usage and information needs of clinical medicine and related disciplines

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ABSTRACT

The relationships between medical libraries and the main users of medical information in the teaching hospitals and University departments in Oxford is examined. Systems ideas are used to define the sort of model or picture of the users that a library manager needs in order to provide the appropriate services, and to provide a formal means of incorporating users and their information needs into a management control system.

Data were gathered by several methods and combined into a rich picture of the users and their information-seeking behaviour. The systems methodology developed by Checkland at the University of Lancaster was used to test this rich picture and link it with monitoring for library effectiveness. Application of the Checkland methodology was a crucial step which shifted the emphasis of the project from quantitative to conceptual modelling.

The methods of data collection and the results are described as the User Survey. The following techniques were used: questionnaires, semi-structured interviews, direct observation, feedback forms (a critical incident technique), a reference tracing experiment and analysis of existing library records. The data gathered by those methods presented a consistent picture in which the nature of the users' work, ie research or clinical practice, was the dominant influence on information-seeking patterns.

Application of the Checkland methodology and the conceptual models derived from it are described as the Systems Study. This revealed that the formal processes for monitoring and control expected by the conceptual models did not appear in identifiable form in the real world. Further examination showed that a detailed description of the library function was necessary and that this statement could be used to generate performance criteria. In addition, the rich picture from the User Survey was found to be a fair representation of reality. Conclusions for systems thinking, user studies, library managers and medical librarianship are presented.

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CHAPTER 1 - INTRODUCTION

THE SYSTEMS STUDY

This work is a systems study looking at the present relationships between medical libraries and the main users of medical information in the teaching hospital and University departments in Oxford. The underlying philosophy is that library and information services must be organised to suit the users and not the converse. The outcome of this study will be of specific interest to library managers in the medical field. However, it also has wider implications for systems practice since it represents an extension of a particular systems methodology as a research tool.

Like those of many management roles, a library manager's brief is often clear but unhelpful, i.e. provide the *appropriate* library and information services to suit user *needs*. The exact interpretation is left to the manager's discretion. To be able to make judgements he must hold, consciously or unconsciously, some views about the users he is serving. These views are usually gained intuitively through experience and may be outdated or biased. This study uses systems ideas to make explicit the sort of model or picture of the users that a library manager might maintain in order to provide them with the appropriate services; and further, it attempts to provide some formal means of incorporating the users and their needs into management control. In other words it is an attempt to contribute to library effectiveness.

Such work may finish up by stating the obvious and the course of the thinking may appear rational and unremarkable with hindsight. Its value lies in the way the ideas have been conscientiously explored and teased out. The outcome is a product of research and, as such, is quite distinct from anecdotal evidence or the weight of opinion stemming from experience. Nevertheless, it should be meaningful to library

managers since it is based on current practice.

The study was not originally conceived in the way that has just been described. It began as a user survey with some suggestions for development in a second stage. In fact the whole project was suddenly viewed in a new light, and the User Survey became incorporated into the wider Systems Study. A description of how this came about is given below.

THE USER SURVEY

The investigation was limited to the main users of information in the medical field in Oxford University. The main users were taken to be staff in the Oxford teaching hospitals and the five pre-clinical science departments. 'Medical information' refers to recorded knowledge which is usually available in libraries; patient records and correspondence are excluded.

The aims of the survey were (i) to study the patterns of use of medical libraries and library services; and (ii) to identify the expressed information needs of University and National Health Service (NHS) staff in the clinical and pre-clinical departments in Oxford. The overall objective was to contribute to the design of a library network covering these subjects in a multi-site teaching environment. It was based on the premise that understanding the user/library relationship is essential to effective management.

This study started in 1978 at a time of growing concern over the lack of factual evidence about the use of medical information and a call for further research in the area. 1978 also saw the establishment of the Medical Information Review Panel by the British Library Research and Development Department (BLRDD) '*to identify problem areas in the provision of medical information, to determine their research order of priority, and to recommend how such problems might be tackled.*'[1] The Review Panel used a report commissioned by BLRDD as a Working Paper. This report by Ford[2] on

the use of medical literature was a broad-ranging, superficial survey of the field intended as a background for planning research and development. It can be contrasted with the present study which is a much more intensive survey of a limited population in one location. The Clinical Librarianship Project[3] at Guy's Hospital also began in 1978 and is closely related to the present study. In the Guy's project two qualified librarians were attached to a medical and surgical team with the functions of identifying and meeting the information needs of medical practitioners within the practitioners' working environment.

In the present survey answers were sought to questions such as: Who exactly are the users of medical information? Do user characteristics such as seniority, type of work, subject of work and location affect library use and information need? Why is information needed? How do users get references to published documents? Which libraries are used, how are they used, and for what purpose? How effective are these libraries at providing services and how effective do the users perceive them to be?

Several complementary methods of data collection were used in a co-ordinated design intended to give a richer picture than could be obtained by any one method used alone. The methods were: semi-structured interviews, questionnaires, feedback forms, direct observation, a reference tracing experiment, and analysis of library records. These different types of data offer different perceptions of library use. For example, questionnaire and interview responses give the user's considered view of library services with the interview giving greater opportunity for the user to elaborate and explain his responses. In contrast, feedback forms completed when leaving the library give his immediate responses. Observation provided the researcher's view of user activities in a library. Library statistics describe the demands of the population as a whole as seen by the librarian. Observation, feedback forms and the reference tracing experiment identify some of the specific incidents which together contribute

to the users view of the library.

The data can also be differentiated according to the type being sampled. Questionnaire and interviews require a sample of users opinions; observation and feedback forms require a time sample of library activity, or of events in the library; the reference tracing experiment uses a sample of references - or of a particular type of event; and library records are based on events in the library classified by type.

DEVELOPMENT OF THE SYSTEMS STUDY

The User Survey was the first stage of this study. Originally it was envisaged that the second stage would concern the design of a library network[4] and that some means of modelling of the library system would be involved. 1978/79 was spent on the Survey. Data collection and analysis continued throughout 1979/80 and 1980/81, meanwhile ideas for the next stage were being explored (see Appendix A1: Calendar of research activities). The study gradually moved away from formal networking towards a view that modelling could be used in some way to extract more information from the 'rich picture' which had been gained. The search for a suitable modelling technique extended into the areas of management science, systems analysis and operational research (OR). Initially thinking was in terms of RAND-style systems analysis, and decision tree and Systems Dynamics techniques were considered (see Appendix A2: Preliminary Systems Dynamics influence diagram). Such methods are characterised by the 'hard' approach which begins by defining the problem. It was felt unlikely that these methods would lead to an improved understanding of information need and library usage in the users' terms. In fact, it is doubtful whether this line of enquiry would have been followed without the discovery of a systems methodology devised by Professor Checkland at Lancaster University. This methodology adopts a 'soft' approach by explicitly recognising the difficulty of defining some problems and introduces the concept of 'human

activity systems'. These systems differ from, say, an order-processing system by containing human beings who are free to attribute meaning to their activities. The discovery and adoption of this methodology is now recognised as a *crucial* step which has shifted the emphasis of the study away from quantitative modelling of the use of library functions to conceptualising the sort of qualitative model or picture of the users that the library manager might maintain in order to provide them with the appropriate services.

ORGANISATION OF THE THESIS

Organisation of this thesis is complicated because the research spans many different subjects. In the format chosen the Systems Study (described in Section B) draws upon the User Survey (described in Section A), as opposed to integrating the survey evidence into the Systems Study. The User Survey is both a study in its own right and an essential part of a phase of the Systems Study.

The following format was adopted:

Introduction: (Chapter 1)

Literature Survey: (Chapter 2)

Section A: User Survey (Chapters 3 to 11) Chapter 3 contains the working definitions and additional information for placing the User Survey in context. The individual methods, results and conclusions are described in Chapters 4 to 10. Chapter 11 compares the data collected by these different methods and presents 'rich pictures' of three user types based on the Survey evidence.

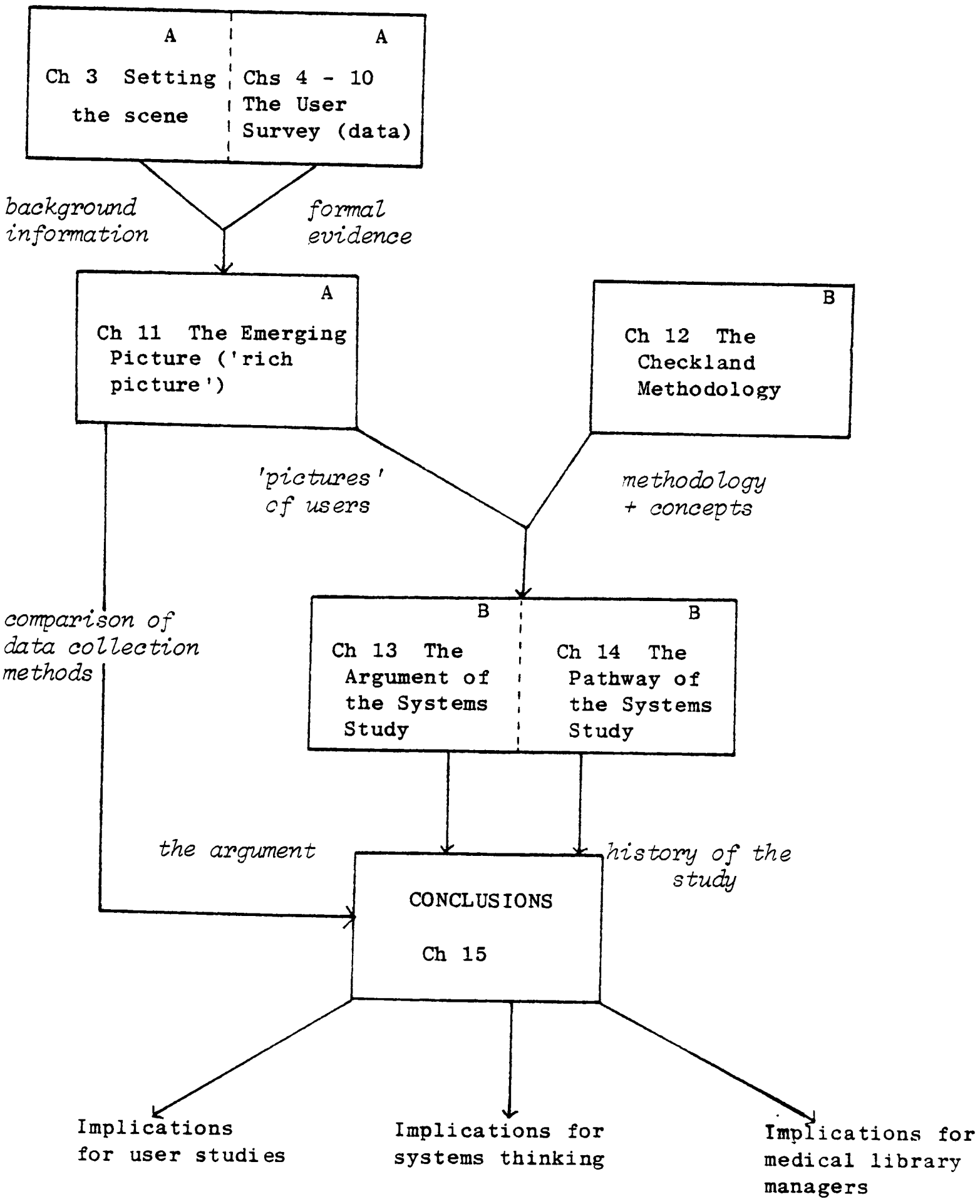
Section B: The Systems Study (Chapters 12 to 15) The Checkland methodology and systems concepts are described in Chapter 12. Chapters 13 and 14 contain the application of the methodology. The outline of the main argument is presented in Chapter 13 and a historical resumé is given in Chapter 14.

Conclusions: (Chapter 15) This chapter examines the implications of the research for systems thinking and the methodology, user studies and medical library managers.

Diagram 1 : Summary of the format of the thesis

INTRODUCTION - Chapter 1

LITERATURE SURVEY - Chapter 2



A = Section A : The User Survey

B = Section B : The Systems Study

CHAPTER 2 - LITERATURE SURVEY

This literature survey is a broad review of the many different aspects of the study. Of necessity, only selected references on each topic are included. The literature is reviewed under three headings: I - The Systems Approach; II - Library Management; III - User Studies.

I THE SYSTEMS APPROACH

The systems movement abounds with many interpretations of systems ideas [5]. This arises because these ideas have emerged in various forms from different disciplines and are used in such diverse areas as chemical engineering, psychology and economics. There is further confusion because the terms describing different branches of the systems movement, for example systems analysis and systems engineering, are not used consistently[6] and may even be interchangeable. Collections of seminal papers on the systems field have been reprinted in Buckley[7] and Beishon and Peters [5]. In this thesis the following terminology has been adopted:

A *systems approach* views the world as a complex of interacting systems and uses *systems thinking* to help in understanding the world and its behaviour. Systems thinking involves the use of *systems concepts* (ideas) and *systems methodologies* (frameworks for learning) and leads to the construction of models of the system, i.e. *systems modelling*.

THE SYSTEMS APPROACH

This is a particular way of thinking about a topic or problem that concentrates on interrelationships. It is characterised by the holistic[8] view i.e. the whole is more than the sum of the parts, as opposed to the elementarist view i.e. the total is the sum of the parts. This is

illustrated by Ackoff[9] in his definition:

> *'The systems approach to problems focuses on systems taken as a whole not their parts taken separately. .... there are some properties of systems that can only be treated adequately from a holistic point of view. These properties derive from the relationships between parts of systems: how the parts interact and fit together.'*

The systems approach is not an attempt to understand everything about a system, rather it tries to include all factors relevant to the topic or problem under consideration [10]; holistic criteria for deciding what to include and exclude are different from elementarist criteria. This leads on to a fundamental point made by many authors[5 9 11] that identifying systems is not a purely objective process since the purposes and interests of the researcher will be involved. A notion is implied by Churchman's[12] comment:

> *'The systems approach really consists of a continuing debate between various attitudes of mind with respect to society.'*

SYSTEMS THINKING

Systems thinking and analytical thinking are complementary[13 14] ways of understanding the world. Analytical explanations are quickly defeated by complexity because the appreciation of interconnections is lost. On the other hand, explanations in systems terms require the perception of some degree of order or interconnectedness in complex situations. Systems thinking is able to expose complexity and lack of understanding, then assist in making complex situations comprehensible through concentrating on these interrelationships.

SYSTEMS CONCEPTS

The fundamental concept is that of the SYSTEM. However, in spite of its widespread use no generally agreed definition seems to exist [5]. This may be partly due to confusion between a real-world system which actually exists and the concept of a system in a persons mind; the two are not necessarily the same. Boulding[15] classified systems according to a

hierarchy of increasing complexity which may be summarised as:

1. static structures, e.g. frameworks
2. simple dynamic systems, e.g. clockworks
3. self-regulating control mechanisms, e.g. thermostats
4. self-maintaining or open systems, e.g. cell
5. plant level systems
6. animal level systems characterised by self-awareness
7. human level systems characterised by self-awareness, language and symbolism
8. social systems characterised by communication and values
9. transcendental systems, e.g. unknowables.

The present study is concerned with level 8.

In a helpful discussion of properties of systems Jenkins[16] describes a system as a complex grouping of man and machine. This system can be broken-down into subsystems and is part of a hierarchy of systems. The subsystems contain transformation processes which convert inputs to outputs and the subsystems are interconnected since the output of one subsystem forms the input for another. In order to function the system must have an overall aim as there are often several conflicting objectives present.

SYSTEMS METHODOLOGY

Methodology must be distinguished from technique. The latter is a precise plan of action that will produce a standard result such as critical path analysis or linear programming as described in standard texts, e.g. Krajewski and Thompson[17]. A methodology is an explicit, ordered, non-random way of carrying out an enquiry[11].

Many systems methodologies originated from coping with industrial and military problems. These problems concerned engineering large complex systems where many components had to be brought together and many different activities had to be integrated in order to achieve a specific objective. Jenkins[16] outlines a methodology which could be geared to the building of a factory or a hospital. It comprises stages of systems analysis, systems design, implementation and operation; formulation of the problem or

objective is the starting point. RAND[18] systems analysis is an example of a methodology concerned with selecting between alternative ways of achieving a policy. Again, it begins with a definition of the objective, then considers various ways of achieving it. Costs and resources for each alternative are identified and the alternatives are modelled. Criteria for deciding amongst these alternatives are also developed.

Both the methodologies outlined above and the problems they are geared to are 'hard' in that their objectives are understood and can be defined as a starting point. They can be viewed as a search for an efficient means of achieving a known end. Checkland[11] argues that there is a fundamental difference between these problems and 'soft' problems because in the latter the end or what should be achieved is part of the problem. This is recognised in the familiar comment 'If I knew what the problem was I could do something about it'. It may even be possible to state the desired ends but, in contrast to 'hard' problems, these statements are too vague to be helpful in tackling the problem. This is the case in the present study where the library manager is concerned with providing the 'appropriate services' and the overall aim was 'to gain an understanding of the relationship between users and libraries'. Checkland devised a methodology[11] specifically geared to 'soft' problem solving. It explicitly includes human beings in the concept of human activity systems and allows for different points of view. Consequently, it appears to offer a promising route to an appreciation of the user library relationship which cannot be achieved through the harder methodologies. These hard methodologies tend to direct attention away from users and towards library functions where they can be applied more easily. They are better for looking at the means of achieving desired ends than for examining the ends themselves. Checkland discusses his ten years experience with the methodology in his new book[14] and Naughton[19] has produced a helpful guide to using the methodology.

SYSTEMS MODELLING [10]

This is a subjective process because no two people will look at any particular aspect of the world in exactly the same way. A systems model is a set of organised assumptions about a particular aspect of the world and the way it works which have been identified as a system. The purpose of the systems model can be predictive or descriptive[16]. Predictive models try to simulate reality in order to learn about consequences of possible events. Examples of these are Monte Carlo simulation[17] which is a technique for generating events in a way that closely approximates to their probability of occurrence, and Systems Dynamics which models variable demand. Oswitch[20] describes a study which used Systems Dynamics to model the impact of online bibliographic services on the U.K. library and information system. Descriptive models are used to learn about reality and provide insights into why the system behaves as it does. We shall be concerned with descriptive models in the present study.

II LIBRARY MANAGEMENT RESEARCH - EVALUATION, EFFECTIVENESS AND DECISION-MAKING

Evaluation methods and studies, and effectiveness concepts have been reviewed by Buckland[21], Swanson[22], Hindle and Raper[23], Bookstein and Kocher[24], and Du Mont and Du Mont[25]. Swanson[22] compares seven 'hard' methods such as operational research (OR), systems analysis, and cost-benefit analysis which all have definition, measurement and modelling phases. She points out that they are primarily intended for evaluation in terms of 'how' and 'how-well' something is achieved and not 'what' should be achieved. In a broader treatment, Du Mont[26] integrates different views of library effectiveness into a conceptual systems model. Du Mont and Du Mont[25] discuss effectiveness in various ways including (i) goal achievement as measured by contributions to patrons (e.g. Hamburg[27], see also Lyders[28] for an illustration of Management by Objectives); (ii) the degree of user

satisfaction (e.g. Lancaster [29], Tagliacozzo[30]); and (iii) the optimization of performance or efficiency (e.g. Burkhalter [31], Leimkuhler [32], Trueswell [33], Morse [34], Chen[35]). The difficulty of defining suitable criteria as performance indicators has been discussed at length [22] [36] [37]. It is a particular problem when using goal statements in that *'They do not yield criteria for evaluating alternative policies '*[27]. *'Goal statements do not shed light on the relationship between means (library processes) and ends (the contribution of a library to its users) '* [25]. The 'hard' approach has resulted in many studies where quantifiable criterion measures are readily available or where qualitative measures can be converted to quantifiable equivalents relatively easily. This may be achieved through arbitary scoring often used in cost-benefit analysis, e.g. the BASYC study [38], or through use of surrogates such as Meier's[39] 'item-use-day' measure for adequacy of the collection, or Hamburg's[40] 'document exposure' measure for value of documents to users. *'It is important that intermediate measures should be defined in a way that reflects their relevance to overall system performance '*[41].

The evaluation process is an integral part of the decision-making process[42] and assessments gained from evaluative studies form part of the information needed by library managers to support decision-making. Hamburg's[27] conceptual model of the library management system illustrates the relationships between these elements in preparation for a design of a statistical information system to support planning, decision-making and evaluation in a PPBS (programming-planning-budgeting system) context. Management Information Systems (MIS) were reviewed by Weiss[43] and Leimkuhler [44]. Chorba & Bommer[45] discuss decision support systems and describe the next stage of their study where information elements will be evaluated by asking library managers to rate the information in respect of its value in decision-making in each key objective area.

The following three systems studies are notable for their attempt

to include user values and illustrate the different approaches that can be used:

Raffel & Shishko[46] (application of cost-benefit analysis in MIT libraries): PPBS was used to get a list of 20 library alternatives with associated costs and benefits. However, more information was needed to make selections at an operational level. In an attempt to ascertain the value which users assign to different services the users were given the list and asked to make their own allocations at three different budget levels. Three user groups with conflicting preferences were revealed. The authors[47] explored this conflict by political analysis based on Easton's[48] conceptual framework. No clear-cut decision rule emerged, instead a list of questions that a library manager should be addressing was obtained. Political analysis could not offer any guidance on the course of action once these questions were answered.

University of Lancaster[49 50] (simulation of loan and duplication policies): an instant diary survey was used to find out the factors which frustrate users when seeking documents and to assess the relative importance of these factors. Borrowing was the main cause of frustration so the borrowing process was simulated and the effects of different loan and duplication policies explored. As a consequence the library implemented a variable loan policy designed to increase satisfaction level and reduce collection bias. In addition, the impact of alternative binding policies on the users was evaluated using the frustration survey evidence.

PEBUL[51] (Project for Evaluating Benefits from University Libraries): this study used the inverse linear programming method to find out what benefit estimates or quantitative values lie behind decisions which have already been taken. It incorporated user and library manager views in two separate models. One, a psychological model of the decision process lying behind user behaviour based on extensive surveys of users, which was used to deduce the value of the different services to the user. Two, a resource-

allocation model was based on current library policy and used to deduce the criteria implicit in the initial policy choice.

It is easy to overlook that a researcher's own values influence the way cost/benefit measures are weighted [25]. Bommer[52] suggests that there has been too much emphasis on the product i.e. the quantified model and not enough on the process of understanding. Careful conceptualization is a prerequisite of quantitative studies. This is illustrated by Martyn & Vickery's[53] abandoned attempt to develop a decision tree model of information systems which foundered in complexity when displaying the alternatives to be quantified. Baker's library/user/funder descriptive model was used as a basis by Nance[54] in an Industrial Dynamics study. The conceptual model used in the current work on Systems Dynamics at University College, London, is described by Oswitch [55].

Reviewing ten years progress in quantitative research Buckland[56] notes that useful developments have been limited in the areas of definition of library objectives and the dynamics of user behaviour. He confirms the belief that traditional OR techniques do not lend themselves to these areas and states *'The most difficult problem area is identifying what the problem is and in structuring it in a form that is both tractable and acceptable. It is here that most help is needed.'* In other words, an ideal candidate for Checkland's soft-systems methodology for problem-solving.

III USER STUDIES

There is an enormous amount of literature on user studies and information-seeking behaviour which spans 30 years of endeavour and has been reviewed by Wood[57] (coverage 1966-1970), Waldhardt[58] (1964-1973), Fabisoff and Ely[59] (1965-1974), Ford[60] (1964-1977). Chapters in the Annual Reviews of Information Science and Technology (ARIST)[61] also illustrate the varied approaches that can be adopted.

INFORMATION NEED AND INFORMATION-SEEKING BEHAVIOUR

Information-seeking behaviour stems from the recognition of some need perceived by the user [62]. The resulting behaviour may take several forms including recourse to a formal information system such as a library where it is visible as demand on or use of the services. The difficulties of defining information need and the related concepts of use and demand have been dealt with by several authors [63] [64]. An information need may be unperceived, perceived but unexpressed, or expressed. In some cases demand and use may be synonymous with expressed need but demands do not necessarily represent needs [65]. Sheth[66] describes a conceptual model of information-seeking behaviour based on the marketing approach.

An investigation of information-seeking behaviour (of which the present study is largely an example) will yield evidence which may help in the redesign of existing formal information systems so that they are more efficient or more effective. Wilson[62] distinguishes this approach from a study into information need that sets out to investigate why the user decides to seek information, what purpose he believes it will serve and to what use it is actually put when it is received.

Factors Influencing Information-seeking Behaviour

The foundations of user studies were laid in 1948 in Bernal's [67] classic questionnaire survey of research scientists which established that different identifiable user groups exist with different identifiable patterns of information need. 20 years later Paisley[61] criticised user studies for shallow conceptualization and suggested the following areas should be considered:

1. The full array of information sources that are available.
2. The uses to which the information will be put.
3. The background, motivation, professional orientation, and other individual characteristics of the user.
4. The social, political, economic, and other systems that powerfully affect the user and his work.
5. The consequences of information use.

However, even Paisley admits the impracticability of coping with all

these areas in a single study. Gradual cumulation of work has established the following as important factors influencing information-seeking behaviour:

1. Total information sources

Some studies, e.g. Barker & Rush [68], INFROSS [69], and Rosenburg[70] have looked at the relative importance/preference/use of the full range of information sources available to the user. Libraries and information services are recognised as only one type of source which also encompass meetings, colleagues and the media.

2. Accessibility and ease of use

Several studies[70 71] have shown that these factors are primary criteria for selection of an information source and information seeking is guided by the principle of least effort [72]. This is expressed succinctly by Line[73] as:

> *'Given the choice of going next door with a small probability of obtaining relevant information or indeed much information at all, and walking a hundred yards with a much higher probability of success and quality, people go next door.'*

3. Personal characteristics

Various personality characteristics such as motivation and introversion/extroversion[60] may be involved as well as factors such as age and experience.

4. Work-role

An excellent discussion is given in Wilson [62]. Work-role and its context seem to be the most relevant factors when considering specialised information services and these are explored in the present study. Work-role is the agreed function of an individual within an organizational setting and it is fulfilled by performance of specific tasks and activities. An individual has many identifiable roles and seeks information for different purposes. He may apply different criteria and adopt different information-seeking behaviours to suit each role [60 74].

Work-role is affected by context such as: (i) the organisational environment [75], i.e. the nature of the institution, the structure within it and its influence on information flow; (ii) the physical environment, i.e. layout, geographical location, type, e.g. laboratory or office; (iii) the social/professional environment which concerns the common attributes of group members, e.g. similar training and background of a profession or the particular way in which the knowledge of a discipline is organised. There will also be political, economic and cultural aspects. Werner[76] includes a useful analysis of characteristics:

Task	:	organisational diversity, organisational level, operations - knowledge orientation of the task, phase of project
Person	:	educational level, professional orientations, professional status, organisational seniority
Professional Environment	:	operations - knowledge of field, concentration of work in field, rapidity of changes
Organisational Environment	:	operations - knowledge of organisational goals, security orientation of the organisation, perceived constraints upon resources.

VALUE

Brittain[77] points out that:

> *'It is no longer regarded as satisfactory merely to satisfy the stated information requirements of the user; it is necessary to make sure the information is of value in the solution of problems and the development of scientific expertise.'*

However 'value' cannot be assessed easily because it is subjective and changes with circumstances. The examination of the activities, e.g. research, teaching, giving rise to information need and hence the contribution of information to those activities, is fraught with political difficulties [60]. Wills and Oldman[78] developed a measure, 'derived value', of benefit of the library to the community. They defined derived value as the difference between what was expected of a library and what was perceived as actually happening when it was used.

RESEARCH METHODOLOGY AND TECHNIQUES

There are many general descriptions[79] [80] of advantages, applicability and problems of survey methods and experimental designs. Line[81] and Ford[60] wrote accounts specifically for information researchers. The present study combined several techniques in recognition that each method has its limitations and problems. This approach was recently advocated by Brenner [82], and had been used to some extent in Projects INISS[83] and INFROSS[69] and by Dougherty and Blomquist [84]. The six techniques (questionnaires, interviews, feedback forms, record analysis, reference tracing and observation) of the present study were chosen after examination of examples in the literature.

Parker and Paisley[85] reviewed methods of investigation, examples of questionnaire and interview schedules abound [86] [87] and the principles of good practice are well documented [88] [89] [90]. The critical incident approach was used effectively in several studies [87] [91] [92]. It requires the respondent to focus on a particular event and answer in terms of that event, thus minimising the effects of memory and the tendency to over-emphasize unusual events. The feedback form used in this study combined this approach with a procedure used by Port[93] where all library users were interviewed at different times of day to ascertain their status and what they were using in the library. Library records were analysed in the present study to compare with and verify data from the other methods. This contrasts with most reported studies where records are analysed in isolation for management-type information [94] [95] [96].

The two other methods used in the present survey deserve more detailed treatment:

Reference Tracing Experiment

The method used in this study is a type of failure survey examining incidents where documents are not found on recourse to the library service, the cause of failure and the subsequent action taken by users. An

alternative way of using document availability to measure library effectiveness is Orr's[97] document delivery test. This test assesses the library's ability to supply items on a set list of references. There are several variations of the failure survey, e.g. users can be asked to complete failure slips which are analysed later[98] or checked immediately [99] [49], users' intended action after failure may be ascertained[100] and users' subsequent action can be followed [101]. Failure surveys are not restricted to document availability, e.g. Lipetz'[102] study on catalogue use. The main drawback of the failure survey is that it cannot show how success rate reflects the users expectations of using the library [99].

Line[101] used a mixture of document delivery and failure methods: users were asked to note the references they wanted to look up as they came across them and keep a record of their action in finding the document. The present reference tracing method was similar in that users' computer search printouts provided personalised reference lists. Unwanted references were filtered out at the start of the experiment following Harley's[103] 'Useful Paper Concept' where users were asked which references they intended to read. Lantz[104] discusses the problems of finding out later how many documents are actually read.

The failure studies described above contain elements of availability and accessibility. Availability is closely bound up with and often confused wit accessibility. In this thesis 'availability' is taken to be an all or none concept, e.g. the document is either on the library shelf or not; it is often used as a measure of library performance [50] [105]. 'Accessibility' is the ease or lack of ease with which a user can get a document and it is influenced by user perceptions, e.g. Dougherty and Blomquist [84]. An item may be equally available to all users but not appear as equally accessible to all.

Observation

Direct observation of library use by an experimenter was chosen in the present study to complement the self-observation approach inherent in questionnaire methods. Although this technique is described by social scientists[106-109] and Ford[110] as a useful method of investigation only a few examples of direct observations were found in information research. Three areas were covered: (i) interpersonal behaviour, e.g. user/librarian interaction [111-113]; (ii) effect of library environment or 'ecology', e.g. seating patterns [114], traffic flow[102 115], and behavioural maps [116]; and (iii) information flow, e.g. Project INISS[117] and Harrop [118]. Two interesting studies were published after observation had been carried out in the present study. MacMurdo[113] had used a similar procedure to confirm that busy library staff are approached less readily than staff who are not busy. An observer was seated nearby and recorded details of approaches in three hour sessions; verbal exchange constituted 'an approach'. In the Campbell and Shlechter[116] study observers toured the library at different times of day and marked the position and activity (reading, walking etc.) of each person on a prepared floor plan (i.e. behavioural mapping). A form of participant observation was used in INFROSS where the observers were ostensibly providing an information service [107].

Project INISS[117] had most influence on the chosen observation procedure. This latter study employed Minzberg's[119] method of structured observation where the researcher observes a person doing his work and records each observed event as it occurs describing it in a way that seems appropriate at the time. Thus systematic recording is achieved while maintaining flexibility of delaying formal categorization until later when it can be done carefully and consistently through reviewing all the evidence. Some categories are pre-determined by the aims of the research and INISS observers used printed edge-notched cards for recording

events. In a recent paper Wilson and Streatfield[120] discuss the method and problems in more detail.

RESEARCH INTO INFORMATION PROVISION FOR WORKERS IN MEDICINE AND RELATED DISCIPLINES

This was reviewed by Sherrington[121] in 1965 and by Wilkin[122 123] in 1981. Previous U.K. studies concentrated on the use and evaluation of library services, for example, the STEIN[124] Project (Short-term Experimental Information Network) where medical users filled in a questionnaire in return for free use of an online retrieval service. An exploratory study of health care staff and their information services was carried out in the Wessex Region [125]. Both Heal [126], and Carmel and Childs [127] have explored the information needs of general practitioners. Slater and Fisher[91] identified medical scientists as a user group and Hibberd and Meadows[128] looked at the use of drug information sources by hospital doctors.

Extrapolation of results from North American user studies to the U.K. is difficult because medicine is organised differently in these countries [129-131]. The essential difference is that *'there is no clear definitive separation of physicians in the USA into 'hospital' and 'non-hospital' doctors'* [129] and so work-roles in these countries cannot be equated easily. In addition, doctors in the USA are practice-based, give and receive more formal training in hospitals, and are less involved in administration than their U.K. counterparts. In spite of these problems North American studies can provide useful pointers; both Rees[132] and Mayeda[133] have noted that differences in information needs exist between researchers and practitioners.

Brief descriptions offour 'key' projects are given below. These comprise only one U.K. and three North American studies because there was little relevant work in the U.K. until recently. This thesis forms part of the renewed activity in this field, already described in Chapter 1.

The conclusions of the other studies which also began in 1978 (i.e. Ford [2], Medical Review Panel [1], Clinical Librarians Project[3]) will be discussed in Chapter 15.

Herner[134] (USA 1958): a semi-structured interview survey of 500 medical scientists which covered the major fields of medical research. Use of information sources for current awareness, problem-solving and idea-generating activities were distinguished. Personal contacts were found to be the most important sources of ideas and solutions to problems, whilst printed references and bibliographic tools were more important in formal literature searches.

Slater and Fisher[91] (UK 1969): a questionnaire survey using the critical incident technique of the use made of technical libraries in different types of institution where users were characterised in terms of employer group, work activity and discipline. Questionnaires were distributed to all users in the libraries on a particular day. The results showed that medical scientists differed from scientists in general by being more interested in periodicals and keeping up to date and less interested in descriptions of method. This group used literature more effectively than other scientists.

Friedlander[92 135] (USA 1970): a questionnaire survey using the critical incident technique of members of a medical school faculty including psychiatrists. An attempt was made to ascertain the part played by the library, among other channels of communication, in work-related information searches. Factors influencing the choice of formal v. informal sources were examined. Use of accessible and easy to use sources and informal contacts was high and the extent of delegation of documentation tasks to a librarian was low. Journal articles and photocopies were major printed sources of information.

Strasser[136] (USA 1978): a questionnaire survey of information needs of practicing physicians in Northeastern New York State. Besides looking at factors such as type of practice and involvement in teaching and research Strasser developed an index of perceived need for improvement in the quality of information relating to areas of interest. Respondents ranked a list of subject areas according to their 'need to know' and 'quality of present information'. The greatest needs for improvement were in new developments in specialties and US government health care regulations. When assessing satisfaction of library users it was observed that users who made most frequent demands on library services had the strongest feelings about the quality of the information provided.

SECTION A : THE USER SURVEY

CHAPTER 3 - SETTING THE SCENE

This chapter contains a general outline of the nature of the medical field, the organisation of medical practice, education and research, and the main institutions involved. This is followed by detailed descriptions of the Oxford survey population, Oxford University and the teaching hospitals and the Oxford libraries.

THE GENERAL OUTLINE

The Medical Field

This encompasses both a profession and a scientific discipline [137]. In simple terms the profession is concerned with treating patients and the practice of medicine, while the discipline is concerned with the pool of knowledge that makes this possible. The discipline extends beyond clinical medicine[138] and includes the pre-clinical subjects of anatomy, pathology, pharmacology, physiology and biochemistry. Knowledge is increased through research which ranges from fundamental science far removed from the patient to research on patients by medical staff. The full range of these activities is found in a teaching hospital and university setting.

Teaching Hospitals

Health care in the United Kingdom is provided without charge by the National Health Service (NHS). The NHS is funded and controlled by government through the Secretary of State for Health and Social Security [139]. Administratively the country is divided into NHS Regions each with at least one teaching hospital. Besides NHS departments and services, teaching hospitals contain a medical school and clinical departments which are part of the faculty of medicine of the associated University. Generally the NHS is responsible for patient care in the hospitals, and the University is concerned with medical education and research. Funds are allocated to

each university by the University Grants Committee (UGC) and university administration is structured into faculties and thence into departments.

Each teaching hospital has unique features but the following characteristics are common[140 141] : (i) the relationships between the university and the NHS are complex; (ii) organisation and control is influenced by university and NHS policy, and hence UGC and government policy; (iii) besides their main employment contract from the NHS or university medical staff often hold honorary contracts in recognition of their contribution to patient care, research or education; and (iv) the research facilities and the academic environment attract staff of a high calibre and so teaching hospitals are centres of excellence with unrivalled expertise in specialist areas.

Medical Education

There are 12 university medical schools in the English provinces and 12 schools concentrated on London University in the capital [142]. Undergraduate education may comprise either a pre-clinical course leading to a first degree followed by a clinical period in a teaching hospital (e.g. at Oxford[143]), or an integrated course where clinical and pre-clinical subjects are taught throughout the course (e.g. at Nottingham[144]). At Oxford clinical students receive formal instruction in lectures and tutorials given by University staff and informal training from all medical staff. At the end of the course a further year must be spent in house officer posts ('pre-registration') before the new doctor can be registered by the General Medical Council. The doctor may then enter general practice or stay in hospital medicine. Hospital medicine has a hierarchical career structure which results in increased specialisation and expertise. It is necessary for the doctor to take more examinations and gain membership of an appropriate Royal College in order to progress within his specialty.

Medical Institutions

The Royal Colleges are bodies which maintain professional standards through their examination procedure and provide further education through seminars and meetings. Another important organisation is the Royal Society of Medicine (RSM) whose role is that of a learned society. The British Medical Association (BMA) represents the medical profession in legal, ethical and political issues.

Research in the Medical Field

The spread of research in the medical field has already been mentioned. Generally basic research is done in the pre-clinical departments and medically oriented research is done in the clinical departments, but there are projects which could be done in either setting. For example, in Oxford, the pre-clinical department of Biochemistry investigates the structure of enzymes, while Clinical Biochemistry examines enzyme regulation in pathological conditions [145]. Many people do research besides established university staff. They may be academics on sabbatical leave, employed for a special project or have fellowships to support their work. Their backgrounds may be medical or scientific and their level of experience varied. It is even possible for the head of a project to transfer his research team with him when he moves elsewhere. Bodies like the Medical Research Council (MRC) or the Wellcome Trust also have established posts and units within teaching hospitals or pre-clinical departments. Many organisations promote and fund research, e.g. the World Health Organisation, government departments, drug companies and charitable trusts [146].

THE OXFORD SURVEY POPULATION

The survey population comprised:

1. *CLINICAL STAFF :* essentially hospital-based staff, members of the faculty including postgraduate students and all NHS medical staff with the exception of those in psychiatry. Medical students,

laboratory technicians, general practitioners and all non-medical staff were excluded. (Total 685 staff).

2. *PRE-CLINICAL STAFF :* arbitrarily defined as all staff engaged on teaching or research including postgraduate students in the University departments of Anatomy, Biochemistry, Pathology, Pharmacology and Physiology. The term pre-clinical is used as a convenient, if not strictly accurate, shorthand for this group. (Total 297 staff).

Users were further characterised in terms of STATUS, ORIENTATION and SUBJECT/SPECIALTY. <u>These characteristics are important</u> and were used in analysing the survey data. Abbreviations are given in brackets.

<u>STATUS</u>: categories were devised to reflect level of seniority and job content for the diversity of posts present in the survey population. Clinical and pre-clinical research workers and postgraduates were similar and the terminology is intended to reflect this.

Clinical Status Categories	Comments
consultant (cons)	all NHS posts (+ hon. univ. contract)
senior registrar (sr)	all NHS posts
registrar (reg)	all NHS posts
house officer (ho)	all NHS posts (includes senior house officers)
honorary consultant (hon cons)	univ. posts + NHS (professors, directors, readers)
clinical lecturer (clin lect)	hon. contracts
research registrar (res reg)	hon. contracts (miscellaneous group, not all univ. posts)
research worker (rw)	not practitioner (includes foreign doctors)
postgraduate (pg)	not practitioner (students reading for M.Sc. or D.Phil.)

Pre-Clinical Status Categories	Comments
professor (prof)	all univ. posts
university lecturer (ul)	all univ. posts
departmental demonstrator (dd)	all univ. posts
research worker (rw)	all univ. posts (incl. postdoctorals, visitors, research assistants)
postgraduate (pg)	(students reading for M.Sc. or D.Phil.)

ORIENTATION: This is a broad grouping of clinical staff according to degree of practitioner or research orientation of their work. Pre-clinical staff are all predominantly researchers.

Clinical Orientation Categories	Comments
practitioner (pract)	all practice (i.e. cons, sr, reg, ho)
practitioner/researcher (pract/res)	mainly practice + some research (i.e. hon cons, clin lect)
researcher/practitioner (res/pract)	mainly research + some practice (i.e. res reg)
researcher (res)	all research (i.e. rw, pg)

References to 'people doing both practice and research' mean both pract/res and res/pract categories which are abbreviated as res + pract.

SPECIALTY: Numbers of staff in the individual clinical specialties were too low for data analysis so they were grouped as shown.

Clinical Specialty Categories	Grouping
surgery (surg)	accident, orthopaedic, bone research, cardiothoracic, general, ENT, otolaryngology, neurosurgery, oral, orthodontics, plastic, paediatric, ophthalmology, urology, radiotherapy, oncology.
medicine (med)	allergy, dermatology, venereology, cardiology, chest diseases, general, geriatrics, haemophilia, infectious diseases, neurology, EEG, clinical neurophysiology, neuropsychology, rehabilitation, physical medicine, rheumatology, renal.
anaesthetics (anaesth)	including intensive care unit, pain relief.
obstetrics & gynaecology (o & g)	including neonatology and foetal development at the Nuffield Institute for Medical Research.
paediatrics (paed)	including special care baby unit.
community medicine (com)	including epidemiology, occupational health.
laboratory medicine (lab)	genetics, clinical biochemistry, metabolic research laboratory, clinical pharmacology, radiology, pathology (neuropath., histopath., immunopath., chem. path., blood transfusion, serology, cytology, bacteriology).

SUBJECT: The pre-clinical equivalent of specialty. Subject is co-incident with the member of staff's department.

Pre-clinical subject categories	Comments
anatomy (anat)	
biochemistry (bioch)	(includes genetics and microbiology)
pathology (path)	(includes immunology)
pharmacology (pharm)	
physiology (physiol)	

THE OXFORD ENVIRONMENT

The University

The University of Oxford is a federal institution[145] comprised of faculties, departments, museums, libraries and colleges. All members of the University are also members of a faculty, a department and a college. Senior academic staff often teach in both their department and college.

The Pre-clinical Departments

These are all located together in the Science Area with the Radcliffe Science Library (RSL) a few minutes walk away. The approximate numbers of staff and postgraduates in each department are: Anatomy (50), Pharmacology (50), Pathology (70), Physiology (150), Biochemistry (including Microbiology and Genetics Units) (250). (see Diagram 2)

The Oxford Hospitals

In common with most teaching hospitals specialties are dispersed through several hospital sites (see Appendix B1 for a list of specialties at each site). Part of community medicine is actually located in Keble Road near the Radcliffe Infirmary but is treated as a department of the latter for analysis purposes. Only the Radcliffe Infirmary is in walking distance (10 minutes) of the Radcliffe Science Library; some form of transport is needed from the other hospitals. (see Diagram 3)

Diagram 2 : The University Science Area

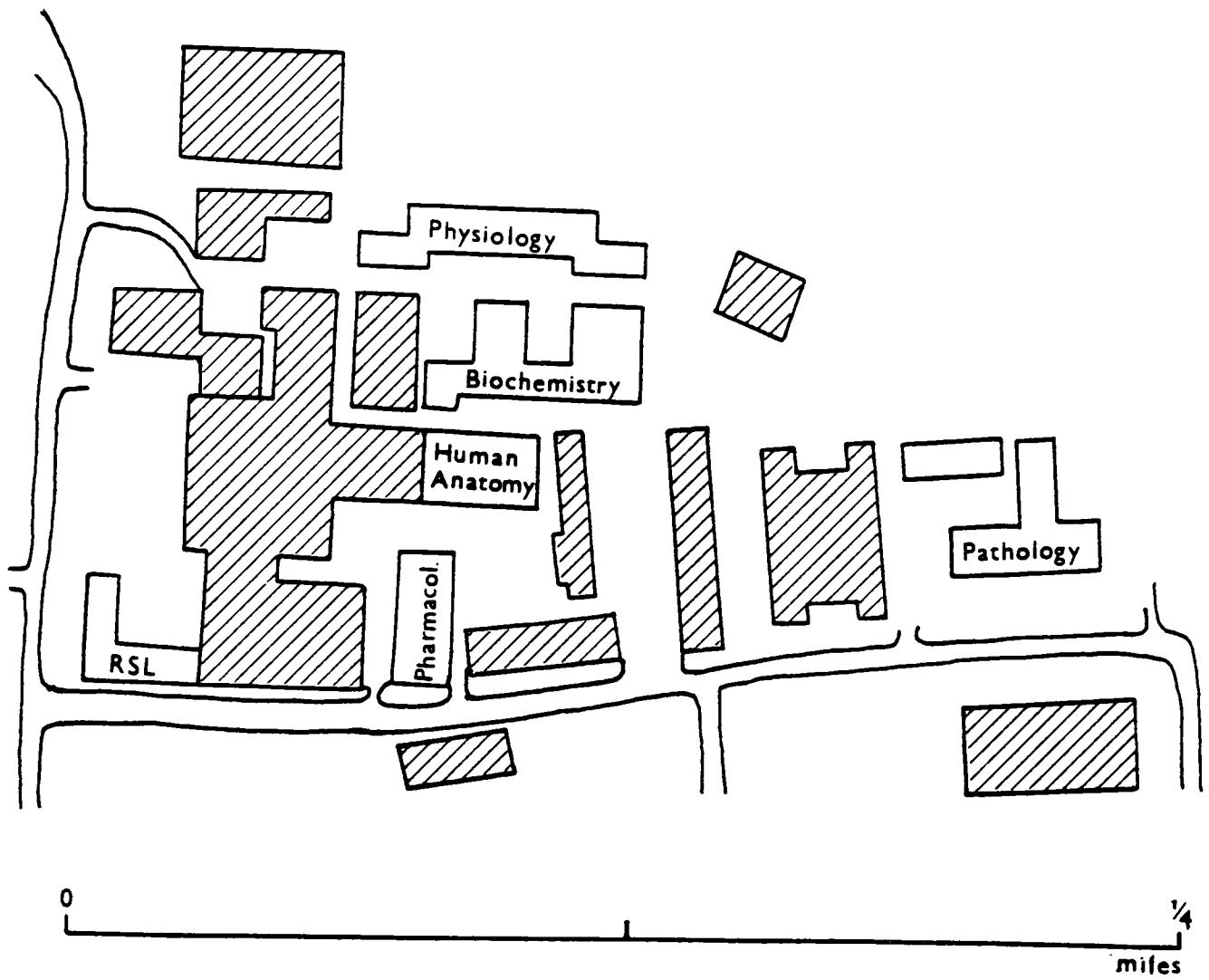
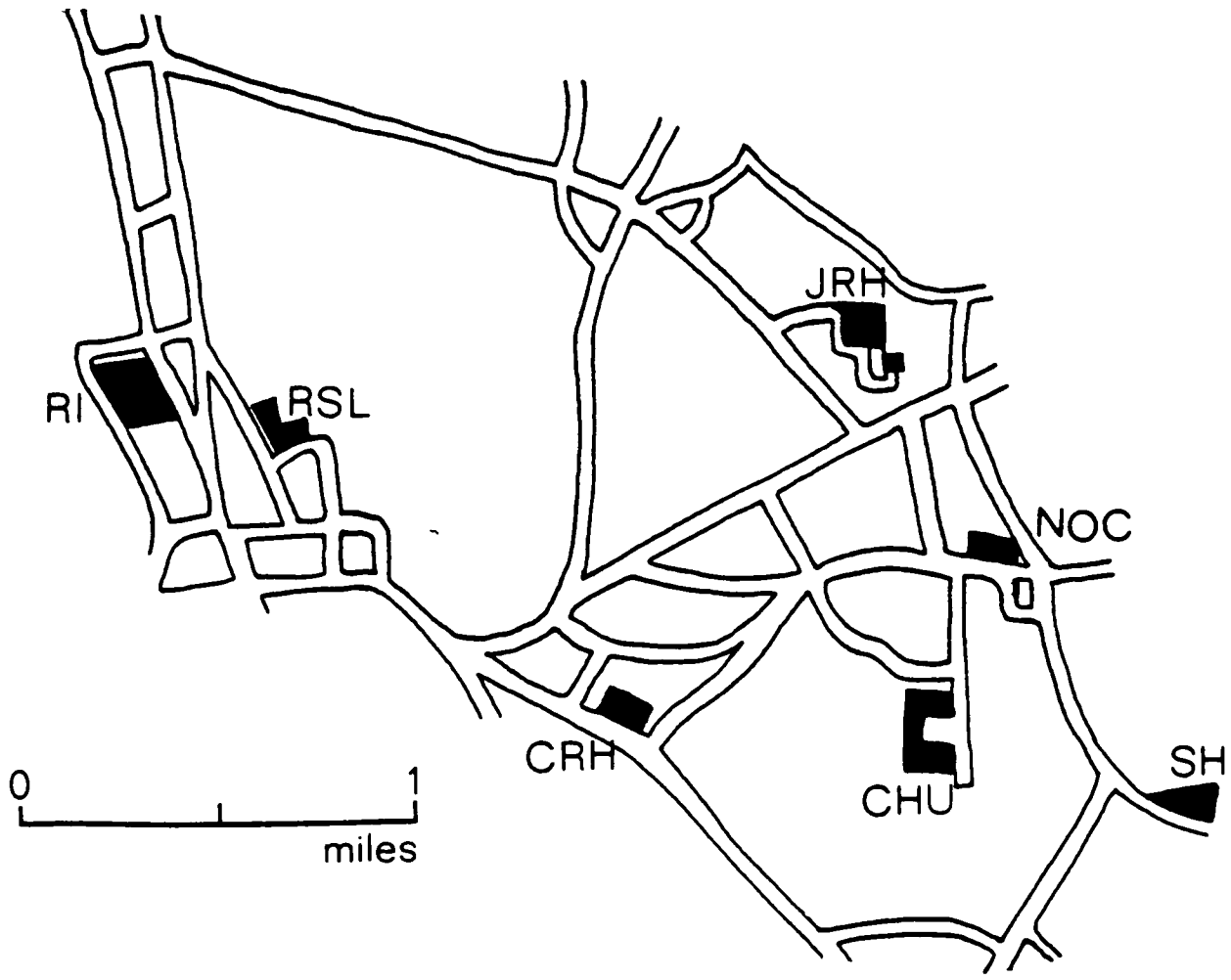


Diagram 3 : Relative positions of the Oxford hospitals



CHU = Churchill Hospital
CRH = Cowley Road Hospital
RI = Radcliffe Infirmary
SH = Slade Hospital

JRH = John Radcliffe Hospital
NOC = Nuffield Orthopaedic Centre
RSL = Radcliffe Science Library

When this study began the Radcliffe Infirmary was the main centre for teaching and research and the Churchill Hospital had a supporting role. There was also a geriatrics hospital at Cowley Road, an isolation hospital at the Slade, the Nuffield Orthopaedic Centre, and a maternity hospital already open at the John Radcliffe site.

The geographical distribution of the specialties changed substantially when Phase 2 of the new teaching hospital at the John Radcliffe site opened in the summer of 1979. This became the new centre with the Radcliffe Infirmary and Churchill Hospital in secondary roles, Cowley Road Hospital closed and geriatrics transferred to the Radcliffe Infirmary; other sites were unaffected. A summary of departmental changes is given in Appendix B2.

At the time of the clinical questionnaire and interview survey (before the move) the following specialties were on more than one site:

	Sites		Sites
accident, orthopaedics	RI, NOC	obstetrics & gynaecology	JRH, CHU
dermatology	RI, SH	oral surgery	RI, CHU
geriatrics	CRH, CHU	paediatrics	RI, JRH, CHU
haematology	RI, CHU	pathology	RI, CHU
neurology	RI, CHU	rheumatology & rehabilitation	RI, NOC

Clinical staff are able to travel between sites on the hospital transport service, and questions were included to assess the amount and pattern of this movement.

Anaesthetics, Clinical Medicine, Obstetrics & Gynaecology, Orthopaedics, Pathology, and Surgery are 'large' clinical departments with staffing levels equivalent to those of the smallest pre-clinical departments (ca. 50). The other departments are smaller (ca. 10 staff).

THE LIBRARIES IN OXFORD

The Pre-clinical Department Libraries

Descriptions of these libraries are summarised in Table 1. Each department is responsible for the control and development of its own library. The primary function of these libraries is to provide the

Table 1 : Descriptions of the pre-clinical department libraries[147]

Department	Staffing	Number of Current Serial Titles	Services	Coverage
ANATOMY	1 full-time	30	lending photocopies interlibrary loans translations	anatomy, neurology, endocrinology, histology, physiology, embryology, microscopy and techniques
BIOCHEMISTRY	1 full-time	130	lending photocopies interlibrary loans	biochemistry and allied subjects including immunology and genetics
PATHOLOGY	none	50	lending	pathology, bacteriology, chemistry
PHARMACOLOGY	1 part-time	55	lending interlibrary loans	pharmacology, physiology, biochemistry, endocrinology
PHYSIOLOGY	1 part-time	62	lending photocopies	physiology, biochemistry, biophysics

Notes: The libraries are open all the time to those with access to the building.
There are also small collections in the MRC Immunology, Microbiology, and Genetics Units.

research and teaching material which is required urgently and frequently by academics and postgraduates in the department. Others may use them on application. Departmental librarians provide an interlibrary loans service by routing requests to the British Library Lending Division (BLLD) via the RSL interlibrary loans service or by obtaining photocopies of RSL documents.

The Radcliffe Science Library[147]

This is the scientific department of the Bodleian and receives legal deposit material. It is therefore a major scientific archive and serves the academics and students of Oxford University as a reference library.

The substantial collection, which covers physical sciences, life sciences and medical sciences, is housed in five reading rooms and a bookstack (see Appendix G2 for map). It occupies 22 km of shelf space and about 10,000 current serial titles are taken. Library staff fetch items from the bookstack for readers at intervals throughout the day. The bookstack is referred to as 'the closed stack' and the reading room shelves as 'the open shelves'. The Bodleian system of fixed location classification is used. Readers locate documents by looking in the Author or Serials catalogues for a shelf-mark. The Serials catalogue is a union list and contains all known Oxford locations for titles. There is no subject catalogue but a comprehensive range of bibliographies is available for subject searches. An online information retrieval service was implemented in 1979; a charge is made for its use. There is a staffed photocopying service, an interlibrary loans service, and a borrowing privilege limited to senior members of the University [148].

All readers are issued with a reader's ticket and are only admitted to the library on production of this ticket. It can be assumed that any request to read at RSL from the hospital staff (i.e. non-university members) of the survey population would be granted. However, although the RSL is thus effectively available to all the survey population, this group may be unaware of it.

Hospital Department Libraries

Like those of the pre-clinical departments these libraries are run for the benefit of the departmental staff. There are numerous collections (see Appendix B3) which generally comprise key serials (5 - 50 titles) and standard reference texts. Anaesthetics is notable for having a librarian [147]. The Nuffield Orthopaedic Centre Library[147] is an exception to the general rule. This library takes 84 current serial titles and is run by one full-time and one part-time librarians. Unlike the departmental libraries,

interlibrary loan requests are sent directly to BLLD though photocopies of items are also obtained from RSL.

In 1979 the collections of the departments of Medicine, Clinical Biochemistry, Oral Surgery, Obstetrics and Gynaecology, Pathology and Paediatrics were absorbed into the new Cairns Library in the John Radcliffe Hospital, together with the collection on reproduction and development, formerly the Library of the Nuffield Institute for Medical Research.

The Cairns Library

This library underwent major changes in 1979 when it moved to new accommodation in the John Radcliffe Hospital. The old Cairns was housed in the Radcliffe Infirmary and served all the NHS and University medical staff and students. Nurses, medical students and the School of Radiography had separate libraries. Although primarily a faculty medical library, the old Cairns also acted as a central resource for the NHS Oxford Region and this dual role was maintained in the new library. Services included coin-operated photocopying, loans and interlibrary loans (from RSL and direct from BLLD) and a heavily used online information retrieval service for which there was no charge. Readers were able to use the library at any time but had to get the key from the porter after 10 p.m. Current periodical issues were displayed on a rack and about 300 titles were taken. There was a subject catalogue and the Barnard system of classification was used. The library operated in cramped conditions which inhibited the growth of stock. The old Cairns was also responsible for maintaining three hospital departmental libraries: dermatology and infectious diseases at the Slade, geriatrics at Cowley Road and the general library at the Churchill Hospital which was staffed part-time.

Problems from the cramped conditions were alleviated by the move to the new accommodation which was seven times the size of the old library. (see Appendix G1 for map). Various departmental and non-medical libraries

were incorporated into the new Cairns which now takes 450 current serial titles. The stock was reviewed and reclassified using the NLM system, while journals were re-shelved alphabetically. Roughly 1½ km of shelving are occupied. The only change in services is the restriction of journal loans to an overnight period. The library is not locked and readers have 24 hour access. A site library was retained at the Radcliffe Infirmary (henceforth referred to as the Cairns, RI) to serve the departments there. It absorbed the Cowley Road collection when geriatrics moved to the Infirmary. The most important difference between the old and new libraries is the change in function; the old Cairns served medical staff only while the new Cairns is a multidisciplinary library serving all groups of staff in the hospital, e.g. doctors, nurses, administrators.

Other Libraries

There are numerous other libraries in Oxford. Nearly all science departments and colleges have their own library and there are several faculty libraries in Arts subjects. The largest medical library in Britain is that of the Royal Society of Medicine in London [137]. It takes about 2,200 current serial titles and provides loans, photocopy, reference and reader services for the benefit of its members. Postal and telephone requests and enquiries are accepted from members but non-members may only use it as a reference library. The BMA library in London also serves as an important source for the medical profession. It takes 1500 current serial titles. The MRC funds two major libraries, those of the National Institute for Medical Research and the Clinical Research Centre. Each library takes about 700 current serial titles. The libraries of the 15 Postgraduate Institutes of the British Postgraduate Medical Federation and the Royal Colleges also represent useful sources of research material within their specialist medical fields.

CHAPTER 4 - THE POPULATION FRAME

The first task was to identify the members of the population to be surveyed. This was not easy because there was no single list giving details of all staff in the population and the names had to be traced through many different sources (Appendix C1). A further complication was a constantly changing hospital-based population which required that the list be regularly updated. In contrast the pre-clinical staff were fairly stable apart from major changes at the beginning and end of the academic year.

The following information about each member of the population was recorded on cards: name, title, specialty/subject, employer, status and location. The cards were filed alphabetically in two sequences - clinical and pre-clinical - then numbered consecutively. The numbers were used to identify interview and questionnaire respondents and in sampling.

SELECTION OF SAMPLES FOR INTERVIEWS AND QUESTIONNAIRES

In order to test the interview schedules as fully as possible people known to be library users were selected for pilot interviews. This pilot group was selected to cover a range of status and subject/specialty categories. For the full interviews random samples of 99 clinical and 100 pre-clinical staff were taken using random number tables[149]. Questionnaires were sent to all the staff on the files who had not been selected for interview.

When arranging the interviews it was discovered that some people had left Oxford. Two classes of leavers were found: those people who had been included in error because the source lists were out of date, and people who had left during the interview stage. The latter were usually junior doctors i.e. house officers and registrars, who were replaced by their successors in the post or a substitute with similar characteristics so that they were not diluted in the interview sample. Names included in error were discarded

and the next random number was selected.

THE SIZE OF THE POPULATION

Interviews and questionnaire surveys were carried out over several months during which time the size of the population varied slightly (less than 5%) because of people leaving and arriving. For practical purposes the total population size was defined as the sum of the interview subjects, the questionnaire respondents and the non-respondents. Non-respondents were people who did not reply to the questionnaire and for whom there was no evidence to suggest that they had left Oxford. Appendix C2 gives a breakdown of clinical and pre-clinical returns according to status and specialty/subject,

total population size was 982 people

(i.e. 685 clinical staff and 297 pre-clinical staff).

CHAPTER 5 - THE INTERVIEW AND QUESTIONNAIRE METHODS

I SEMI-STRUCTURED INTERVIEWS

AIMS

(i) to gather evidence about the user's background, information-seeking behaviour, reference-seeking behaviour, use of libraries and expectations/perceptions of libraries;

(ii) to indicate potentially important or revealing areas for further investigation by questionnaire;

(iii) to provide a basis for the wording of the questionnaires;

(iv) to supply richer information than could be gathered by questionnaire.

The choice of this semi-structured method was governed by practical considerations, i.e. the researcher's lack of interviewing experience, the ease of analysis, and the usefulness of the results in relation to the questionnaire design. Non-structured interviews in the hands of an experienced interviewer might have been more revealing, especially with regard to information need.

CONDUCT OF THE INTERVIEWS

A formal letter was sent to Heads of Department informing them of the survey and requesting co-operation. After a pilot test of the interview schedule, the people to be interviewed were selected (see p. 36) and contacted by telephone for an appointment. The arrangement of interviews took almost as much time as the interviews themselves! Only two people refused to be interviewed.

Interviews began with a brief standard explanation of the purpose of the survey. A printed schedule (Appendix D1) contained the questions and was used to record the responses. Each schedule was identified by

the subject's population file code number. The researcher took care to adopt a neutral tone and tried to avoid any appearance of judging the interviewee. Great effort was made to ask each person exactly the same question in the same way, as stated on the schedule. Although the questions were dealt with in strict order, some flexibility was possible. Comments were noted whenever they were made, even if they were not relevant to that particular question. When either the researcher or subject were confused about a point it was clarified by further discussion, similarly, when the researcher became aware of inconsistencies or earlier misunderstandings. Points were raised again at a suitable opportunity or at the end of the interview so that the natural flow was maintained. Schedules were checked wherever possible soon after an interview to make sure that the answers would not be misinterpreted at a later date. Most interviews lasted about thirty minutes but ranged between twenty and ninety minutes depending on the subject's personality.

METHOD OF ANALYSIS

The schedules were analysed by hand. In the first instance, superficially in order to provide a basis for questionnaire design, and then again more thoroughly for comparison with the questionnaire responses.

II QUESTIONNAIRES

AIMS

(i) to gather evidence about the user's background, information-seeking behaviour, reference-seeking behaviour, use of libraries and expectations/perceptions of libraries;

(ii) to provide sufficient data from the population for identification of any statistically significant variations in library use attributable to status, specialty/subject and degree of practitioner or research orientation.

DESIGN

The most useful and revealing questions were adapted from the structured interview schedules, retaining the original wording where possible. Although the basic format of the questionnaire (see Appendix D2) was the same for both clinical and pre-clinical staff, the wording was altered slightly in Questions 1-4, 8 and 10 to suit.

An effort was made to keep the questionnaire short, unambiguous, and easy to complete for the respondent. Flexibility of response was allowed when it would be more revealing even though responses were harder to analyse than structured response. Ease of coding the answers for computer analysis was also an important, though secondary, consideration in format design.

Some thought was given to the order of the questions. The arrangement needed to appear logical while fitting into the available space. Question 6 was deliberately sited on the reverse of the page carrying Question 5 in an attempt to reduce visual clues which might affect the open-ended response to Question 5.

DISTRIBUTION

The schedules were not p -tested through lack of time. Once the interviews were complete the questionnaires were sent out through the internal mail to the clinical staff (April 1979) and to the pre-clinical staff (January 1980). A personalised covering letter (see Appendix D3) and an addressed envelope for return were included with each questionnaire which was identified by its number from the population file. A repeat mailing was sent to people who had not replied after three weeks. This contained a reminder letter (see Appendix D4), another copy of the questionnaire and a return envelope. Several weeks later, a sample ($\frac{1}{3}$) of the people who still had not returned a questionnaire (i.e. non-respondents) were contacted by telephone to find out whether there were any

particular reasons for non-reply. However, no obvious pattern emerged.

RESPONSE RATE

questionnaire returns	457	questionnaire returns	151
non-respondents	129	non-respondents	46
total of clinical staff	586	total of pre-clinical staff	197
response rate = 78%		response rate = 77%	

The response was high, and the returns from the clinical staff were particularly encouraging as medical staff have many demands on their time and are constantly bombarded with unsolicited circulars and questionnaires. When the returns were broken down by status and subject/specialty the distribution patterns closely resembled those found in the whole population (see Appendix C2) and so *the completed questionnaires were felt to be fully representative of the whole population.*

Analysis of the non-respondents by status revealed that house officers were significantly worse at replying than the rest of the population. In fact, only 61% of the house officers who received a questionnaire returned it compared with the value of 78% for the other total groups. The percentages of users in the other groups who returned the questionnaire did not vary much.

Table 2 : Questionnaire response of clinical staff

Clinical status	Returns	Non-response
cons	83%	17%
sr	82%	18%
reg	89%	21%
ho	61%	39%
hon cons	79%	21%
clin lect	89%	11%
res reg	79%	21%
rw	86%	14%
pg	76%	24%

The response to individual questions varied between 96% - 100%, except for the open-ended questions where it was about 83% (Q.5) and 76% (Q.9) for both clinical and pre-clinical staff.

METHOD OF ANALYSIS

The content of the questionnaires was analysed by SPSS[150] (Statistical Package for Social Scientists) on the Oxford and Manchester University computers. The questionnaire design enabled most answers to be converted directly into code in a simple clerical operation which only required reference to previously prepared coding schedules. However, where open-ended replies were allowed the classification structure for coding could only be devised after a review of all the answers to a question. These were coded by the researcher and checked for consistency. It was possible to code those answers in two category levels - general and specific. All the data was coded onto standard 80-column sheets before entry into the computer file.

CHAPTER 6 - CONTENT AND ANALYSIS OF THE INTERVIEWS AND QUESTIONNAIRES

This chapter describes the nature of the questions asked in the interviews and questionnaires and the answers obtained. Five topics are covered, namely: background information, information-seeking behaviour, reference-seeking behaviour, use of libraries, and expectations/perceptions of libraries. Answers from the population as a whole (i.e. both clinical and pre-clinical replies) are given under each topic.

The results have been presented in the scheme set out below to avoid the tedious repetition involved in separate descriptions of interview and questionnaire results. This scheme was designed to make the interview evidence distinguishable from the questionnaire evidence. The former is essentially illustrative while the latter comprises data which is statistically valid at the $p = 0.01$ level.

Table 3 : Scheme presenting the organization of results

Topic of investigation	Interviews	Questionnaires
Background information	MINOR discussion	MAJOR discussion
Information-seeking behaviour	ALL discussion	-
Reference-seeking behaviour	MAJOR discussion	MINOR discussion
Use of libraries	-	ALL discussion (with illustrative quotes from the interviews given in italics)
Expectations/perceptions	-	

On occasion both sections will have to be consulted to get all the available evidence on a given topic.

I SEMI-STRUCTURED INTERVIEWS

CONTENT

The interviews covered the following: background details, information-seeking behaviour, reference-seeking behaviour, use of libraries and expectations and perceptions of library function.

The interviews began with two questions (Q1, Q2) about the subject's fields of interest. This was chosen as an innocuous beginning which people would be happy to talk about. Working locations and reasons for visiting other sites were explored in Questions 3 and 4. Question 7 asked about the content of the subject's work, e.g. amount of teaching or research. Checks on status (Q22) and employer (Q23) were at the end of the interview. Reasons for seeking information were examined in two structured questions (Q5 and Q6). Reference-seeking behaviour was explored in depth (Q8-Q10) and followed by two questions (Q11, Q12) on journal purchase and scanning. Subjects were asked to list the libraries they used and give details about frequency of use, length of visit, special reasons, and any indirect modes of use, e.g. telephone (Q13-17). The expectations of libraries were covered by Q18-21 . An open-ended question was followed by a structured question on the same topic in which subjects were presented with specific reasons for using a library and were asked to give relative judgements on frequency of use and value. The effects of library closing policies were explored to reveal whether difficulties were caused to certain subgroups of the population. The final question was an open-ended request for criticisms which was included as an opportunity for airing problems and further comment.

ANALYSIS

The Subjects and their Background

(Minor discussion : see questionnaire analysis for major discussion).

The breakdowns of the interview sample by subject/specialty

characteristics are given in Appendix C2.

1. Scope of interest within specialties

Main interests: not surprisingly, people doing research gave specific answers such as *'Transplantation immunology, specific immunosuppression'* (rw/surg) or *'The formation of nerve connections'* (dd/anat). Many practitioners also had special interests, though these were generally patient oriented, e.g. *'Intensive care therapy'* (reg/anaesth) and *'Foot and ankle surgery'* (sr/surg). However, few junior doctors had particular interests within their specialty.

Additional interests: about half of the clinical subjects had other interests. The lack of specialisation of house officers was emphasised by their wide range of interests which bore little relation to the specialty they were working in at the time of the survey. Consultants and registrars had fewer additional interests, possibly because consultants concentrated on a narrow field of expertise and registrars were involved with the Royal College examinations. Some of the additional interests were related to the subject's specialty, e.g. *'Tryptophan metabolism'* (rw/lab) and others were general, e.g. history of medicine, the health services, psychiatry, computing and statistics. The additional interests of some pre-clinical workers were the main interests of others. For example, a university lecturer in pharmacology with a main interest in cardiac arrhythmia was peripherally interested in immunology, which was the main interest of some workers in pathology.

2. Nature of the subjects' work

Question 7 asked What percentage of your time do you spend on clinical practice, teaching, research and administration?. Some subjects were sensitive about this question which may have had political overtones. They were also unhappy about apportioning time in this way because *'it is*

all one job' (ul/pharm) and *'The amounts vary depending on the work at the time'* (res reg/o & g). Nevertheless, it gave some insight into the type of work done by each status group, so the unaltered question was included in the questionnaire.

Pre-clinical staff: University lecturers did the bulk of undergraduate teaching and supervised postgraduates. Departmental demonstrators also taught and demonstrated to undergraduates. These activities were concentrated in terms and alternated with research in the vacations. Research worker teaching consisted mostly of postgraduate supervision and occasional lectures, tutorials and practicals, while postgraduate teaching comprised undergraduate tutorials plus practicals, preparations and demonstrations. The amount of administration was generally low and variable. Question 23 asked about the subjects' employing or funding organization. Professors, university lecturers and departmental demonstrators were University posts, postgraduates were usually grant-funded and research workers were employed by the University or another organization, like the MRC (Medical Research Council), or received a grant from another organization.

Clinical staff: (Q23 and Q7) generally, the NHS staff (cons, sr, reg, ho) were practitioners with minimal teaching, research and administrative commitments, while the University Medical School posts (hon cons, clin lect) showed an increased involvement in research and teaching along with their clinical responsibilities. Research registrars had honorary NHS contracts and did some routine clinical practice, but mainly concentrated on research. Research workers and postgraduates were funded by a variety of sources. They did not have any clinical commitments and though a few (15%) of these staff were medically qualified, they did not deal directly with patients during the course of their research. Teaching and continuing education were intimately bound up in

the work of a teaching hospital. Members of the Medical School (hon cons, clin lect) were responsible for the clinical training of medical students and worked in close collaboration with the consultants, who were also honorary clinical lecturers. However, a lot of teaching was informal and done at different levels to different groups, e.g. *'I do informal teaching on the wards'* (reg/o & g), *'Students are there all the time at out-patients, ward rounds etc.'* (cons/med). The difference between teaching and continuing education was blurred. The teaching done by clinical research workers was similar to that done by pre-clinical research workers, i.e. lecturing and supervising postgraduates.

3. Location and movement of subjects

Subjects replied in more detail to the interview Question 4 Do you spend time at any other sites, e.g. the hospitals or the departments in Oxford? than to the equivalent structured question (Q1) of the questionnaire. This leads to the conclusion that the actual amount of movement is greater than was indicated by the questionnaire replies. Interviewees often explained the reasons for these visits. Practitioners visited other hospitals both in Oxford and in the Region to see individual patients, to attend clinics, and to provide support services, e.g. radiology, anaesthetics. In addition, they may attend lectures and meetings. Visits to the University science departments by the population were usually concerned with research or teaching, i.e. to give or attend lectures/meetings/seminars, learn techniques, use equipment or for collaboration over research. Examples of collaboration were found between cardiology, chest diseases and pharmacology, and clinical biochemistry and biochemistry. Few pre-clinical staff visited the hospitals, usually to get biological samples or to attend lectures and seminars.

Information-Seeking Behaviour

(All discussion)

1. Reasons for seeking information

Question 5 : What aspects of your work cause you to look for information? Subjects were presented with a list of possible categories and asked to tick those which were applicable. Then they were asked to rank them in order of importance (Q6). The replies were weighted for analysis as follows: 1st = 4 points, 2nd = 3 points, 3rd = 2 points, unplaced = 1 point, not applicable = 0 points. When subjects wanted to give two or more categories equal importance the points were divided equally (e.g. joint 1st place : (3 + 4)/2 = 3.5 points). The arbitrary indices presented in the table below were derived by dividing the total points assigned to a given category by the number of clinical or pre-clinical subjects. Comparative indices for each status group were also calculated (see Appendix E1).

Several people expressed dissatisfaction with ranking because they said several fields overlapped. For example, *'This is difficult to answer; all those I have ticked are important. It will vary, especially clinical problems which are unpredictable. There I may go for six months without needing to look anything up whereas research needs are fairly constant'* (hon cons/med). This part of the interview caused most problems and involved most extra discussion between the subjects and the researcher. Since there was no obvious way of improving these questions without lengthy additions this area of investigation was omitted from the questionnaire.

Table 4 : Information needs of clinical and pre-clinical staff

Reasons for needing information	Clinical (97 subjects)	Pre-clinical (100 subjects)
Keeping up-to-date	2.2	2.6
Writing papers and books, preparing for lectures and scientific meetings	2.1	1.8
Undertaking and supervising research	2.0	2.2
Solving specific clinical problems	1.6	-
Solving specific problems	-	2.1
Teaching (formal and informal)	1.2	1.1
General interest	0.8	0.9
Further education	0.7	0.3
Look for job advertisements	0.4	0.3

Both populations gave keeping up-to-date as the most important reason for seeking information, combined with writing papers, research and problem-solving. For the clinical staff, clinical problems were a significant reason for seeking information, ranking behind research but ahead of teaching. Predictably, those who were more strongly oriented to clinical practice than to research were more likely to mention clinical problems. Further education was an important reason for house officers, registrars and postgraduates, and junior doctors were least interested in research and writing papers. Among pre-clinical workers the functions of each particular group were reflected in their responses. Besides keeping up-to-date departmental demonstrators also ranked teaching highly, and university lecturers writing papers. Departmental demonstrators may particularly need information for teaching because they are relatively inexperienced compared with university lecturers. The latter did not consider teaching an especially important reason for seeking information because they probably had the information anyway: *'I may use the same piece of information for research, teaching and keeping up-to-date'.* (ul/physiol). This also applied to clinical lecturers: *'Writing papers gives me the information I need for teaching'* (clin lect/o & g).

An 'Other' category was included, though few people (< 5%) made any additions. Examples were: details about equipment; who is working where; NHS administration; forthcoming meetings and courses.

2. Personal Journal Subscriptions

Question 17 : Do you personally subscribe to any medical/scientific journals? What are they? Why do you subscribe to them? Not all journals were received from full subscriptions. The alternatives were: reduced subscription (usually to society members or as part of membership subscription), and free for various reasons. Several journals are sent free to hospital doctors, some automatically and others on request,

e.g. Hospital Medicine, Prescribers Journal. Free journals were only recorded in the interview if mentioned by the recipient as being worthwhile. Attitudes towards these free journals were expressed by a consultant who said *'They are good for keeping up to date, have lay comments and are basically a good read'*. A few pre-clinical staff received free journals but these were the same titles mentioned by the hospital staff.

The monthly add-on journal 'Medicine' merits special attention. This journal is issued in sections as a continuously updating textbook. Pre-registration doctors can obtain it free on request, whilst others pay subscriptions. Junior medical staff mentioned it as particularly important, as did anyone wanting to get up to date quickly in a specific area. The majority of people subscribed to a journal because they wanted to ensure quick and easy access to it. For example: *'I use them [Brit. J. Anaesth., Anaesth.] often enough to want my own copies - they are easier to carry around and can be read at odd moments so I don't have to come into the library'* (sr). However, many journals were also received *'... because I am a member'* (ul/physiol). Surprisingly few people (7) said they subscribed to journals because the library did not take them or because *'The library copy [Lancet] is never there!'* (clin lect/med).

Table 5 : Journals received by clinical and pre-clinical staff

Route of receipt	Number of journals received Clinical (97 subjects)	Pre-clinical (100 subjects)
Membership	133	51
Free	81	20
Editor	9	15
Subscription	83	72
Total	306	158

Only 16% of the clinical staff did not receive any journal compared with 58% of the pre-clinical staff. University lecturers were responsible

for most of the pre-clinical journal receipts. However a third of research workers also received 3 or 4 journals, whilst the remaining two-thirds did not receive any. All clinical status groups, except post-graduates, received at least 2 or 3 journals. The most senior status groups (i.e. cons, hon cons and prof) received the highest number of journals per person. Analysis of the journal titles revealed a wide distribution: clinical staff received 137 different titles and pre-clinical staff 95 titles.

Table 6 : The commonest journal titles received by clinical and pre-clinical staff

Title	Route of receipt	Number of staff receiving title Clinical (97 subjects)	Pre-clinical (100 subjects)
British Medical Journal	Membership	37	7
Hospital Medicine	Free	25	-
Medicine	Free or Subscription	21	6
Hospital Update	Free	17	-
Lancet	Subscription	16	-
New England Journal of Medicine	Subscription	8	-
Journal of the Royal Society of Medicine	Membership	8	-
Prescribers' Journal	Free	5	-
Journal of Physiology	Membership	-	9
Nature	Subscription	-	7
Scientific American	Subscription	-	6
New Scientist	Subscription	-	5

3. Journal scanning habits

Question 12 asked : How many journals other than those already mentioned, do you scan regularly, i.e. each issue? (NB personal subscriptions were covered in Q11). The number of people who scanned five or more journals was surprisingly high. In fact most subjects listed titles in response to this question and so it seems unlikely to

be just wishful thinking on their part; several people remarked that they scanned other journals irregularly as well. The titles were recorded and followed the distribution pattern found in Question 11; only a few journals (BMJ, Lancet and Nature) were mentioned by several subjects.

Table 7 : The number of journals scanned by the number of subjects

Journals scanned	Subjects
0	5
1-5	58
6-10	68
11-15	44
16-20	13
20+	9
	Total 197

Only five people did not scan any journals but three of these looked at Current Contents and one used CA Selects; the other person relied on his colleagues to keep him up to date! Several people used Current Contents in conjunction with scanning, e.g. *'It depends which is available first, the journal or Current Contents'* (pg/bioch). The number of journals scanned varied with clinical status but not pre-clinical status where an average of 9 journals per person were scanned.

Table 8 : The average number of journals scanned by clinical status

Clinical Status	Average number of journals scanned
cons	9
sr	7
reg	5
ho	5
hon cons	19
clin lect	12
res reg	9
rw	12
pg	7

NB. These figures are approximate because some answers were given in terms of 'about 20'.

Additional comments brought to light several other points: (i) It is the practice of some departments to circulate journals or contents pages

to members, and also some senior staff pass contents pages on to sub-ordinates. A few people also received journals circulated from an external source such as the Public Health Laboratory, Colindale. (ii) A few people shared the view that *'Most information is published in a limited number of journals. Some articles are published in peculiar places - these are suspect.'* (rw/path). (iii) Three clinical subjects participated in journal clubs where a portion of about 25 journals are scanned by individuals who report on them at regular meetings. (iv) Some people said they scanned all the periodicals taken by their department library.

Reference-Seeking Behaviour

(Major discussion : see questionnaire analysis for minor discussion)

These questions inspired many general comments about looking up references. The most popular method in an unfamiliar area was to follow-up references, usually to journal articles, given in a review article or a chapter of a book. Researchers were more likely to want exhaustive coverage and used a variety of sources, e.g. *'I go through Index Medicus and the current journals, review articles etc. and then do a computer search for thoroughness'* (clin lect/med); whereas practitioners were more likely to obtain satisfactory results from Index Medicus alone.

1. Word of mouth v. published documents

Question 8 : Do you get your references by word of mouth or from published documents? Documents dominated over word of mouth as reference sources. Word of mouth seemed to play a different role, and meetings, seminars and discussions acted as 'alerters' to articles about to be published or gave ideas about where to look. Contact with colleagues or experts was likely to produce information about highly relevant references and preprints or results prior to publication. The difference was illustrated by *'I get increasingly more references by word of mouth as*

groups communicate during meetings and pre-publication contact is more frequent. We are in the front-line and rely more on actual work done in other laboratories - it is too old when it is published. I use the literature to discuss results or solve technical problems' (ul/pharm) and *'Mainly documents, but I am expecting these references to appear. I have already been alerted by scientific meetings and correspondence with colleagues.'* (ul/physiol). Junior doctors (ho and reg) made more use of word of mouth than any other status group. This may reflect the training element of these posts and that senior colleagues are on hand to ask and give expert advice.

2. Abstracting and indexing services

Subjects were asked: Have you used any abstracting and/or indexing services this year? (Q9 Pre-clinical/Q10 Clinical). The difference in clinical and pre-clinical pattern is attributable to the research/ practitioner orientation; Index Medicus is used for clinical practice, whilst the other sources are used for research.

Table 9 : Number of subjects using each service

Services Used	Pre-clinical (100 subjects)	Clinical (97 subjects)
Index Medicus	40	63
Current Contents	50	33
Excerpta Medica	2	23
Chemical Abstracts	15	5
Biological Abstracts	12	3
Science Citation Index	20	12
Other	38	16

Index Medicus: pre-clinical staff and clinical researchers showed a low level usage - *'once or twice a year', 'occasionally'.*

Current Contents: not generally used by subjects doing clinical work alone though a consultant said *'I find it a useful way of getting up to date'.* A postgraduate in biochemistry commented *'It covers the journals*

I usually scan for current research in my field - this is just covered by Current Contents so I have no need to look elsewhere.' Explanations of non-use were given by researchers, e.g. *'This is a waste of time. There are not enough references accessible in the department to make it worth-while.'* (dd/anat).

Science Citation Index: usage varied from *'once'* to *'The main reason for visiting RSL.'* (pg/path).

Abstracting journals: limited and low-level usage, for example, to find an English abstract, and again associated with research. Perhaps the subjects felt like the person who said *'I have given up using abstracts because it is more satisfying to get the journal itself.'* (ul/anat).

Other: about twice as many pre-clinical as clinical staff named other services. Few titles were mentioned more than once and only the Brain Information Service Publications were named by both clinical and pre-clinical staff. Pre-clinical subjects mostly named specialised services e.g. Biological Membrane Abstracts, and the clinical staff also mentioned the University of Sheffield Biomedical Information Service which provides a current awareness service (Express Bulletin) and re-packaged Index Medicus entries on selected topics (Economy Bulletin).

Of the 197 subjects 34 had not used any abstracting or indexing journal in the last twelve months. The reasons given are summarised in *'I have never found out how to use them efficiently - they always seem very complicated and take too long. Now I know where to look, which journals to read, and I flick through the contents pages. This is more satisfying and more sufficient because one can quickly establish what is in the papers. One also sees titles that would not normally be followed up. It is difficult to interpret the contents of a paper from the abstract.'* (ul/bioch).

3. Value of printed reference sources

The relative importance of various sources was asked in a structured question (clinical Q9/pre-clinical Q10). The heading 'frequency' was used in the clinical interviews. It was replaced by 'importance' in the pre-clinical interviews and so the answers are not comparable. This subject was also covered by Question 8 of the questionnaire which was a combined version of the interview questions 9 and 10 (see questionnaire analysis section : Reference Sources for the results of Question 8).

The main conclusions from the questionnaire Question 8 are:

1. Journals were the most important reference sources.
2. The research or practice component was the major influencing factor.
3. Index Medicus was important for practitioners.
4. Current Contents and specialised bibliographic services were important to anyone doing some research.
5. Research registrars, clinical lecturers and consultants particularly valued computer searches.
6. Books were most important to university lecturers as reference sources.
7. In general abstracting services are only valued by a few people.
8. 'Other' sources covered highly specialised subject areas.

Supplementary details from the interviews:

Abstracts and indexes: although these are valued and usage is widespread actual level of use is low, e.g. once a year. *'I rarely come across things I have not found already but they provide a safety-net for obscure things.'* (pg/bioch).

Journal indexes: these were usually used to find an article when a few details were known. Subjects sometimes used them when literature searching but pointed out that papers were usually picked up in current issues.

Books: subjects often specified a type of book e.g. monograph, symposium or review and remarked that books were too out of date to be much use as reference sources. However, books were used as a starting point for an unfamiliar topic. A typical comment about books was

'Other than for teaching, books are only useful for a new subject area' (rw/path).

Computer searches: at least 40% of the population had never used a computer search and many people had not heard of them. Some subjects assumed searches would be too expensive, or were completely discouraged by irrelevant references or were disappointed but still used them; others were very enthusiastic. The deterrent effect of assumed cost is difficult to assess. More clinical staff felt computer searches were important than pre-clinical staff, but the former had access to a well-advertised free service.

Other: the population named several review series such as Advances in ... , Clinics in ... , Annual Review of ... . Clinical subjects also mentioned drug company literature as reference sources. A quarter of the pre-clinical subjects mentioned abstracts or preprints of conferences (not the full proceedings). They also listed theses, correspondence and publishers information.

II QUESTIONNAIRES

CONTENT

The content of the questionnaires was largely the same as the interviews and covered the following areas: background information, value of documents as reference sources, use of libraries, and perceptions/expectations of library function.

Background information on status etc. was already available from the source lists (see Appendix C1). However, since the descriptive characteristics were to be used in analysing the evidence, the accuracy of this information was checked by eliciting similar details from the respondents in Questions 1 and 10. The correlation between status and degree of research was verified in Question 2. Reasons for seeking information were explored in the interviews but not in the questionnaires.

Experience in the interviews showed that meaningful replies could not be obtained without some discussion. This was felt to be a fundamental problem which could not be improved by a simple rewording of the question. With hindsight a possible solution may have been the procedure used for the questions on perceptions of library function, i.e. an open-response and a structured question on the same subject. The value attached to various documents as reference sources was examined in Question 8. In Questions 3 and 4 respondents were asked to list the libraries they used and give details about the frequency of use, length of visit and special reasons for using them. The most important section, about perceptions/expectations of libraries, was covered by several questions (Q5-7, 9). An open-ended question was followed by a structured question on the same subject in which respondents were asked to give relative judgements of importance and frequency of use for various specific reasons for using a library. The effect of library closing times was explored to reveal whether difficulties were caused to certain sub-groups of the population. Finally, an open-ended request for criticism was included and this provided an opportunity for airing problems and further comment.

VALIDITY AND STATISTICAL TESTS

The data collected by the questionnaire was qualitative (classificatory) and consisted of frequencies in discrete categories, i.e. measurements on the nominal scale. The chi-square test was chosen as an appropriate statistical test for the nominal level. It was used to test the assumption that groups differed in respect of some characteristic. In other words, it helped to distinguish between observed differences in relative frequencies due to chance variations and those due to relationships with some of the groups. The method and criteria for application recommended by Siegal[151] were followed. Results were accepted as statistically significant i.e. the difference

was real and not due to chance, if the calculated value of chi-square was significant beyond the 0.01 level. In the few cases where tests for rank correlation would have been useful correlations were so strong that tests were unnecessary.

The data presented and discussed in the next section are a selection chosen because they were felt to be important or revealing. Three types of results were obtained: (i) both statistically significant and important; (ii) illuminating but not statistically valid because the frequencies involved were too low for chi-square tests; and (iii) recurring themes that were not statistically validated but together indicated a trend. Appendix E2 summarises all the relationships tested that were significant at the 0.05 level or beyond.

ANALYSIS

The Respondents and their Background

(Major discussion; see interview analysis for minor discussion).

The breakdowns of the returns by status and specialty/subject characteristics are given in Appendix C2. There was negligible disagreement between background information supplied by the respondents and that gained from the source lists (see Appendix C1). 64% of the clinical respondents were medically qualified compared with 18% of the pre-clinical respondents.

1. Nature of the respondents' work

Question 2 gave valuable insight into the relative amounts of clinical practice, teaching, research and administration in each job as perceived by the person doing it. Clinical and pre-clinical research workers and postgraduates spent all their time on research, though a few did a little teaching (< 10% of their time). University lecturers

spent between 10% - 80% of their time teaching but this was concentrated in term-time and alternated with research in the vacation. Some also spent 6% - 10% of their time on administration which was often concerned with college matters. Departmental demonstrators spent 30% of their time teaching and the rest on research. The group of Professors was too small for generalisations. Only 3 pre-clinical respondents mentioned any clinical commitments.

The interviews had revealed a strong correlation between orientation (i.e. degree of research or practitioner content in the work) and clinical status. This relationship was confirmed by the questionnaires:

Nature of subjects' work	Orientation	Status
Mainly clinical practice + some research (< 25%) + some teaching (1-10%)	pract	cons, sr, reg, ho
Clinical practice (25%) + research (25-50%) + teaching (10-30%)	pract/res	hon cons, clin lect
Research (75%) + clinical practice (25%) + some teaching (1-10%)	res/pract	res reg
Mainly research + some teaching (1-10%)	res	rw, pg

Some bias with specialty was noted: workers in anaesthetics were practitioner oriented; workers in obstetrics and gynaecology, and community and laboratory medicine were research oriented; workers in medicine were oriented toward combined clinical and research work.

Orientation was not applicable to pre-clinical staff who were all effectively researchers.

2. Location and movement of respondents

An appreciation of the extent of the mobility of the population was desirable. Mobility could have had a profound effect on perceived availability and access to library services, and this was borne in mind when interpreting the data.

Unlike the clinical staff, the pre-clinical staff did not regularly travel about during the course of their work. 36% of them (mainly ul) made occasional visits to other locations, e.g. another science department or college. 63% of the clinical staff travelled to different sites. For example, anaesthetics workers routinely provided service cover at all sites though the department was based in the Radcliffe Infirmary. Similarly, practitioners (cons, sr, reg, ho) travelled about to see patients. The Radcliffe Infirmary was the central location with 54% respondents based there and another 26% visiting there.

Use of Libraries

(All discussion. Quotations from interviews are given in italics)

Answers to Questions 3 and 4 are presented here. These questions asked which libraries were used, what they were used for and how they were used (i.e. regularity, frequency, length of visit, route of use).

1. General pattern

Most (60%) respondents named 2 or 3 libraries in response to this section. Four people did not name any library at all, and the maximum number of libraries named by an individual was 7.

Two general principles emerged: (i) the pattern of use of individual libraries was related to their type and function; and (ii) the clinical and pre-clinical staff were similar in the way they used libraries. The respondents required (or chose to use) a wide range of libraries to satisfy their needs. The 457 clinical respondents named 84 different libraries and the 151 pre-clinical respondents named 27 different libraries (see Table 10 and Appendix E3). The normal pattern for the population was to use the appropriate hospital or science department library in conjunction with the Radcliffe Science Library (RSL). Departmental libraries were used regularly and at least once a week; quick visits (< 1 hr) were made to look at journals and current issues. The respondents also gave 'convenience' as a reason for

using their departmental library, probably because it could be used easily when they had a few spare minutes. Most clinical (69%) and pre-clinical (95%) staff also used the RSL and described their visits as infrequent and irregular, with a tendency towards visits lasting an hour or more. Interview evidence attributed this pattern to the deliberate accumulation of work, e.g. *'I save up my references till I have a day's work.'* (pg/anat). The respondents said they used the RSL because books or journals were not held elsewhere and the library held a wide range of journals in one place. Typical comments were *'I am more certain of getting the things I need from the RSL and so I use it most.'* (hon cons/lab); *'I use RSL when all else fails!'* (clin lect/lab); *'I go to the RSL for things that are not in the department.'* (rw/anat). The patterns of use of the different libraries are summarised in Table 11.

Table 10 : The commonest libraries named by clinical and pre-clinical staff *

Libraries named	Number of Users	
	Clinical (457 respondents)	Pre-clinical (151 respondents)
Radcliffe Science Library (RSL)	312	143
Cairns Library, RI	395	22
Department libraries, RI	198	-
Biochemistry department library	24	92
Department libraries, JRH	53	1
Churchill Hospital library	52	-
Royal Society of Medicine library	44	2
Department libraries, CHU	44	-
NOC library	39	-
Physiology department library	3	35
Pathology department library	1	29
Pharmacology department library	2	27
Anatomy department library	3	23
Various college libraries	7	12
Zoology department library	-	11
Psychology department library	7	3
Bodleian	8	2
Department library, CRH	10	-
Department library, KR	8	-
Department libraries, NOC	8	-
British Medical Association Library	7	-
Department library, SH	7	-
Regional Health Authority Library	7	-
Genetics Unit Library	-	6
Organic Chemistry department library	-	6
British Dental Association Library	6	-

* other libraries that were also mentioned are listed in Appendix E3

Table 11 : Variations in patterns of use of different types of libraries

Type of Use	All respondents (608)	Pre-clinical respondents (151)		Clinical respondents (457)			
	RSL	Own science department library	Other science department library	Cairns	Hospital department library	Society library	Other science department library
	%	%	%	%	%	%	%
Regular	37	88	14	35	66	10	35
Sporadic	63	12	86	65	34	90	65
Frequent (1/day - 1/week)	31	96	15	39	73	1	33
Sometimes (1/fortnight less often than 1/month	69	4	85	61	27	99	67
< 1 hr	25	47	69	60	58	33	20
> 1 hr	39	11	11	12	8	49	27
Mixture of long & short visits	36	42	20	28	34	19	43
Special reasons	Books and journals not held elsewhere Wide range of journals in one place	Journals Current issues Convenience	Journals in special subjects Journals not held elsewhere Convenience	Journals Current issues	Books and journals in special subjects Current issues Convenience	Books and journals in special subjects Books and journals not held elsewhere	Journals in special subjects Books and journals not held elsewhere Convenience

2. Differences between clinical and pre-clinical respondents

The clinical and pre-clinical staff were similar in most respects but two differences in detail emerged: (i) there was no equivalent to the Cairns Library for pre-clinical staff; (ii) the pattern of use of individual libraries varied with the user characteristics of the clinical staff, whilst no such variation was seen with pre-clinical staff. 69% of clinical respondents used the RSL and 86% used the Cairns Library. Like the RSL, visits to the Cairns were infrequent and irregular, but tended to be shorter and were for different reasons, i.e. current issues and journals in general. There seemed to be three tiers of library provision for clinical respondents - *'I begin by going to the NIMR Library [a department library], then go to the Cairns, and finally the RSL'* (clin lect/o & g). The Cairns Library was used most regularly and frequently by senior registrars, registrars, research registrars and clinical lecturers, and least often by people doing research only. Consultants and house officers used the Cairns irregularly. Conversely, the RSL was used more frequently by anyone doing some research and less often by people doing practice only. RSL users doing both research and practice and also consultants were more concerned with access to journals that were not held elsewhere, whilst interest in a wide range of journals increased with increasing research orientation. People working in Radiology, Accident Service (surgery) and the Special Care Baby Unit (paediatrics) stressed in the interviews the particular importance to them of departmental collections because they needed to be available in these departments most of the time: *'Ten minutes delay could be fatal for small babies so we cannot leave the area when on call.'* (ho/paed).

The way in which pre-clinical respondents used libraries of other departments was quite distinct from the way in which they used their own. Other department libraries were used quickly, irregularly and infrequently

because they were the most convenient sources of journals in specific subjects: *'It [Biochem. library] is nearer than the RSL.'* (pg/path).

3. Use of libraries outside Oxford

In the interviews (Q14) subjects were asked why they used libraries outside Oxford. Three types of answers were given: (i) subjects were visiting the parent organisation anyway for work purposes; (ii) the specialist nature of the collection made a special trip worthwhile; and (iii) habit, the subjects were used to that library. The type of additional libraries mentioned in the questionnaire (see Appendix E3) varied with user characteristics. Senior practitioners (cons, sr, hon cons) used libraries in other hospitals, the Royal Colleges and the Royal Society of Medicine (RSM). 10% of clinical respondents used the RSM library stating, e.g. *'I am a member. It is a habit, I used to work in London.'* (sr/o & g) and *'I use the RSM library in preference to the RSL, I am often in London for half a day and can ring up and have the articles brought out ready for me.'* (hon cons/med). Pre-clinical staff and researchers used libraries in other University departments or specialised collections such as the nearby United Kingdom Atomic Energy Authority Library.

4. Indirect use of libraries

In the interviews (not the questionnaires), subjects were asked: Do you use the libraries in Oxford by telephone, letter or via someone else? The frequency and reasons for this indirect use were also explored (Q17). About 60% of the subjects never used these indirect methods and clinical staff were more likely to use them than pre-clinical staff.

Table 12 : Indirect use of libraries

Indirect route	Clinical (97 subjects)	Pre-clinical (100 subjects)
Telephone	43	14
Letter	23	0
Someone-else	43	29

Telephone: the subjects used this route infrequently and usually checked whether a document was in the library. Other enquiries included checking references, making an appointment for a computer search, renewing loans and ordering photocopies. Most telephone contact was with the RSL, Cairns and Biochemistry libraries and was made by senior staff (cons, ul).

Letter: on rare occasions clinical subjects left notes for the librarian or sent lists of documents required or photocopy requests.

Someone-else: this was the most common form of indirect use, which, again, senior staff (ul, cons, hon cons) were most likely to employ. Subjects asked someone-else to check references or collect/return documents about three times as often as they asked another person to find some information. Usually colleagues were involved: *'I ask a colleague to copy an article for me if he is going to the RSL anyway. This happens about twice a year.'* (pg/bioch). University lecturers tended to delegate to their technicians.

Perceptions/Expectations of Libraries

(All discussion. Quotations from interviews are given in italics).

Users' perceptions of libraries were explored in terms of the value of library facilities (where facilities include staff, stock, services etc.) and inadequacies of libraries.

1. Value and use of libraries

This topic was covered by two complementary questions, one unstructured (Q5) and the other structured (Q6). Question 6 was designed to get the views from all respondents about the relative value of each of 12 specific library facilities. This list reflected the interests of traditional library management. In contrast, Question 5 allowed respondents to state in their own words what facilities they felt to be valuable. The structured approach ensured sufficient answers for statistical tests which could not be guaranteed in an open-response

question like Question 5. Respondents do not necessarily answer questions in order, so Question 6 could have influenced answers to Question 5. It was placed on the other side of the page to reduce this effect as much as possible.

Question 6 said: Please indicate the relative importance to you of the following specific reasons for using a library, and the frequency with which you use each facility. The results are presented in Table 13. Ranking was calculated by the allocation of 3 points for 'important/ frequently' responses, 2 for 'useful/sometimes' and 1 for 'no interest/ rarely'. Use of different weighting schemes had little effect on ranking order. Value and frequency of use were highly correlated.

Overall pattern: journals, both as current or back issues clearly dominated as the most important reason for using a library. Books, photocopies and literature searches were the next most important reasons. Photocopying journals was valued and used more than borrowing journals but the converse was true of books.

Clinical v. pre-clinical respondents: these respondents were similar in most respects but two differences were apparent: (i) pre-clinical users ranked literature searching higher in value (but not in use) than consulting books; (ii) they ranked photocopying part of a book higher than clinical respondents, and computer searches lower.

Variations with user groups: the value and frequency of use of the following aspects increased with increasing research orientation of the clinical respondents: earlier journal issues, latest journal issues, literature searches, photocopying journals and books. Senior registrars used the latest journal issues more than other user groups. Respondents doing both practice and research valued and used interlibrary loans and computer searches more than other groups. They also used journal lending facilities more. Junior staff (reg, ho, pg) appreciated and used the

Table 13 : The relative use and value to the respondents of various reasons for using a library

Reasons	Percentage* Clinical response (457 respondents)								Percentage* Pre-Clinical response (151 respondents)							
	IMPORTANT	USEFUL	OF NO INTEREST	FREQUENTLY	SOMETIMES	RARELY/NEVER	RANK USE	RANK VALUE	RANK USE	RANK VALUE	IMPORTANT	USEFUL	OF NO INTEREST	FREQUENTLY	SOMETIMES	RARELY/NEVER
For looking at earlier issues of journals in the library	83	17	0	68	31	1	1	1	2	2	88	12	0	83	16	1
For looking at the latest issue of a journal in the library	71	28	1	67	29	5	2	2	1	1	89	10	1	88	11	2
For consulting books in the library	54	45	2	38	52	9	3	3	4	5	56	40	4	36	56	8
For obtaining a photocopy of a journal article	56	39	5	39	44	17	4	4	3	4	57	40	3	47	45	9
For carrying out your own literature searches	53	41	6	29	54	17	5	5	5	3	62	33	5	31	55	14
For obtaining loans or photocopies from other libraries	49	42	9	16	47	37	7/8	6	10	8	30	57	13	6	37	57
For borrowing a book from the library	34	56	9	18	53	28	6	7	6	6	36	52	12	12	56	32
For a computer search	32	46	22	8	46	46	11	8	12	12	13	52	35	2	19	80
For borrowing a journal from the library	26	56	18	18	42	41	7/8	9	7	9	25	53	22	16	44	40
For a quiet place to work	30	37	33	16	40	44	9	10	8	10	26	33	41	19	35	47
For obtaining photocopies of part of a book	23	56	21	10	46	44	10	11	9	7	22	66	12	8	46	46
For advice and guidance from the library staff (excluding help with computer searches)	19	60	21	5	47	47	12	12	11	11	14	42	44	2	38	59

* percentages refer to the response to each reason

library as a quiet place to work. House officers, registrars and university lecturers valued consulting books and borrowed them more often than other users. Although help from staff was least important in the overall pattern, this service was valued by pre-clinical research workers. This may be because they were more likely to use unusual documents and needed help to find them. Their response may be related to their appreciation of simple cataloguing and classification which emerged in Question 5.

Answers to Question 20 of the interviews provided further supporting evidence. This question was virtually identical to Question 6 of the questionnaire. People who did not use the latest journal issues in the library or did not value them highly explained that they received these journals by other means, such as, their own subscriptions or via circulation. Likewise, readers who showed little interest in photocopying in the library said they had access to a machine in their department.

Note on the wording of Question 6: In retrospect it was realised that the answers may have been biased towards 'important' and 'useful' by the terminology 'of no interest'. A better heading would have been 'of limited interest'.

Question 5: What do you consider are the most important facilities in terms of stock or services which libraries should provide? This question was only answered in 84% of the returns (385 clinical, 125 pre-clinical). The replies were classified into categories. Although 10 replies were allowed per respondent, no-one gave more than 8 and the average was 2 or 3. The breakdown for clinical v. pre-clinical staff showed a similar pattern except that only 21% of the pre-clinical staff mentioned

bibliographic services compared with 34% of the clinical staff.

Table 14 : Percentages of staff replying to Question 5 mentioning each facility

Facilities	All staff (510)	Clinical staff (385)	Pre-clinical staff (125)
Journals	84%	83%	84%
Books	50%	50%	52%
Photocopying	42%	40%	46%
Bibliographic services	31%	34%	21%
Ease of use	29%	28%	31%
Interlibrary loans	19%	19%	17%
Lending	16%	16%	17%
Physical environment	11%	11%	10%
Library staff	9%	9%	6%
Miscellaneous	9%	10%	8%

In the following section each category is discussed in detail and variations with different user groups are noted. The number of staff making the comments are stated in brackets and some quotations from the interviews are included as illustrations.

Journals: a wide or comprehensive range (153), current issues (120), easy availability and access (102), back issues (52). Other factors mentioned were complete sets, review series and the value of a good selection: *'Ready access to journals and ready availability of back numbers.'* (hon cons/lab); *'Good coverage of journals of an inter-disciplinary nature. It is excellent if there are also unusual journals - especially foreign ones.'* (ul/bioch); *'Current and up-to-date journals is the most important requirement. Then back issues and review articles.'* (rw/bioch).

Books: textbooks (82), up-to-date (80), wide selection (45). Other factors mentioned were monographs, standard references, conferences, theses, expensive volumes and multiple copies. House officers and registrars were particularly interested in books; house officers made most of the comments about textbooks. *'I am about to take exams and*

need textbooks.' (reg/lab); *'I want the new, latest textbooks on special subjects, the older ones aren't much good.'* (ho/med); *'Elementary textbooks for teaching.'* (dd/anat); *'Books, monographs and handbooks.'* (ul/physiol); *'Expensive books, standard reference books, reviews.'* (pg/pharm); *'The 'Medicine series' is very good and most junior doctors are satisfied with this.'* (ho/med).

Photocopying: university lecturers and practitioners made least mention of photocopying. *'Photocopies - but I will take notes if I am seriously interested.'* (ul/biochem); *'Do it yourself photocopying. This encourages people not to take journals away. One can write on them.'* (rw/pharm); *'Especially for crucial papers and lab. techniques.'* (pg/physiol).

Bibliographic services: bibliographic tools in general (77), computer searches (84), Index Medicus (26). None of the pre-clinical staff mentioned Index Medicus. Certain groups of the clinical staff were more interested in bibliographic services, i.e. senior doctors (cons, sr) and those doing both practice and research, whilst junior doctors (reg, ho) and researchers (rw, pg) were least interested. (Computer searches followed a similar pattern but it was only significant at the 0.05 level). *'Facilities for literature searches, i.e. abstracts and computer.'* (hon cons/ o & g); *'Bibliographic tools, e.g. the Citation Index.'* (dd/bioch); *'some means of finding information, e.g. Index Medicus.'* (sr/paed).

Ease of use: simple cataloguing and classification (53), ability to browse (34), long opening hours (27). There was some evidence to suggest that research workers were more interested in simple cataloguing and classification (chi-square test not applicable). *'A catalogue or indexing system that is simple enough to use oneself without needing to ask for help.'* (cons/lab); *'I would hate not to be able to browse. I*

get items I might not get in a systematic search this way.' (rw/path); *'A good catalogue which is easy to use and clearly labelled shelves so it is easy to find documents.'* (rw/lab).

Interlibrary loans: staff doing both practice and research were more interested in interlibrary loans. *'I want to get hold of almost anything without delay, for example, journals listed in Index Medicus in, say, 10 days.'* (hon cons/med); *'Acquisition of volumes on interlibrary loan. For electron microscopy one needs to see the presented illustration, a photocopy will not do.'* (ul/anat).

Lending: facilities wanted (32), facilities should be restricted (26), should not be allowed at all (21). These comments were not related to any particular user groups. The restrictions that were suggested were limited borrowing overnight, general discouragement and limiting loans to books and not journals. The conflict is illustrated by the following remark: *'I borrow volumes but am often inconvenienced by the absence of volumes I wish to read - on balance I would be happy if there were no borrowing at all and the volumes were on the shelves.'* (rw/surg). *'Could have a lending service though this is not necessary if photocopies are good and quick.'* (rw/bioch).

Environment: quiet (33), working area (18), space (15). There is some indication (chi-square test not applicable) that research workers and postgraduates were more aware of the environment, possibly because they spent more time working in libraries than the other groups. *'Peace and quiet. The "working do not disturb" aura is much appreciated.'* (res reg/o & g); *'Quiet, somewhere to work, space - large tables.'* (rw/path).

Library staff: staff doing both practice and research mentioned help from Library staff more than other user groups, e.g. *'The knowledge of a librarian to find things I cannot find.'* (clin lect/lab); *'Help from a librarian, but this is not often needed.'* (ho/med).

The results of Questions 5 and 6 were consistent. Mutually supporting evidence was lacking in two instances: (i) help from library staff was valued by people doing both research and practice in Question 5 and by pre-clinical research workers in Question 6; (ii) Question 5 did not support the value of the library as a quiet place to work for junior staff (Q6). The following consistent relationships of use and value were noted: photocopying by anyone doing some research; books by university lecturers, house officers and registrars; interlibrary loans by people doing research and practice; and computer searches by senior practitioners and people doing both research and practice.

2. Inadequacies of libraries

This topic was covered by two questions (Q7 and Q9). Question 7 concentrated on library closing times and their effect on different user groups. Question 9 was an unstructured question where respondents were asked to criticise the library service.

Question 7: Do library closing times affect you? If so, how?

Most people made one comment about how they were affected and no respondent gave more than three answers.

About a third (201) of the respondents were affected in some way. 80% of the comments made by these people were about the RSL, and the main causes were: early evening closing in the vacation (100 respondents), and Saturday afternoon closing in the vacation (63). Obviously, the answers were influenced by the various library policies which are summarised as follows:

Cairns : full-services 9 a.m. to 5 p.m.
access via key after 10 p.m.

RSL : full-services 9 a.m. to 5 p.m. and Saturday a.m.
minimal services and staffing after 5 p.m. and Saturday p.m. in term-time.
closed evenings and Saturday p.m. during vacation.

Department libraries : usually access available when the department is open and to key holders when closed.

Virtually all comments referred to lack of opening rather than to lack of services (e.g. access to locked cases, closed stacks or professional advice) out of normal working hours.

It was thought that certain groups of people might be affected by library closing times, in particular, clinical staff with commitments during normal working hours. However, the effects increased with increasing research orientation and not amount of practice. No one group of pre-clinical staff were affected more than the others, but clinical lecturers and hospital-based postgraduates were particularly affected, also research workers at the Nuffield Institute for Medical Research. (NB. all heavy RSL users).

The interviews supported this picture. Comments suggested that readers were only slightly inconvenienced by not being able to use the RSL in the vacation evenings. A departmental demonstrator replied *'Shutting at 5 p.m. is not very serious - I tend to think "I cannot go", rather than try to.'* and a clinical lecturer said *'No, except occasionally when work is slack, and then the RSL is often closed so I cannot go anyway - especially in vacations like Easter.'* A postgraduate at the Nuffield Institute for Medical Research suggested the RSL opened at 8 or 8.30 a.m. *'Then I can get there before going up to the Institute.'*

Question 9: In what ways are the library facilities which are available to you inadequate? Please range as widely as you like in your criticisms. This question was only answered in 77% of the returns (350 clinical, 117 pre-clinical), and house officers showed a lower than average response (57%). The replies were classified into categories and up to 10 answers were allowed per respondent. No-one gave more than 7 replies and most people gave 1, 2 or 3. The types of criticisms are illustrated by comments from the interviews.

382 people made critical comments, though a few qualified their remarks by expressing general satisfaction, e.g. *'We are well served in Oxford.'* (cons/lab), and *'I am not a great library user. I have never found the libraries here restrictive in any way - they are adequate for me.'* (ul/physiol). 85 people said that library facilities were adequate. Difficulties concerning lack of access or availability formed the most revealing group of criticisms. Otherwise comments related to specific libraries or the photocopying facilities.

Availability: 137 people commented on this area. The most common complaints were about documents not being where they ought (or were expected) to be (50 people affected) and the absence of journals which had been sent to the binders (44). Clinical staff, in particular workers at JRH and NIMR, mentioned difficulties in getting access to libraries and included car parking problems. Delays in interlibrary loans and documents not being available in Oxford were also noted: *'Current journals are slow to get on the shelves in the RSL. It is difficult to find journals which have been taken out and left around, they are not reshelved. Borrowing is also a nuisance.'* (rw/physiol); *'There is a problem about binding time. Journals are sent off just about the time they are referred to in the indexes and search tools.'* (cons/lab); *'It is difficult to get in [Cairns] and talk about a MEDLINE search because of the parking difficulties. It is a waste of time and takes an hour to*

get there and back.' (clin lect/o & g at JRH); *'My interlibrary loans took too long and so I was put off getting any more.'*(res reg/med).

Lending v. no lending: the conflict which emerged in Question 5 has appeared again here. Documents not being where they should be was blamed on many factors including lending. On the other hand, the RSL was criticised for lack of lending facilities (only a few privileged readers may borrow), especially for books. Obviously for some, this was a heartfelt need: *'Not being able to borrow from the RSL drives me up the wall! It is very difficult but only applies to books, journals can be photocopied.'* (pg/bioch).

Photocopying: 69 people made critical comments about these facilities, and 56 people specifically mentioned the service at the RSL which happened to be unusually slow at the time (Nov./Dec. 1979). Post-graduate users were most affected: *'Photocopying is very expensive, the department will not pay, and I cannot do it myself so there is a delay.'*

Radcliffe Science Library (RSL): 172 of the 538 respondents who said they used this library made some criticisms. More pre-clinical respondents (59%) than clinical respondents (29%) made comments. Apart from the main problem with the photocopying service, sources of trouble were the closed stack (56 people affected), the lack of lending facilities (25), the complicated layout of the library (23) and the complex catalogue (22, mainly rw). Typical comments from the interviews were: *'Many books are in the stacks, so they are inaccessible and cause delay.'* (rw/path); *'The RSL is good because there are many journals, but they are hard to find or time-consuming to get at.'* (rw/physiol); *'The index system is not easy to use. I find RSL difficult anyway but it may be me - I don't use it enough to know it.'* (pg/bioch); *'There is a bizarre classification system which seems to be arbitrary!'* (rw/lab).

Cairns Library: 116 of the 417 respondents who said they used this library made some criticisms. 50 people commented on the poor journal stock and 35 (mainly reg, ho) on the poor book stock. Other factors mentioned were noise and lack of space. *'Journals don't go back far enough and there isn't enough space and privacy.'* (sr/surg); *'I'm on training and so need to borrow books for a long time. Most training grades need these books and have to buy them, especially American text-books.'* (reg/surg); *'The Cardiology books are out of date and only a very narrow spectrum is represented. Books are best for clinical practice because the data in journals changes.'* (res reg/med).

Department libraries: 60 of the 395 respondents who said they used their department library made some criticisms. 20 people complained that a particular journal title was not taken by these libraries but these remarks were often qualified: *'It would be better if the library took "Plasmid" and "Gene", but there are obviously limits!'* (pg/bioch); *'There isn't a wide range of journals but one cannot expect it.'* (clin lect/surg).

Value of Reference Sources

(Minor discussion; see interview analysis for major discussion)

Question 8 was a structured question which asked respondents to rate the relative values of various printed reference sources. The results are shown in Table 15. Ranking was calculated by the allocation of 3 points for 'important', 2 for 'useful' and 1 for 'no interest'. Use of different weighting schemes had little effect on rank order.

Journal articles dominated as sources of references for both clinical and pre-clinical respondents, but in other respects there were substantial differences. These were attributable to the nature of the respondents' work, i.e. whether they had any research or practice commitments; and to the lack, for the researchers, of a single pre-

Table 15 : The relative value to respondents of various printed reference sources

Reference sources	Percentage* Pre-clinical response (151 respondents)				Percentage* Clinical response (457 respondents)			
	Important	Useful	No interest	Rank	Rank	Important	Useful	No interest
	%	%	%			%	%	%
Other journal articles	93	7	0	1	1	82	17	1
Journal indexes eg. annual indexes to individual titles	43	51	7	2	3	38	44	18
Books	28	64	8	3	5	27	62	11
Current Contents	39	40	21	4	6	27	46	27
Index Medicus	22	43	35	5	2	55	33	12
Computer Searches eg. Medline	13	32	54	6	4	37	32	22
Excerpta Medica	9	28	63	7	7	12	46	42
Science Citation Index	15	38	48					
Biological Abstracts	10	41	49					
Chemical Abstracts	7	27	66					

* percentages refer to the response to each reference source

eminent service comparable to Index Medicus. Respondents who did some clinical work (pract, pract + res) valued Index Medicus as a reference source, whilst people who did some research work (pre-clinical staff, res, pract + res) valued Current Contents and a wide variety of other specialised services. However, 63% of the former group rated Index Medicus 'important' and only 39% of the latter group rated Current Contents 'important'. University lecturers were more likely than other groups to value books highly as reference sources, possibly because they provide references suitable for teaching.

The respondents were asked to specify any specialised lists, abstracts etc. that had not already been covered. People doing research provided most of the replies here and mentioned 28 titles, few of which were named by more than one respondent. They covered highly specialised services such as Muscular Dystrophy Abstracts or the Brain Information Service. A few other sources were also mentioned, e.g. circulated contents pages, drug company literature and lecture lists. In addition 16 respondents mentioned their colleagues as reference sources, although the question did not ask about personal contact.

The pre-clinical respondents were also asked to rate the value of the Science Citation Index, Biological Abstracts and Chemical Abstracts. Only 15%, 10% and 7% of respondents respectively, said these services were 'important'. The clinical respondents were not specifically asked about these services and relatively few people mentioned them. The percentages of clinical respondents naming these services were 4% Science Citation Index, 2% Biological Abstracts, 2% Chemical Abstracts and 1% Psychological Abstracts.

Variations with Specialty and Location Characteristics

Relationships between responses and specialty were apparent but could be satisfactorily explained in terms of the relative numbers of workers in the practice/research spectrum in each specialty. High proportions of

people in obstetrics and gynaecology, community medicine and laboratory medicine did research, while many people in anaesthetics did clinical practice. Use of the RSL and photocopying facilities and value of Current Contents increased with research orientation and these patterns were reflected in the breakdowns by specialty.

Library use was related to location as expected. The Cairns library was not used often by people based at the Nuffield Orthopaedic Centre (chi-square not applicable) which has a substantial site library and by anaesthetics workers who also have their own staffed departmental library (significant at the 0.02 level).

SUMMARY OF CONCLUSIONS

1. *The completed questionnaires adequately represent the population being surveyed.*

2. *Clinical and pre-clinical subsets of the population are similar with respect to library usage.*

Use of libraries - the types of libraries used and the way in which they are used follow a similar pattern:

clinical staff : department library + RSL + Cairns
pre-clinical staff : department library + RSL

departmental libraries : valued for immediacy and convenience; quick, frequent visits.

RSL (and Cairns) : valued for wider collections, and to supplement use of department libraries; less frequent and longer visits.

Reasons for using libraries - these are listed in decreasing order of importance:

1. journals
2. books, photocopies
3. bibliographic services, ease of use
4. interlibrary loans, lending, environment, library staff.

Inadequacies of the library service - these were:

Lack of access to or availability of documents
Problems with photocopying services
RSL - (photocopying service), closed stack, difficult to use
Cairns - poor book and journal stock

Only a minority of users were affected by library closing policies. The cause was reduced opening hours during vacation, not reduced services.

Sources of references - Journal articles were the prime source.

These similarities between clinical and pre-clinical staff outweighed the differences between them. The differences are discussed below.

3. *The characteristic which has the greatest influence on information-seeking behaviour and library usage is the degree of research or practice orientation amongst the clinical staff (pre-clinical staff are all research-oriented).*

Thus there are three main user types:

Practitioners - nearly all time spent on practice

Researchers - nearly all time spent on research

Practitioner-researchers - at least 25% of time spent on practice and 25% on research

Differences in behaviour between these user types

(i) Respondents with research activities (res, pract + res) were more likely to use RSL than practitioners. Respondents with clinical duties (pract, pract + res) were more likely to use the Cairns than researchers. The former also had access to additional medical collections such as the library of the Royal Society of Medicine.

(ii) The importance of journals, photocopying and literature searches to the population increased with increasing research orientation.

(iii) Respondents doing both practice and research (pract + res) valued the following more than the rest of the population: bibliographic

services (including online retrieval), interlibrary loans and help from library staff.

(iv) Index Medicus was valued as a reference source by anyone doing clinical practice (pract, pract + res), whilst Current Contents and specialist bibliographies were valued by anyone doing research (res, pract + res).

4. *Some variations in detail are observed with the other user characteristics.*

Status - (i) Of the clinical staff postgraduates and clinical lecturers were most affected by the RSL closing policy. (Pre-clinical postgraduates were not affected more than other groups).

(ii) Both clinical and pre-clinical postgraduates were affected by delays in the RSL photocopying services and more so than any other group.

(iii) Senior doctors (cons, sr) were more likely to use computer searches and valued them more than junior doctors (reg, ho) and research workers.

(iv) Junior staff (reg, ho, pg) used libraries as a place to work.

Specialty - Observed variations with specialty could be explained in terms of research or practice bias.

Location - People working at the John Radcliffe site had more difficulties than other users in respect of library access. Visits to the Cairns and RSL often involved car journeys and problems of car parking were mentioned.

5. *Some user groups value books more than others.*

Registrars and house officers valued, used and borrowed books more than the other clinical staff. They made most criticisms of the Cairns bookstock. House officers often mentioned textbooks. There is some

evidence that university lecturers are more likely to use and borrow books than the other pre-clinical staff. They valued books as important reference sources.

6. *There are conflicting attitudes towards lending facilities.*

The population as a whole showed little interest in lending facilities. The minority of respondents who commented were equally divided between reduction and expansion of facilities. The former said the increased chance of finding a document when needed was more important than the inconvenience caused by lack of lending facilities.

CHAPTER 7 - FEEDBACK FORMS : A CRITICAL INCIDENT METHOD

AIMS

(i) To complement the questionnaire data on the relative use of library facilities. The questionnaires asked respondents to generalise about their own actions; the critical incident method asks people to recall a particular recent incident and describe the action they took.

(ii) To maintain an awareness of who were clinical and pre-clinical staff so that they could be distinguished from the rest of the library users during the observation sessions.

METHOD

During selected sessions all users leaving the RSL or Cairns Library were stopped and asked their department and status, which was recorded. Those belonging to the survey population were then asked to indicate their status and the library services which they had used on that particular visit by ticking replies on the feedback form (see next page). Sessions of feedback forms were alternated with sessions of observation according to a timetable (Appendix F1).

The RSL was surveyed during June/July 1979 and Oct/Dec 1979 to cover both vacation and term-time which might affect patterns of use. The Cairns Library, JRH, was surveyed only in Oct/Dec 1979.

RESULTS AND DISCUSSION

Effect of Term on RSL Use

The total number of people leaving the library was higher in term-time due to the presence of undergraduates. The number and content of the feedback forms completed by the survey population were unaffected.

FEEDBACK FORM

A SURVEY OF THE USE OF THE RADCLIFFE SCIENCE LIBRARY BY WORKERS IN THE MEDICAL AND LIFE SCIENCES

1. What is your Department?

CLINICAL MEDICINE	BIOCHEMISTRY	ANATOMY
PATHOLOGY	PHYSIOLOGY	PHARMACOLOGY

2. What is your status?

Professor, Director*	Consultant (and Hon. Clin. Lect.)
Reader*	Senior Registrar
University Lecturer*	Registrar
Departmental Demonstrator	Senior Houseman, Houseman
Research Worker	Clinical Reader (and Hon. Cons.)
Postgraduate	Clinical Lecturer (and Hon. Reg. etc)
* also Hon. Cons.	Research Worker (and Hon. Reg. etc)

3. Whilst in the library did you use or consult any of the following:

Lending facilities for journals, e.g. to borrow or return an item.

Lending facilities for books.

Interlibrary loan facilities, e.g. to request or return an item not held by the Library

Photocopying facilities, e.g. to request or collect an item. *or to 'do-it-yourself'*

Card catalogues

Journals from the closed stack / *locked shelves*

Books from the closed stack / *locked shelves*

Journals from the open shelves.

Books from the open shelves.

Current journal issues.	*Computer Search.*
Index Medicus.	Excerpta Medica.
Current Contents.	Chemical Abstracts.
Science Citation Index.	Biological Abstracts.
Your own material.	Another Abstracting journal.

4. Did you ask the Library staff for assistance?

NO YES

5. Did you fail to find what you were looking for?

NO YES (specify):

* *Italic type represents altered wording for Cairns Library forms.*

The Survey Population as a Proportion of the Total Users Leaving the Library

The survey population represented only 4% of all RSL users encountered but 33% of all Cairns users encountered.

Table 16 : Categories of people leaving the libraries

	Survey Users (completed forms)		Non-survey Users	Unidentified Users
	Clinical	Pre-clinical		
RSL	36	40	1623	113
Cairns	196	1	319	75

No-one refused to complete a form. Some users were unidentified because another reader was completing a feedback form at the time and the researcher could not speak to two people at once.

In general, more readers left RSL during afternoon sessions than at other times, and more left the Cairns during lunch sessions.

Comparison of Radcliffe Science Library (RSL) and Cairns Library over Oct/Dec Period

The completed forms showed marked differences between these libraries. 197 Forms were completed at the Cairns Library compared with 76 at the RSL for the same period (i.e. an average of 10 forms/hour at the Cairns v. 4 forms/hour at RSL). Only 1% of the forms at the Cairns were completed by pre-clinical staff compared with 53% at RSL. Analysis by practice/research orientation showed that few pure practitioners completed forms in RSL and supported questionnaire data in this respect.

Table 17 : Distribution of feedback forms by clinical orientation

	Cairns		RSL	
Clin	36%	(71)	8%	(3)
Clin/Res	11%	(21)	19%	(7)
Res/Clin	15%	(29)	19%	(7)
Res	39%	(76)	53%	(19)
Total	101%	(197)	99%	(36)

Visits to the Cairns Library were more likely to concern one activity than those to the RSL ($\rho = 0.01$). Moreover, these visits were usually made by practitioners, especially house officers.

Table 18 : Comparison of activities in the Cairns and Radcliffe Science Library (RSL)

Activity	Cairns	RSL
	%	%
Current journals	22	4
Open-shelf journals	17	22
Lending books and journals	11	7
Open-shelf books	10	14
Photocopying	8	13
Bibliographic tools	9	10
Catalogues	7	17
Own material	7	4
(Remaining categories)	9	9
Total	100% (350 ticks)	100% (195 ticks)

The Cairns Library was more likely to be used for current journals and lending facilities, whilst readers at the RSL were more likely to use open-shelf journals and catalogues. This evidence reflects the organisation of the RSL where it is necessary to use the catalogue in order to find a document and where there is no separate display of recent journal issues. The Cairns Library has an alphabetical arrangement of bound journals and a current periodicals display.

Time of day had no effect on the RSL ticked activities, whereas in the Cairns use of current journals and newspapers was heaviest in lunch sessions and use of open-shelf journals was lightest.

Failure

Question: Did you fail to find what you were looking for?

The number of and reasons for failure were similar for both RSL and the Cairns. About 20% of readers failed to get what they wanted in each case.

Table 19 : Failure v. success

	Cairns		RSL	
failed	22%	(44)	21%	(16)
not failed	78%	(153)	79%	(60)
Total	100%	(197)	100%	(76)

The main reasons for failure were documents not held in the Library (15 Cairns; 2 RSL) and documents not available in the library, i.e. in use, on loan, at binders, not found (16 Cairns; 7 RSL). Other reasons given were photocopies not ready for collection or information not found. The reasons for failure were similar to comments about unavailability given in answer to the questionnaire Question 9 'In what ways are the library facilities inadequate?'

On reflection, it was felt that the wording of the question 'Did you fail to find what you were looking for?' was too vague and open to such wide interpretation that the responses had to be treated with care. However, being more specific, for example asking 'Did you fail to find a particular document?' excludes other possible types of failure. Failure can be clear-cut - the unavailability of a particular document, or ill-defined - failure to find some expected information. An absence of information is not necessarily regarded as a failure, indeed, it is the raison d'être of original research. One reader qualified his failure to find a particular document by saying *'I did not expect the library to have this, so has it failed?'*. In general, comments did imply that failure in this context was assumed to be 'failure of the library to have certain documents available', and unfulfilled expectations often gave rise to expressions of annoyance.

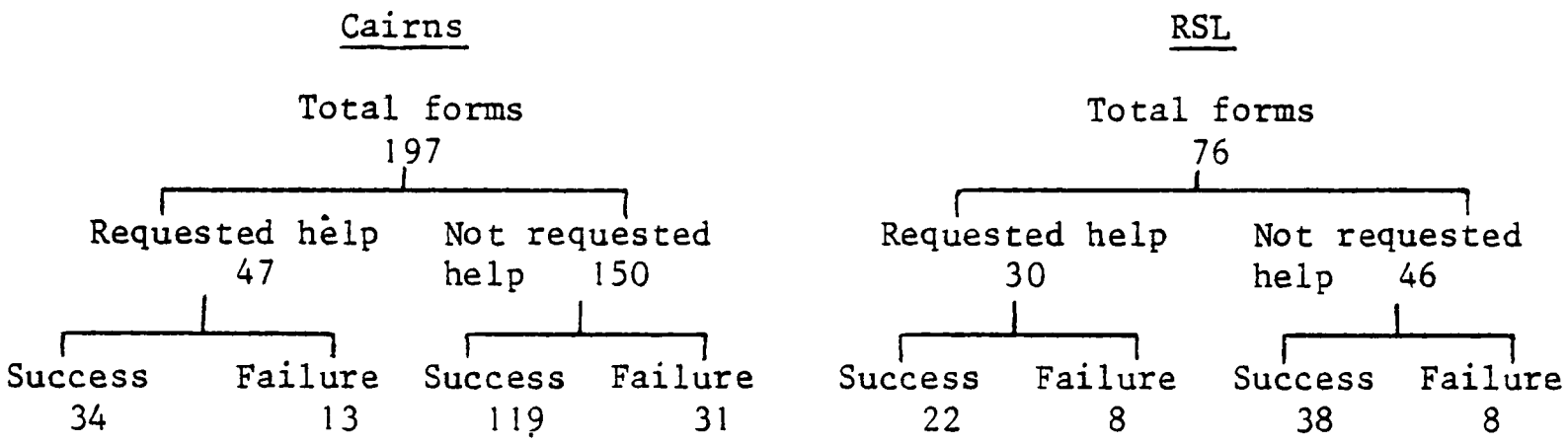
In conclusion, one should be cautious of reading too much into data gained at this level of enquiry. Although it provided some insight into 'failure', this question indicated the need for a more detailed study.

Seeking Assistance

Question : Did you ask the library staff for assistance?

There is a significant difference ($p = 0.01$) between the numbers of people asking for help and the libraries used. Only 24% (47) of the survey users at the Cairns Library, compared with 39% (30) at the RSL, indicated that help was sought. Requests for help at the Cairns Library varied with practitioner / research orientation ($p = 0.05$): practitioners were least likely to seek help whilst people doing both practice and research work were most likely to seek help. This evidence supports the trends already seen in the questionnaire (Q5 and Q6).

Failure and Seeking Assistance



In both libraries about 20% of the people who did not ask for help failed to get what they wanted. Would they have succeeded if they had asked for help? Why did they not ask for help? Perhaps failure acts as an arbitrary mechanism for keeping reading in manageable proportions, or some people do not like asking for help. Maybe a successful outcome is perceived to be (or actually is) highly unlikely. This is quite possible since one in four people who do get help still fail to get what they want.

SUMMARY OF CONCLUSIONS

1. There was no difference in use of RSL by the survey population in October (Term) and July (Vacation).

2. The survey population represented only a proportion of total users encountered (4% RSL; 33% Cairns).

3. There were many differences between the RSL and the Cairns Library.

(i) the types of users reflected the questionnaire pattern;

(ii) the actions on each visit reflected the organisation of the libraries:

Cairns - current journals display/lending facilities
RSL - open-shelf collection/catalogues.

4. 20% of users failed to get what they wanted.

5. People doing both practice and research sought help more than other groups.

6. 20% of users who did not seek help failed to find what they wanted.

7. *Evidence gained from feedback forms supported questionnaire data. There were no conflicts.*

CHAPTER 8 - DIRECT OBSERVATION

AIMS

(i) to ascertain the relative use of library services;

(ii) to estimate the proportion of the total use of the Radcliffe Science Library (RSL) and the Cairns Library by the survey population;

(iii) to monitor enquiries from the survey population, i.e. obtain a quantitative estimate of the pattern of enquiries and an assessment of their content.

METHOD AND DISCUSSION

The procedure that was finally adopted was governed by the physical layout of the libraries and involved an observer making written notes of specific events such as use of the catalogue or the nature of enquiries. Alternative techniques, e.g. videotape and sound-recording, were considered and discarded because of technical difficulties.

Sessions of observation were alternated with sessions of feedback forms (see Appendix F1) to aid identification of users which presented special difficulties during observation. In observation all events were recorded and categorised by type of use and type of user (e.g. clinical, pre-clinical, nurse, undergraduate). This categorisation was done by the observer who never contacted the users but relied on visual indicators such as name badges, uniforms, signatures, and her knowledge of the readers. This knowledge was constantly revised and checked through the feedback form sessions where each reader leaving the library was asked their status. The 'unidentified' category was used if there was any doubt about user type.

The Cairns and RSL had to be divided up into observation areas (see Appendix G) since it was impossible to see all the service points at once and because there could be a lot of events to record during busy periods.

The observer changed area every 10 minutes. Some types of event were dependent on the way each library was organised. For example, use of Index Medicus was recorded during observation of the Cairns Library but not during observation of RSL where it was housed in a reading room. The Cairns was adequately covered by two observation areas whereas the RSL needed four, and so the number of events in these libraries cannot be compared.

Events were recorded as they occurred in as much detail as possible. This procedure was preferred to ticking prepared categories which demanded instant and irrevocable decisions about events and was liable to error in busy periods. The recorded details were subsequently transferred to edge-notched cards for analysis. Decisions about categories and the constitution of an 'event' were made at this stage. One card was used for one event. This procedure led to a lot of analysis but enabled consistent categorisation in the light of all the data.

RESULTS AND CONCLUSIONS

The conclusions presented below are only valid if users have been correctly identified. The researcher is convinced that this was achieved.

Effect of Term on RSL Use

The number and type of events from the survey population were unaffected as in the feedback forms. However, the total number of events increased in term and decreased in vacation as undergraduate numbers varied.

The Proportion of the Total Use of the Libraries by the Survey Population

Table 20: The number of events observed by type of user

Library	Number of events observed				
	Survey Users	Non-survey Users	Unidentified Users		Total Users
Cairns	424	218	14	=	656
RSL	90	382	60	=	532

65% of the events observed at the Cairns Library were attributed to the survey population and 17% at the RSL. Feedback form data showed that the survey populations formed 33% of total users leaving the library for the Cairns and 4% for the RSL. So it seems that, while the survey population is only a small part of the total users of each library, it is more active than the other users and makes more demands on library services. This has important implications for management of the Cairns Library where library staff may be more aware of use by clinical staff and consequently under-estimate use by other groups which is less obvious.

Use of the Cairns Library Services

The library was significantly busier on Mondays (166 events) and quieter on Fridays (115 events). Only one event was from a pre-clinical user and 423 were from clinical users. An average of 21 events/hour were observed from the survey population.

Survey users were responsible for most use of the photocopier, bibliographies, interlibrary loans and current periodicals; while nurses and medical students (i.e. non-survey users) made more enquiries and loans.

Table 21: Type of event observed in the Cairns Library by type of user

Type of event	Number of events observed	
	Survey Users	Non-survey Users
Current periodicals display	151	56
Catalogues	58	36
Photocopying	57	12
Bibliographies	49	11
Enquiries	41	39
Loans	29	39
Interlibrary loans	12	2
Quick reference books	10	8
Users' telephone	5	4
Miscellaneous	12	25
Total	424	232

Cairns Library Enquiries

Enquiries from the survey population were particularly concerned with the photocopying service and those from the non-survey population with the loans service. 17 of the survey enquiries were about locating information or a document and 24 about using the library and its services. Only a small proportion (9 enquiries) needed the attention of a professional librarian. These queries entailed explaining how to use the catalogue or the library, and reference work. The other queries included : how to obtain a journal that was not in the library, how to find a document that should be in the library but could not be found, and how to make a loan or photocopy.

An Illustration of the Details Recorded During a Typical Observation Session in the Cairns Library

(Wednesday AM, half-session). 1. Observation began in area 1 at 10.20 a.m where two clinical users were reading newspapers and one was looking at the quick reference index. 2. At 10.30 the observer moved to area 2 where a nurse was enquiring how to take a book out (there were no staff at the issue desk in area 1 at the time). All subsequent events in this time slot were attributed to the clinical population: someone did some photocopying; there was a telephone enquiry as to whether the Public Health Laboratory took the American Journal of Epidemiology; an appointment for a computer search was made; the periodicals catalogue, Index Medicus and Current Contents were used; and the librarian was asked to explain how to find the way out to the car park. 3. At 10.40 the observer returned to area 1 where a medical student was sitting at the table by the catalogue looking at the telephone directory. The issue desk received a query about a computer search appointment from an unidentified user (staff at the enquiry desk were at coffee), then a laboratory technician came in to read the newspaper, and an 'other' person looked at the current periodicals. 4. Back to area 2 at 10.50 where a medical student used 1979 Index Medicus

and then the Cumulative Indexes, a nurse consulted the author catalogue, four clinical users consulted the periodicals catalogue, and one clinical user consulted the author catalogue.

Table 22: Summary of the events mentioned in the illustrated Cairns observation session

Time	Area	Total events	Survey events	Non-survey events
10.20 - 10.30	1	3	3	0
10.30 - 10.40	2	8	7	1
10.40 - 10.50	1	4	0	4
10.50 - 11.00	2	8	5	3

Use of RSL Services

The library was significantly busier in the afternoon (213 events) and quieter during lunch-time (139 events). It was much harder to ensure correct identification of users in the RSL than in the Cairns Library and the survey population comprised about 55% clinical staff and 45% pre-clinical staff. An average of 4.5 events/hour were observed from the survey population.

There were no differences between survey and non-survey users and the recorded events. The extensive catalogues were used heavily by everyone. However, this is essential for location of books and journals in the RSL, whether on the open shelves or in the closed stack. There is no equivalent requirement in the Cairns Library (although use of the catalogue may be desirable).

Table 23: Type of event observed in the RSL by type of user

Type of event	Number of events observed	
	Survey Users	Non-survey Users
Catalogues	34	205
Enquiries	15	93
Closed stack items	13	45
Loans	15	15
Photocopies	7	18
Miscellaneous	3	14
Upper reserve collection	0	16
Quick reference books	1	11
Bibliographies	1	10
Questions to porter	0	8
Interlibrary loan	1	5
Admission to library	0	2
Total	90	442

RSL Enquiries

Only 14 enquiries were observed from the survey population. 8 were about locating information or documents (e.g. cannot find document in library, cannot find entry in catalogue), and 6 were about library services (e.g. explanation of catalogue entry needed, how to get a photocopy or item from the closed stack).

There were 93 non-survey enquiries. 40% were about locating information or documents and 60% about library services. Most enquiries were about using the catalogues.

An Illustration of the Details Recorded During a Typical Observation Session in the RSL

(Wednesday PM, half-session). 1. Observation began at 2.30 p.m. by the loans desk in area 1 where a non-survey user collected some photocopies and an undergraduate was filling in a request for photocopies. 2. At 2.40 the observer moved to area 2 by the enquiries desk where a query about an interlibrary loan for a book on bumble bees was being dealt with; meanwhile, an undergraduate asked the porter where a particular subject was housed in the library. It was relatively quiet at the catalogues in 3. area 3 between 2.50 and 3.00, only two undergraduates consulted the main author catalogue. 4. At 3.00 the observer went upstairs to the medical office (area 4). Most activity here centred on the catalogues : the medical periodicals catalogue and symposium catalogue were consulted by two survey users, and the medical author catalogue was consulted twice by survey users and also by an unidentified user. In addition, an undergraduate asked about a book he thought may be held in the special upper reserve collection and another undergraduate handed in a closed stack request.

Table 24: Summary of the events mentioned in the illustrated RSL observation session

Time	Area	Total events	Survey events	Non-survey events
2.30 - 2.40	1	2	0	2
2.40 - 2.50	2	2	0	2
2.50 - 3.00	3	2	0	2
3.00 - 3.10	4	7	4	3

Summary

1. There was no difference in use of RSL by the survey population in term and in vacation.

2. It appears that, although the survey population forms only a small part of the total users of each library, it is an active part and makes proportionately more demands on library services than the rest of the users.

3. CAIRNS: 21 survey events per hour were observed
users : 99% clinical, 1% pre-clinical
main activity : looking at current periodicals
differences in type of activity observed between survey population and rest of users

RSL: 4.5 survey events per hour were observed
users : 55% clinical, 45% pre-clinical
main activity : using the catalogues
no difference in type of activity observed between survey population and rest of users

4. Enquiries : There were insufficient enquiries observed for much detailed analysis.

CAIRNS: 17 enquiries concerned locating information or documents
24 enquiries concerned using the library and its services

RSL: 8 enquiries concerned locating information or documents
6 enquiries concerned using the library and its services

5. Evidence from observations supported the questionnaire data.

There were no conflicts.

COMPARISON OF FEEDBACK FORMS AND OBSERVATION EVIDENCE

Both methods showed a basic pattern for the relative use of services although it was partially obscured by differences attributable to the two ways of collecting data. Feedback form data indicated whether a given activity had occurred on a particular visit or not, while every occurrence of an activity was regarded as an 'event' during observation. Thus, if a person used the catalogue five times on a visit this would be recorded as one tick on the feedback form or five events during observation.

DISCUSSION

This technique has four problems: (i) the physical layout and organisation of the library complicates interpretation of the data and invalidates interlibrary comparisons; (ii) it is expensive in research time, e.g. in the time available (20 hours) the number of survey events observed in the RSL was disappointingly low and the enquiries were inadequate for analysis; (iii) checking that users have been correctly categorised is difficult; (iv) it is hard in practice for a single observer. The method could be improved by employing several pairs of observers, then user categorisation could be cross-checked and the whole library observed at once.

The supreme advantage of the method is that it provides a distinct picture of library use which cannot be gained through other methods. In effect, the activities of the target or survey population are put in context and give an impression of a working library in use. The value of this was illustrated in this study by the realisation that the clinical users make such heavy demands on the Cairns Library services that they are disproportionately visible to the library staff who tend not to notice the presence of other users in the library.

Although it is expensive in research time and effort this advantage makes fuller implementation in further research projects worthwhile.

CHAPTER 9 - REFERENCE TRACING EXPERIMENT

AIMS

(i) to identify the problems users encounter when trying to obtain specified documents from the library system ;

(ii) to investigate the effect of those problems on users efforts to obtain documents.

Working Definitions

FAILURE i.e. The inability to find a document.

REFERENCE i.e. A surrogate document, a bibliographical citation.

Hence 'references looked for' is equivalent to 'specific documents sought'.

ABANDONED - Used to describe references which have been looked for but the documents were not found and no further effort was made.

PURSUED - Used to describe references which have been looked for unsuccessfully and a further effort was made to find them.

INTRODUCTION

Other surveys concerned with the concepts of availability and accessibility have already been described in Chapter 2. Their primary aim was to measure the performance of a particular library in terms of document availability, in contrast to this study which is concerned with the reasons for and effect of failure. A new methodology was designed which used, as a starting point, a sample of references that users were likely to look for. All members of the survey population requesting a computer search from the Cairns library during a fixed period were identified and asked to specify which references on the printout they expected to look up. Their subsequent action was followed up in brief interviews. The use of computer search printout follows Line's[101]

approach that, *'One really wants to know what references a user comes across that he would like to follow up'*, but avoided the necessity for the user to note his references and keep a record of his own action.

Whether a user does look up a reference will be influenced by many factors including previous experience of the library system. Neither Line's study nor this one attempted to discuss why a user decides to look up a reference. It does seem reasonable to assume that a user will make some attempt to obtain a reference if he perceives it to be of value.

DESIGN AND CONDUCT OF THE EXPERIMENT

The Cairns online service operates an appointment system and most users are present at the search. The service is available free to all NHS and University staff in the hospitals but members of the pre-clinical departments are charged. Most searches involve MEDLINE but other databases are used occasionally.

The success of the whole experiment rested on enlisting the users' participation and getting a duplicate of their computer search. This was achieved by the member of library staff during the search process. A formalised procedure (see Appendix H1) was adopted to ensure repeatability. It also had to be unintrusive so that the flow of the search interview was not interrupted. Some streamlining modifications were made after a pilot test with 20 participants. The librarian was briefed about who should be asked to participate and instructed in how to deal with refusals. It was stressed that the purpose of the experiment should not be revealed. A form (see Appendix H2) was used to record details of all users of the online service during October to December 1980. Participants were asked by the librarian to mark which references they were likely to look up on a duplicate of the computer printout.

The researcher interviewed participants in person or over the telephone about a week after the search, and again after two months.

Participants were asked which references they had obtained, where from, and whether they had had any problems in obtaining them.

Comments on the Method

The librarian did not meet any serious problems and very little effort was required of the participants who were barely aware of the experiment. These advantages were offset by the difficulties of administration for the researcher. The follow-up interviews took a lot a organisation, though once contact was made the necessary information was acquired in a couple of minutes. Other problems were that 7 participants were slow to return offline printout and it was impossible to achieve the exact projected interview dates in practice. It was difficult to judge when to do the follow-up interviews, a problem also noted by Lantz.[104]

39% of the 425 references selected had been looked for by the first interview (days 7 to 35) and 56% by the second interview (days 48 to 75). It was felt that the first interview might affect participants' subsequent reference tracing behaviour so a second group (10 people) were only interviewed once after the longer period. No differences between the two groups were observed.

RESULTS

71% of the searches were done for research purposes and the sample of participants was biased towards users doing both research and practice.

52 people were asked to participate:

41 agreed (39 clinical and 2 pre-clinical) PARTICIPANTS
9 refused
11 agreed but dropped out later

Status of participants:

cons	sr	reg	ho	hon cons	clin lect	res reg	rw	pg	ul		
4	3	4	4	0	6	4	9	5	2	=	41

pract	pract/res	res/pract	res		
15	6	4	16	=	41

Purpose of search:

a) patient/problem oriented	22%
b) research	71%
c) preparation of book etc.	7%

Route:

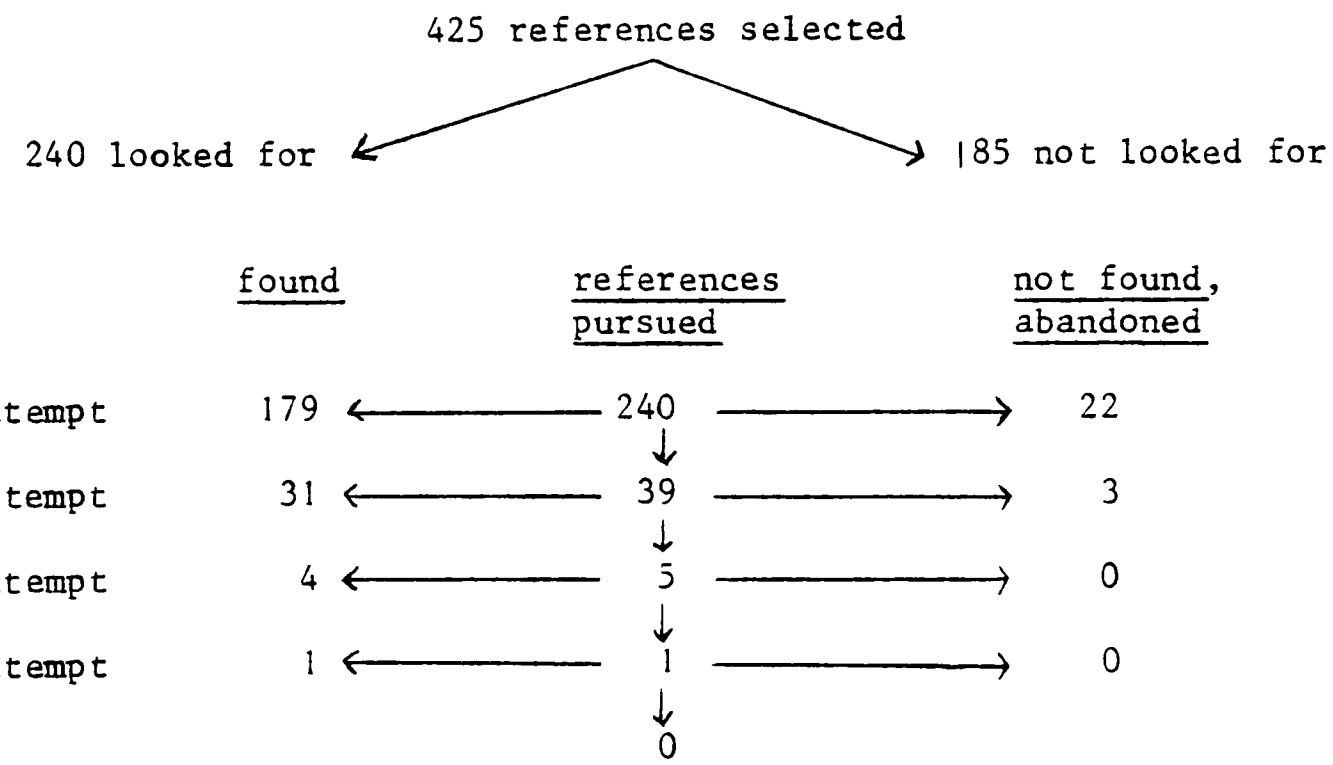
telephone	20%
letter	2%
personal	78%

User present at search:

Yes	61%
No	39%

41 participants (39 clinical and 2 pre-clinical) marked 425 references as likely to be looked for. Each reference was analysed in terms of whether it was looked for or not, whether the document was found or not, how many attempts were made, the type of action taken and the problems encountered. Two surprising facts emerged: (1) a very high proportion (90%) of the references looked for were found; (2) by the end of two months 56% (240) of the original 425 references selected had been pursued.

Diagram 4 : Fate of references



Reasons for Not Finding References

Table 25 : Reasons for not finding references

Reason	1st attempt	2nd attempt	3rd attempt
Not taken by Cairns	39	-	-
Not taken by RSL	11	3	-
Not available in Cairns	7	1	1
Not available in RSL	4	4	-
Total	61	8	1 = 70

We did not find out whether 'not available' references were not located through reader error. In the pilot survey 'not taken' references were checked with the library catalogues and no evidence for reader error was found. However, one instance was found in the main survey when a participant failed to find a document because he was unaware of the closed stacks in the RSL and had not consulted the catalogue. On another occasion a reader said he was so annoyed by a library error (the wrong item had been brought up from the RSL closed stack) that he used the Institute of Psychology Library on his next visit there rather than resubmit his request to the RSL.

Action Taken by Users in Pursuing References

179 (75%) of the references that were looked for were obtained on the first attempt and only 22 of the 61 references not found were abandoned at this stage. The remaining 39 references were pursued further (see Diagram 5).

By the end of the experiment, 9 of the 61 references not found on the first attempt had been found through other sources, 27 were satisfied through interlibrary loans requests and 25 had been abandoned. The majority (64%) of the references not found initially were pursued further.

Diagram 5 : Action taken in pursuing references beyond the first attempt

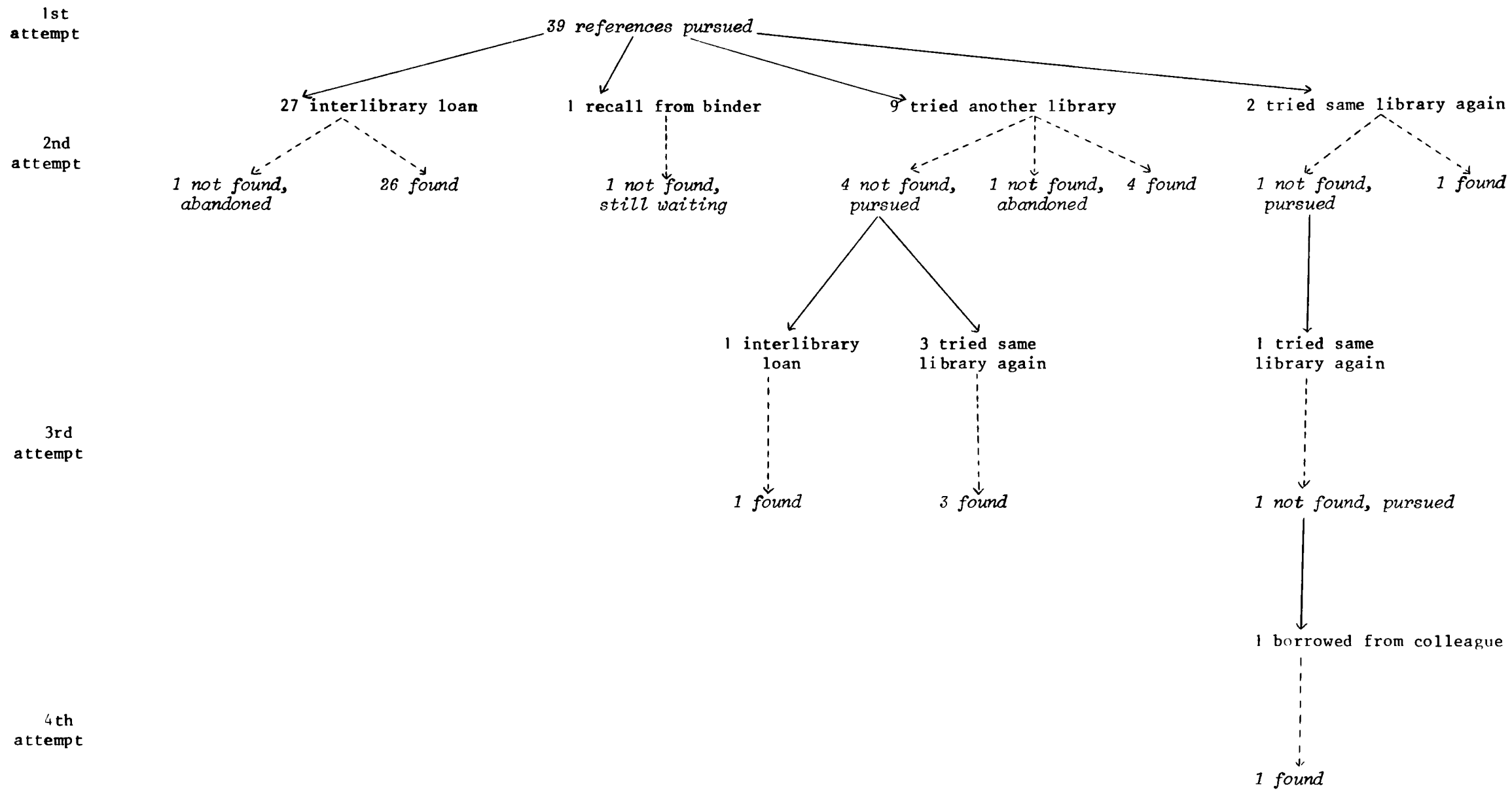
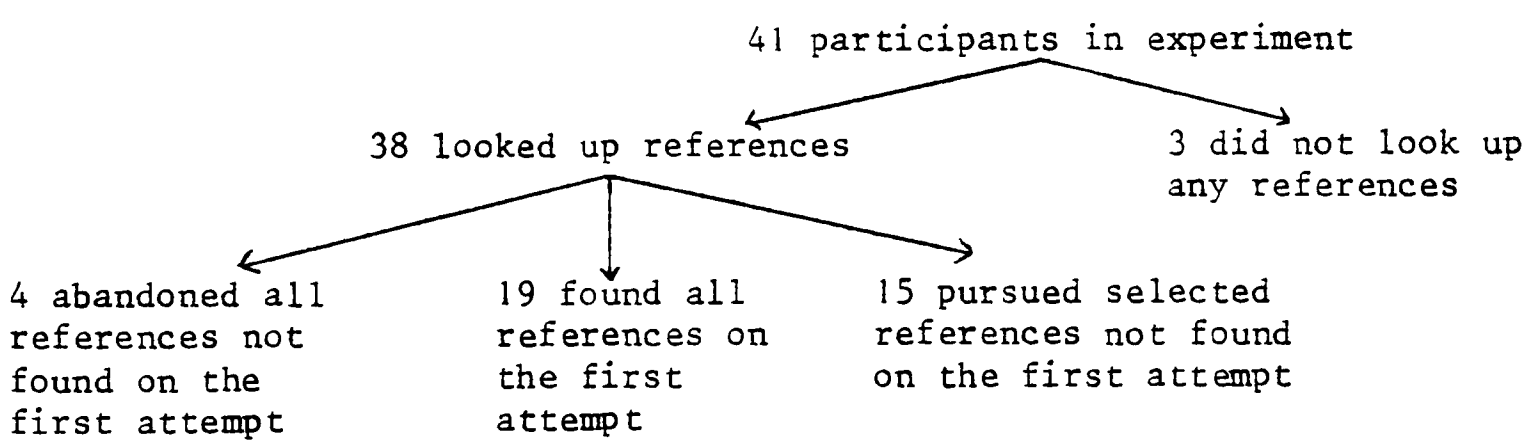


Table 26 : Where participants found references after various attempts

Sources of reference	Attempts to find a reference 1st	2nd	3rd	4th
Cairns	64	1	-	-
RSL	58	1	3	-
Department library (5 libraries)	29	-	-	-
Own collection	19	-	-	-
Colleague	1	-	-	1
Cairns, RI	8	1	-	-
Interlibrary loan, Cairns	-	22	-	-
Interlibrary loan, RSL	-	4	1	-
Inst. Psychology, London	-	2	-	-
Total	179	31	4	1 = 215

It was suspected that certain participants would abandon all their references after one attempt to find them, whilst other participants would pursue all of them. In fact, a majority of the participants (15) abandoned some references and pursued others selectively.

Diagram 6 : Action taken by participants in pursuing references



Speculations on the Decision to Look up a Reference

Comments in the follow-up interviews provided some clues as to why 44% of the original 425 references were not looked for: (i) references are set aside for planned work - 4 participants stated they intended to look at their references later for this reason (1 person accounted for 87 of the references not looked for); (ii) the need for the reference may have passed; (iii) the information required may be obtained without consulting all the references; (iv) the original value of the reference may be revised in the light of further knowledge; (v) the user expected the references to be hard to find.

CONCLUSIONS AND DISCUSSION

Results of this method were unexciting because the proportion of 'failures' was so small. The low number in the failure sample therefore limited the significance of the conclusions. Failure because items were not taken by the library was three times more likely than failure through the unavailability of an item which should have been in the library. The majority of users pursued the majority of the references not found on the first attempt. However, the commonest response was to make an interlibrary loan request and only a few references were found by visiting other libraries.

The methodology only partially achieved its aims because so few problems were encountered. The high success level in obtaining references can be interpreted in two ways: (1) the library system in Oxford is excellent at meeting demand; (2) users have become adept at recognising the references which they can find easily. Some evidence for this view was afforded by the comment *'So far I have only looked for references I know I can find'*. On the other hand, Oxford does have good medical information resources and the first interpretation is also credible. Probably both factors are involved but if excellence at meeting demand is playing a dominant role the methodology could still be used effectively in another library system which did not have such good resources. If, however, users adapting their choice to suit the library system is the dominant factor then the methodology is unlikely to uncover more problems elsewhere.

It is recommended that the methodology be tried out in another library system to establish its usefulness conclusively and that more searching interviews would be worthwhile.

CHAPTER 10 - ANALYSIS OF EXISTING LIBRARY RECORDS

AIMS

(i) to compare the patterns of use of the Radcliffe Science Library (RSL) and the Cairns Library for January to March 1979 (before the move to the new hospital) with the patterns for the same period in 1980 (after the move);

(ii) to find evidence in support of or in contradiction to the questionnaire and interview analysis;

(iii) to compare the relative use of the loans, interlibrary loans, and photocopying services.

THE RECORDS AND THE LIBRARY SERVICES

The records comprised the original library service request forms. Thus, unlike all the other data, the researcher had no control over the information elicited or the way in which it had been collected. There are gaps in the analysis where the records were unsuitable, i.e. Cairns photocopying records, or incomplete, i.e. Cairns 1980 loans records.

The way in which the services are run must be taken into account when interpreting the data.

RSL photocopying: this is a staffed service. Users hand in a document with a personally signed request form and their photocopy is usually available for collection next day.

Interlibrary loans: the RSL houses a major scientific collection and so few interlibrary loan requests arise. In contrast, the Cairns offers a core collection supplemented by the interlibrary loans service. Different policies operate: the RSL will not accept an interlibrary loan request if the user could obtain the document from another University library in Oxford, whilst the Cairns will accept any request that is not covered by

its own stock.

Loans: the RSL is primarily a reference library though some restricted borrowing occurs. Postgraduates, and junior doctors and research workers are not usually able to borrow. Professors and university lecturers of 'approved scientific departments' may borrow and other people in these departments, e.g. consultants, may be able to borrow on recommendation. The Cairns has no borrowing restrictions other than for selected reference texts.

The 'old' and 'new' Cairns Library: 1979 records refer to the old Cairns which consisted of the medical collection in the Radcliffe Infirmary. 1980 records refer to the new Cairns Library which is a large multi-disciplinary library based at the new John Radcliffe Hospital.

METHOD OF ANALYSIS

The original request forms were supplied by the libraries. One request represented one document or article. The requests from the survey population were withdrawn from the full set and status and specialty/subject were written on each form before they were counted.

The data represents a minimum level of use because: (i) it is possible that requests were made for the population by people excluded from the survey, such as laboratory technicians; (ii) both libraries discarded loan requests if an item was borrowed and returned the same day.

RESULTS

The evidence discussed here covers the salient points of the analysis. It is based on selected data presented in Appendix I. Chi-square tests were applied according to the principles described in Chapter 6 and differences were accepted as statistically significant at a level of 0.01 or beyond (see Appendix I3 for summary of tests). Some results are reported even though frequencies are too low for the chi-square test.

Differences in Patterns of Use between 1979 and 1980 Periods

The average monthly use of each RSL and Cairns service is summarised in Table 27. No significant differences were found between the number of

Table 27 : Relative use of library services

Services	Period	Requests per month	Individuals per month	Request/ Individual
PRE-CLINICAL USERS				
RSL : interlibrary loans	1979	14	9	1.6
	1980	11	9	1.2
RSL : book loans	1979	30	14	2.1
	1980	36	15	2.4
RSL : journal loans	1979	45	18	2.5
	1980	53	19	2.8
RSL : photocopies	1979	126	39	3.2
	1980	88	35	2.5
CLINICAL USERS				
RSL : interlibrary loans	1979	20	12	1.7
	1980	31	14	2.2
RSL : book loans	1979	37	17	2.2
	1980	43	17	2.5
RSL : journal loans	1979	70	18	3.9
	1980	83	26	3.2
RSL : photocopies	1979	289	53	5.5
	1980	362	61	5.9
Cairns : inter-library loans	1979	200	51	3.9
	1980	180	52	3.5
Cairns : book loans	1979	89	55	1.6
	1980	-	-	-
Cairns : journal loans	1979	184	70	2.6
	1980	-	-	-

pre-clinical or clinical individuals using the services in 1979 and 1980. However, there was a significant difference in the number of pre-clinical and clinical RSL photocopy requests submitted in 1979 and 1980. Although the number of individuals using this service was constant the number of

pre-clinical requests decreased in 1980 and the number of clinical requests increased. Thus the move to the new hospital corresponded with an increase in clinical RSL photocopy requests in absolute terms and an even greater increase relative to pre-clinical requests. The decrease in pre-clinical requests may be attributed to a deterioration of the RSL service (the delay between request and collection had stretched to a week). The increase in clinical requests was associated with researchers (i.e. rw, pg), perhaps because in 1980 they relied heavily on copies that could be taken away to the new hospital.

There were several differences in number of requests submitted in 1979 and 1980 with user characteristics. Three of interest in relation to the move were (i) the number of RSL journal and interlibrary loans to users doing both practitioner and research work increased significantly in 1980; (ii) research registrars did not borrow any books from the RSL in 1979 but 12 people borrowed 50 books in 1980; (iii) Cairns interlibrary loan requests for clinical lecturers leapt from 37 requests by 13 people in 1979 to 124 requests by 12 people in 1980.

Variations in Use of the Services with User Characteristics

The users' perceptions of value and use of the services were ascertained by the questionnaire (Q6). Agreement or disagreement was sought between this evidence and data from actual records of library usage. Differences in the record data (R data) related to user characteristics were identified through chi-square tests of thesedata against similar information on users of Radcliffe and Cairns libraries obtained from the questionnaire (Q3), i.e. (Q data).

RSL photocopying: the records showed that more pre-clinical post-graduates made requests than other groups (at 0.01 level) and agreed with the questionnaire evidence that more postgraduates said they valued and used photocopies than other groups.

	prof	ul	dd	rw	pg		total
RSL pre-clinical users (1980 Q data)	6	34	10	56	37	=	143
RSL pre-clinical photocopying users (1980 R data*)	2	12	4	37	48	=	103

The records showed that more clinical users made photocopy requests as research orientation increased (at 0.01 level) and agreed with the questionnaire evidence that reported value and use increased with research orientation.

	pract	pract/res	res/pract	res		total
RSL clinical users (1979 Q data)	108	62	35	107	=	312
RSL clinical photocopying users (1979 R data*)	19	24	20	92	=	155

Journal loans: In the questionnaires users reported increased value and use of journals with increasing research orientation. The library records did not show any evidence of this.

Interlibrary loans: In the questionnaires more users doing both practitioner and research work said they valued and used interlibrary loans than other groups. The library records partially agreed with this showing that anyone doing some research was more likely to make a request than someone doing only practitioner work (at the 0.01 level).

	pract	pract/res	res/pract	res		total
RSL clinical users (1979 Q data)	108	62	35	107	=	312
RSL clinical interlibrary loans users (1979 R data*)	4	8	2	21	=	35

	pract	pract/res	res/pract	res		total
Cairns clinical users (1979 Q data)	196	63	41	95	=	395
Cairns clinical interlibrary loans users (1979 R data*)	55	24	33	39	=	154

* see Appendix I

Book loans: In the questionnaire more registrars, house officers and university lecturers said they valued and used books than other groups. The record data suggested that house officers borrowed more books than other users but this was not valid at the 0.01 level.

Other variations: More users in the anaesthetics specialty requested photocopies from RSL than other specialties, probably because they have a departmental librarian who submits and collects requests on their behalf.

Relative Use of the Services

Evidence from the questionnaires indicated that photocopying dominated over interlibrary loans and loans, and that use of journals dominated over books. The data from the library records in Table 27 agrees with this evidence. The 1979 data from Table 27 was normalised to a value of 1 for pre-clinical individuals making RSL interlibrary loans; the number of requests were similarly normalised.

Table 28 : Normalised use of library services

Services	Individuals		Requests	
	Pre-clinical	Clinical	Pre-clinical	Clinical
RSL interlibrary loans	1	1	1	1
RSL book loans	2	2	2	3
RSL journal loans	2	2	3	5
RSL photocopies	4	6	9	21
Cairns interlibrary loans	-	6	-	15
Cairns book loans	-	6	-	7
Cairns journal loans	-	8	-	15

Thus for each pre-clinical individual using the RSL interlibrary loans service there will be 4 pre-clinical and 6 clinical individuals using the RSL photocopying service. Similarly, for each pre-clinical RSL interlibrary loan request there will be 9 pre-clinical and 21 clinical RSL photocopying requests. The numbers of clinical and pre-clinical individuals using the RSL services are comparable but clinical individuals

generate more requests than pre-clinical individuals. Clinical demand on the Cairns services is greater than their demand on the equivalent RSL services, e.g. for each clinical RSL interlibrary loan request there will be 15 requests at the Cairns.

The record evidence contradicted the questionnaire evidence in one respect. Ranking of the replies to questionnaire Q6 indicated that more people borrowed a book from the library than borrowed a journal. In contrast the records showed a consistent pattern of slightly more people borrowing journals than books.

Proportion of Total Use of the Library Services by the Survey Population

Observation evidence attributed 65% of the total observed events in the new Cairns and 17% of the events in the RSL to the survey population. The library records (where available) revealed similar levels of demand on the library services by the survey population. However, the proportion of the survey population (34%) requesting RSL loans was higher than expected.

Table 29 : Proportion of total requests made by survey users

Services	Survey users Clinical	Survey users Pre-clinical	Non-survey users
	%	%	%
RSL photocopying	16	7	77
RSL book and journal loans	20	14	66
RSL interlibrary loans	11	8	81
New Cairns interlibrary loans*	82	0	18

* The Cairns Library staff have reported a massive increase in Cairns interlibrary loan requests in 1981/82 which they have attributed to the survey population. It seems that the impact of the move took a surprisingly long time to become apparent.

SUMMARY OF CONCLUSIONS

There was not a great difference in the patterns of demand on the RSL services by clinical staff before and after the move to the new hospital. The same number of individuals used the library but they used it more intensively after the move. The records were in general agreement (with one exception) with users' perceptions of their use of libraries though in some instances clear differences in questionnaire replies were not reflected as significant differences in the records. Use of the following RSL services increased in the order: interlibrary loans, book loans, journal loans, and photocopying facilities. The numbers of clinical and pre-clinical individuals using these services were similar but the clinical users generated more requests. Similar inferences could not be made for the Cairns services because the data was not available.

CHAPTER 11 - THE EMERGING PICTURE

This chapter is arranged into three sections: I : Comparison of evidence from the different methods; II : Summary of unique evidence from the individual methods; and III : Descriptions of the main user types - practitioners, researchers, and practitioner-researchers.

I : COMPARISON OF EVIDENCE FROM THE DIFFERENT METHODS

The methods which ought to provide data on each topic are noted in parentheses.

DIFFERENCE IN BEHAVIOUR IN TERM AND VACATION

(interviews/feedback forms/observation)

Use of the RSL by the survey population did not differ between term and vacation. Interviews suggested that university lecturers and departmental demonstrators might show altered patterns since they concentrated on teaching in term but this was not detected.

PROPORTION OF TOTAL USE OF THE RSL AND CAIRNS ATTRIBUTED TO THE SURVEY POPULATION

(feedback forms/observation/records)

RSL: the survey population accounted for 20-30% of the total demand on various library services and of the total observed events, but for only 4% of the total users leaving the library.

Cairns: the survey population accounted for 82% of the total demand on the interlibrary loans services and 65% of the total observed events but only 33% of the total users leaving the library. It seems that the survey population uses these libraries more intensively than the other users.

RELATIVE USE OF LIBRARY SERVICES BY THE SURVEY POPULATION

(interviews/questionnaires/feedback forms/observation/records)

Taken together data from the different methods was confusing. This may be partially explained by the various approaches of each method but may also point to the lack of any clear pattern. The broad trends observed were:

(i) relative frequency of use and perceived value of photocopying facilities, bibliographies, and interlibrary loans decreased consistently in this order;

(ii) the level of use of catalogues and of enquiries services was equivalent to the demand on the RSL photocopying service.

Table 30 : Intercomparison of results on the relative use of services from the different methods. Presented in decreasing order of use (actual or perceived).

(questionnaire and interview) Reasons for using a library NB. Not specific to a particular library	(observation) Observed events	(feedback forms) Activities ticked per visit	(records) No. of requests or users
photocopies bibliographies ILL/loans/help	RSL: catalogue enquiries/ loans photocopies bibliographies ILL	RSL: catalogue enquiries photocopies bibliographies loans ILL	RSL: photocopies loans ILL
photocopies bibliographies ILL/loans/help	Cairns: catalogue photocopies bibliographies enquiries loans ILL	Cairns: enquiries loans bibliographies/ photocopies catalogue ILL	Cairns: (requests) (users) ILL loans loans ILL

* ILL = Interlibrary loans

SEEKING HELP FROM THE LIBRARY STAFF

(feedback forms/observation)

Fewer people requested help at the RSL than at the Cairns, but they represented a higher proportion of RSL users than Cairns Library users in the population.

FAILURE

(interviews/questionnaires/feedback forms/reference tracing).

The level of failure was about 20%. This proportion of the population said they experienced some failure on their visit to the library. 25% of the references in the tracing experiment were not found on the first attempt. Two types of failure occurred: (i) stock limitations - the document was not held by the library; (ii) unavailability - the document was not found in the library because it was in use, on loan, not in place, at the binders, not found by the reader, etc. Half of Cairns failure occurred through stock limitations which was not a problem with the extensive RSL collection.

USERS OF THE LIBRARIES

(all methods)

The RSL is likely to be used by anyone doing some research and the Cairns by anyone doing some clinical practice. Use of the Cairns by pre-clinical staff is negligible.

USE AND VALUE OF STOCKS AND SERVICES

Journals (all methods): Both current and retrospective issues are of outstanding importance and are used heavily by the whole survey population.

Books (interviews/questionnaires/feedback forms/records): Evidence from the questionnaires and interviews showed that registrars, house officers and university lecturers valued and used books. The other methods did not provide conclusive evidence.

Photocopying (interviews/questionnaires/feedback forms/records): Pre-clinical postgraduates valued photocopies. The value of photocopies to clinical users increased with increasing research orientation. Feedback form data was inconclusive.

Interlibrary Loans (interviews/questionnaires/feedback forms/records): People doing clinical practice only were least likely to want interlibrary loans, whilst anyone doing some research used this service. Again, feedback form evidence was inconclusive.

Loans (interviews/questionnaires/feedback forms/records): This is the only instance of conflicting evidence. In the questionnaires and interviews users said they were more likely to use a library for book loans than journal loans but according to library records more journals were borrowed. (Feedback form evidence was inconclusive). This conflict may have arisen because (i) users' perceptions of a book and a journal differ from library classification; (ii) the user views book and journal loans differently, especially if a journal is borrowed to photocopy in the department; (iii) users may make fewer journeys to borrow journals than books but borrow more journals on each visit. The population as a whole did not have strong views on loans facilities. The users who commented were equally divided between expansion and reduction of lending. The latter was advocated by users who preferred a high chance of finding an item in the library.

Computer Searches (interviews/questionnaires/feedback forms/reference tracing):

(a) computer searches were valued and used most by people doing both practice and research;

(b) senior practitioners (cons, sr) valued and used them more than junior practitioners (reg, ho). Feedback form evidence was inconclusive.

Sources of references (interviews/questionnaires): Everyone valued journals as reference sources. Index Medicus was highly valued by practitioners, whilst anyone doing some research was more likely to value Current Contents and any specialist publications which covered his research interests.

Enquiries (interviews/questionnaires/feedback forms): People doing both practice and research valued and sought help from library staff.

Final Conclusion: The findings of the different methods were consistent to a high degree. Evidence from the individual methods was not always conclusive because the data were too few for chi-square tests. However consistent trends were seen which were convincing when viewed together.

II : SUMMARY OF UNIQUE EVIDENCE FROM THE INDIVIDUAL METHODS

EFFECT OF THE MOVE TO THE NEW HOSPITAL (records).

Although the number of clinical staff using the RSL services did not change after the move to the new hospital, they did make more demands on the services, especially the photocopying service. Pre-clinical users showed no change in pattern as expected

COMPARISON OF PATTERNS OF USE OF THE SURVEY POPULATION AND OTHER LIBRARY USERS (observation)

The survey population and the rest of the users (mostly medical students and student nurses) used the Cairns library services in different ways. This was not observed in the RSL.

COMPARISON OF PATTERNS OF USE OF THE CLINICAL AND PRE-CLINICAL STAFF (records)

The number of clinical and pre-clinical individuals using RSL services was similar but clinical individuals generated more requests than pre-clinical users.

THE NATURE OF ENQUIRIES (observation)

The enquiries at both the RSL and the Cairns were equally split between how to use the library and its services and how to locate a document or information. Certain enquiries were related to the library e.g. using the catalogues in the RSL. Most enquiries were straightforward and did not need the attention of a professional librarian.

ACTION TAKEN IN LOOKING UP REFERENCES (reference tracing)

The majority of people who did not find all their references on the first attempt pursued them further. However, they only followed up selected references and abandoned the rest. No-one made more than four attempts to get a particular reference. When further action was taken interlibrary loan requests were made three times as often as trying another library.

III : DESCRIPTIONS OF THE USER TYPES

Three distinct types of user were identified from the questionnaire and interview evidence: practitioners, researchers, and practitioner-researchers. Their descriptions below are based on evidence from Chapters 3 to 10 and are preceded by a description of the survey user in general. This section represents the 'rich picture' to be used in the Systems Study.

THE SURVEY USER IN GENERAL

Information and Reference-seeking Behaviour

The user regularly scans new issues of at least 6 journals and personally receives several journals, the number increasing with seniority. He subscribes to these because he wants to ensure quick and easy access to them. Journal articles are his most important source of references.

Library Use

He uses 2 or 3 libraries and the pattern of use varies with the type of library. He goes to his departmental library regularly, at least once a week for quick visits, because it is convenient (especially if he has a few spare minutes) and it has the journals and current issues he is interested in. This contrasts with his use of the RSL which is sporadic and less frequent; the user may collect together some work over a period before going and then his visits are longer. He uses the RSL because it has a wide selection of journals in one place and because it holds documents he cannot get elsewhere. The Cairns is usually used for current journals and its selection of medical journals, but the user goes there less often than his department library. He usually goes to these libraries himself but on rare occasions he may ask someone to collect or return a book or photocopy if they are visiting the library (often RSL) anyway. He may also telephone the Cairns to make a loan.

Expectations, Perceptions and Use of Services

The user regards journals, books and photocopies as the most important services. The journal collection is of outstanding importance and he prizes currency, easy availability, back runs, and a comprehensive range. Current and retrospective issues are valued highly and used more than anything else in the library. A wide selection of up to date books is also valued. The user frequently uses the photocopying service for journal articles, but is more likely to borrow a book. Lending facilities and the library as a place to work are of little interest.

THE PRACTITIONER

Background

The practitioner spends nearly all his time in patient care in the hospitals. He practices in a specialty but may have specific interests within that specialty. His work revolves round seeing patients in wards, clinics and operating theatres and his working day is spent in many places

in the hospital besides his department. His time is highly regulated by appointments and clinical duties and it is often fragmented. The practitioner deals with a lot of people during the course of a day - colleagues, patients, nurses, secretaries - and he periodically works long hours 'on call' or in an emergency. Administration concerned with patients and informal teaching and training is part of his daily work. The practitioner routinely travels to other hospitals in Oxford for clinical duties, meetings and lectures, and he may also visit patients in hospitals elsewhere in the Region. The practitioner is medically qualified with anything from none to forty years experience and is employed by the NHS.

Information-seeking Behaviour

The practitioner's main reasons for seeking information are for keeping up to date and for clinical problems. Secondary reasons are writing, teaching, and research; their relative importance varying with his seniority. He scans about 6 journals regularly and personally receives several journals either free, e.g. Hospital Medicine, from his Royal College, or by subscription, e.g. British Medical Journal.

Reference-seeking Behaviour

Unlike the researcher, the practitioner does not want everything written on a given topic, instead he only wants enough information to answer a clinical problem (the 'sufficient' approach). His most important reference sources are journal articles and Index Medicus. He may also use a review article or book as a guide to journal articles in an unfamiliar area. Documentary sources provide most of his references.

Library Use

The practitioner uses his departmental library, the Cairns and probably the RSL if he is a consultant. He may also visit libraries in other hospitals in the Region if he is seeing a patient.

Expectations, Perceptions and Use of Services

Like all users, the practitioner regards journals and books as most important. He also values and uses photocopying and bibliographic services and appreciates ease of use. The practitioner photocopies journal articles to take and read away from the library. Ease of use to the practitioner seems to be the impression that a document or service can be obtained with little effort in a short visit to the library. A substantial amount of his library use occurs as brief visits and since he can be restricted to a certain area of the hospital by his clinical duties he appreciates a library which is close to his working environment.

He has little interest in interlibrary loans, and help from the library staff.

Variations with Status

Most of the variations can be described simply in terms of senior (sr, cons) and junior (ho, reg) doctors.

1. Senior doctors

The senior doctor is expert in a narrow field of endeavour within his chosen specialty. Much of his time is spent in patient care but writing, research and attending meetings are also significant features of his work. They play a larger part in the information-seeking behaviour of senior than junior doctors. He is also more interested in Index Medicus and online retrieval services than his junior colleagues and is more likely to use the RSL and the libraries of the Royal Colleges and the RSM when in London. The consultant makes most indirect use of libraries either by telephone or by sending his secretary.

2. Junior doctors

Studying for the examinations of the appropriate Royal College is a major preoccupation of the registrar. House officers are a varied group including staff in their pre-registration posts, doctors following a career within a specialty, and those gaining experience before going into

general practice or administration. The house officer is the least specialised practitioner with the widest subject interests. He is busy with routine clinical work and spends long hours on call.

Besides clinical practice, the junior doctor wants information for further education and examinations. He values and obtains personal copies of the monthly add-on journal 'Medicine' which is effectively a continuously updating textbook. Although he gets the majority of his references from documents, the junior doctor will also get a substantial proportion from his colleagues. This may be because he has little time (or need) to do more than read a recommended article. He values and uses books almost as much as journals, borrows more books than his seniors and is more concerned with the currency and quality of the bookstock. He also appreciates the library as a place to work.

THE RESEARCHER

Background

In his work the researcher concentrates on the detailed knowledge of a narrow subject and he has no concern with patients. Most of his time is spent doing or directing research though he may also have some teaching and administrative responsibilities. He is either based in the University science departments or in the hospital departments and works in a laboratory to which he has 24 hour access. He is relatively free to organise his own time but is limited by the nature of his experiments which may need constant attention over long periods or extensive planning. The researcher may occasionally visit other places for his work usually the University science departments, college or, more rarely, the hospital departments. His reasons for these visits are lectures, meetings, learning techniques, obtaining samples, borrowing equipment or collaboration over research. The researcher's experience may span anything from none to fifty years. He is not active in medical practice and is rarely medically

qualified. He is either employed by the University or funded by grants from a variety of organizations.

Information-seeking Behaviour

The researcher seeks information mainly for his research interests and for keeping up to date. His secondary reasons are for writing and, to a lesser extent teaching. He scans about 9 specialist journals regularly and personally receives several journals either from his professional institution, by editing them or through subscription. He is likely to get the most up to date information on current research through meetings and personal contacts rather than through publications.

Reference-seeking Behaviour

The researcher's reference-seeking behaviour is characterised by an exhaustive approach - he wants to know everything in a narrowly defined area. Journal articles are his major sources of references but he may also use Current Contents and a specialised bibliographic service, e.g. CA Selects, Membrane Abstracts, if these are available and appropriate to his subject. He only uses the more general abstracting services like Biological Abstracts, Chemical Abstracts or the Science Citation Index on rare occasions (once or twice a year) and seems to view them as a 'safety-net'. Reviews, theses and conference preprints also provide references. Documentary sources supply nearly all his references while 'word of mouth' seems to alert him to forthcoming papers. 'Word of mouth' also gives him clues in an unfamiliar subject or he may use a review article or book as a lead to journal articles.

Library Use

The researcher uses his own hospital or University department library, the RSL, and probably another science department library. He uses the latter for specific journals, makes quick infrequent visits, and is influenced by the apparent convenience of the library. In addition to this pattern, the hospital-based researcher also uses the Cairns Library though

not as much as someone with clinical duties.

Expectations, Perceptions and Use of Services

The researcher regards journals, books, photocopying and ease of use as important. He likes photocopies for retention in his own collection. To the researcher ease of use is the impression that a document or service is easily obtainable without much effort on his part. It includes physical access (distance, car parking facilities, opening hours), guidance to library contents (catalogue, classification, arrangement), and access to library contents (the ability to browse; periodical displays; speedy acquisition, processing and binding; restricted lending). The researcher based at the John Radcliffe Hospital has most difficulties in getting to the RSL.

He also values and uses bibliographic services such as Current Contents and specialised publications. Clinical researchers value online retrieval services higher than pre-clinical researchers, however, the former have been exposed to the free Cairns online service, whereas their pre-clinical counterparts have not.

The researcher has little interest in interlibrary loans and help from library staff, but he does use these features on occasion.

Variations with Status

The researcher may be either hospital or university based.

1. Professor

This pre-clinical group is too small for generalisations. Much time is spent on administration as well as directing research, supervising graduates and giving lectures.

2. University lecturer

He does the bulk of undergraduate teaching and also supervises graduates in the science departments. Teaching may take up from 11-80% of his time and is highly concentrated in terms. Research constitutes

20-75% of his time and is done in vacations. The university lecturer often has some college responsibilities which may also be seasonal, for example, interviewing prospective undergraduates. He visits other science departments in relation to his teaching activities.

The university lecturer seeks information for writing in addition to keeping up to date and for research. He also wants information for teaching, though to a lesser extent. He is likely to use libraries indirectly by delegating reference checking tasks or collection and return of documents to his laboratory technician. He values books and uses them as reference sources and for teaching. He also borrows books and has lending rights at the Radcliffe Science Library, a privilege which is not available to most researchers. He has little interest in photocopying.

3. Departmental demonstrator

He also teaches undergraduates and demonstrates in the science laboratories for 6-30% of his time. His vacations are spent on research.

4. Research worker

He may work in either the hospital or the science departments. This is a large varied group including research assistants, post-doctoral researchers, people with many years experience, and visiting academics. The researcher spends nearly all his time on research but may spend 1-10% on teaching (i.e. mainly graduate supervision and some undergraduate lectures, tutorials and practicals). He is either employed by the University, another organization like the MRC, or is funded by grants.

In addition to seeking information for research and keeping up to date the research worker wants information for writing. He values help from library staff, perhaps because he needs documents which are difficult to find. He appreciates catalogues and classification which are simple to use, and he uses the library as a place to work.

5. Postgraduate

He is a Junior Member of the University who is reading for a higher degree (M.Sc. or D.Phil.). He may have interrupted his medical training to do so and works in the science area or the hospitals. He spends nearly all his time on research but teaching may also take up to 10% of his time (i.e. undergraduate practicals, demonstrations and tutorials). He does not receive or subscribe to journals and appreciates the library as somewhere to work.

THE PRACTITIONER-RESEARCHER

Background

The practitioner-researcher is hospital-based and sees patients as well as doing some research. He may spend between a quarter and three-quarters of his time on research and the rest on clinical practice. His research is patient-oriented, either indirectly, e.g. the development of a new surgical technique or treatment, or directly i.e. 'clinical research' involving patients. His work as a practitioner is the same as that of his full-time colleagues - seeing patients in wards, clinics and theatre, and is characterised by the same fragmentation and pressures. Similarly he will do his share of teaching and administration. The practitioner-researcher's time is more structured than the researcher's (q.v.) owing to his clinical duties and the demands on his time are heavy. He is based in the hospital and has somewhere to work in the department with access to a laboratory if required. He visits other places for work purposes. These are the hospitals for clinical duties, lectures and meetings, and the University science and hospital departments for meetings, seminars, equipment and collaboration over research. The practitioner-researcher is medically qualified with anything from none to 50 years experience and is employed by the University or NHS.

Information-seeking Behaviour

The practitioner-researcher seeks information mainly for his research interests, writing and keeping up to date. Clinical problems and teaching are secondary reasons. He scans about 13 journals and personally receives several others.

Reference-seeking Behaviour

He follows the researcher's exhaustive approach (q.v.) when seeking references for research, and the practitioner's 'sufficient' approach (q.v.) when seeking references for clinical practice. The former pattern is dominant, a small amount of research can generate a lot of visible information-seeking activity in the library. Like the practitioner he uses Index Medicus but not as often. He values and uses online retrieval services (especially MEDLINE) more than either of his colleagues.

Library Use

The RSL, Cairns and department libraries are used by the practitioner-researcher. He also uses libraries of societies, institutes and the Royal Colleges for their unique specialist collections.

Expectations, Perceptions and Use of Services

The practitioner-researcher regards journals, books, photocopying and bibliographic services as most important. Like the researcher he wants photocopies to keep. Of the three user types he values and uses bibliographic services most; his use is a combination of the researcher and the practitioner patterns.

He also values ease of use, interlibrary loans and help from library staff. Ease of use to him seems to be the impression that he is likely to obtain a document from his chosen source. Thus he either goes to the RSL where he feels he has a high chance of success, or he gets what he can from the Cairns and supplements this with interlibrary loans. Like researchers he also regards ease of use in terms of physical access,

access to library contents and guidance to library contents; but use of the RSL may be a linking factor here.

Variations with Status

In addition to his main title the practitioner-researcher also has an NHS title reflecting his position in the practitioner hierarchy.

1. Honorary consultant

A varied group comprising professors and readers of University clinical departments, and directors of special units. He is a senior doctor but only spends about a quarter of his time on patient care and the rest on research and formal training of medical students.

2. Clinical lecturer

He has an additional NHS title of house officer, registrar or senior registrar and his division of work resembles that of the honorary consultant.

3. Research registrar

The research registrar spends three quarters of his time on research and the rest on clinical practice, though informal teaching may also take up to 10% of his time. He practices at the house officer, registrar or senior registrar levels.

SECTION B : THE SYSTEMS STUDY

CHAPTER 12 - THE CHECKLAND METHODOLOGY

This is an account of the methodology and its associated ideas developed by Checkland. These are set out by Checkland in his original paper[11] and in his comprehensive book [14]. Naughton[19] has also written a helpful practical guide. The researcher consulted with Checkland over the application of the methodology.

In some 'soft' problems the need is for action, in others the need is for knowledge. The methodology has been used in over 100 studies in an action research programme. So far these studies have concentrated on organisations or industrial firms and were conducted in a client/consultant context where the client commissioned the study and expected to benefit from it; the emphasis being on action.

HUMAN ACTIVITY SYSTEM

This is a central concept. It is a system which contains autonomous human beings carrying out some activities, e.g. a city or a game of football. Human activity systems are not descriptions of reality but are intellectual constructs used in a debate about possible changes which may be introduced into the real-world. Checkland argues that these systems are distinct from, say an order-processing system because they contain humans who are able to attribute meaning to human activities. Consequently there is no single testable account of such a system. Instead there is a set of possible accounts, any of which may be valid according to a particular point of view. The choice of view is subjective and cannot be judged as inherently 'right' or 'wrong'. However, it can be judged according to its bearing on the 'problem situation' and a case must be made in defence of this choice. A description of a human activity system must be accompanied by an account of the observer and the point of view from which his observations were made.

TERMINOLOGY

The list below gives precise working definitions of the terms printed in italics. Their meaning will be made clear in the explanatory discussion.

climate i.e. the relation between structure q.v. and process q.v.

communication i.e. the transfer of information (fact & meaning).

conceptual model i.e. the structured sets of activities [expressed as verbs] which are the minimum necessary activities for the system to be the one named in the root definition q.v.

conceptual world i.e. a world of intellectual constructs or ideas which only exist in thought or imagination.

control i.e. the process by which an entity retains its identity or performance under changing conditions.

emergent property i.e. a property which cannot be explained in terms of lower levels in the hierarchy, e.g. the smell of ammonia is the property of the molecule, not of its constituent atoms.

hierarchy i.e. a ranking of entities according to a principle.

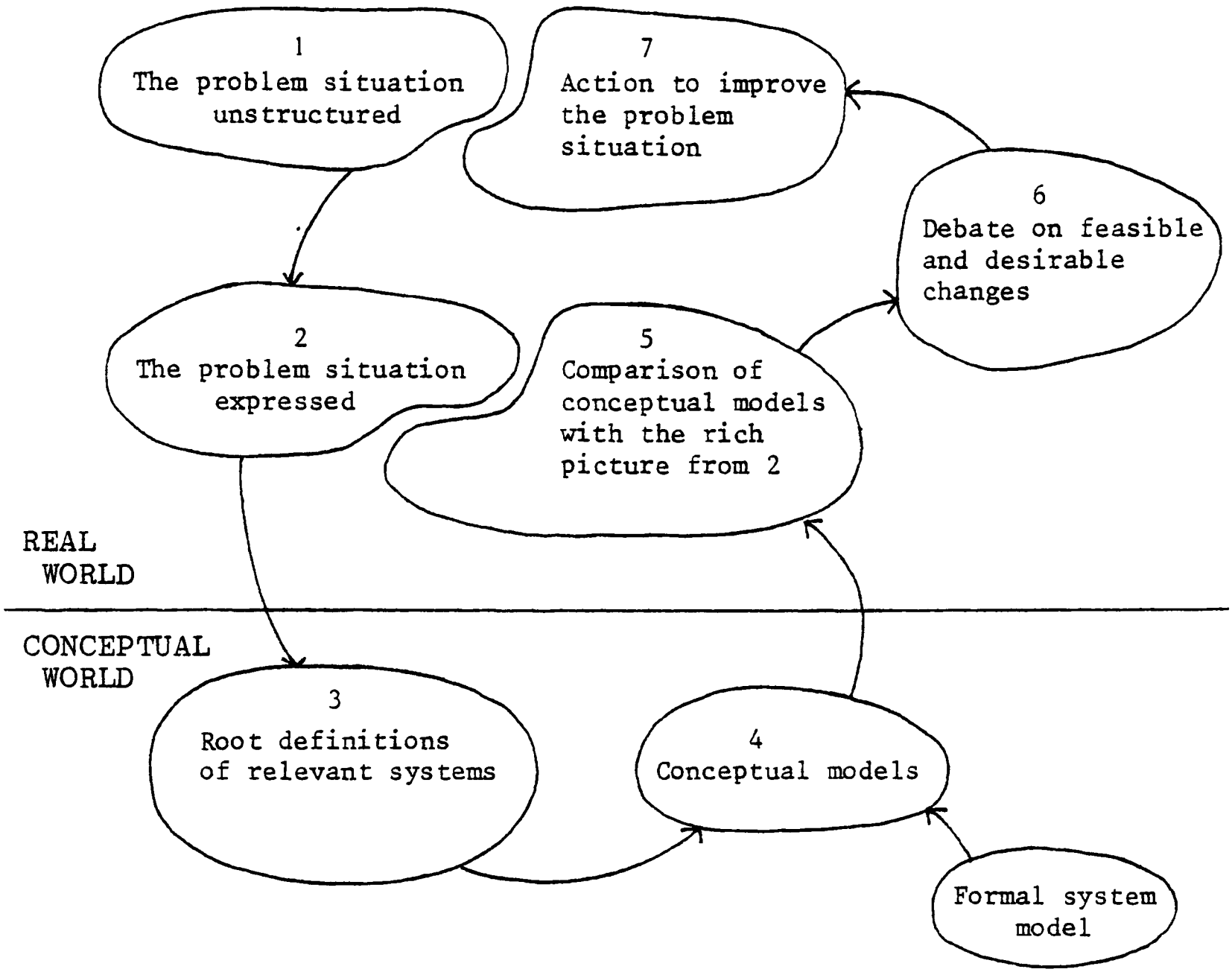
problem-content system i.e. a conceptualization of the 'problem situation' which contains the role problem-owner.

problem-owner i.e. a role in the problem-content system occupied by the person most likely to benefit from an improvement in the 'problem situation'.

problem-solver i.e. a role in the problem-solving system. The problem-solver uses the methodology to take or recommend action to improve aspects of the problem-content system.

problem situation i.e. a mesh of entities, activities and relationships which someone perceives as problematical.

Diagram 7 : THE METHODOLOGY (after Checkland)



- Outputs of various stages are:

  Stage 2: relevant system
  Stage 3: root definition of relevant system
  Stage 4: conceptual model of system described in root definition
  Stage 5: agenda of possible changes derived from comparison of conceptual model and rich picture analysis
  Stage 6: a list of possible changes which are judged feasible and desirable.

- A conceptual model must be derived logically from its associated root definition and from nothing else.

- Many points of view can be adopted suggesting many relevant systems.

- The view behind <u>one</u> relevant system is made explicit in <u>one</u> root definition which gives rise to <u>one</u> conceptual model.

problem-solving system i.e. a conceptualization of the 'problem situation' which contains the role of problem-solver.

process i.e. an element in a 'problem situation' which changes continuously.

real world i.e. a world of things that actually exist or occur in fact

relevant system i.e. a particular human activity system which the researcher selects as likely to provide insight into the 'problem situation'.

root definition i.e. a concise verbal statement of a human activity system.

structure i.e. an element in a problem situation which is static or changes slowly.

EXPLANATION OF THE METHODOLOGY

Stage 1: This directs attention away from defining 'the problem' to examining the situation in which the perceived problem lies.

Stage 2: This is the analysis phase where the richest possible picture of the *problem situation* is built up. The picture enables the selection of a particular viewpoint(s) and identification of a *relevant system(s)* for the next stage. When doing the analysis it is helpful to think in terms of the *problem-content system* and the *problem-solving system*, look for elements of *structure* and *process*, and examine the *climate*. The choice of relevant system effects a transition from the *real world* into the *conceptual world* for relevant systems are examples of human activity systems.

Stage 3: This is concerned with the formulation of *root definitions*. A root definition is a short verbal statement of a relevant system. It makes explicit the point of view embodied in the relevant system and tries to capture the essence of the relevant system. A well-formulated root definition will contain the following elements for which the mnemonic

CATWOE is used. These elements should not be omitted without good reason:

C Customers, victims or beneficiaries affected by the system's activities
A Actors or the people who carry out the transformational processes
T Transformational processes or activities
W Weltanschauung i.e. the world image which makes this root definition meaningful
O Owner, the person or organisation who has the power to cause the system to cease to exist
E Environmental constraints which must be taken as given

Stage 4: This consists of *conceptual model* building. These models are structured sets of activities (expressed as verbs) which are the minimum necessary activities for the system to be the one named in the root definition. It is a process model of a human activity system and is not a description of the real world. A conceptual model is best built at a low level of detail initially, comprising about seven activities, and then each activity can be expanded in turn. Sometimes it is helpful to produce written root definitions when resolving conceptual models, but this may be unnecessary if there is little danger of introducing hidden assumptions* (as in the present study). A conceptual model should be checked against its parent root definition and Checkland's formal system model. The properties of a formal system are summarised as:

- an objective or goal
- a measure of performance
- a decision-taking process
- sub-components which are themselves systems
- sub-components which exhibit connectivity so that flows of information, materials and influences can be traced
- an existence within wider systems or environments with which it interacts
- a boundary delimiting the area over which the decision taking process has control
- resources
- some guarantee of continuity

* This is a matter of judgement at the present stage of development of the methodology.

Stage 5: This is the stage where the conceptual model and the rich picture are compared. It is achieved by listing the elements of the conceptual model and writing down the real world mechanism. This activity often reveals gaps in the analysis and so stages 2 to 5 must be repeated. The final list of differences forms the basis for debate in the next stage.

Stage 6: The debate must involve participants from the problem content system. The exact nature of the debate will vary with the aim of the study. Possible changes or future plans are discussed in terms of feasibility and desirability. Again gaps in the analysis may appear as unrecognised constraints come to light.

Stage 7: Once the changes have been agreed they can be implemented and may give rise to a new set of problems.

THE NEW DEPARTURE

In previous studies the client organisation who commissioned the work clearly owned the problem and was responsible for taking action to solve it. There are also problems which cannot be owned in this sense. Cornock[152] extended the methodology into this area of 'supra-institutional' problems when he used it to interpret the state of the art world in Britain. In supra-institutional problems no single person or organisation can gain ownership of the problem. In the present Systems Study the client is neither a person nor an organisation and no-one is intended to benefit directly from the study or take action as a result of it. It is true that the Cairns or RSL library managers may take action if they wish but they did not commission this study. The present problem is neither client-owned nor impossible to own but seems to be somewhere in between. The study is working on the edge of experience with the methodology here and further explorations are described in subsequent chapters.

CHAPTER 13 - THE ARGUMENT OF THE SYSTEMS STUDY

This chapter describes the application of the Checkland methodology and presents a logical account of the argument of the Systems Study. It complements Chapter 14 which contains a historical resumé of how the study was done.

THE 'PROBLEM SITUATION' UNEXPRESSED (Stage 1)

The aim is to learn about the relationships between users of information and libraries (documentary sources) in a medical context.

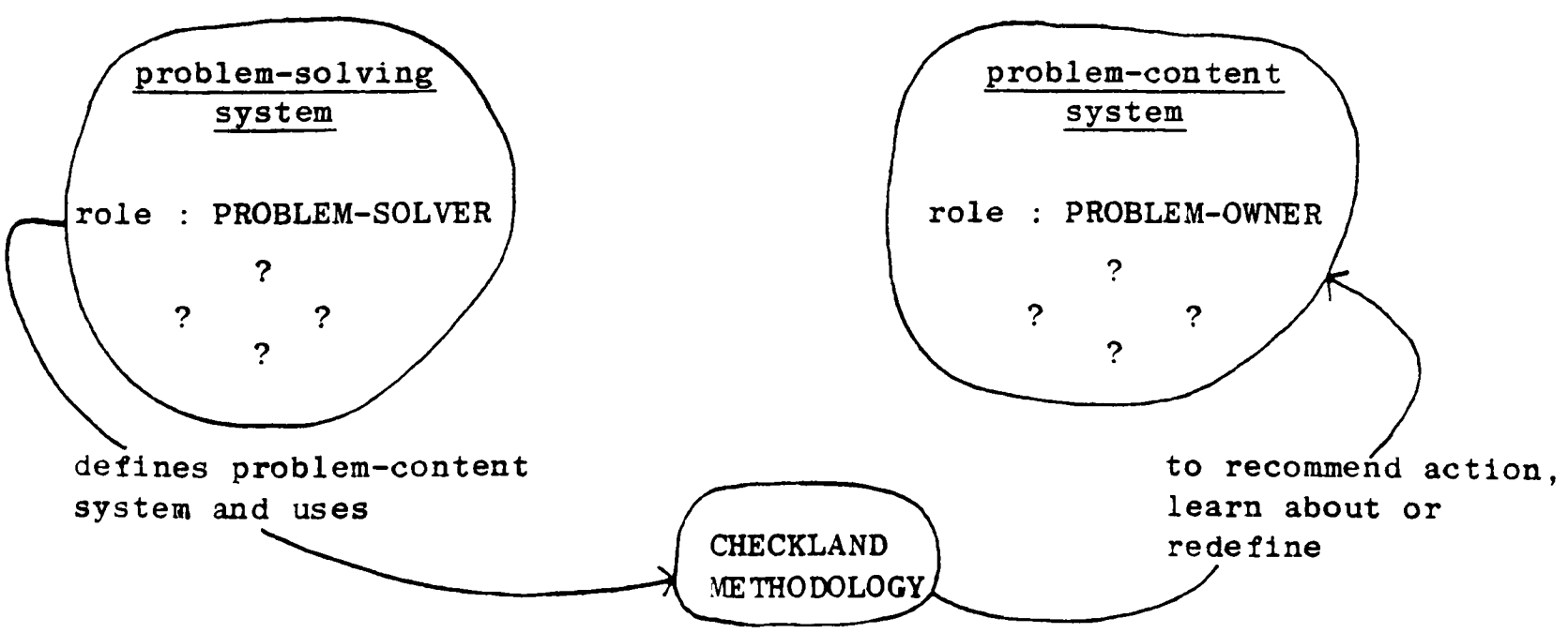
There are three elements in this study:

THE USER SURVEY	(see Chapters 3 - 11)
THE CHECKLAND METHODOLOGY	(see Chapter 12)
THE RESEARCHER	(the author)

THE 'PROBLEM SITUATION' EXPRESSED (Stage 2 Analysis Phase)

Thinking about the problem-content and problem-solving systems is the starting point for the subsequent discussion. It identifies the elements in these systems likely to be of relevance to the 'problem situation' and replaces the question-marks in Diagram 8.

Diagram 8 : Relationship between the problem-solving and the problem-content systems



The Problem-solving System

This contains the role PROBLEM-SOLVER (the author) who has experience as a medical librarian in Oxford, knowledge of information science/librarianship and a scientific background. Other roles in the system are: ADVISOR, occupied by Professor Checkland who contributed his experience with the methodology in two discussions; and SUPERVISOR, occupied by Dr. Leggate (PL) and Dr. Shaw (DFS) who contributed their experience in research and information science. (NB. These people also occupy the role of LIBRARY MANAGER in the problem-content system). Resources of the problem-solving system are: the combined experience of the participants, full-time work by the problem-solver and evidence from the User Survey. The point of view operating in the problem-solving system is that of research i.e. contribution to the knowledge of information science/librarianship. The constraints on the problem-solver are satisfaction of the requirements of Oxford University for the degree of D.Phil. and the submission of a thesis within a given time limit.

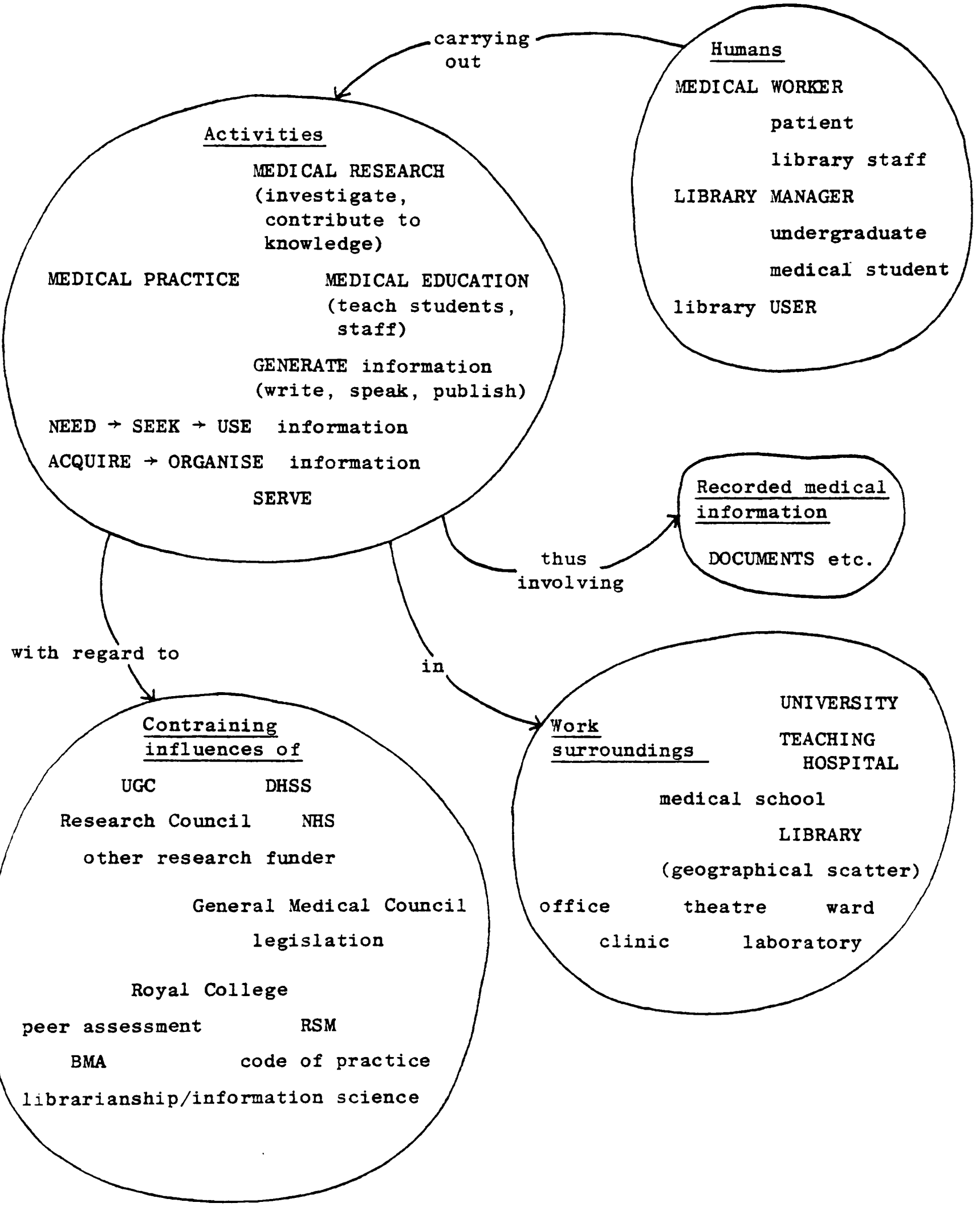
The Problem-content System

The working context of users of medical information and libraries has already been described in Chapter 3. The 'problem situation' is expressed again here in diagram form (see Diagram 9). The relationship between the elements has been rationalised as: humans carry out activities (thus involving recorded medical information) in university and teaching hospital surroundings, and their activities are regulated by constraining influences of the health care, academic, educational and professional contexts of the medical field.

1. The effect of Oxford on structure, process and climate

   The elements described below seem likely to be relevant in the problem-content system. The study is being done in Oxford and so the structure has real-world manifestations.

Diagram 9 : Recorded medical information and the medical field in the university and teaching setting



Structure	Oxford manifestations
MEDICAL WORKER DOCTOR USER	- the Survey Population
TEACHING HOSPITALS	- Radcliffe Infirmary, John Radcliffe Hospital, Churchill Hospital, Slade Hospital, Nuffield Orthopaedic Centre
UNIVERSITY	- Oxford : Departments of Anatomy, Biochemistry, Pathology, Pharmacology and Physiology
LIBRARY MANAGER	- Keeper of the RSL Librarian/Co-ordinator (Cairns)
RECORDED MEDICAL INFORMATION	- there is a rich supply available in Oxford

Activities

RESEARCH, PRACTICE, TEACH
GENERATE, NEED → SEEK → USE information
ACQUIRE → ORGANISE information
SERVE

Climate	the Oxford climate
academic, professional, educational and health care contexts	- within these contexts there are areas of expertise unique to Oxford - the educational pattern is a pre-clinical course then a clinical course
physical surroundings	- places of work and libraries are scattered within a circle of 1½ miles radius

Constraints

(i) the Oxford location
(ii) geographical scatter is inevitable
(iii) one central document source is not feasible
(iv) document sources cannot be made equally accessible to all users

2. The notion of LIBRARY

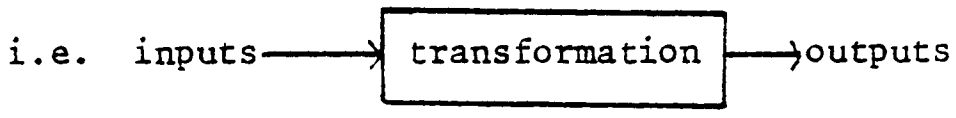
This is central to the 'problem situation' and has been explored by answering the following questions:

What are the elements of structure?

users
library staff expertise
physical form, a place or places
information (recorded knowledge which exists independently from its originator, usually in documentary form or as tapes, films etc.)

These elements are present in various proportions and so LIBRARY also encompasses the notions of *information point* and *archive*. An information point could comprise a librarian/information scientist and a telephone. Enquiries are received by the librarian who uses an information source to find an answer which is then passed back to the enquirer. Archives comprise a store of recorded information with the emphasis on future use.

What transformations occur in LIBRARY?



Some examples:

money ⟶ stock, services, staff
disparate documents ⟶ organised collection
* unsatisfied information need ⟶ satisfied information need
librarianship expertise ⟶ management and operational decisions
ill-defined information needs ⟶ defined information needs
* need for information ⟶ use of document
unretrieved information ⟶ retrieved information
* inaccessible information ⟶ accessible information
* medical practitioners and researchers ⟶ 'better' medical researchers and practitioners

* denotes answers that seem to be central to the 'problem situation'.

What does LIBRARY provide?

Some suggestions:

- employment for librarians
- an environment for study which protects against interruption
- a status symbol for the parent institution
* - a source of medical information
* - means for transferring knowledge
* - a focus for information-gathering activity

Some answers from librarians:

- stock
- services
- information services
- place to read and study
- current awareness
- guidance in information activities
- promotion/dissemination of stock, services and information
- browsing capability

A simplistic view could be that the user's image of LIBRARY is of a

collection of documents, whilst a librarian's image is of the exploitation of information.

What is LIBRARY not?

Some suggestions:

- a barrier to information transfer
- only a collection of documents
- a mechanism for evaluating information
- profit-making or money generating
- a mechanism for selling or giving away documents
- run solely for the benefit of librarians

What is the essential nature of LIBRARY?

It converts unsatisfied information needs to satisfied needs. This is achieved by providing organised information, enabling retrieval of selected information, and facilitating its use. It contains the role LIBRARY MANAGER who is responsible for the operation of a library, takes decisions about library activities and institutes action. His decisions are limited by the overall function or aim of the library.

The following types of library exist in Oxford:

- an extensive and important university science (including medical) collection, i.e. Radcliffe Science Library
- a library with a core collection covering most medical subjects, i.e. Cairns Library
- various departmental libraries with special collections tailored to departmental interests

3. The role USER

This is the potential library customer - anyone who works in medical research, teaching and practice in the University and teaching hospital settings occupies this role. The USER is likely to need recorded medical information as a result of his work, i.e. as a means to an end.

This role cannot be explored further without recourse to the Survey evidence. The role USER is then occupied by the Oxford Survey Population whose structure has been considered in terms of status

specialty/subject, orientation and work location. The User Survey discovered relationships between information activities and the research/practice nature of the user's work. Thus USER can be modified into USER (practitioner), USER (practitioner + researcher) and USER (researcher). Chapter 11 contains the rich picture descriptions of these relationships. The relevant factors are summarised in Tables 31, 32 and 33. The first part of each table depicts structure, process and climate in the USER's world (* indicates his main activities). The second part views information-seeking behaviour thus:

A Activities give rise to needs for information.

B The information has certain characteristics.

C The types of information required are sought in various types of document and hence these documents are used.

D The documents are found in libraries, hence libraries are used.

E Other needs concerning library and information usage are generated. These are described as 'valued means of facilitating information use' (i.e. perceived value to the user).

4. The roles PROBLEM-OWNER and DECISION-TAKER

Who occupies the role of PROBLEM-OWNER in the problem-content system? Two likely candidates are - the LIBRARY MANAGER and the USER. The former is a clear choice. The LIBRARY MANAGER is also a DECISION-TAKER, and as such, could be taken to seek guidance on the action he should take in providing an information service. It is less obvious that the USER can also be assigned to this role. It is by this choice that the user's view is incorporated into the study, although an actual user would probably not himself recognise that he owns the problem. The USER is not a DECISION-TAKER in the problem-content system in the same sense that the LIBRARY MANAGER is. However, he does exercise choice and make decisions about his own individual information activities.

Table 31 : Rich picture of the world of the USER PRACTITIONER

STRUCTURE (nouns) : qualified doctors, patients, NHS, clinical students, teaching hospital, wards, office, clinics, theatre

PROCESS (verbs)		CLIMATE	CONSTRAINTS
*Care for patients	- see patients in hospital; test, diagnose, treat	'health care service'	professional control through GMC and law
administrate	- organise treatment, work; patient records	'benefit to patient is paramount'	
educate	- constant informal practical guidance to staff and students	'educational'	expected in teaching hospital
report	- write papers/lectures on observations, improvements unusual cases	'professional'	peer group assessment
*develop & maintain expertise in specialty	- keep up-to-date; contribute to specialty through own expertise; gain expertise in patient care, current practice, new developments		pressure to maintain position
	- the practitioner working day is organised and fragmented		
	- he moves about within the hospital and to other sites		

INFORMATION ACTIVITIES

A. Activities giving rise to information need

1. Keeping up-to-date, clinical practice
2. Writing, teaching, research

B. Characteristics of information needed

currency
references
original work
evaluated work
answers to different clinical problems
(not all the recorded information available)

C. Information sources

- current journals
- Index Medicus, journals
- journals, books
- reviews
- preferably fulfilled immediately by stock

D. Libraries Used

departmental collections (journals in specialties)
core medical collection (Cairns) (wider selection)

E. Valued means of facilitating information use

photocopying : as a way of removing information from a library
ease of use of library : i.e. the impression that a document or service can be obtained in a brief visit or visits

Table 32 : Rich picture of the world of the USER RESEARCHER

STRUCTURE (nouns) :	researcher, funder/employer, laboratory, office, teaching hospital, university, science area, undergraduates, postgraduates, NO patients		
PROCESS (verbs)	**CLIMATE**		**CONSTRAINTS**
*research	- state of the art, ideas, experiments	'academic'	peer group assessment
*report	- write papers, publish, lecture, present new knowledge, results	'academic'	pressure to maintain position
*develop & maintain knowledge	- detailed knowledge of narrow subject, keep up-to-date	'academic'	review by funding body
administrate	- for department, research, college		
educate	- constant informal supervision of postgraduates; lectures, tutorials, practicals for undergraduates	'educational'	
	- researchers organise their own time		
	- researcher has fixed location and does not move about		NO direct health care involvement

INFORMATION ACTIVITIES

A. Activities giving rise to information need

1. Keeping up-to-date, research
2. Writing (and teaching)

B. Characteristics of information needed

currency
references
state-of-the-art
original work

all recorded information on a narrow subject

C. Information sources

- current journals, Current Contents
- journals, Current Contents, special bibliogs.
- reviews, conferences, symposia
- journals, books, theses, reports etc.

D. Libraries used

departmental collections (journals in special subjects)
large science collection (RSL) (extensive collection)

E. Valued means of facilitating use

photocopying : provision of copies for retention
ease of use of library : i.e. the impression that a document or service is obtainable without much effort on the researchers part; access and guidance to contents appreciated.

Table 33 : Rich Picture of the world of the USER PRACTITIONER + RESEARCHER

STRUCTURE (nouns) : qualified doctors, patients, NHS, teaching hospital, office, wards etc., clinical students, funder/employer, medical school, university.

PROCESS (verbs)	CLIMATE	CONSTRAINTS
*Care for patients	- see patients in hospital; test, diagnose, treat } 'health care' 'benefit of patient paramount'	GMC and law
administrate	- for practice, research, teaching	
educate	- informal guidance to staff and students; formal teaching of clinical students } 'educational'	
*report	- write papers, publish, lecture; present new knowledge, results, observations, unusual cases, new developments	peer group assessment
*develop & maintain knowledge	- detailed knowledge of research subject; gain expertise in patient care, current practice, new developments; keep up-to-date } 'academic'	
*research	- contribute to knowledge of specialty. 1. basic research, lab. experiments 2. new techniques for clinical use 3. clinical research on patients 4. clinical trials	pressure to maintain position review by funding body
	- characteristics of both researcher and practitioners' worlds	
	- dual role varies from non-clinical research + routine clinical practice to closely related clinical research and practice.	
	- organised working time and movement within environment	

INFORMATION ACTIVITIES

A. Activities giving rise to information need

1. research, writing, keeping up-to-date
2. practice, teaching

B. Characteristics of information needed

currency
references
original work

all recorded information on a narrow subject for research
answers to different clinical problems

C. Information sources

- current journals, Current Contents
- databases, special bibliogs., journals Current Contents, Index Medicus.
- journals, books etc.
- regardless of immediate availability
- preferably an immediate answer

D. Libraries used

departmental collections (journals in specialties)
core medical collection (wider selection)
large science collection (RSL) (extensive collection)
other libraries e.g. RSM (large special medical collections)

E. Valued means of facilitating information use

photocopying : as a way of retaining a copy of the information
interlibrary loans : as a way of access not involving personal travel to documents not immediately available
library staff : assistance appreciated
ease of use of library : i.e. the impression that a document will be obtained from the chosen source; minimum effort.

Hence the USER's version of the problem could be:

I have unique needs which I must satisfy from a source(s) organised to meet general demand and not my individual needs. This contrasts with the LIBRARY MANAGER's version: *I am concerned with organising information to meet the unique needs of individuals but these are difficult to predict and so I actually organise information to meet general demand.*

Basic Assumptions

1. Assimilation of medical information is essential to medical practice, teaching and research (though to varying degrees for different individuals). There is a level at which assimilation of information becomes detrimental to these activities and competes with rather than contributes to them. The level at which this occurs defies definition because it depends on fashion and current acceptable practice.

2. The need for medical information exists and its use is desirable. Specialist means of organisation and exploitation of medical information such as those found in medical libraries have emerged as a result.

3. The practitioners of one profession (librarianship/information science) serve another profession (workers in the medical field) and the former do not have experience of the work activities of the latter.

4. Information-seeking behaviour is influenced by many factors. Some, e.g. the nature of a user's work or his motivation, cannot be controlled by the library manager but may help him to assess potential information need. Other factors, e.g. type of library or budget, are also outside the library manager's control and limit the nature of library use. Yet other factors, e.g. the user's perceptions of ease of use of the library and the value of information, can be influenced by the library manager and so he can affect user choice.

5. Information is a combination of fact and meaning to a recipient.

The meaning of a message is subjective. It varies with the current state of knowledge of each individual recipient and the use to which the knowledge will be put. Thus documents in a library are a source of an infinite variety of information.

6. Evaluation of medical information from the individual user's point of view is not done by librarians in the medical field. Evaluations from the point of view of the medical profession in general are made available in libraries in the form of abstracts and journals. However, medical librarians do select stock according to whether it contains likely required information but their activities are limited by a lack of subject knowledge.

Expression of the 'Problem Situation'

The question marks in the original diagram can now be replaced with the essential elements concerning the 'problem situation'. (see Diagram 10).

Choice of the 'Relevant System'

The preceding analysis suggests some possible 'relevant systems'. These examples are not intended to be mutually exclusive or form a complete list. A pitfall here is to view LIBRARY as, say, 'a need-satisfying system' when in fact it is part of such a system. (* indicates examples of interest to this study).

* - a need-satisfying system (for employment, information ..)

\- an information storing and accessing system

* - a system for facilitating the transfer of recorded information

\- a system for employing librarians

\- a system enabling medical workers to disseminate their ideas and findings

\- a system for promoting an awareness of information

* - a system providing a service

\- a system for demonstrating the benefit of a service to a wider system

Diagram 10 : Elements in the problem-solving and problem-content systems

Problem-solving system

PROBLEM-SOLVER : the author

Other roles :

SUPERVISOR (i) PL
(ii) DFS

ADVISOR : Checkland

resources :

- User Survey evidence
- combined research experience time

constraints on problem-solver :

- satisfy requirements for a higher degree
- do work, write and submit thesis within time limit

point of view :

contribution to knowledge of information science and systems thinking

defines problem-content system and uses

CHECKLAND METHODOLOGY

to recommend action, learn about or redefine

Problem-content system

PROBLEM-OWNER : (i) LIBRARY MANAGER
(ii) USER practitioner
USER researcher
USER practitioner + researcher

structure : TEACHING HOSPITAL
UNIVERSITY
LIBRARY
RECORDED MEDICAL INFORMATION
USER
MEDICINE

activities : PRACTICE, RESEARCH, TEACH, GENERATE, NEED → SEEK → USE information
ACQUIRE → ORGANISE information
SERVE

climate : (i) (surroundings) Oxford university and teaching hospitals scattered geographically

(ii) (context) health care, academic, educational, professional (medicine and librarianship)

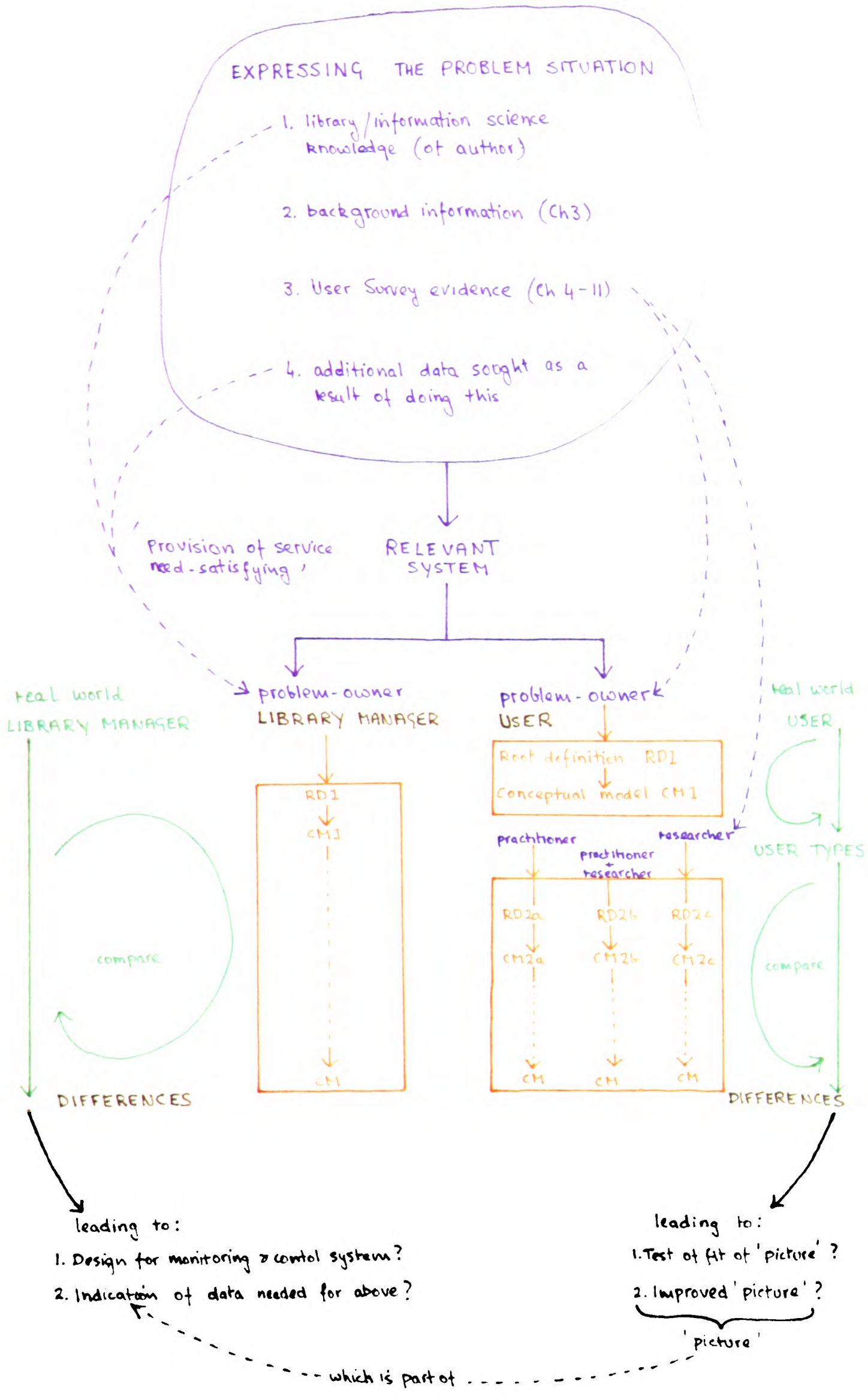
(iii) Library SERVES users

(iv) Information is a MEANS TO AN END

(v) INDIVIDUAL needs are satisfied through a GENERAL service

(vi) LIBRARY MANAGER has some scope for influencing user needs

Diagram 11 : the strategy of the Systems Study



- a system for maximising benefit through the exploitation of information
- a system for the control of recorded medical knowledge

The 'relevant system' selected as having most bearing on the 'problem situation', i.e. learning about library/user relationships is that of the *provision of service/need-satisfying type* which serves by providing and facilitating use of information.

The Strategy of the Systems Study

The strategy shown in Diagram 11 was adopted. The colours reveal parts of the methodology within this strategy:

blue	-	the analysis phase
red	-	the conceptual world
green	-	the comparison of real and conceptual worlds
black	-	possible outcomes

The analysis phase leads to the selection of a 'relevant system' of the *provision of service/satisfaction of need* type and the identification of two PROBLEM-OWNERS, LIBRARY MANAGER and USER. The strategy then branches into LIBRARY MANAGER and USER strands which continue with root definition formulation, conceptual model building and comparison. Further questions requiring additional analysis are likely to arise from the comparison. Speculations on the possible outcomes suggest a monitoring and control system which should give guidance on the appropriate services to satisfy user needs. This system will need management information, and some of this information is likely to come from the user rich picture. The USER strand differs from the LIBRARY MANAGER strand in two ways: (i) it is specifically based on the User Survey data as opposed to assumed general knowledge; and (ii) the comparison of real and conceptual worlds may reveal areas where the user rich picture could be improved, i.e. it tests that model, whereas the LIBRARY MANAGER strand will generate recommendations for action.

THE USER STRAND : ROOT DEFINITIONS AND CONCEPTUAL MODELS (Stages 3 and 4)

1. USER

Root definition (RD1): *A university and NHS funded, professionally run system, specialising in the acquisition, organisation and exploitation of recorded medical information. This system serves me, a worker in the medical field (i.e. USER), by providing the medical information I need and facilitating its use.*

C (customer)	-	Worker in the medical field, i.e. USER
A (actor)	-	Professional library staff
T (transformation)	-	Serve, through the provision of medical information and facilitation of use
W (Weltanschauung)	-	(i) The exploitation of medical information is necessary and desirable. (ii) A special system of providing it is necessary.
O (owner)	-	NHS and Oxford University
E (environment)	-	Competition for funds amongst other services.

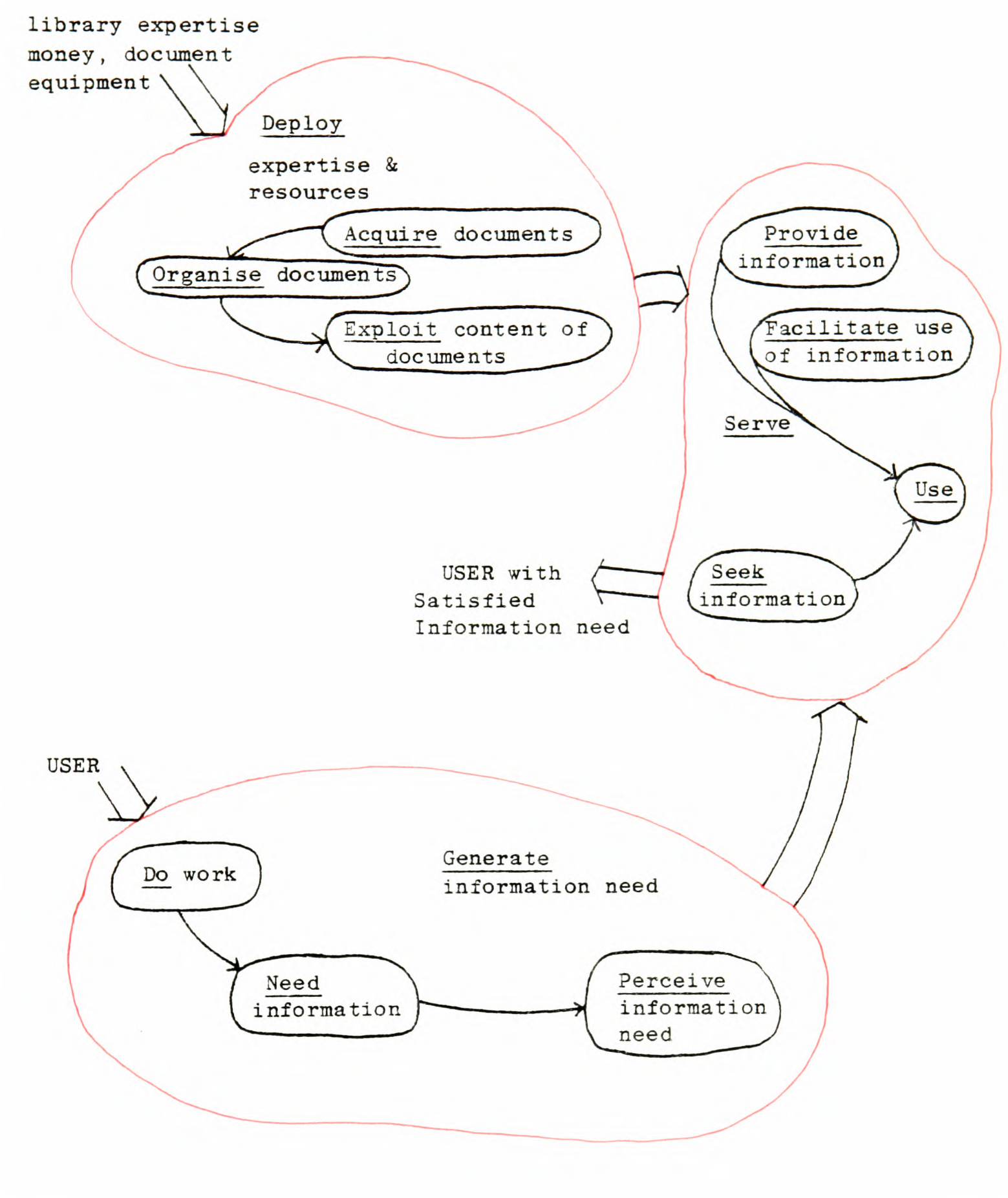
Conceptual model (CM1): (see Diagram 12)

This conceptual model cannot be resolved into a more detailed level about how these activities might be carried out without more information. The analysis (Stage 2) reveals that there are three types of users - practitioners, researchers, and practitioner + researchers - whose work and information activities are summarised in Tables 31, 32 and 33. The modelling process can be repeated, treating each of these user types as PROBLEM-OWNER.

2. USER PRACTITIONER

Root definition (RD2a): A university and NHS funded, professionally run system specialising in the acquisition, organisation and exploitation of published medical information. This system serves me, *a medical practitioner (whose activities are: patient care, administration, education, writing, and developing expertise)* by providing the medical information I

Diagram 12 : Conceptual model (CM1) of USER root definition (RD1)



inputs, outputs

logical dependencies

need and facilitating its use. *My information needs are: primarily for keeping up to date and clinical practice, and secondarily for writing, informal teaching and research into unusual cases. To satisfy these needs I use : old and new journals, books and Index Medicus and my use is facilitated by : photocopying and libraries which are easy to use.*

Conceptual models (CM2a and 3a)

The 'generate' activity of CM1 has been expanded in CM2ai (see Diagram 13) to include USER PRACTITIONER details. Similarly the 'serve' activity has been expanded in CM2aii (see Diagram 14). CM3a (see Diagram 15) is a third level conceptual model where specific libraries in Oxford are introduced. Another activity 'choose' appears and CM3a focuses on the areas of choice and service. We know from the analysis that the practitioner uses the Cairns and department libraries and his reasons for using them (denoted by * in the model). We also know that department libraries (with some exceptions) only provide a few books and journals so he must also go to the Cairns to satisfy the information needs which emerged in CM2a.

3. USER RESEARCHER

Root definition (RD2b): A university and NHS funded, professionally run system specialising in the acquisition, organisation and exploitation of published medical information. This system serves me, as *a medical researcher (whose activities are : research, writing, developing knowledge, administration and teaching)* by providing the medical information I need and facilitating its use. *My information needs are : primarily for keeping up to date and research and secondarily for writing and to a lesser extent teaching. To satisfy these needs I use : old and new journals, books and other documents, special*

Diagram 13 : Conceptual model (CM2ai) of USER PRACTITIONER with activity 'generate' expanded

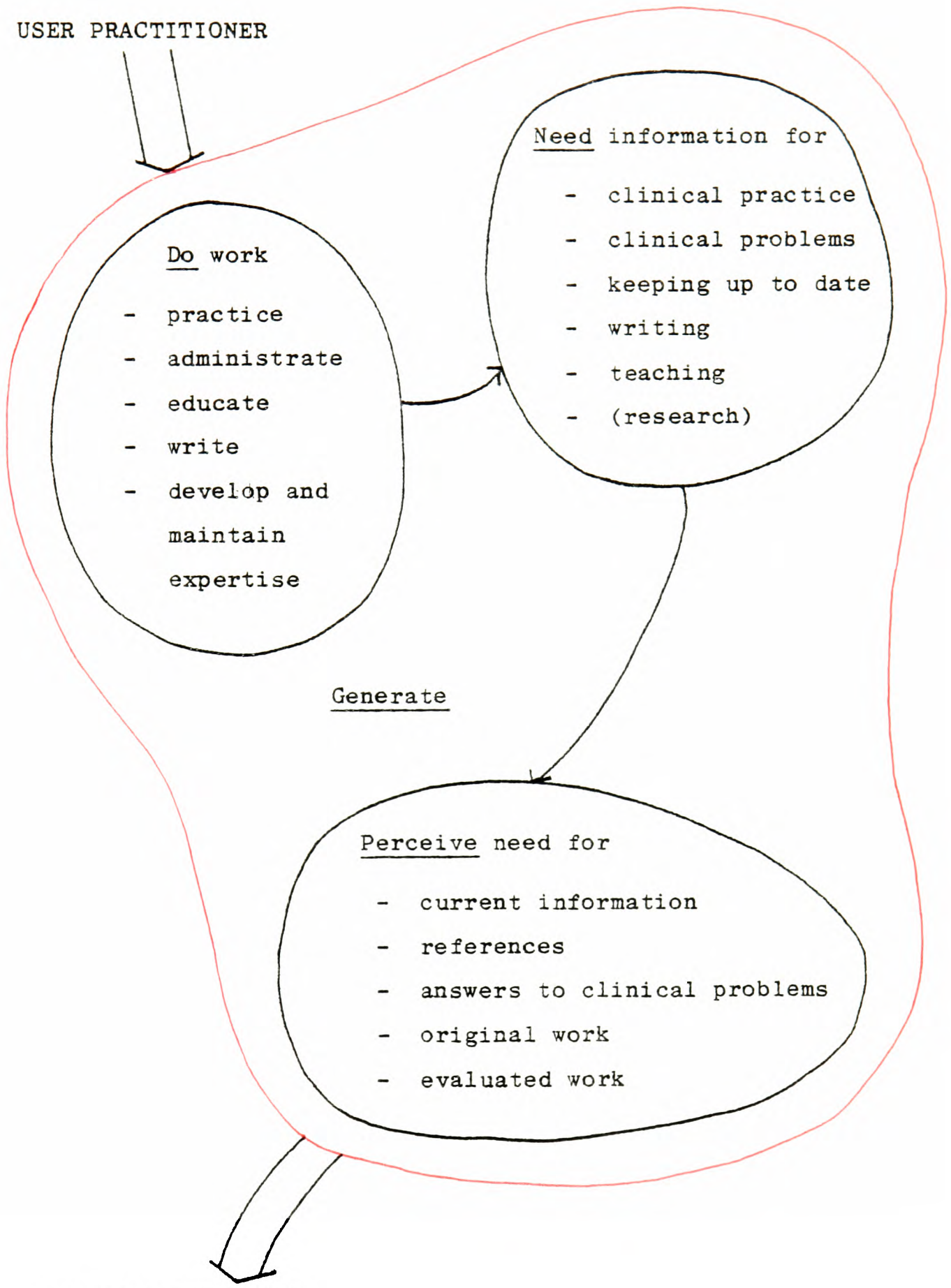
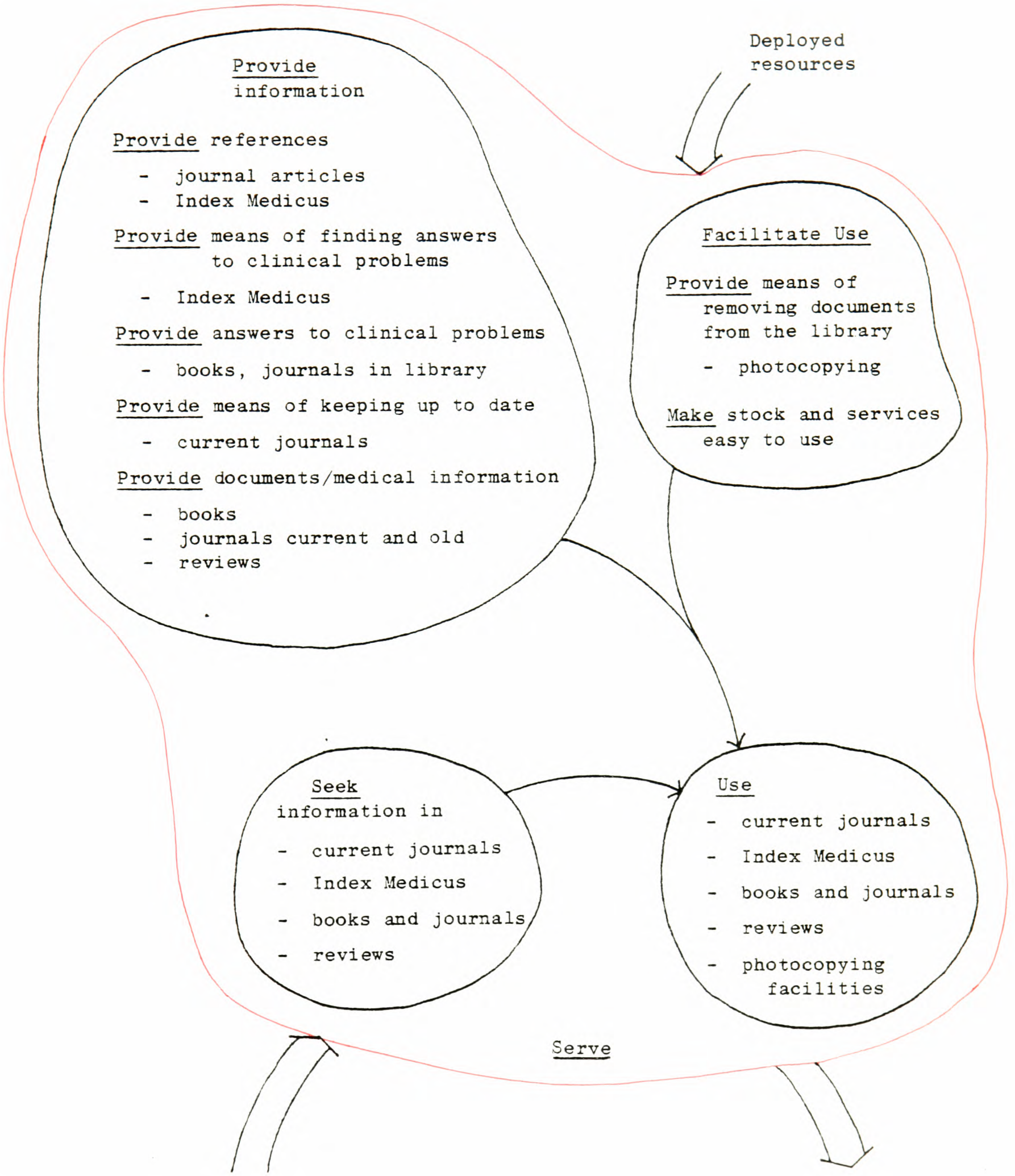


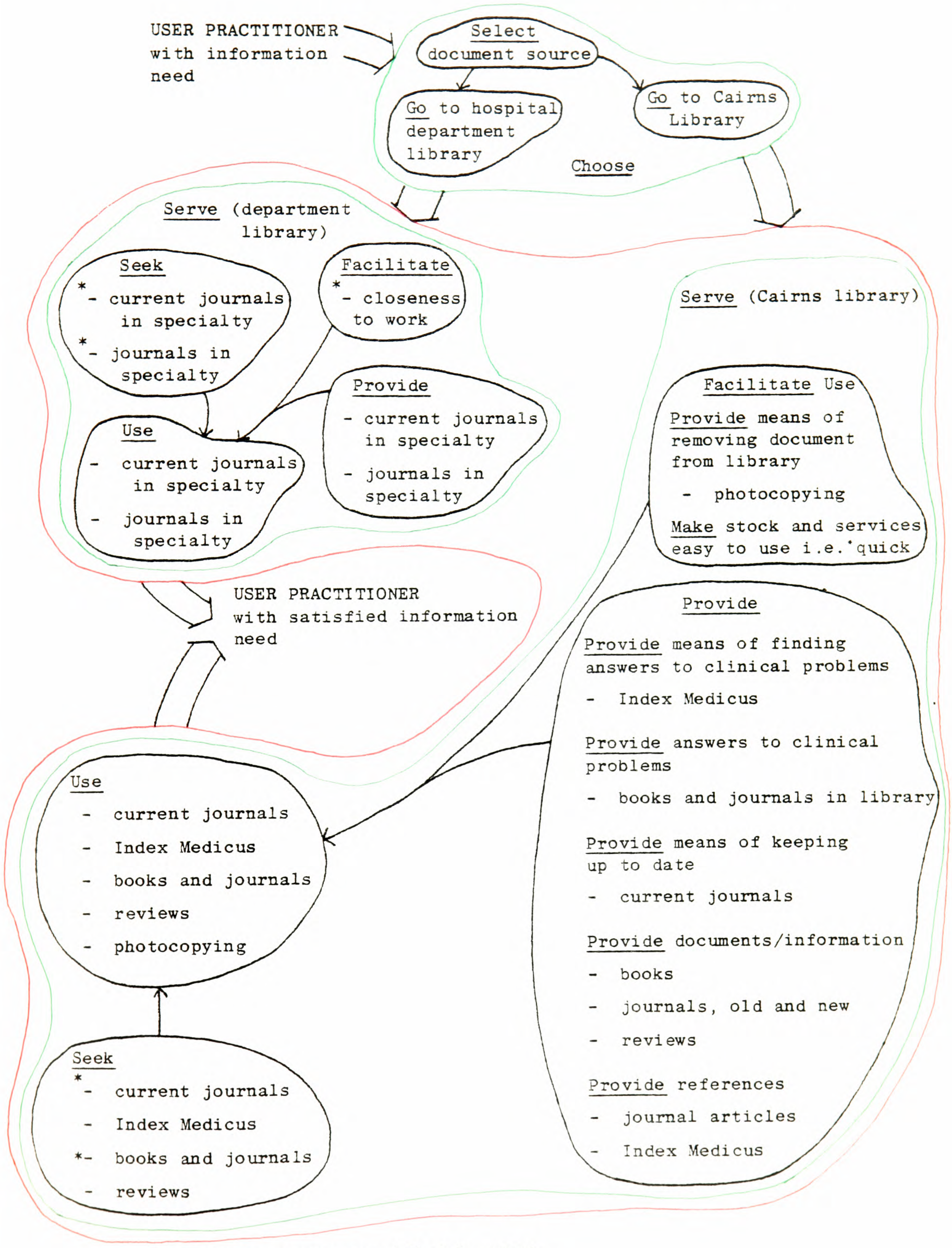
Diagram 14 : Conceptual model (CM2aii) of USER PRACTITIONER with activity 'serve' expanded



USER PRACTITIONER with perceived information need

USER PRACTITIONER with satisfied information need

Diagram 15 : Conceptual model (CM3a) of USER PRACTITIONER



* denotes reason specified by user

bibliographies, Current Contents; and my use is facilitated by : photocopying and libraries which are easy to use.

Conceptual models (CM2b and 3b)

Models were derived in the way described above: CM2bi (see Diagram 16), CM2bii (see Diagram 17) and CM3b (see Diagram 18). The comment about the Cairns and department libraries also applies to the RSL.

4. USER PRACTITIONER + RESEARCHER

Root definition (RD2c): A university and NHS funded, professionally run system specialising in the acquisition, organisation and exploitation of published medical information. This system serves me, *a medical practitioner-researcher (whose activities are : patient care, administration, teaching, writing, developing expertise and research)* by providing the information I need and facilitating its use. My information *needs are primarily for keeping up to date, research and writing, and secondarily for clinical practice and teaching. To satisfy these needs I use : old and new journals, books, Index Medicus, Current Contents, specialist bibliographies, databases : and my use is facilitated by : photocopying, interlibrary loans, help from library staff and libraries which are easy to use.*

Conceptual Models (CM2c and 3c):

Models were derived in the way described above : CM2ci (see Diagram 19), CM2cii (see Diagram 20) and CM3c (see Diagram 21). The 'serve' (Cairns Library) activity has been simplified in CM3c. The activities implied by 'etc.' are those listed above under 'serve' (RSL), except for those asterisked which relate specifically to the RSL. Again we know that department libraries only provide a few journals so the practitioner + researcher must use the RSL and/or the Cairns for his

Diagram 16 : Conceptual model (CM2bi) of USER RESEARCHER with activity 'generate' expanded

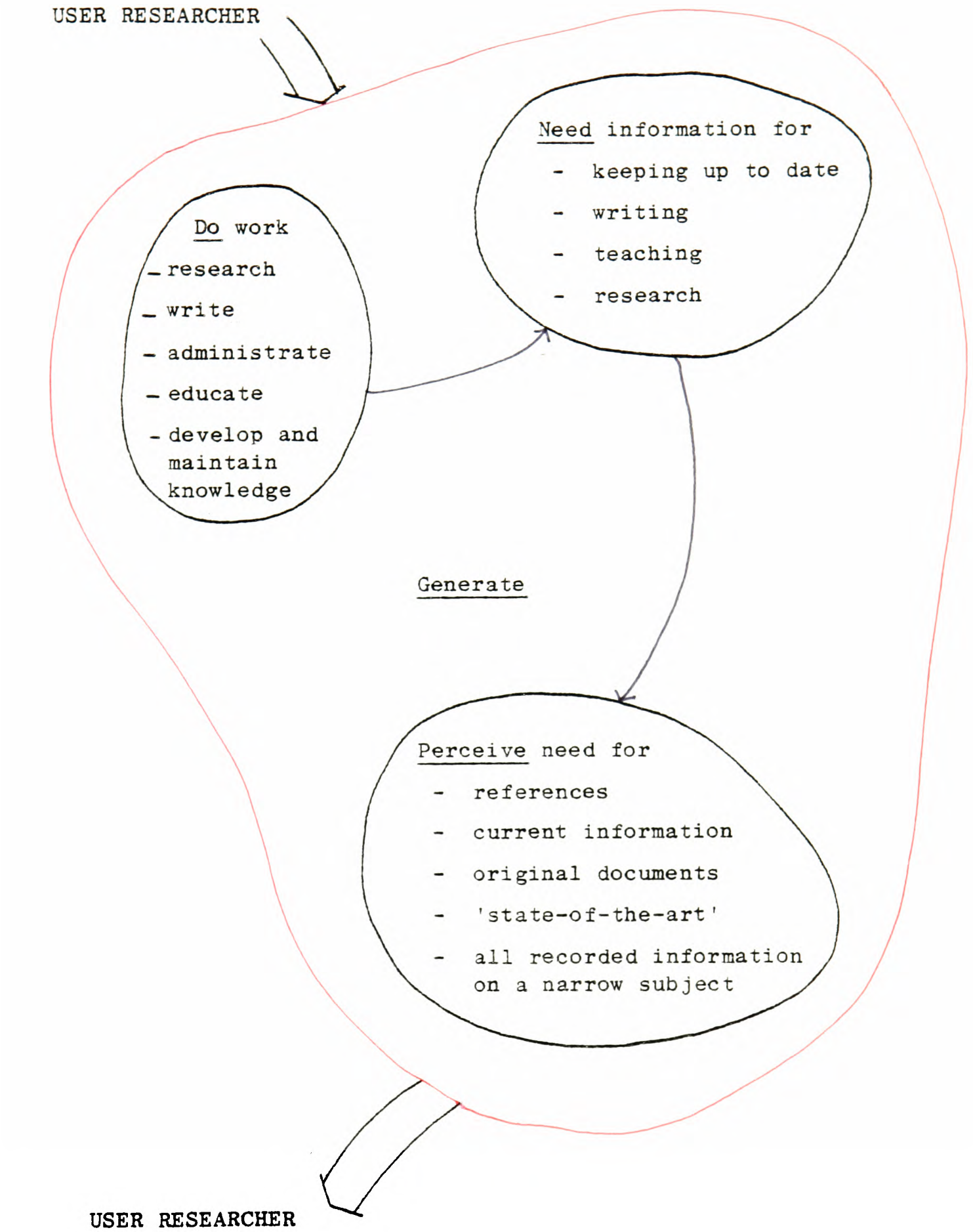


Diagram 17 : Conceptual model (CM2bii) of USER RESEARCHER with activity 'serve' expanded

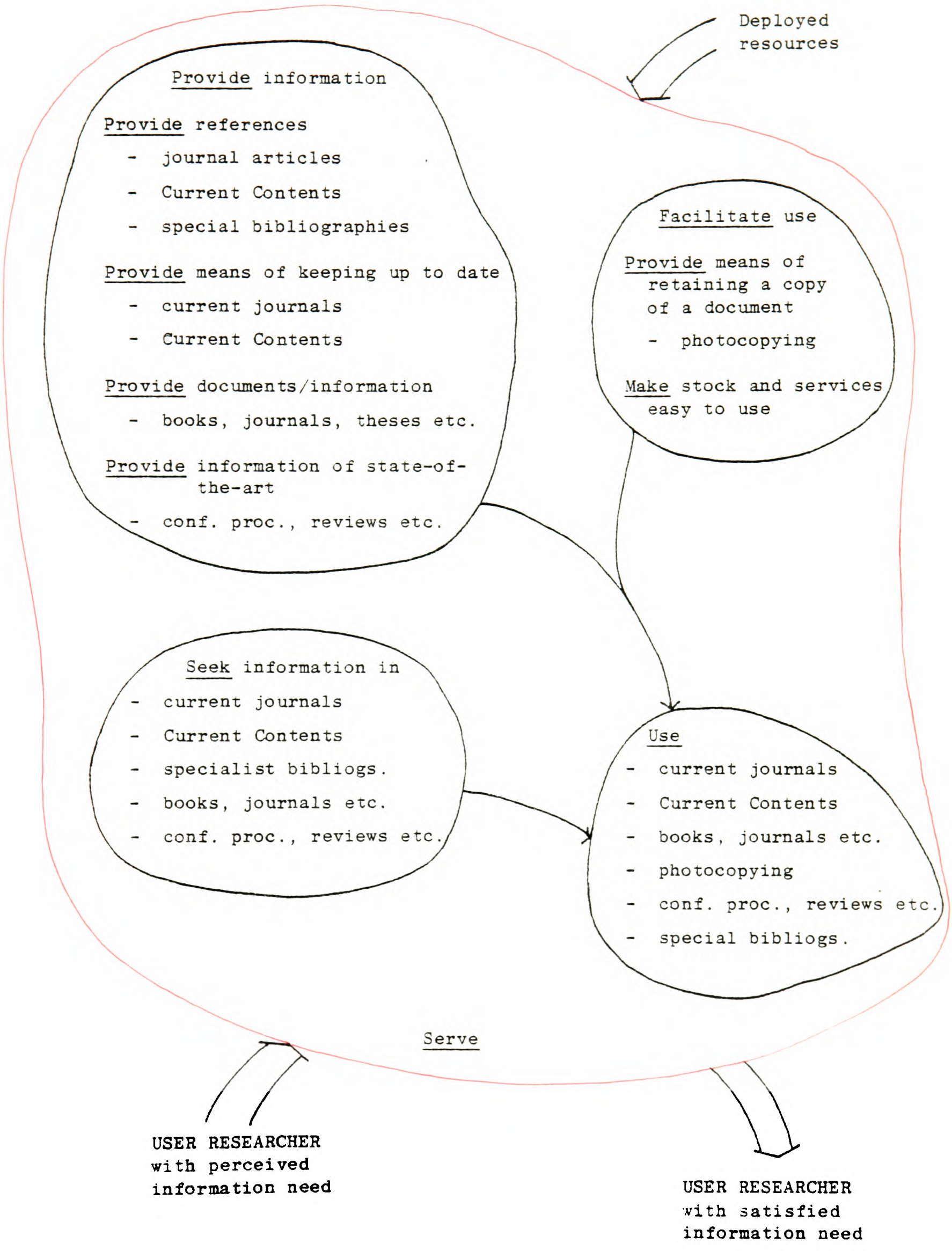


Diagram 18 : Conceptual model (CM3b) of USER RESEARCHER



* denotes reason specified by user

Diagram 19 : Conceptual model (CM2ci) of USER PRACTITIONER + RESEARCHER with activity 'generate' expanded

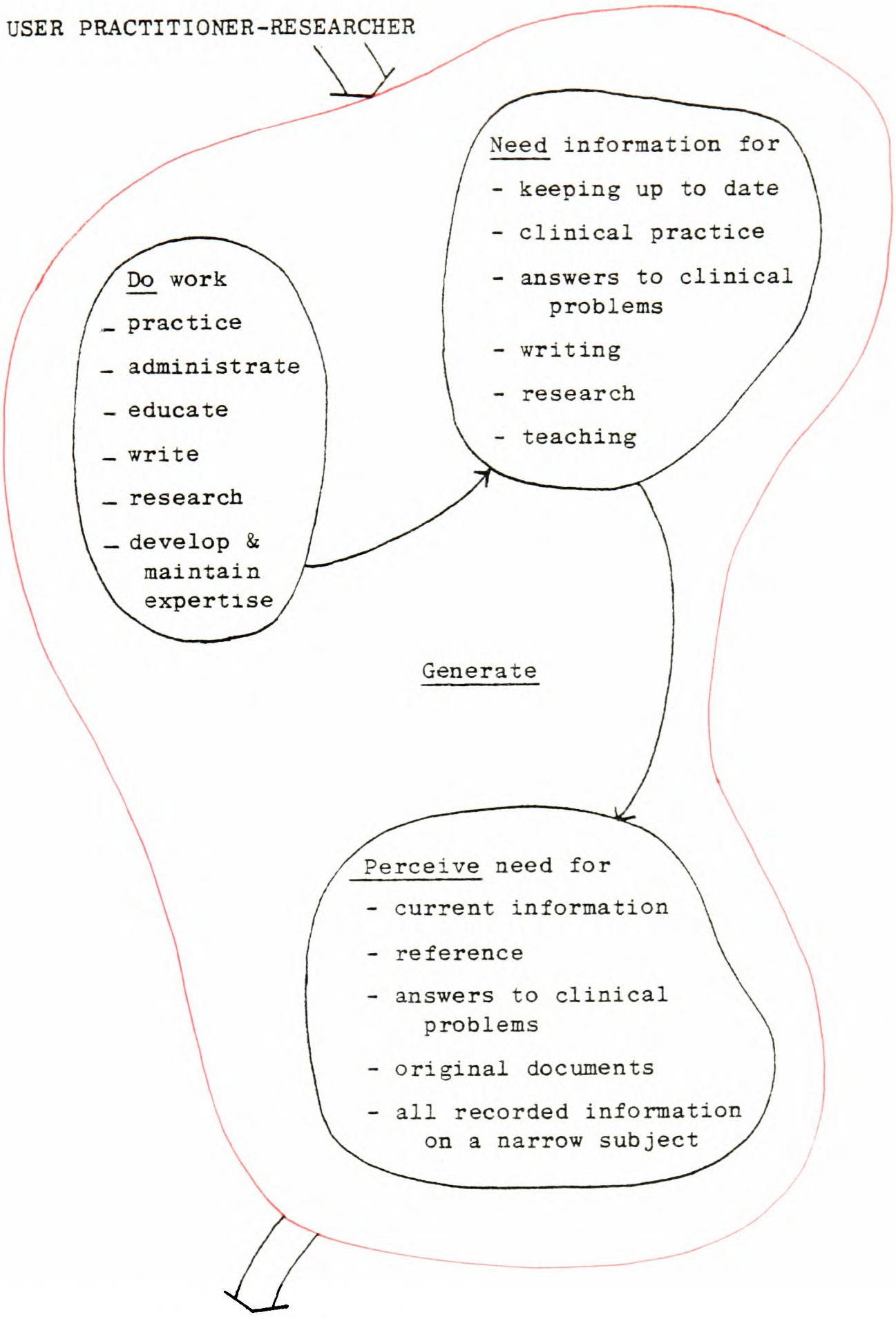


Diagram 20 : Conceptual model (CM2cii) of USER PRACTITIONER + RESEARCHER with activity 'serve' expanded

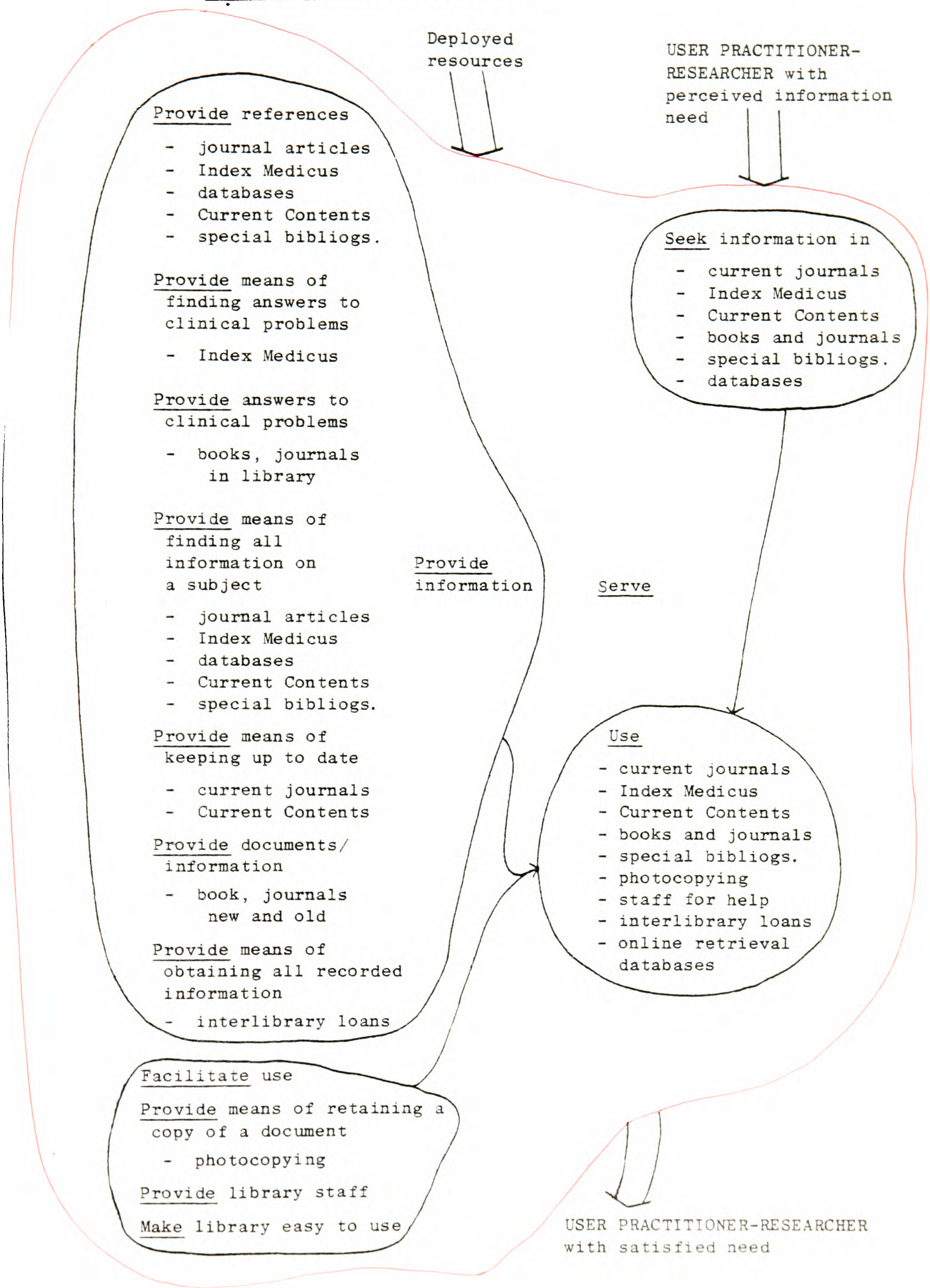
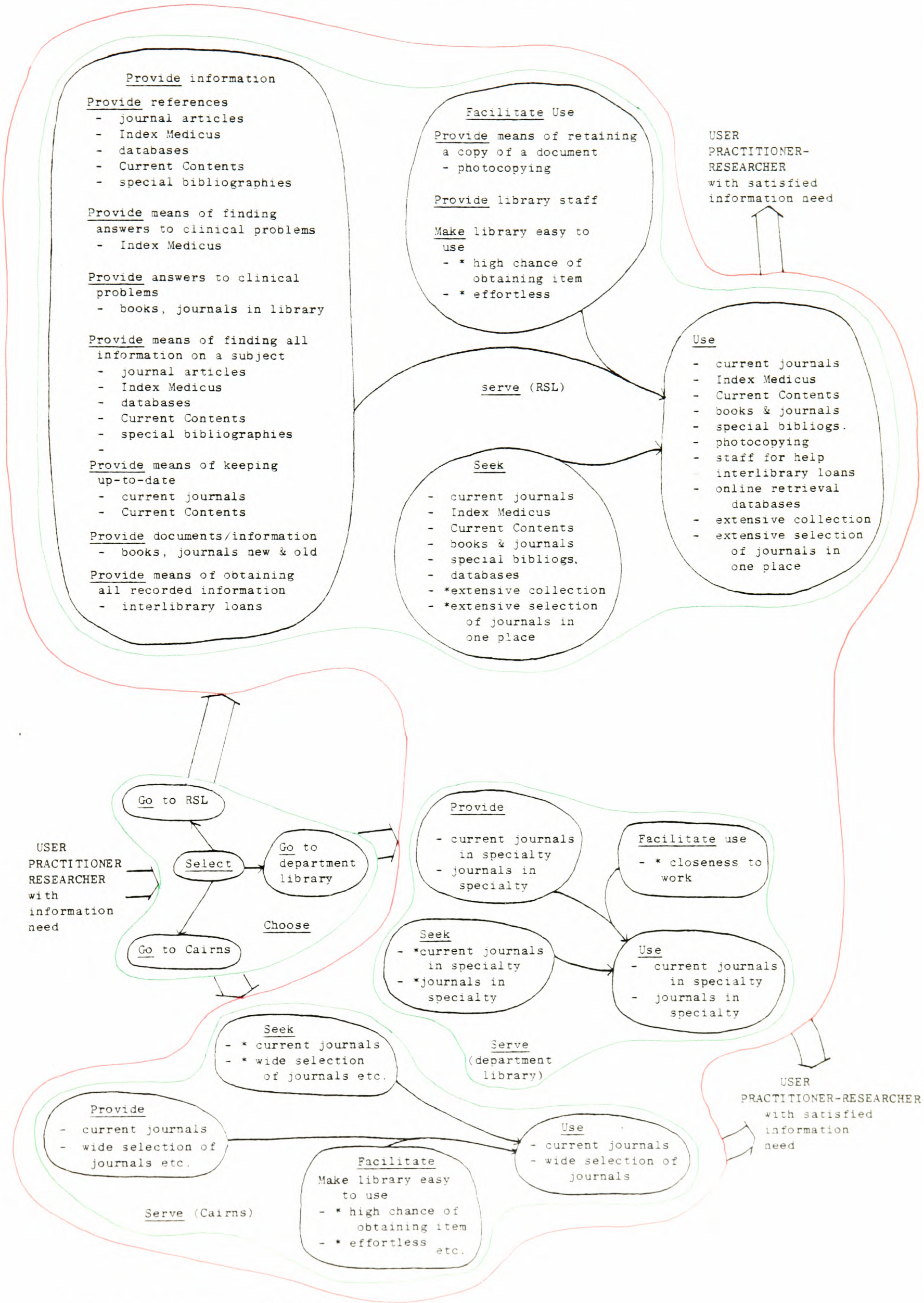


Diagram 21 : Conceptual Model (CM3c) of USER PRACTITIONER + RESEARCHER



* denotes reason specified by user

other information activities which emerged in CM2c. Special reasons for using each library are asterisked.

THE USER STRAND : COMPARISON OF REAL AND CONCEPTUAL WORLDS (Stage 5)

The conceptual models described above were now compared with the real world as perceived by members of the survey population. Users in each of the three user roles were presented with lists of conceptual world activities and asked whether the model agreed or disagreed with their experience, what were the differences, and whether the model omitted major elements of the real world. The second level comparison for the PRACTITIONER is illustrated in Table 34. The Conceptual World column corresponds with the lists presented to the practitioner and the Real World column notes his responses. Similar tables were produced for the other user types but, for the sake of brevity, these have been replaced by summaries of the differences. The comparison is also discussed in Chapter 14.

1. Differences - PRACTITIONER

CM2a : see Table 34

CM3a : The respondent also used the department library for textbooks and standard references and the Cairns for its wide selection of books.

2. Differences - RESEARCHER

CM2b : The respondent said that state-of-the-art knowledge was not gained by seeking information for that purpose but incidental to another purpose - 'one picks it up without realising it.' She did not use special subject bibliographies personally (NB. these were available in her specialty) but said she would if they were in the department. She added that when she used Index Medicus or the Science Citation Index (NB. general bibliographies) it was to check the citation details, to look for papers by another author or to see who else had used a particular method.

Table 34 : Comparison of conceptual model CM2a with the real world
USER PRACTITIONER

CONCEPTUAL WORLD	REAL WORLD ✓ agree x disagree	Comments
Your work activities are:		
mainly CLINICAL PRACTICE	✓	
DEVELOP & MAINTAIN expertise	✓	
WRITING	✓	
some ADMINISTRATION	x	none personally
some TEACHING	✓	
You need information for:		
primarily : PRACTICE	✓	
KEEPING UP TO DATE	✓	
secondarily : WRITING	✓	
TEACHING	✓	
RESEARCH	✓	
You need these type of information		
CURRENT	x	what does current mean?
REFERENCES (i.e. citations)	✓	this is how I see original work
ANSWERS TO CLINICAL PROBLEMS	✓	(see below)
ORIGINAL WORK (i.e. articles)	x	no
EVALUATED WORK (i.e. reviews)	x	and evaluations of new drug treatments
You use (somewhere in Oxford):		
CURRENT JOURNALS	✓	
INDEX MEDICUS	✓	(see below)
BOOKS & JOURNALS	✓	(see below)
REVIEWS	✓	
PHOTOCOPYING FACILITIES	✓	

Additional Comments:

- If practitioner comes across a patient with a disease he has not experienced before he will ask a colleague or look up in a textbook (standard reference work) that is on hand (possibly his own book).
- Textbooks get out of date so he may follow it up later through Index Medicus
- Ideal to have a filing cabinet containing the key articles on different topics.

CM3b : The researcher pointed out that there are many journals available in the department in private collections, not just in the library. Once in the RSL she used everything she wanted regardless of whether it was in the department.

3. Differences - RESEARCHER + PRACTITIONER

CM2c : The respondent felt that 'answers to clinical problems' was not the same sort of category as the other types of information listed. He suggested it should be replaced with 'literature pertaining to clinical problems' i.e. textbooks (reference works). He said he used textbooks for clinical practice. He did not use special subject bibliographies (NB. none available in specialty).

CM3c : No differences.

CONCLUSIONS OF THE USER STRAND

The respondents agreed with the models presented to them and it was concluded that the models are reasonable representations of the users' activities. Their answers suggested further investigation into:

- textbooks
- bibliographies
- what users mean by 'answers to clinical problems' and 'research'

The questions raised will be discussed further after the descriptions of the library manager strand. This concludes the description of the user strand.

THE LIBRARY MANAGER STRAND : FIRST ITERATION OF THE METHODOLOGY (Stages 2 to 6)

PROBLEM-OWNER : LIBRARY MANAGER

Root definition (RDL1) : *A university and NHS funded, professionally run system concerned with the management of recorded medical information; which seeks to fulfil its agreed function as part of a service providing recorded medical information and the means of facilitating its use with the aim of enabling medical practitioners and researchers in a university/ teaching hospital setting to meet their own continuing needs for recorded*

medical information.

C - Medical practitioners and researchers.

A - Library manager, library staff.

T - The system takes in (i) professional skill in handling recorded information; and (ii) knowledge of medical practitioners and researchers and their needs for recorded medical information. It generates action to meet these information needs and its outputs are users with satisfied needs. The action is to serve through the provision of recorded medical information and means of facilitating its use.

W - The medical practitioners and researchers are working in a world where it is desirable that their needs for recorded medical information are met and that this is achieved through a service with special skills in handling it. (Note - the service is concerned with helping people to meet their own needs and not with providing evaluated answers as in a drug information service.)

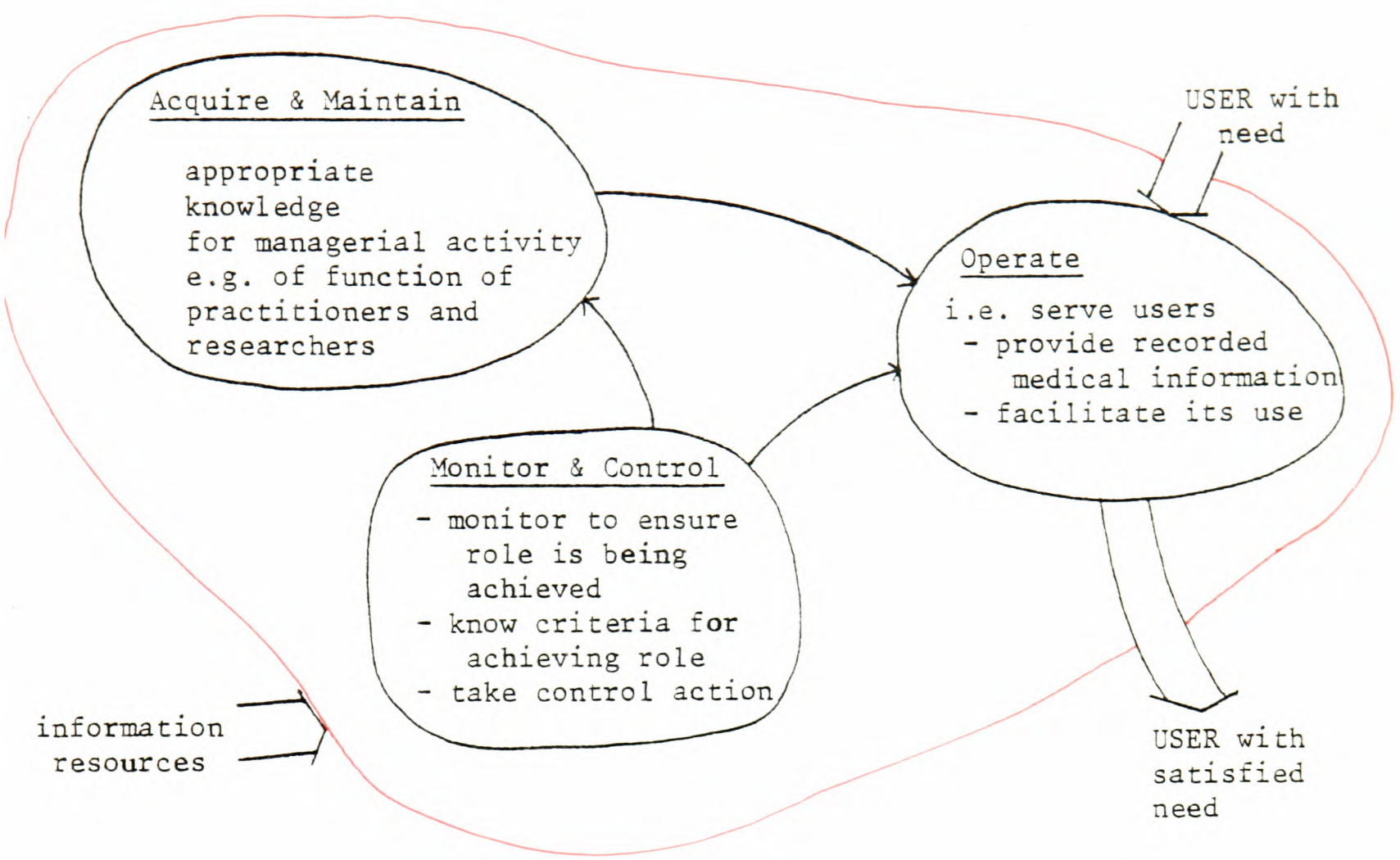
O - University, NHS

E - Agreed function within wider system, service, 'continuing'. The libraries in Oxford are independent entities connected by formal consultative links but not under any one administrative umbrella [153]. This was treated as an environmental constraint. The system seen by the LIBRARY MANAGER is only part of the wider system seen by the USER, and he controls a library which has an agreed function within that wider system.

RDL1 suggests a system CML1 (see Diagram 22) which has resources and information inputs, which takes managerial action concerning the provision of appropriate services, and which monitors its activities to ensure that it is achieving its purpose (agreed function).

The implications of RDL1 were compared with the real world, no differences were found, and CML1 was resolved into CML2 (see Diagram 23). The conceptual world activities derived from CML2 were compared with the

Diagram 22 : Conceptual model (CML1) of LIBRARY MANAGER root definition (RDL1)



real world mechanism (see Table 35). This led to further collection of data (i.e. more Stage 2 of the methodology) to supply the necessary details about the real world mechanism.

The observed differences suggested an investigation of the monitoring and control system which ensured the system achieved its agreed function and examination of this function in detail.

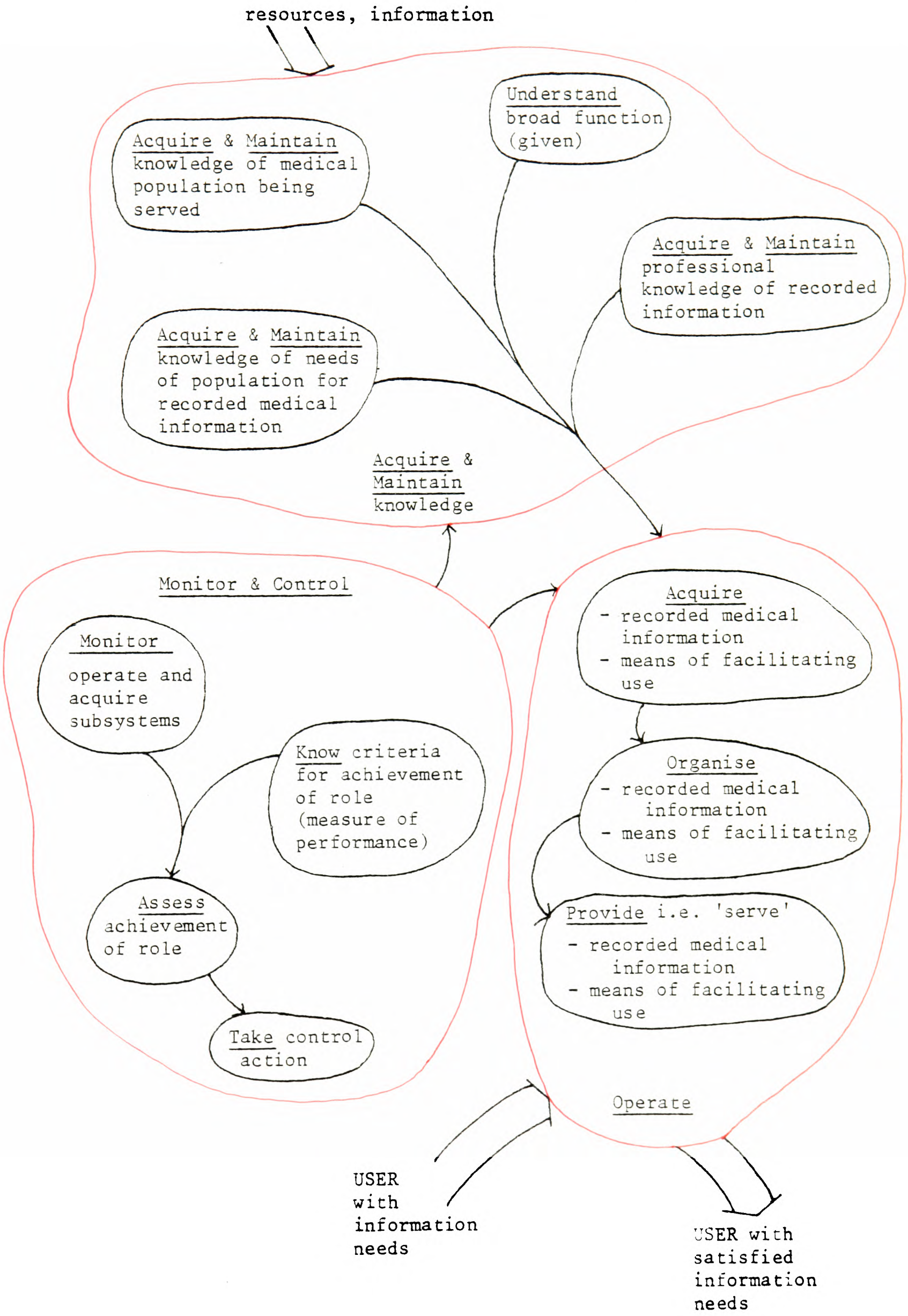
The conclusions were now presented to a 'real world' library manager. In the subsequent discussion the library manager commented that:

(i) merely pointing out some areas to consider was worthwhile (from his point of view);

(ii) that help in achieving some rational control would be acceptable;

(iii) that this help should provide a framework to guide thinking - perhaps a list of questions to be asked and how to obtain the answers.

Diagram 23 : Conceptual model (CML2) of LIBRARY MANAGER



He also commented *'When thinking about needs for recorded medical information in detail it is easy to slip into thinking about specific services without necessarily considering all the alternatives. In addition one sees what other medical libraries are providing and tends to assume that someone somewhere has thought about the needs of the users.'*

Table 35 : Comparison of conceptual model (CML2) with real world
LIBRARY MANAGER

CONCEPTUAL WORLD ACTIVITY	REAL WORLD MECHANISM	DIFFERENCES potential changes indicated
Acquire and maintain knowledge of population to be served	experience, unconscious process	x - gather information
Acquire and maintain knowledge of population needs for recorded information	assume needs are met by 'normal' library services	x - question assumption
Understand agreed function	read Working Party Recommendations	
Acquire and maintain professional knowledge re handling information	employ professional library/ information staff	
Acquire recorded medical information and means of facilitating its use	select, order,	
Organise recorded medical information and means of facilitating its use	e.g. catalogue, classify, set up services, e.g. loans	
Provide recorded medical information and means of facilitating its use	make accessible to users, staffed service 9-5 p.m.	
Monitor these activities	statistics, crises, complaints, experience	x - suggest other ways
Derive measure of performance in terms of function	compare with previous year's performance, i.e. statistics	x - set criteria
Assess activities	library manager uses judgement	x - compare with criteria
Take control action	staff carry out decisions of library manager	

LIBRARY MANAGER : DESIGN PHASE

The outcome of the previous section suggested an investigation of monitoring and control activities, so attention is focussed on this area for the second iteration of the methodology. The new root definition can be stated informally as 'a monitoring and control system to support the system described in RDL1 and illustrated in CML2 (Diagram 23)'. Since the monitoring and control subsystem is subservient to the 'operate' and 'acquire knowledge' subsystems these also need to be examined in more detail. CML3i and CML3ii show how the monitoring and control subsystem (indicated by red lines in Diagrams 24 and 25) relates to these other subsystems at a more detailed level.

The 'Acquire Knowledge' and 'Monitoring and Control' Subsystems

1. Writing the formal statement of library function

In order to proceed further a formal statement of library function needs to be constructed. The procedure for this is explained with reference to model CML3i (see Diagram 24):

(i) Knowledge of the population and of their needs for recorded medical information is combined into a description. ((a) in CML3i).

(ii) A list of various ways of meeting different information needs is derived from knowledge of current library and information science practice. ((b) in CML3i).

(iii) These are combined into a formal statement of the detailed function of the library. ((c) in CML3i).

This statement describes what are the information needs of the population and how they will be met in practice.

2. Management information required to define the library function

The next step is to enquire about the information needed to support these activities. Table 36 lists each conceptual world activity and then identifies the management information required to carry it out. This list of questions is applicable to library management in general and could be used as a guide in any library. The third column of the Table suggests how this information might be gathered by a manager of a library which serves medical practitioners and researchers in a university and teaching

Diagram 24 : Conceptual model (CML3i) of LIBRARY MANAGER 'acquire knowledge' and 'monitor and control' subsystems

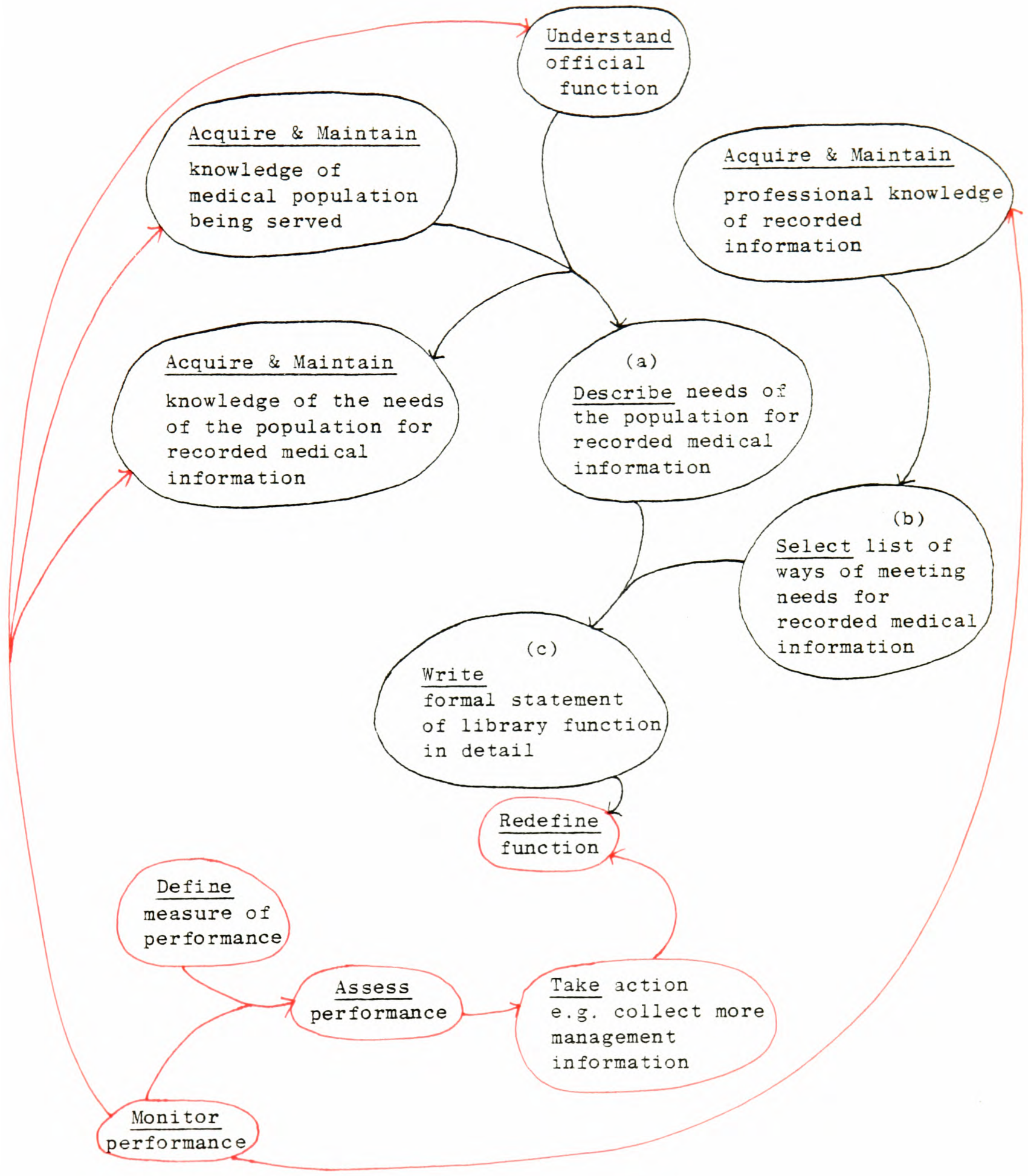


Table 36 : Management information required for defining the detailed function

Conceptual world activity	Management information needed for conceptual world activity	Suggested real-world mechanism for obtaining management information needed for a system serving medical practitioners and researchers in a university and teaching hospital setting	Illustration of the sort of management information likely to be obtained (based on information gained in present study)
Understand broad function	Authoritative statement of broad function from parent organisation(s)	Seek in official documents e.g. In Working Party Recommendations for the Cairns	e.g. 'To serve the requirements of members of University depts., postgraduates and NHS staff in the hospitals'
Know about medical population being served	What are the limits of the population? What groups are included and what are excluded?	Judgement (basis is indefinable) on who main users of recorded medical information are likely to be (in the context of the broad function)	e.g. All clinical and pre-clinical staff in the University and hospitals in Oxford
	Who actually constitutes the population? How are they described?	Seek in staff lists obtained from University and Area Health Authority e.g. Appendix C1	e.g. The User Survey population
	What is the size of the population and its constituent groups? Does it/they vary much?	Count people in staff lists over a period	e.g. Survey population numbered about 1000 people; 10% were consultants. Variation appeared to be < 5%.
	Where are people located?	Staff lists, handbooks etc.	e.g. 6 hospitals and 5 science departments in 1½ mile radius
	Do they move about?	Ask head of departments, administrators, readers. May need to assess in more detail perhaps by survey if movement seems extensive.	e.g. Hospital transport system exists, so movement likely

Table 36 (Contd)

Conceptual world activity	Management information needed	Suggested real-world mechanism	Illustration of the sort of management information likely
	What do people in the population do?	Find out by observing environment, and talking to people generally. Read official publications Ask as in User Survey	e.g. Mainly practice and/or research and some teaching and administration
	What are the parent organisations? What is their purpose?	Ask administrators Read publications	e.g. Oxford university and hospitals Health care, education, research
	What changes recur and how often - in the population	Indicated by updated staff lists	e.g. Junior doctors: 6 month turnover Academic year
	- in activities of the population	Ask administrator or colleagues	e.g. Hospital staff are less busy at holidays like Easter. University staff teaching varies with terms.
	Are there any non-recurrent changes?	Keep in touch with what is happening	e.g. Move to new hospital
Know about needs for recorded medical information relevant to population	What population characteristics affect need for recorded medical information?	Read research reports e.g. User Survey	e.g. Research or Practice, content of job - i.e. pract, pract + res, res
	What are the needs for recorded medical information associated with these characteristics?	Read research reports e.g. User Survey	e.g. res want all recorded info. on a topic for research pract want sufficient info. on a topic to develop their professional expertise
	How are these characteristics distributed in the population?	Compare with staff lists; may need to find out how staff descriptions relate to these characteristics - ask people who compile lists or do mini-survey	e.g. pract 35% pract + res 15% res 50% 100%

Table 36 (Contd)

Conceptual world activity	Management information needed	Suggested real-world mechanism	Illustration of the sort of management information likely
Know about profession of information handling	What is the nature of recorded information? What aspects are peculiar to medical information? How much information is there? What topics does it cover? etc.	Suggestions about how to find this information are not appropriate here. It is usually gained during training and through experience Read books about information handling	
	What are the possible alternatives for meeting each type of need for recorded medical information	Think about and list regardless of costs and practical difficulties	e.g. Need for means of removing info. from library: 1. borrow document 2. photocopy it 3. make notes 4. memorise it 5. relay elsewhere by TV 6. send by facsimile transmission etc.

teaching hospital setting. The sort of information that might be obtained is illustrated by that gathered during the present study. Some of this information is so nebulous that specific sources cannot be suggested as it is usually gained through experience and awareness. Even in these cases, consideration of the questions will draw the library manager's attention to factors of which he may already be aware, but the significance of which is not recognised.

A framework for the description (referred to above and (a) in CML3i) is provided by completion of the following statements:

1. The characteristics which affect the needs of medical workers for recorded information are:

2. These characteristics are present in the population being served in the following proportions (to nearest 5%):

3. The type of needs for recorded medical information associated with each characteristic are:

4. Therefore the needs for recorded medical information for the medical population served and its constituent groups are:

This description is still crude because it only accounts for high priority needs of each group. The formal statement of library function is obtained by combining the above description with the selected list of ways of meeting these needs ((b) in CML3i). The content of the statement is illustrated in Table 37 and a way it might be used is described in Appendix J1.

3. Monitoring and control of detailed function

Monitoring and control of the activities (see CML3i Diagram 24) involved in writing the statement of the detailed function ensures that it is kept up to date and still applicable to the population being

Table 37 : Illustration of the statement of the library function in detail

Type of need for recorded medical information (or for facilitation of use of information)	Group associated with need	Proportion of the group in the population % (no.)	Need satisfied by: a) providing recorded medical information	b) facilitating use
Example 1				
Authoritative opinion on current practice	Junior doctors	20% (200)	textbooks 'Medicine' series	multiple copies loans reference only copy
Example 2				
Any document containing information on research topic	Anyone doing some research i.e. res, pract + res	50% (500)	stock of documents, abstracts	inter-library loans abstracts in online databases

served. Monitoring is a continuous process of being aware of changes which may affect the details of the library function and is easier if key areas have already been identified. Each piece of knowledge should be consciously reviewed at intervals. The criteria for deciding when to do this will be based on past experience and knowledge about the likely frequency of change. Where the population remains static for many years the role may only need revising as new ways of meeting information needs develop. On the other hand if the population is constantly changing in character then the library function would have to be reviewed more often. Initial control action will be to check the original knowledge or gather new management information. The details in the formal statement can then be modified accordingly.

The 'Operate' and 'Monitor and Control' Subsystems

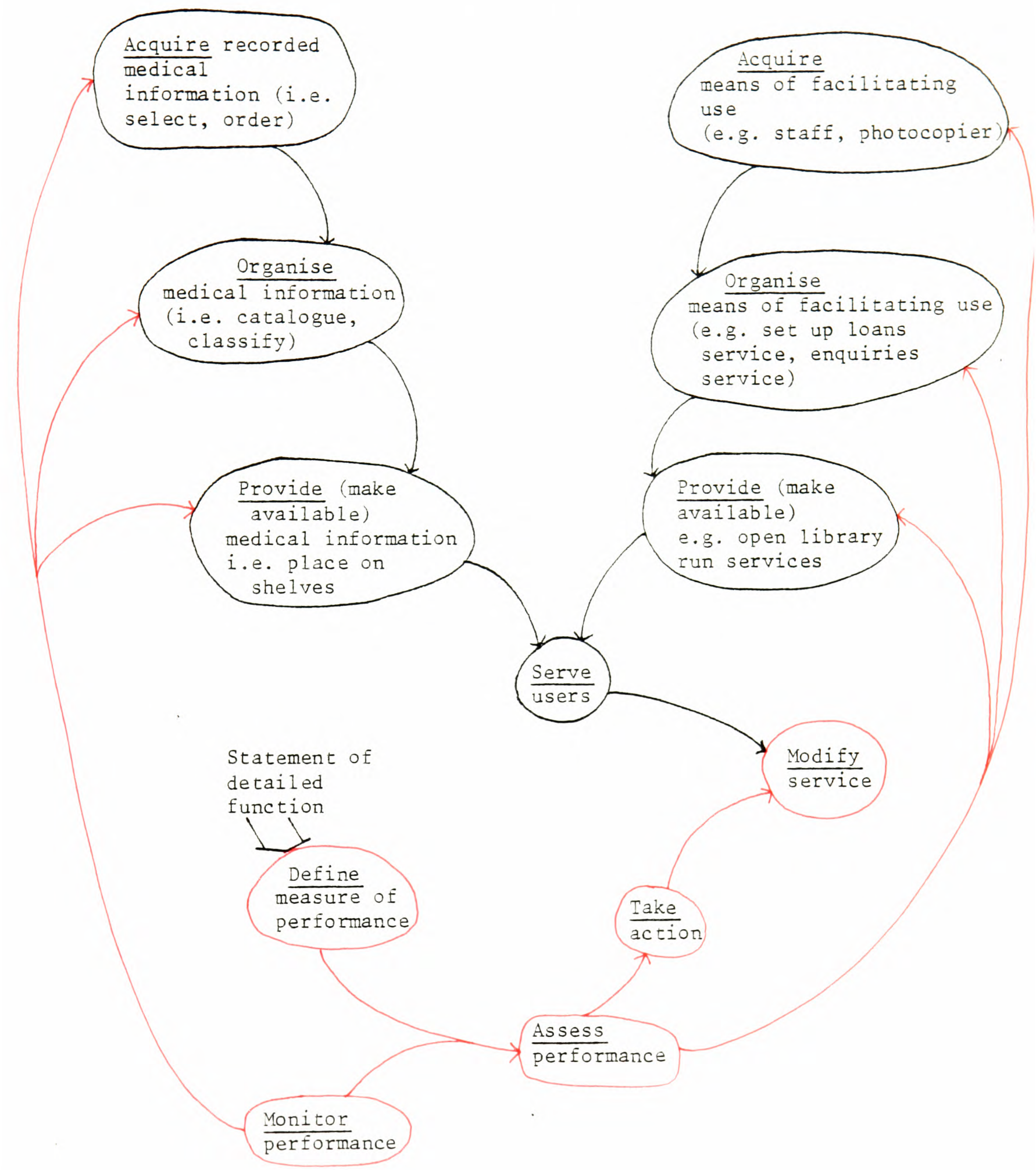
The purposes of this monitoring and control system (see Diagram 25) is to ensure that library operations do what they are supposed to do, and there must be a link between the library function and the monitoring process. This is achieved by deriving the criteria for judging performance from the formal statement of the library function. Each operational activity needs its own set of criteria and must be monitored in ways which enable performance to be matched against them.

In example 1 the formal statement indicated that the interlibrary loans service is of special interest to one particular group of 100 people, so the criterion for judgement would be use of the service by these individuals. Analysis of the interlibrary loan requests by the appropriate user characteristic would constitute monitoring. If 90 of these people used the service it could be concluded that there was unlikely to be a serious failure in library function. On the other hand if only 10 of this group used it then further investigation would be indicated. For example, the next action could be to find out whether the monitoring period was unsuitable, there was something wrong with the service, or the needs of the people using it had changed. If the latter was the case the formal statement of the library function would need to be revised. *This line of approach can point out the possibility of a service being ineffective, but cannot measure how effective the service is.*

Table 38 shows how the monitoring process and the criteria are related. A list of corresponding criteria and monitoring processes should be produced for each activity.

Example 2 illustrates a service (provision of textbooks) where suitable documentary evidence of use is not available, though loan requests would enable some quantitative measurement. In this case it would be more valuable to identify the main group using textbooks and involve them in

Diagram 25 : Conceptual model (CML3ii) of LIBRARY MANAGER 'operate' and 'monitor and control' subsystems



the qualitative assessment of the service, for example in book selection.

Table 38 : Illustration of the criteria and monitoring processes appropriate to the library function

Selected alternative means of satisfying need	Criteria for judging performance (derived from the statement of library function)	Monitoring process
Example 1 Interlibrary loans	- 100 pract + res interested - opinion of pract + res group	Count number of individual pract + res using service in a period (defining the period carefully)
Example 2 Textbooks	- 200 junior doctors interested - opinion of junior doctor group	Involve junior doctors in selection process Seek opinion of junior doctors re quality of textbooks (Count number of individual junior doctors borrowing textbooks - as a rough guide.)

CONCLUSIONS OF THE LIBRARY MANAGER STRAND

The main differences between the conceptual world and the real world are in:

(i) the monitoring and control processes for ensuring effectiveness;

(ii) the lack of a model or picture of the population served.

These formal processes which are predicted by the conceptual world, do not appear in anything like so identifiable a form in the real world, hence

these should be examined in more detail, and possibly, new systems implemented.

THE WAY FORWARD

The Library System as Part of a Wider System

Another step would be to examine the monitoring and control system which links together different parts of the system providing medical information in Oxford. However, by selecting the library manager as the 'problem-owner' the 'system' was limited to the library under his sphere of control. This system is only part of a wider system, and the library's agreed function within that wider system has to be taken as given. The study as presented, therefore, has centred on 'task-based' root definitions[154] where the primary concern is the activities of the system. Looking at the wider system would produce 'issue-based' root definitions where there will be several views about the aims of different parts of the system. However, this approach would be likely to lead to a study of a university administrative structure, rather than specifically library issues.

Improving the Rich Picture of the Users

The user strand finished with a debate about the User Survey model and concluded it was representative. Comments made during this discussion prompted further questions and indicated the need for more data collection. So far, what people use in libraries, the reasons why they need information, and how they use libraries and library services have been examined. *Why the users use each service and information source* could be explored, in order to question the assumption that these sources are used in the ways and for the reasons intended by the library manager. If the users' reasons can be discovered, then the Checkland methodology could be used to infer from them the information needs that are being met. Comparison of users' reasons and library managers' intentions may reveal differences that could lead to new ways of exploiting recorded information.

CHAPTER 14 - THE PATHWAY OF THE SYSTEMS STUDY

The aims of this Chapter are to give a historical account of how the work described in Chapter 13 was done, and to try and give some flavour of how it progressed from vague ideas to the final outcome. It begins with a chronological account of the sessions of systems thinking which were interspersed with periods of User Survey data analysis (see Appendix A1 for Calendar). The main points of each session are described briefly, together with the problems met and how they were overcome. Finally some significant problems are discussed in more detail. The pathway presented is a superficial account illustrating the threads that were followed throughout the project. It is emphasised that understanding of the ideas deepened gradually and continuously. The pathway is written from a diary maintained during the study.

THE PATHWAY

Session 1

(i) At the beginning of the study the author held vague ideas about a picture or model of users' information needs and a monitoring system for library/user interactions. Useful measures of performance and factors which should be consciously re-assessed at intervals by library managers were also in mind.

(ii) Two distinct problems were identified; (a) the 'problem situation' itself; and (b) the problem of doing the work and writing the thesis. These were later recognised as problem-content and problem-solving systems, concepts which were not known to the author at the time.

(iii) It was realised that expressing the 'problem situation' was based on knowledge gained through doing the User Survey. The idea emerged of

one profession serving another of which it had no direct experience. This proved to be a central idea which influenced the whole study.

(iv) Although many differently worded root definitions were produced the majority took the form of *a system doing something for (i.e. serving) another system.* An alternative root definition was 'a system which had to justify its existence by demonstrating its contribution to another system'. The 'service' type of definition was felt to have most bearing on the 'problem situation'.*

Session 2

(i) A system concerned with the overall provision of medical services was also explored, but abandoned in favour of the 'service' type of system.

(ii) Conceptual models were derived from the 'service' root definition but users were only present as inputs and outputs - more central involvement had been hoped for.

(iii) It was realised that the 'problem situation' could be expressed from the user's and the library's points of view. The notion of user and library manager 'problem owners' probably grew from this idea.

(iv) The assumptions and facts about libraries derived in the analysis phase were based on the author's own knowledge. In order to reduce the possibility of bias they were checked and refined in a panel discussion with several medical librarians.

(v) The notes on the study so far were rearranged to correspond with different stages of the methodology. *This revealed confusion between the problem-content and problem-solving systems,* resolved by organising the work into: (a) comments on the project as it evolved; (b) justification

* Progress was discussed with Checkland at this point.

for choosing the research topic; (c) justification for choosing the methodology and; (d) the 'problem situation'.

(vi) This clarification also showed up a more fundamental cause of muddle. *There was a lack of a true 'client' and the author was able to occupy several roles including that of 'client'.* This was a recurrent source of trouble and is discussed in detail as 'the multiple role problem'.

(vii) It was concluded that *library managers and users could be taken as notional 'problem owners'.* It became clear that the initial root definition and conceptual models were those of the library manager as 'problem owner' which had been achieved by the author unknowingly adopting this role.*

Session 3

(i) A strategy was obtained which used the 'service' type of 'relevant system' and root definitions for each of the library manager and user as 'problem owner'. A quick trial of the library manager strand was satisfactory but a run through of the user strand could not get beyond a general level. This impasse was removed on the realisation that the author was again acting as the library manager and thus could progress, while she could not act as user and was unable to progress *unless the User Survey evidence was used.* The implications of this step are discussed in detail below. Now the likely outcomes of the two strands could be identified.

(ii) Notes for the study were reorganised again to provide a cumulative record for the essential argument of the work and a chronological record which were used as bases for Chapters 13 and 14 respectively.

* Progress was again discussed with Checkland.

Session 4

(This session centred on the library manager strand and more or less followed the order presented in Chapter 13.)

(i) By taking the system to be one serving another it was necessary that this system should hold some image of the system it was serving ie. *that definition of the function in detail was essential.*

(ii) In the next step the User Survey was seen to contribute some of the information needed to form a detailed function and that *the detailed function was a source of criteria for measuring operational effectiveness.* (It was previously thought that criteria would emerge from the user strand.)

(iii) The user strand could not be pursued without first writing the rich picture description from the User Survey.

Session 5

(i) Once the three user types had been identified from the User Survey their corresponding root definitions and conceptual models could be built.

(ii) The comparison stage was problematical and showed that the conceptual models were themselves based on a model. The implications of this were far-reaching and are discussed in detail below. The comparison between the conceptual models and real world users revealed few differences and so it was concluded that the rich picture model was an adequate representation of reality.

(iii) Now the rich picture model could be used in the library manager strand.

THE MULTIPLE-ROLE PROBLEM

The author occupied the roles 'client' and 'problem-solver'. She is also a member of the library and information profession and so could act as a 'library manager' and a 'proxy' for the profession. The ability of the person in the role 'problem-solver' to assume other roles was a continual source of confusion as the author switched roles without being aware of it. This ability seems to be related to the type of problem and the research setting. It could not have happened so easily if there had been a true 'client' or if the 'problem-solver' had not been a member of the profession under investigation. However it is likely that in a research context the 'problem-solver' would have a lot of knowledge about the subject and so this remains a trap for the unwary.

Of course the 'supervisors' also occupied roles as 'library managers'. However the distinction was clearer and the potential for confusion was recognised and avoided by not discussing the methodology with them.

IMPLICATIONS OF BASING CONCEPTUAL MODELS ON THE USER SURVEY

The aim of the User Survey was to collect data and combine it into a 'rich picture', itself a descriptive model of the real world (not a 'conceptual model'). Unlike conceptual models, this model/picture was intended to be a model of the real-world and to correspond closely with it. The result was that user strand root definitions and conceptual models also showed this correspondence with the real world. Now what should the conceptual models be compared with? Since they contain the essential features of the picture/model, comparison with the User Survey will not lead anywhere. Therefore they must be compared with real-world users, but asking these users about their activities in the hope they would respond with the conceptual world activities seemed to repeat the original interviews. Eventually it was realised that representatives of the three

user types had to be presented with their appropriate conceptual model and be asked whether they agreed or disagreed with it. This user strand comparison could be improved by panel discussions, one for each user type, with several representatives. However, actually getting several medical workers together for such a discussion would be extremely hard to achieve.

The comparison stage of the user strand was inherently different from that of the library manager strand. The latter followed the methodology in conventional fashion and compared conceptual world activities with the way they were done or not done in the real world.

WHAT TYPE OF PROBLEM IS THE PRESENT STUDY CONCERNED WITH?

Chapter 12 hinted that learning about user/library interactions in a research setting was neither a 'client-owned' nor an 'impossible-to-own' (supra-institutional) problem. Examination of the client role was prompted by the muddle caused by the assumption of multiple roles by the 'problem-solver'.

Who is the 'Client'?

According to Checkland the 'client' is someone *who wants to know or do something and commissions the study. The implication is that he can cause something to happen as a result of the study*[14]. The client does not exist in this sense in the present study. Instead there are several partial 'clients' each displaying some of the above characteristics to some degree which when taken together constitute 'the client'. In other words the client exists but in diffuse form, not as a single person or organization.

These partial clients are: the author, the library and information profession, and the real-world library managers in Oxford (i.e. the Keeper of the RSL and the Librarian/Co-ordinator of the Cairns). The author

commissioned the study by selecting the problem initially, but is not in a position to take action as a result of it. The library and information profession could be said to have commissioned it indirectly (and is unaware of doing so) through the passive mechanism of accepting the research proposal and providing funds. The profession may take action when it becomes aware of the study but is not required to do so. The library managers in Oxford did not commission the study but they could have done. Again they may take action as a result if they wish and they are most likely to derive benefit from it. However this benefit arises incidentally, whereas it would have been central if they had actually commissioned the study.

Lack of a True 'Client'

The expected effect of this would be that Stages 6 and 7 (debate about change and action to improve the problem) would be impossible, but in fact they were carried out quite easily. The debate about change with the real-world library manager occurred at two levels: (i) the library manager considering change in his library; and (ii) the library manager acting as a proxy for the profession in general. This debate focussed attention on key areas as the Stage 7 change. The second iteration then produced a design for defining the function in detail, monitor and control mechanisms for this process and an illustration of how they worked by reference to the real world example. The work for the profession could not go beyond the design stage, but it could be taken further for the real-world library manager if he desired it.

In conclusion it seems that the problem has a 'diffuse client' and could have a 'true client' and so it is not supra-institutional. Furthermore it has two types of solutions: a description of what activities might be carried out and suggestions as to how they could be achieved - aimed at the library manager in general; and a more specific design that could be put into practice for the medical library manager.

OTHER FRUITFUL LINES OF THOUGHT

It was not possible to follow all potentially useful avenues and the following list illustrates some of the discarded ideas. They fall into two groups, those about library management and those about handling recorded information.

1 A system which competes with other medical services for funds.

2 A system which has to justify its existence to a wider system and demonstrate its contribution towards that wider system.

3 The role of the medical library in evaluating recorded medical information (see p.148 assumption 6).

4 The library as a barrier to information flow and as a selective filter.

5 The contribution of the medical library to the communication of knowledge across specialties and subjects.

6 The emergent properties (q.v.) of a library, e.g. as a focus for information-seeking activities.

CHAPTER 15 - CONCLUSION

The final chapter draws together the implications of the project for systems methodology, user studies, library managers, and medical librarianship. The overall objective was to improve understanding of library and user interactions. Data about the potential users of medical information in Oxford was collected by several methods in the User Survey. Each method gave a different slant on users and their information behaviour and together they provided a rich picture or descriptive model. This picture could be interpreted in many ways and a means of relating it to the practical problems of library management was sought. The systems methodology developed by Checkland was selected. The outcome of using this methodology was to emphasise the importance of monitoring and control for ensuring library effectiveness. The methodology was also used to test the rich picture and show how it might be improved.

IMPLICATIONS FOR SYSTEMS THINKING AND THE METHODOLOGY

1. Using the Checkland Methodology as a Research Tool

Fundamental to the methodology is the notion of a problem to be solved or understood and that the person conducting the investigation is a 'problem-solver'. In most previous applications there has been a clearly identified client or the investigator has been an outsider brought in to an environment of which he has little knowledge. The possibility of the 'problem-solver' assuming a role within the 'problem situation' had not therefore been recognised. In the present study the 'problem-solver' could and did unconsciously assume roles within the 'problem situation'. This was a constant source of confusion which was eventually avoided by writing down the origins of all the information used (see the multiple role problem p. 187).

There is a range of problems spanning those which are owned or controlled by a client, via those which are not but could be, to those which cannot be owned. However, there must be some sort of client who commissions the study for there to be any interest in the problem. It is suggested that there are two types of client: (i) the 'true client' who commissions the work and has control over the problem and may be either a single person or an organisation; and (ii) the 'diffuse client' made up of several 'partial clients' each having some of the properties of a 'true client' and together being equivalent to the 'true client'. The idea of a 'diffuse client' is introduced for circumstances where there is a clear separation between who commissions the study on the one hand, and who controls the problem and may take action to solve it on the other. It is recommended that further work should be done to clarify the notion of 'client' (see p. 188).

2. The Methodology and this Systems Study

This study demonstrates the strong effect of the principle embodied in Checkland's law of conceptualisation, *'a system which serves another system cannot be defined and modelled until a definition and a model of the system served are available'* [14]. It is this logic which required the description of the library function in detail. There is a hierarchy of three levels of specificity in this study: at the highest level the user strand developed the model of 'the system being served', which was required for the middle level library management system in turn supported by the lower level monitoring and control system.

3. Was the Checkland Methodology Appropriate?

A variety of quantitative modelling methods were explored before deciding on the Checkland methodology which was considered more appropriate

and likely to be more enlightening. To what extent have these views been borne out by experience? The methodology was successful when taking the library manager as owning the problem in that it showed how user studies could be linked to library management, that describing the function of the library was essential, and how this description could be used to monitor for effectiveness. The value of the methodology in testing the rich picture from the User Survey is less easy to justify. It could have been tested by asking users to read and comment about the rich picture itself without using the methodology at all. The advantage of the methodology was that it not only tested the picture and showed how it could be improved, but revealed a fundamental assumption - that people use documents and library services for the reasons and in the ways assumed by the library manager. Furthermore, the methodology could be used to work backwards from the users' reasons to the 'Weltanschauung' implied in them, or in other words, to the information needs that were being satisfied.

IMPLICATIONS FOR USER STUDIES

Gathering data about the same users by several different techniques was an essential element in this study.

1. User studies should report background information which places such studies in perspective and identifies possible bias. For example, the value of a photocopying service may be affected by access to a departmental photocopier. The impression of the users' environment gained while collecting data is also useful in this respect.

2. The findings from the different methods were consistent and offered different perceptions of library and information use.

3. Direct observation is worth pursuing, although it is a time consuming method of data collection, since it shows that groups of users which are active in using services are more visible to library staff and can give a distorted view of library use.

4. The Reference Tracing Experiment would be worth repeating with more intensive interviews to try and find out why people choose to follow up some references and not others, and how much their perceptions of availability affect their decisions. The results were disappointing in this study in that few people failed to find their references. However, there is a wealth of information in Oxford, so this high success may be a local effect and the method might be more revealing if repeated elsewhere.

5. It is recommended that the question of why people use a particular information source or service and what they expect from it should be investigated in depth. It is assumed by the library profession that the manner in which services are used and the reasons for using them coincide with their intentions. In addition even if users vary from the 'norm' in their use of services it is assumed that this happens because users need educating in how to use them properly. An alternative and equally valid explanation is that services are used for reasons other than those for which they were designed. Investigating reasons for use provides an approach to users' information needs. It is much easier to answer specific questions such as 'When you last used a textbook what did you use it for?' than a general query such as 'For what purposes do you need information?'. The original information need might then be inferred from the user's reasons.

6. If the results of user studies are to be used by library managers, they should be reported in a form suitable for them.

IMPLICATIONS FOR LIBRARY MANAGERS

1. Knowledge about the population served is a requirement of providing a service.

2. Information about the user population, their needs for recorded information and ways of meeting these needs has been combined into a formal statement of the function of the library which describes in detail what the aims of the library are and how they will be achieved in practice. This formal statement is a source of criteria for judging the performance of library operations and ensuring their effectiveness in terms of what they are trying to achieve.

3. The following aspects are discussed:

(i) what information is needed for the formal statement, how it might be obtained, and the sort of information that might be found;

(ii) how to write a formal statement of the library function in detail;

(iii) how to modify this statement so that the aims remain appropriate to the population served;

(iv) how to derive criteria for judging performance from the statement;

(v) how to relate these criteria and the monitoring process to library operations;

(vi) how such a monitoring and control system for operational effectiveness might work (see p.179).

4. The main conclusions are applicable to library management in general though the examples give more specific guidance for managers of medical libraries in teaching hospitals.

5. Some of the information needed to define the function of the library in detail can only be obtained by intensive user study research. The list of questions (p. 174) shows which results of user studies might be significant for library managers.

6. The approach presented here is intended to guide and aid judgement and decision-taking, not to replace them. It can reveal where a library is likely to be ineffective and suggest how this should be investigated, but cannot show quantitatively how effective the library is, nor the action to be taken to solve its problems.

7. The guidance given by the approach outlined in this thesis takes the form of a framework for questioning and gathering information about library function and the population being served. It is advised that the answers are written down, however vague, familiar or trivial they may appear, because their significance only emerges when seen together.

IMPLICATIONS FOR MEDICAL LIBRARIANSHIP

1. The main finding of the User Survey was that patterns of need for recorded information and library usage varied with the nature of the users' work, ie whether they did research or clinical practice. People who did both research and practice showed both patterns.

2. The teaching hospital setting gave the survey a strong research bias and further investigation on practitioners in non-teaching hospitals is recommended. It is of particular interest to compare this study with two other projects which differed in method and specificity. In a broad survey Ford[2] showed how the information needs of various health care groups including

hospital doctors and general practitioners, differed. The nature of the hospital doctors' work was not asked in Ford's survey and, although details about the type of hospital were obtained the results were not analysed by this variable, consequently the patterns brought to light in the present study were obscured. The Clinical Librarianship Project[3] looked at some issues of information needs related to clinical problems and concluded that these problems prompted the doctor to seek information to improve his medical knowledge, rather than for direct patient care. This confirms the conclusion of the present study that further enquiry is needed to find out what users mean by 'answers to clinical problems'. These studies point to three types of user of medical information: the hospital or university medical researcher, the hospital practitioner, and the general practitioner.

3. It is suggested that reasons for using sources and services should be explored in depth. Medical textbooks and bibliographic tools were selected as important areas. The Medical Review Panel[1] made two related recommendations: that deployment of resources on textbooks should be looked at for planning and budgeting purposes (RR5); and that abstracting methods and the use made of locally produced abstracting bulletins by doctors should be evaluated (RR8).

4. Knowledge of the population served is necessary to ensure library effectiveness. The Medical Review Panel's[1] recommendation for action (RA10), that an experimental information fellowship for qualified doctors should be established, would add a new dimension to this knowledge. The need for this knowledge has implications for the training of medical librarians which should, therefore, include some superficial learning about the nature of clinical practice and medical research.

IMPLICATIONS FOR LIBRARY AND INFORMATION SCIENCE RESEARCH

This final section gathers together the conclusions which may have some bearing on future information science research.

1. The Combination of Data Collection Methods

Several methods were used in the survey to counteract bias inherent in each method and to contribute different perspectives of information-seeking behaviour. Comparison was illuminating, even when the data collected by different methods showed the same patterns, for the views of users could be contrasted with their observed use of libraries. However, not only is a lot of data produced, but several types of data result because the methods are at different stages of development. These disjointed sets of data need to be formed into a cohesive whole. In spite of these difficulties it is recommended that user surveys employ several methods of data collection. In addition, they should include a descriptive account to convey the flavour of users' information-seeking behaviour besides reporting the evidence.

2. Changing the Direction of the Research

The user survey was seen as a prerequisite of a study about library networks. Ideas about networking had included facsimile transmission of data, referral services for users, and transfer of documents within the network. These ideas led to an exploration of the literature on modelling and management. Such work is strongly oriented towards library function and the user element is lost. It seemed that quantitative methods were not suitable for exploring complex human situations, cannot account for information sought as a means to an end and not an end in itself, and their application is hindered by the difficulty of finding useful quantitative measures of performance. Disillusionment with the quantitative

approach coincided with the discovery of Checkland's methodology for conceptual modelling which appeared to offer a way of linking behavioural data to management while retaining the user element. The decision to abandon the original intention of the research and follow the potentially more promising lead was not taken lightly. The lesson learnt is that ideas which are promising at the start of a project may turn out to be sterile and that it may not always prove useful to follow the original research intention to a conclusion.

3. Application of the Checkland Methodology in Information Science

The advantages of the methodology are:

(i) It provides a framework for thinking about complex situations which has mechanisms to prevent wandering off into abstraction.

(ii) It forces the recognition that the researcher is part of the study and influences it. This concept is frequently glossed over.

(iii) It brings to light basic assumptions. This is valuable because not only are the preconceptions of the researcher made explicit, but it also indicates other areas of research in questioning these assumptions.

(iv) It forces the researcher to follow where it leads and so the outcome is not necessarily predictable. This avoids the possibility of defining an artificial problem at the outset which might constrain the investigation.

The Checkland methodology follows on from the idea of forming a rich picture of information-seeking behaviour. This qualitative approach is often intuitively valid but difficult to verify, in contrast to the quantitative approach which may model accurately something which has little relation to reality. Clearly both approaches have their drawbacks and advantages. Information science research has so far been dominated by

quantitative methods and it should now make more use of qualitative methods. The Checkland methodology can be applied in any instance where a conceptual model is sought, for example before any attempt is made at quantitative modelling. When using the methodology it is helpful to keep a diary recording in detail the thinking and decisions at each stage to keep track of the project as it develops.

4. Information Science and Other Disciplines

There is a wealth of ideas in the literature of other disciplines such as management science, systems thinking and industrial psychology. These should not be neglected in future research.

5. Linking Users and Libraries

Surveys of library and information use might be improved if they included investigations of the attitudes of library and information staff towards the users they served and the information they handled as well as looking at the attitudes of users.

6. The Significance of Time

A relationship with time has been implied throughout this thesis. It is now realised that the perception of time has far-reaching implications for information science research. Information-seeking behaviour can be viewed as the result of many factors which are in a continual state of change. This phenomenon applies to any study of humans. New fashions in culture, education and ways of handling information continually arise and should be set beside past experience. The significant feature is the rate of change of these factors with time. Change in some aspects will be barely perceptible such as basic human needs for love, food etc. which govern behaviour. Some factors will change slowly, for example change in

the use of medical literature as medicine itself evolves. Yet other factors change quickly and dramatically, as in the impact of online information retrieval.

Research on the 'softer' side of information science is often criticised for lack of cumulative effort. If we take into account an awareness of time as outlined above, the assumption that it is possible to accumulate facts in such 'soft' research must be challenged. The effect of change means that some facts are only valid in relation to the time at which the research was done. Thus we must alter our expectations of the outsome of such research and accept that while it cannot be universally applicable and transferable, it is nonetheless enlightening.

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ABBREVIATIONS

cons	consultant
sr	senior registrar
reg	registrar
ho	house officer
hon cons	honorary consultant
clin lect	clinical lecturer
res reg	research registrar
rw	research worker
pg	postgraduate

prof	professor
ul	university lecturer
dd	departmental demonstrator

pract	practitioner
pract/res	practitioner researcher
res/pract	researcher practitioner
res	researcher
pract + res	practitioner and researcher

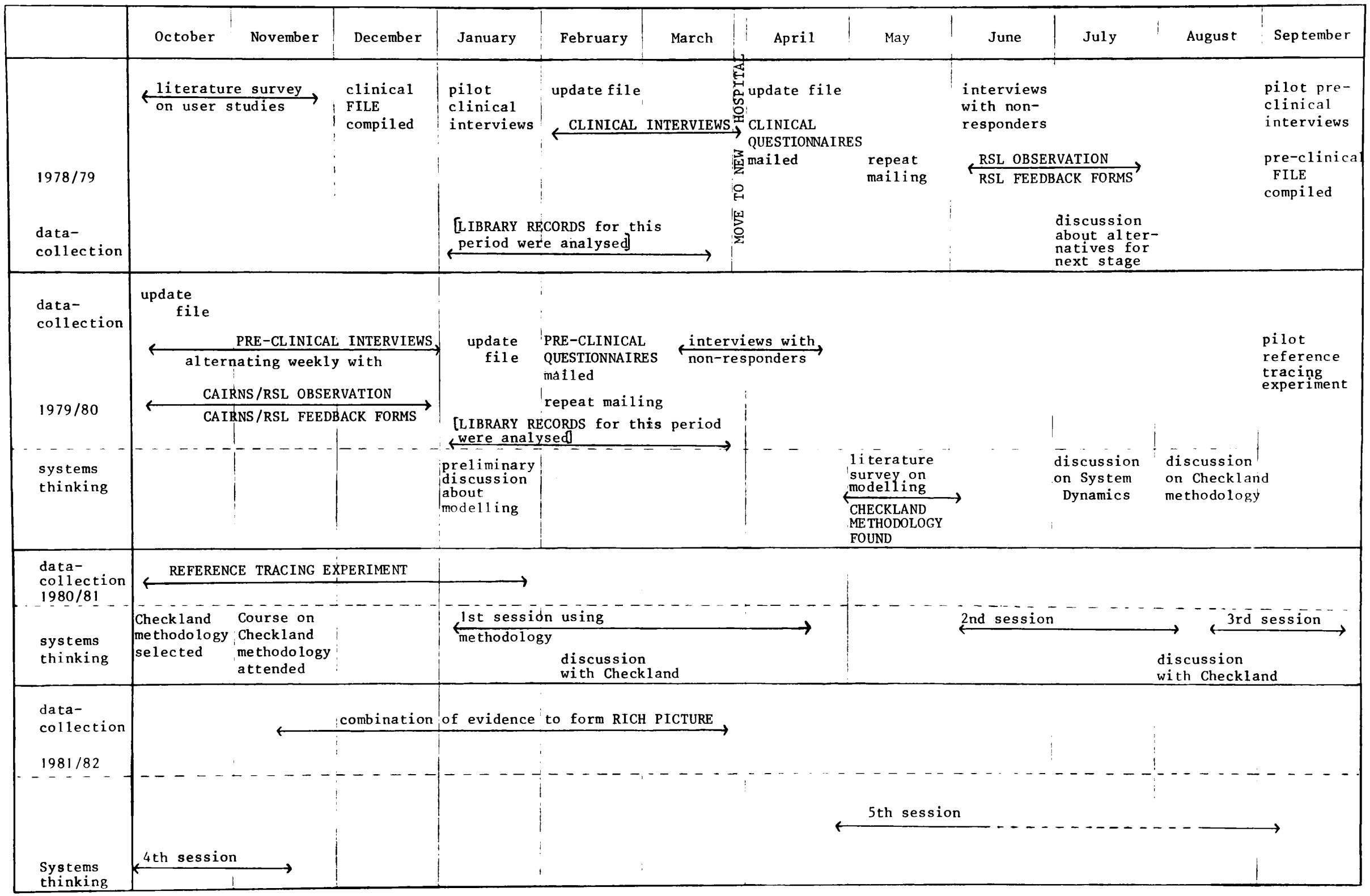
anat	anatomy
bioch	biochemistry
path	pathology
pharm	pharmacology
physiol	physiology

surg	surgery
med	medicine
anaesth	anaesthetics
o & g	obstetrics & gynaecology
paed	paediatrics
com	community medicine
lab	laboratory medicine

CHU	Churchill Hospital
CR	Cowley Road Hospital
JRH	John Radcliffe Hospital
KR	Keble Road
NIMR	Nuffield Institute for Medical Research
NOC	Nuffield Orthopaedic Centre
RI	Radcliffe Infirmary
SH	Slade Hospital

BLRDD	British Library Research & Development Department
MRC	Medical Research Council
NHS	National Health Service
RSL	Radcliffe Science Library
RSM	Royal Society of Medicine

RD	root definition
CM	conceptual model



Appendix A1 : Calendar of research activities

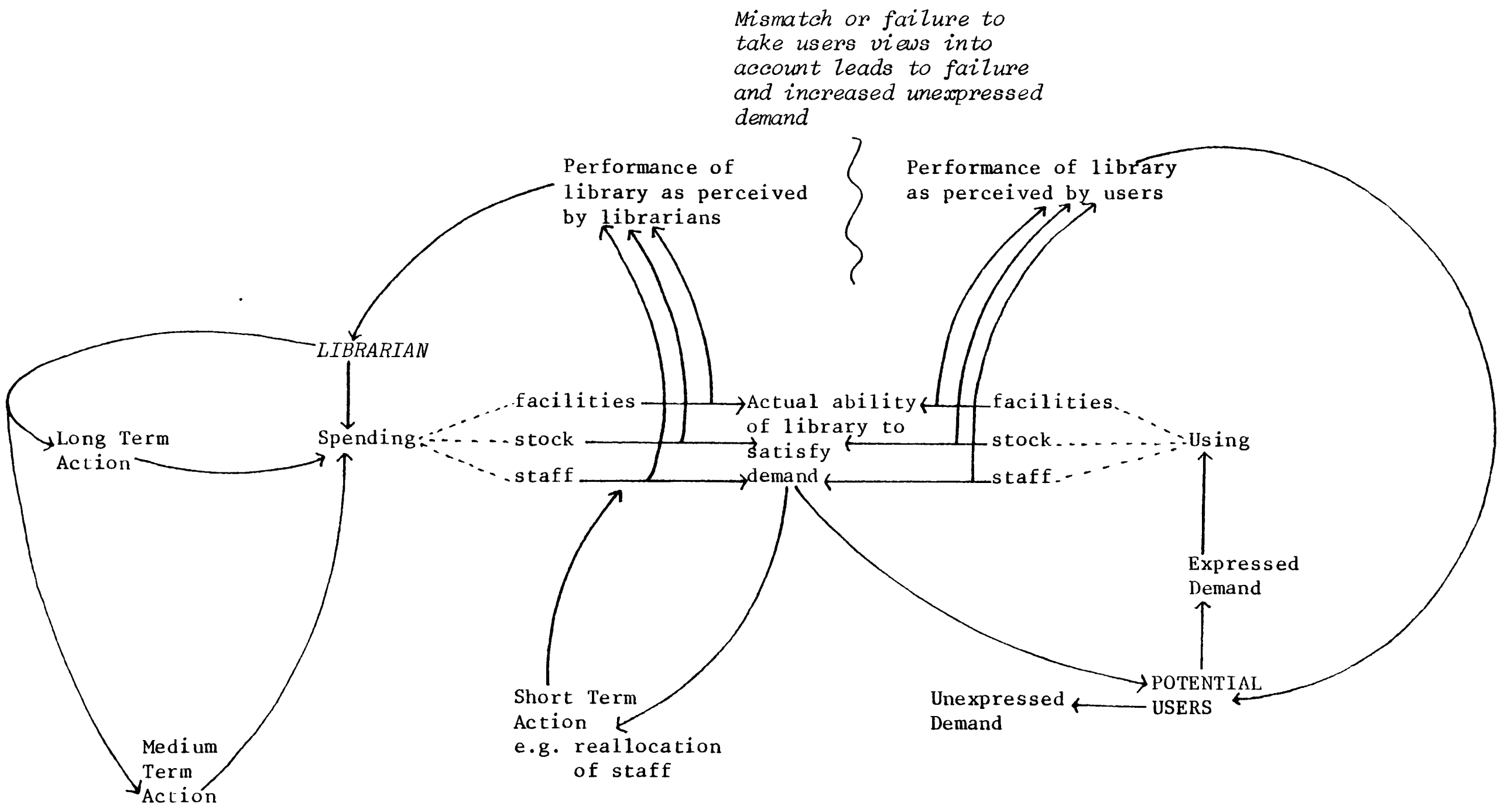
Appendix A2 : Preliminary explorations with Systems Dynamics

Systems Dynamics is a computer simulation technique which can be used to predict the effect of different policies on the operations of a system through time. The behaviour of the system is described mathematically in terms of rates of change of levels and rates of flow between levels which are linked by feedback loops in an influence diagram.

Systems Dynamics was thought to be promising because it offered a way of including both the user and the librarian in the model (see influence diagram overleaf). This diagram is explained as follows: in the LIBRARIAN loop decisions about long, medium and short term action affect levels of spending on facilities, stock and staff, which in turn affect the actual ability of the library to satisfy demand. In the USER loop decisions about using a library lead to expressed demand, and hence levels of use of facilities, stock and services. Again these affect the actual ability of the library to satisfy demand. The librarian and user make decisions based on library performance as they perceive it. Mismatch between user and librarian assessments lead to increased levels of unexpressed demand which is undesirable.

Clearly many assumptions have to be made before these interactions can be expressed mathematically. Systems Dynamics cannot give guidance on what these assumptions should be and it was felt that the present study ought to concentrate on finding out about these assumptions. It may be feasible to carry out a Systems Dynamics study using the results of the present Systems Study.

Appendix A2 : Preliminary Systems Dynamics influence diagram



APPENDIX B

Appendix B1 : Distribution of the clinical departments in the hospitals in 1978

Radcliffe Infirmary Site

Accident Service, Orthopaedics; Allergy, Dermatology, Venereology; Anaesthetics; Cardiology, Cardiothoracic Surgery; Clinical Biochemistry; Clinical Medicine; Clinical Pharmacology; ENT, Otolaryngology; Metabolic Research Laboratory; Neurology, EEG, Neurosurgery; Ophthalmology (Oxford Eye Hospital); Oral Surgery; Paediatrics; Pathology (incl. Bacteriology, Haematology etc.); Radiology, X-ray; Regius Professor of Medicine; Rheumatology and Rehabilitation; Surgery.

Departments at Keble Road (considered as Radcliffe Infirmary Departments)

Childhood Cancer Research Group; Cancer Epidemiology and Clinical Trials Unit; DHSS Unit of Clinical Epidemiology; Social & Community Medicine.

Churchill Hospital Site

Blood Transfusion Service; Chest Clinic; Cytology; DHSS Perinatal Epidemiology Unit; Genetics; Geriatrics; Haematology, Haemophilia Centre; Neurology, Clinical Neurophysiology, EEG, Neuropsychology; Obstetrics & Gynaecology; Oral Surgery, Orthodontics; Paediatrics; Plastic Surgery; Radiotherapy; Renal Unit; Virology.

Cowley Road Hospital Site

Geriatrics

Slade Hospital Site

Dermatology; Infectious Diseases

John Radcliffe Hospital Site

Obstetrics & Gynaecology; Paediatrics; Pathology; Special Care Baby Unit; also the Nuffield Institute of Medical Research (research into reproduction and development).

Nuffield Orthopaedic Centre Site

Bone Research Unit; DHSS Orthopaedic Engineering Unit; Orthopaedics; Rheumatology and Rehabilitation.

Appendix B2 : The changes in clinical departments after re-organisation in 1979

Churchill Hospital Site (CHU)

Blood Transfusion Service; Oral Surgery, Orthodontics; Paediatrics; Public Health Laboratory, Virology.) transferred to JRH

Radcliffe Infirmary Site (RI)

Accident Service; Cardiology, Cardiothoracic Surgery; Clinical Biochemistry; Clinical Medicine; Oral Surgery; Pathology (except Neuropath.); Surgery; Paediatrics.) transferred to JRH

Geriatrics; Plastic Surgery - gained by RI

Regius Professor of Medicine - department re-organised into Specialist Medicine.

John Radcliffe Hospital Site (JRH)

Accident Service; Cardiology, Cardiothoracic Surgery; Clinical Biochemistry; Clinical Medicine; Oral Surgery; Paediatrics; Pathology (except Neuropath.); Surgery; Blood Transfusion Service; Virology. NB. Paediatrics expanded.) gained by JRH

NOW MAJOR CENTRE IN PLACE OF RADCLIFFE INFIRMARY.

Cowley Road Hospital

Hospital closed. Geriatrics transferred to RI and CHU.

Slade and Nuffield Orthopaedic Centre departments remain unchanged.

Appendix B3 : Distribution of libraries in the Oxford hospitals in 1978

RADCLIFFE INFIRMARY SITE (RI)

Main Medical Library: Cairns Library

Departmental Libraries:
- Accident Service
- Anaesthetics
- Clinical Biochemistry
- Clinical Medicine
- Clinical Pharmacology
- Ear, Nose and Throat
- Haematology
- Opthalmology
- Paediatrics
- Pathology
- Public Health Laboratory
- Radiology
- Regius Professor of Medicine (Department of)
- Rheumatology and Rehabilitation
- Surgery
- Social and Community Medicine
- Venereology

CHURCHILL HOSPITAL SITE (CHU)

General Medical Library (branch of Cairns)

Departmental Libraries:
- Bone Research Laboratory
- Chest Clinic
- Haemophilia Centre
- Oral Surgery
- Neurology
- Plastic Surgery (Kilner Library)
- Radiotherapy Research Unit
- Renal Dialysis Unit

Also on site : Oxford Regional Health Authority Library

JOHN RADCLIFFE HOSPITAL SITE (JRH)

Departmental Libraries:
- Obstetrics and Gynaecology
- Special Care Baby Unit

Library of the Nuffield Institute for Medical Research (reproduction and development)

NUFFIELD ORTHOPAEDIC CENTRE SITE (NOC)

Main Library: Girdlestone Library (staffed)

Departmental Libraries:
- Mary Marlborough Lodge
- Oxford Regional Rehabilitation Unit

COWLEY ROAD HOSPITAL (CRH)

Departmental Library: Geriatrics (branch of Cairns)

SLADE HOSPITAL (SH)

Departmental Library: Dermatology

APPENDIX C

Appendix C1 :

Source lists used in compilation of the population frame

(All issues between October 1978 and September 1980)

University of Oxford : Graduate Studies. Faculty of Clinical Medicine.

University of Oxford : Graduate Studies. Faculty of Physiological Sciences.

University of Oxford : Graduate Studies. Sub-faculty of Biochemistry.

University of Oxford Medical School. Prospectus of the Clinical School.

University of Oxford. Calendar.

Oxfordshire Area Health Authority (Teaching) :

Consultant list

Non-consultant medical staff list

Honorary contracts list

Various lists of members from the departments.

Appendix C2:

Breakdown of returns according to status and specialty or subject

	RETURNS			
	Interview subjects	Questionnaire respondents	Non-respondents	Total
CLINICAL STATUS				
cons	13* (13%)	79 (17%)	16 (12%)	108 (16%)
sr	10 (10%)	36 (8%)	8 (6%)	54 (8%)
reg	13 (13%)	45 (10%)	12 (9%)	70 (10%)
ho	10 (10%)	67 (15%)	42 (33%)	119 (17%)
hon cons	8 (8%)	34 (7%)	9 (7%)	51 (7%)
clin lect	9 (9%)	34 (7%)	4 (3%)	47 (7%)
res reg	11 (11%)	44 (10%)	12 (9%)	67 (10%)
rw	19 (19%)	77 (17%)	13 (10%)	109 (16%)
pg	6 (6%)	41 (9%)	13 (10%)	60 (9%)
Total	99* (99%)	457 (100%)	129 (99%)	685 (100%)
CLINICAL SPECIALTY				
surg	25 (25%)	122 (27%)	26 (20%)	173 (25%)
med	24 (24%)	127 (28%)	43 (33%)	194 (28%)
anaesth	7 (7%)	42 (9%)	12 (9%)	61 (9%)
o & g	13 (13%)	37 (8%)	12 (9%)	62 (9%)
paed	7 (7%)	22 (5%)	6 (5%)	35 (5%)
com	4 (4%)	16 (4%)	3 (2%)	23 (3%)
lab	19 (19%)	91 (20%)	27 (21%)	137 (20%)
Total	99 (99%)	457 (101%)	129 (99%)	685 (99%)
PRE-CLINICAL STATUS				
prof	2 (2%)	7 (5%)	2 (4%)	11 (4%)
ul	22 (22%)	34 (23%)	7 (15%)	63 (21%)
dd	6 (6%)	11 (7%)	5 (11%)	22 (7%)
rw	34 (34%)	62 (41%)	14 (30%)	110 (37%)
pg	36 (36%)	37 (24%)	18 (39%)	91 (31%)
Total	100 (100%)	151 (100%)	46 (100%)	297 (100%)
PRE-CLINICAL SUBJECT				
anat	8 (8%)	14 (9%)	4 (9%)	26 (9%)
bioch	41 (41%)	58 (38%)	24 (52%)	123 (41%)
path	20 (20%)	31 (21%)	6 (13%)	57 (19%)
pharm	8 (8%)	20 (13%)	1 (2%)	29 (10%)
physiol	23 (23%)	28 (19%)	11 (24%)	62 (21%)
Total	100 (100%)	151 (100%)	46 (100%)	297 (100%)

* includes 2 refusals

PRE-CLINICAL

I would like to begin by asking a few questions about your professional background.

1. Can you describe any areas of particular interest you may have within your subject?

2. How about any scientific interests outside your subject?

3. Where are you based most of the time?

Genetics Unit	Anatomy	Biochemistry	Pharmacology
Other	Pathology	Microbiol. Unit	Physiology

4. Do you spend time at any other sites, e.g. the hospitals, or departments in Oxford?

The next section is concerned with your need for information. Please note that libraries are only one special type of information source.

5. What aspects of your work cause you to look for information? (Please tick those categories applicable to you).

teaching (both formal and informal)

solving specific problems (e.g. data, lab. methods etc.)

writing papers and books, preparing for lectures and scientific meetings

undertaking and supervising formal research

keeping up-to-date in your subject

general interest

further education geared towards professional qualifications

looking for job advertisements

other .....

6. Now, I would like you to rank in decreasing order the three reasons which you find most important. Please write 1, 2 and 3 beside them on your list.

CLINICAL

I would like to begin by asking a few questions about your professional background.

1. What is your clinical speciality?

2.a) Can you describe any areas of particular interest you may have within your speciality? .....

b) How about any professional interests outside your speciality?

3. Where are you based most of the time?

Radcliffe Infirmary	Cowley Road
Churchill	Slade
John Radcliffe	Nuffield Orthopaedic Centre
Other	

4. Do you spend time at any other sites or departments in Oxford?

The next section is concerned with your need for information. Please note that libraries are only one special type of information source.

5. What aspects of your work cause you to look for information? (Please tick those categories applicable to you).

teaching (both formal and informal, e.g. ward rounds)

solving specific clinical problems (e.g. diagnosis, treatment)

writing papers and books, preparing for lectures and scientific meetings

undertaking and supervising formal research

keeping up-to-date in your subject

general interest

further education geared towards professional qualifications

looking for job advertisements

other .....

6. Now, I would like you to rank in decreasing order the three reasons which you find most important. Please write 1, 2 and 3 beside them on your list. (a separate copy of Q5 was supplied)

PRE-CLINICAL

7. Roughly, what percentage of your time do you spend on: research, teaching, departmental administration (i.e. not for research).

In this group of questions I want to find out how you get your references to printed literature.

8. Do you get your references by word of mouth or from published documents?

	all	mainly	both equally
word of mouth			
published documents			

9. Have you used any abstracting and/or indexing journals this year?

Wait for reply then go through list

P = prompted reply

Index Medicus	Biological Abstracts	
Excerpta Medica	Science Citation Index	
Current Contents	Other	
Chemical Abstracts		

10. How important are the following as sources of references to articles which are of interest?

	important	useful	of no interest
other journal articles			
journal indexes i.e. annual indexes to individual journals			
books			
abstracting and indexing journals			
computer searches			
other, specify			

(NB. include specialized subject lists and bibliographies under 'other')

11. Do you personally subscribe to any scientific journals?

What are they? Why do you subscribe to them?

12. How many journals, other than those already mentioned, do you scan regularly, i.e. each issue?

CLINICAL

7. Roughly, what percentage of your time do you spend on

teaching research (other than that arising directly from clinical practice) clinical practice administration

In this group of questions I want to find out how you get your references to printed literature.

8. Do you get your references by word of mouth or from published documents?

	all	mainly	both equally
word of mouth			
published documents			

9. Are those from published documents:

	frequently	sometimes	rarely/never
reference made in books			
references made in journal articles			
from journal indexes			
from computer searches			
from abstracting and indexing journals			
from subject lists and bibliographies			
other			

10. Have you used any abstracting and/or indexing journals this year?

Wait for reply then go through list

P = prompted reply

Index Medicus	Chemical Abstracts	
Excerpta Medica	Biological Abstracts	
Current Contents:	Science Citation Index	
Life Science	Other	
Clinical Practice		

11. Do you personally subscribe to any medical/scientific journals?

What are they? Why do you subscribe to them?

12. How many journals, other than those already mentioned, do you scan regularly, i.e. each issue?

PRE-CLINICAL

Now I would like to ask you about the libraries you use or visit for any reason.

13. Which libraries do you use? Wait for reply then read list

14. Are there any particular reasons why you use the libraries outside Oxford instead of those in Oxford?

15. Is your use of each library regular or sporadic as influenced by other commitments?

16. When you visit these libraries do you usually stay: less than an hour, about an hour, more than an hour, a combination of long and short visits. How often do you go?

LIBRARY	regular sporadic	Once a day	Several times a week	Once a week	Once in two weeks	Once a month	Less often
RSL							
Anatomy							
Pathology							
Pharmacology							
Physiology							
Biochemistry							
Cairns							
Hosp. Dept.							
Prof. Soc.							
Other							

17. In addition to personal visits do you use the Oxford libraries:

frequently	sometimes	rarely	never	
				by telephone
				by letter
				by sending someone else

For what purposes do you use these indirect methods?

CLINICAL

Now I would like to ask you about the libraries you use or visit for any reason.

13. Which libraries do you use? Wait for reply then read list

14. Are there any particular reasons why you use the libraries outside Oxford instead of those in Oxford?.....

15. Is your use of each library regular or sporadic as influenced by other commitments?

16. When you visit these libraries do you usually stay: less than an hour, more than an hour, about an hour, combination of long and short visits? How often do you go?

LIBRARY	regular sporadic	Once a day	Several times a week	Once a week	Once in two weeks	Once a month	Less often
RSL							
Cairns							
Churchill							
NOC							
Sites							
Hosp. 1							
2							
Univ. 1							
2							
Prof.Soc. 1							
Other							

17. In addition to personal visits do you use the Oxford libraries:

frequently	sometimes	rarely/never	
			by telephone
			by letter
			by sending someone else

PRE-CLINICAL

18. Do library closing times or staffing times affect you? How?

Consider the next section in terms of what you use the library for.

19. From your point of view, what are the most important facilities in terms of stock or services which libraries provide?

20. Could you indicate the relative importance to you of the following specific reasons for using a library?

frequency	important	useful	of no interest	
				for looking at the latest periodical issue in the library
				for looking at earlier issues of periodicals in the library
				for consulting books in the library
				for carrying out your own literature searches
				for a computer search
				as a quiet place to study
				for obtaining photocopies
				for borrowing a book or journal from the library
				to have books, journals or photocopies obtained from another library
				for advice and guidance from the library staff

F = frequent S = sometimes R = rarely/never

21. In what ways are the library facilities you require inadequate? Please range as widely as you like in your criticisms.

Thank you for your co-operation in answering my questions.

22. Finally, what is your status?

23. And who pays your salary? Grant University Other

CLINICAL

18. Do library closing times or staffing times affect you? How?

Consider the next section in terms of what you use the library for.

19. From your point of view, what are the most important facilities in terms of stock or services which libraries provide?

20. Could you indicate the relative importance to you of the following specific reasons for using a library?

frequency	important	useful	of no interest	
				for looking at the latest periodical issue in the library
				for looking at earlier issues of periodicals in the library
				for consulting books in the library
				for carrying out your own literature searches
				for a computer search
				as a quiet place to study
				for obtaining photocopies
				for borrowing a book or journal from the library
				to have books, journals or photocopies obtained from another library
				for advice and guidance from the library staff

F = frequent S = sometimes R = rarely/never

21. In what ways are the library facilities you require inadequate? Please range as widely as you like in your criticisms.

Thank you for your co-operation in answering my questions.

22. Finally, what is your status?

23. And who pays your salary? Joint NHS and University NHS Other University

Questionnaire No:

THE LIBRARY AND INFORMATION NEEDS OF PRE-CLINICAL WORKERS

Please answer the questions in relation to your present position

(Signify your replies with a tick in the appropriate position unless otherwise indicated and add comments if you wish)

1. Where do you work?

Department	Main Base	Occasional Visits
Anatomy		
Pathology		
Pharmacology		
Physiology		
Biochemistry		
- Genetics Unit		
- Microbiology Unit		
At an Oxford Hospital specify:		
Other, specify:		

2. What percentage of your time do you spend on:

teaching (formal and informal) ☐

research ☐

departmental administration (i.e. not for research) ☐

(Please include extra time spent on medical or scientific matters out of formal working hours)

THE LIBRARY AND INFORMATION NEEDS OF CLINICAL WORKERS

Questionnaire No:

Please answer the questions according to your post and place of work as of 1st April 1979.

(Signify your replies with a tick in the appropriate position unless otherwise indicated and add comments if you wish)

1. Where do you work?

Site	Main Base	Additional Base(s)	Occasional Visits
Radcliffe Infirmary			
Churchill Hospital			
John Radcliffe Hospital			
Nuffield Institute for Medical Research			
Cowley Road Hospital			
Slade Hospital			
Nuffield Orthopaedic Centre			
At a hospital outside Oxford			
Other, specify:			

2. What percentage of your time do you spend on:

clinical practice (including the reporting of unusual cases) ☐

teaching (formal and informal) ☐

research (including clinical research programmes but excluding the reporting of unusual cases) ☐

departmental administration ☐

(Please include extra time spent on medical or scientific matters out of formal working hours)

3. The purpose of the following table is to define the libraries you use, whether your use is regular or sporadic, how often you use each library, and what is the average length of stay. (Please include under 'Other' hospital libraries or professional society libraries, college libraries and any other libraries that you use for professional purposes.

Pre-clinical

	Radcliffe Science Library	Cairns Library, John Radcliffe or Radcliffe Infirmary	University Science Area Dept. Libraries. 1.specify:	2.specify:	3.specify:	Other specify:	Other specify:
a) Which libraries do you use or visit for any reason?							
b) Is your use of the libraries regular or sporadic? Please enter: S = Sporadic R = Regular							
c) How often do you use each library?							
Once a day							
Several times a week							
Once a week							
Once in two weeks							
Once a month							
Less often							
d) How long do you usually stay?							
Less than an hour							
More than an hour							
A mixture of long and short visits							

3. The purpose of the following table is to define the libraries you use, whether your use is regular or sporadic, how often you use each library, and what is the average length of stay. (Please include under 'Other' additional hospital libraries or society libraries, University Science Department libraries and any other libraries that you use for professional purposes)

Clinical

	Radcliffe Science Library	Cairns	Hospital Dept. specify:	Hospital Dept. specify:	Professional Society specify:	Other specify:	Other specify:
a) Which libraries do you use or visit for any reason?							
b) Is your use of the libraries regular or sporadic? Please enter: S = Sporadic R = Regular							
c) How often do you use each library?							
Once a day							
Several times a week							
Once a week							
Once in two weeks							
Once a month							
Less often							
d) How long do you usually stay?							
Less than an hour							
More than an hour							
A mixture of long and short visits							

Pre-clinical

4. Please state any special reasons you may have for using each library.

Radcliffe Science Library	
Cairns Library, John Radcliffe Hospital or Radcliffe Infirmary	
University Science Area Department Libraries 1. specify:	
2. specify:	
3. specify:	
Other 1. specify:	
2. specify:	

5. What do you consider are the most important facilities in terms of stock or services which libraries should provide?

Clinical

4. Please state any special reasons you may have for using each library.

Radcliffe Science Library	
Cairns	
Hospital Department Specify:	
Hospital Department Specify:	
Professional Society Specify:	
Other Specify:	
Other Specify:	

5. What do you consider are the most important facilities in terms of stock or services which libraries should provide?

6. Please indicate the relative importance to you of the following specific reasons for using a library, and the frequency with which you use each facility.

Pre-clinical

REASON	IMPORTANT	USEFUL	OF NO INTEREST	FREQUENTLY	SOMETIMES	RARELY/NEVER
For looking at the latest issue of a journal in the library						
For looking at earlier issues of journals in the library						
For obtaining a photocopy of a journal article						
For borrowing a journal from the library						
For consulting books in the library						
For obtaining photocopies of part of a book						
For borrowing a book from the library						
For obtaining loans or photocopies from other libraries						
For a quiet place to work						
For a computer search						
For advice and guidance from the library staff (excluding help with computer searches)						
For carrying out your own literature searches						

6. Please indicate the relative importance to you of the following specific reasons for using a library, and the frequency with which you use each facility.

Clinical

REASON	IMPORTANT	USEFUL	OF NO INTEREST	FREQUENTLY	SOMETIMES	RARELY/NEVER
For looking at the latest issue of a journal in the library						
For looking at earlier issues of journals in the library						
For obtaining a photocopy of a journal article						
For borrowing a journal from the library						
For consulting books in the library						
For obtaining photocopies of part of a book						
For borrowing a book from the library						
For obtaining loans or photocopies from other libraries						
For a quiet place to work						
For a computer search						
For advice and guidance from the library staff (excluding help with computer searches)						
For carrying out your own literature searches						

Pre-clinical

7. Do library closing times or staffing times affect you?

NO ☐ YES ☐

If yes, how?

8. How important are the following as sources of reference to articles which are of interest?

	IMPORTANT	USEFUL	OF NO INTEREST
Other journal articles	☐	☐	☐
Journal indexes i.e. annual indexes to individual journals	☐	☐	☐
Books	☐	☐	☐
Current Contents	☐	☐	☐
Index Medicus	☐	☐	☐
Excerpta Medica	☐	☐	☐
Biological Abstracts	☐	☐	☐
Chemical Abstracts	☐	☐	☐
Science Citation Index	☐	☐	☐
Computer searches, e.g. Medline	☐	☐	☐
Other, specify:	☐	☐	☐

(Please include under 'Other' any specialized subject lists, bibliographies, abstracts, indexes, etc.)

Clinical

7. Do library closing times or staffing times affect you?

NO ☐ YES ☐

If yes, how?

8. How important are the following as sources of references to articles which are of interest?

	IMPORTANT	USEFUL	OF NO INTEREST
Other journal articles	☐	☐	☐
Journal indexes i.e. annual indexes to individual journals	☐	☐	☐
Books	☐	☐	☐
Current Contents	☐	☐	☐
Index Medicus	☐	☐	☐
Excerpta Medica	☐	☐	☐
Computer searches, e.g. Medline	☐	☐	☐
Other, specify:	☐	☐	☐

(Please include under 'Other' any specialized subject lists, bibliographies, abstracts etc., also Biological Abstracts, Chemical Abstracts and the Science Citation Index)

Pre-clinical

9. In what ways are the library facilities which are available to you inadequate? Please range as widely as you like in your criticisms.

10. Are you employed by:

- ☐ the University
- ☐ receive a grant
- ☐ another organization

What is your status?

- ☐ Professor
- ☐ Reader
- ☐ University Lecturer
- ☐ Departmental Demonstrator
- ☐ Postgraduate
- ☐ Research (incl. research assistants, post-doctoral research workers and fellows etc.)
- ☐ Other, specify:

Are you medically qualified? ☐ YES ☐ NO

Please return the form to: MRS. V.L. BREMBER, RADCLIFFE SCIENCE LIBRARY, PARKS ROAD, OXFORD, by Monday, 11th February 1980.

THANK YOU FOR YOUR HELP

Clinical

9. In what ways are the library facilities which are available to you inadequate? Please range as widely as you like in your criticisms.

10. Are you employed by:

- ☐ the University
- ☐ the N.H.S.
- ☐ another organization

What is your status? Please indicate Honorary appointments with 'Hon.'

- ☐ Consultant
- ☐ Senior Registrar
- ☐ Registrar
- ☐ Senior Houseman
- ☐ Houseman
- ☐ Postgraduate
- ☐ Senior Research Officer
- ☐ Research Officer
- ☐ Professor
- ☐ Director
- ☐ University Lecturer
- ☐ Clinical Reader
- ☐ Clinical Tutor
- ☐ Clinical Lecturer
- ☐ Other, specify:

PLEASE RETURN THE FORM TO THE CAIRNS LIBRARY, RADCLIFFE INFIRMARY, BY 30TH APRIL 1979

THANK YOU FOR YOUR HELP

RADCLIFFE SCIENCE LIBRARY

OXFORD UNIVERSITY

Keeper of Scientific Books
Dr. Dennis Shaw CBE

PARKS ROAD
OXFORD. OX1 3QP
Telephone: 44675/~~54161~~

Ext. 436

21st January, 1980.

Dear

I am engaged in a study of library provision in the life sciences including medicine in Oxford. The aims are to find out how the libraries are being used, how scientists obtain their information and what problems they encounter in order to identify areas where the services might be improved. The study is sponsored jointly by the Radcliffe Science Library and the Cairns Library, and I have been awarded a research studentship by the Department of Education and Science for this project.

A number of staff in the Departments of Anatomy, Biochemistry, Pathology, Pharmacology and Physiology have kindly consented to be interviewed at some length, but a larger sample is needed for more information in certain areas. I am therefore asking you to complete the enclosed questionnaire.

Individual replies will be treated as confidential but the general results and conclusions of the survey will be made available to staff in the departments and hospitals involved in the survey. The work will also form part of my thesis to be submitted to the University of Oxford for a higher degree.

Yours sincerely,

Virginia L Brember

Virginia L. Brember.

(Research Student).

The Cairns Library — *Radcliffe Infirmary, Oxford OX2 6HE*

Telephone Oxford (0865) 49891 Extensions 6202 Librarian, 6105 General Enquiries , 498 P.Leggate

17th April, 1979

Dear

I am engaged in a study of medical library provision in Oxford. The objectives are to find out how libraries are being used and how the medical library network in the teaching hospitals and the science area might be improved. The study is sponsored jointly by the Radcliffe Science Library and the Cairns Library, and a studentship to support the work has been awarded by the Department of Education and Science.

A number of medical staff have kindly consented to be interviewed at some length, but a larger sample is needed for information in certain areas. I am therefore asking you to complete the enclosed questionnaire. I do realize that this is not the best moment to make such a request but the information would be of great help for planning better library services.

Individual replies will be treated as confidential but the results and conclusions of the survey will be made available to medical staff, and will also form part of a thesis to be submitted for an M.Sc degree in the University of Oxford.

Yours sincerely,

Virginia L. Brember

Appendix D3 : Questionnaire covering letter

RADCLIFFE SCIENCE LIBRARY

OXFORD UNIVERSITY

Keeper of Scientific Books
Dr. Dennis Shaw CBE

PARKS ROAD
OXFORD. OX1 3QP
Telephone: 44675/~~54161~~
Ext. 436

11th February, 1980.

Dear

Three weeks ago I sent a questionnaire to staff of the Departments of Anatomy, Biochemistry, Pathology, Pharmacology and Physiology, as part of a study on how libraries in Oxford are being used and how provision for life sciences and medicine might be improved.

I have already received many replies but have not yet heard from you. I should be most grateful if you could spare a few minutes to complete and return the questionnaire. In case the questionnaire did not reach you, or has been mislaid, I enclose second copies of both the questionnaire and the explanatory letter which accompanied it.

Yours sincerely,

Virginia L. Brember

Virginia L. Brember (Mrs.)

The Cairns Library — *Radcliffe Infirmary, Oxford OX2 6HE*
Telephone Oxford (0865) 49891 Extensions 478 Librarian, 6105 General Enquiries

7th May, 1979

Dear

Just after Easter I sent a questionnaire to the medical and research staff of the Oxford Hospitals as part of a study on how the medical libraries are being used and how the medical library network in the teaching hospitals and science area might be improved.

I have already received many replies but have not yet heard from you. I should be most grateful if you could spare a few minutes to complete and return the questionnaire. In case the questionnaire did not reach you, or has been mislaid, I enclose second copies of both the questionnaire and the explanatory letter which accompanied it.

Yours sincerely,

Virginia L. Brember

Virginia L. Brember (Mrs)

Enc.

Appendix 14 : Questionnaire reminder letter

APPENDIX E

Appendix E1 : Information needs of clinical and pre-clinical staff by user characteristics

User characteristic	Number of subjects	Reasons for seeking information								
		Keeping up-to-date	Writing papers etc.	Research	Clinical problems	Specific problems	Teaching	Further education	Looking for jobs	General interest
Clinical status										
cons	11	2.6	2.5	1.3	2.4	-	1.4	0.0	0.1	0.8
sr	10	2.1	2.4	2.0	2.0	-	1.9	0.2	0.8	0.9
reg	13	2.2	1.5	0.5	2.5	-	1.7	1.8	0.5	0.7
ho	10	2.0	1.1	0.5	2.7	-	1.1	1.6	0.3	1.2
hon cons	8	2.1	2.5	2.7	1.5	-	1.2	0.0	0.5	0.8
clin lect	9	2.2	3.2	2.7	1.1	-	1.4	0.1	0.3	0.4
res reg	11	2.0	2.5	3.2	1.2	-	0.8	0.6	0.2	0.8
rw	19	2.7	2.4	2.9	0.3	-	1.0	0.1	0.3	0.8
pg	6	1.7	0.3	2.9	0.7	-	0.2	2.1	0.7	1.0
Total	97									
Pre-clinical status										
prof	2	0.5	1.8	1.8	-	0.5	0.7	0.0	0.0	0.5
ul	22	2.2	2.8	2.0	-	2.1	1.7	0.0	0.0	0.3
dd	6	2.4	1.8	1.7	-	1.2	2.6	0.5	0.7	0.8
rw	34	3.0	1.5	2.4	-	2.2	0.8	0.0	0.5	0.9
pg	36	2.8	1.4	2.2	-	2.3	0.9	0.6	0.3	0.9
Total	100									
Orientation										
pract	44	2.4	2.0	1.1	2.5	-	1.6	0.9	0.4	0.4
pract + res	28	1.9	2.6	2.7	1.1	-	1.1	0.3	0.3	0.6
res	125	2.6	1.8	2.3	-	-	1.1	0.4	0.3	0.9
Total	197									

APPENDIX E2 : Summary of all relationships tested and found to be significant at the 0.05 level or beyond

PRE-CLINICAL

Section of questionnaire	Variable	Cross-variable	Level of significance P	Interpretation (differences attributed to)
Background Q1, 2, 10	STATUS	occasional location	0.01	ul
Use of Libraries Q3, 4	SUBJECT	use v. non-use : Bioch. Lib.	0.001	path, bioch
		: Physiol. Lib.	0.001	physiol
	DEPT. LIBRARY	members v. non-members : use	0.02	
		regularity	0.01	
		frequency	0.01	
		length of visit	0.02	
	RSL	: regularity	0.01	
		frequency	0.01	
		length of visit	0.01	
		reasons	0.05	
Perceptions/ expectations of libraries Q6	STATUS	books : value	0.02	ul
		frequency	0.05	ul
		help : value	0.02	rw
	SUBJECT	photocopying journals : value	0.001	bioch
		: frequency	0.001	bioch
		journal loans : frequency	0.01	bioch
Q5	STATUS	photocopying	0.01	rw, pg
Value of reference sources Q8	STATUS	books	0.01	ul
		Current Contents	0.01	rw
		Biological Abstracts	0.02	rw
	SUBJECT	books	0.05	not bioch

CLINICAL

Background Q1, 2, 10	STATUS	location : CHU	0.01	cons, ho
		visits : CHU	0.001	
		: JRH	0.001	cons
		: NOC	0.001	
	ORIENTATION	status	0.00001	
		specialty	0.001	
		location : CHU	0.001	pract
		visits : CHU	0.001	pract
		: JRH	0.001	res
		: NOC	0.001	pract
	SPECIALTY	location : RI	0.001	not o & g
		: CHU	0.001	surg, med
		visits : RI	0.001	lab, anaesth
		: CHU	0.001	med, anaesth
		: JRH	0.001	anaesth, o & g, paed.
		: NOC	0.001	surg, anaesth
Use of Libraries Q3, 4	STATUS	use v. non-use : RSL	0.001	not junior pract
		: CHU	0.001	junior pract
		: DJRH	0.001	rw, pg
		regularity : RSL	0.01	
		: Cairns	0.01	not cons, ho
		reasons : RSL (unique journal holdings)	0.001	cons, res reg, clin lect
		frequency : Cairns	0.01	sr, reg, clin lect, res reg
	ORIENTATION	use v. non-use : RSL	0.001	not pract
		: CHU	0.001	pract
		: DRI(2)	0.001	
		: DJRH	0.001	res
		: DCHU	0.05	pract
		: RSM	0.01	pract, pract + res
		regularity : RSL	0.001	res
		: Cairns	0.01	pract + res
		: DJRH	0.05	res
		reasons : RSL (range of journals)	0.001	res
		Cairns (computer searches)	0.05	res, pract + res
		frequency : RSL	0.02	res, pract + res
		: Cairns	0.001	not res
	SPECIALTY	use v. non-use : RSL	0.001	cons, lab, o & g
		: Cairns	0.001	
		: DRI(1)	0.001	
		regularity : Cairns	0.02	not o & g, anaesth
		frequency : Cairns	0.05	not o & g, anaesth
		: RSL	0.05	

Section of questionnaire	Variable	Cross-variable	Level of significance	Interpretation (differences attributed to)
Perceptions/ expectations of libraries Q6	STATUS	latest journals : frequency	0.001	sr
		earlier journals : value	0.05	rw, pg
		: frequency	0.001	rw, pg
		photocopying journals : value	0.001	rw, pg
		: frequency	0.0001	rw, pg
		lending journals : frequency	0.04	
		books : value	0.02	ho, reg
		: frequency	0.05	ho, reg
		photocopying books : value	0.02	rw, pg
		lending books : frequency	0.003	ho, reg
		interlibrary loans : value	0.0001	
		: frequency	0.0001	
		quiet : value	0.006	ho, reg, pg
		: frequency	0.01	ho, reg, pg
		computer searches : value	0.0001	cons, clin lect, res reg
		: frequency	0.0001	cons, clin lect, res reg
		literature searches : frequency	0.01	
	ORIENTATION	latest journal : value	0.005	res
		: frequency	0.001	res
		earlier journals : value	0.001	res
		: frequency	0.001	res
		photocopying journals : value	0.0001	res
		: frequency	0.0001	res
		lending journals : frequency	0.0002	pract + res
		books : value	0.05	junior pract
		photocopying books : value	0.001	res
		lending books : frequency	0.0003	pract
		interlibrary loans : value	0.0001	pract + res
		: frequency	0.0001	pract + res
		computer search : value	0.02	pract + res
		: frequency	0.01	pract + res
		literature search : frequency	0.01	res
	SPECIALTY	earlier journals : value	0.02	
		: frequency	0.02	
Q5	STATUS	textbooks	0.01	ho
		up-to-date books	0.05	reg, ho
		photocopying	0.01	rw, pg
		interlibrary loans	0.05	
		bibliographic tools	0.01	senior pract
		computer searches	0.05	cons, clin lect, res reg
		books (all comments)	0.001	reg, ho
		bibliographies (all comments)	0.001	cons
	ORIENTATION	photocopying	0.001	pract + res, res
		bibliographic tools	0.02	pract + res
		interlibrary loans	0.01	pract + res
		help	0.01	pract + res
		books (all comments)	0.01	pract
		bibliographies (all comments)	0.01	pract + res
	SPECIALTY	photocopying	0.01	o & g, cons, paed (JRH, NIMR)
Inadequacies of libraries Q7	STATUS	effect of closing times : general	0.01	clin lect, pg
		: evening	0.001	pg
		: Saturday p.m.	0.01	pg, hon cons, clin lect
	ORIENTATION	effect of closing times : general	0.001	res
		: evening	0.001	res
		: Saturday p.m.	0.001	pract/res, res
	LOCATION	effect of closing times : general	0.001	NIMR, CHU
	SPECIALTY	effect of closing times : evening	0.02	o & g
Q9	STATUS	reply v. non-reply	0.01	ho
		satisfied v. critical	0.01	(sat.), senior pract
		criticism of RSL v. non-criticism	0.01	res, pg
		criticism of photocopying v. non-criticism	0.001	pg
	ORIENTATION	satisfied v. critical	0.01	res (crit.)
		criticism of RSL v. non-criticism	0.01	res
		criticism of photocopying v. non-criticism	0.001	res
	SPECIALTY	criticism of RSL v. non-criticism	0.05	o & g
		criticism of photocopying v. non-criticism	0.02	o & g
Value of Reference Sources Q8	STATUS	Current Contents : value	0.001	rw, pg
		Index Medicus : value	0.0001	
		computer searches : value	0.003	cons, sr, res reg, clin lect
	ORIENTATION	journal articles : value	0.01	res
		Current Contents : value	0.001	res, pract + res
		Index Medicus : value	0.001	pract, pract + res
	SPECIALTY	Current Contents : value	0.0001	o & g, lab
		Index Medicus : value	0.01	not o & g, lab

Appendix E3 : Other libraries named by clinical and pre-clinical staff

Clinical staff

Horton General Hospital Library
Littlemore Hospital Library
Stoke Mandeville Hospital Library
High Wycombe Hospital Library
Northants Area Health Authority Library
Berinsfield Health Centre Library
Warneford Hospital Library

Royal College of Surgeons, London Library
British Institute of Radiology Library
Royal College of Obstetrics and Gynaecology Library
Public Health Laboratory Library
London Institute of Ophthalmology Library
Royal College of General Practitioners Library
London School of Tropical Medicine and Hygiene Library
Royal Statistical Society Library
Royal College of Physicians Library
Association of Anaesthetists Library
Society for Occupational Health & Hygiene Library
Spastics Society Library
Department libraries: Biomathematics
Geography
Economics
Rhodes House
Mathematics

Oxford Public Library
British Museum
SRC Rutherford Library
UKAEA Harwell Library
Patents Library
Lewis's Lending Library
Osler House Library
Own collection

Pre-clinical staff

Cambridge University Library
London University Library
Royal National Institute for the Deaf Library
Royal Society Library
Warneford Hospital Library
Hooke Library
Department libraries: Botany
Computing Centre
History of Medicine
Immunology Unit
Microbiology Unit
Physical Chemistry

APPENDIX F

Appendix F1 : Timetable for observation and feedback form sessions

October - December 1979

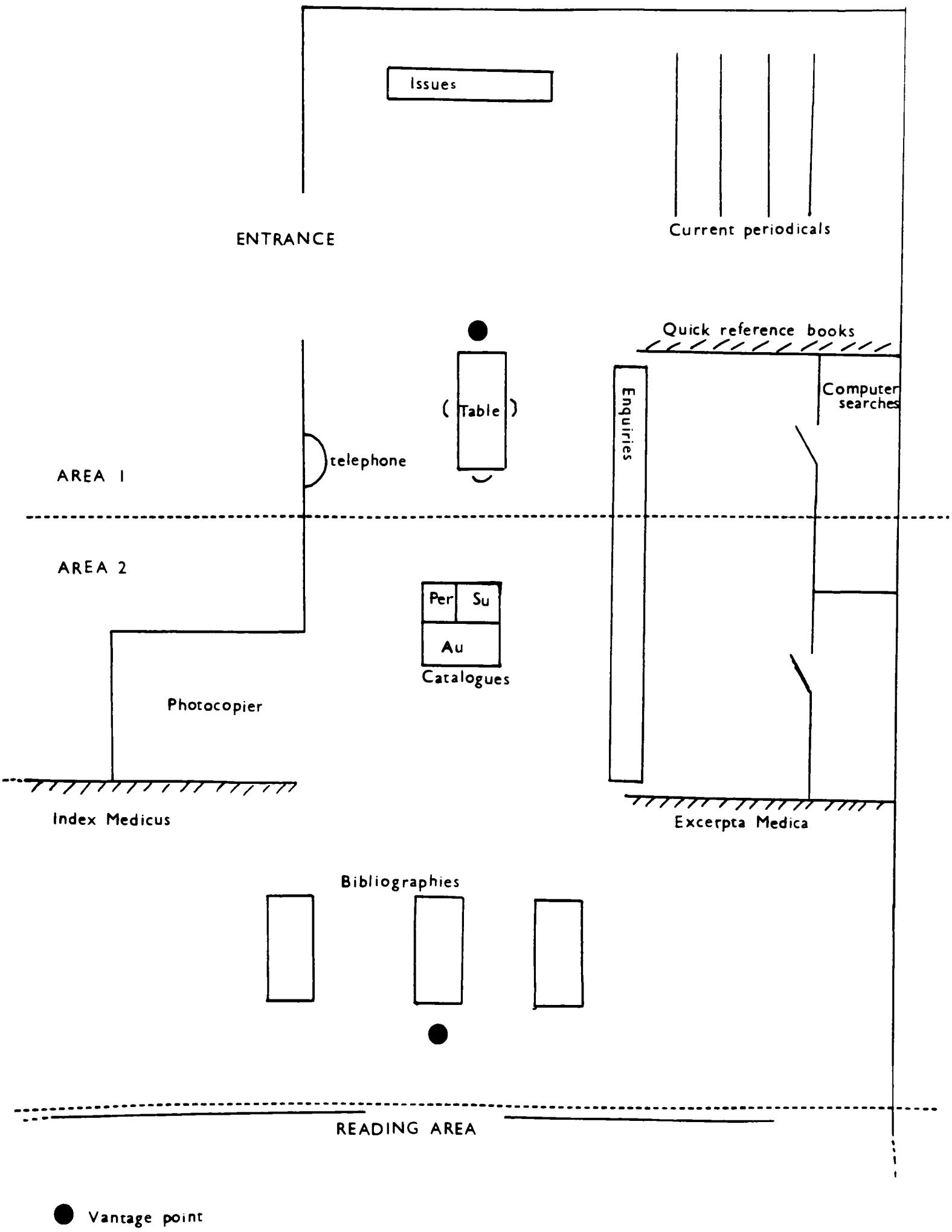
		Monday	Tuesday	Wednesday	Thursday	Friday
		RSL	CAIRNS	RSL	CAIRNS	RSL
Week 43 (Oct.22nd)	AM	O	O	O	O	F
	LUNCH	O	F	F	F	F
	PM	F	O	F	F	O
		CAIRNS	RSL	CAIRNS	RSL	CAIRNS
Week 45 (Nov.5th)	AM	O	F	O	O	F
	LUNCH	F	O	F	F	O
	PM	F	F	O	O	F
		RSL	CAIRNS	RSL	CAIRNS	RSL
Week 47 (Nov.19th)	AM	F	F	F	F	O
	LUNCH	F	O	O	O	O
	PM	O	F	O	O	F
		CAIRNS	RSL	CAIRNS	RSL	CAIRNS
Week 49 (Dec.3rd)	AM	F	O	F	F	O
	LUNCH	O	F	O	O	F
	PM	O	O	F	F	O

RSL = Radcliffe Science Library
CAIRNS = Cairns Library

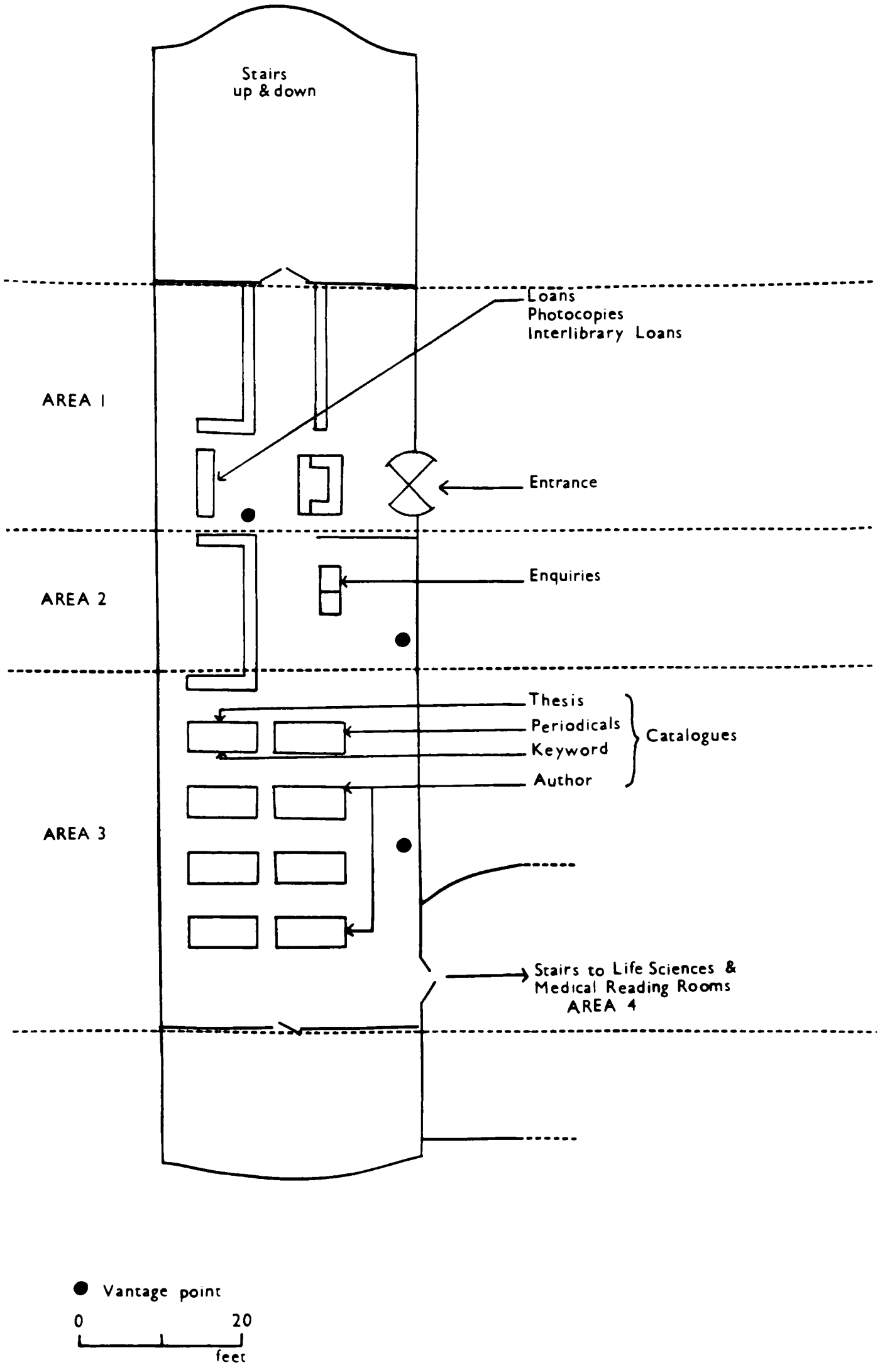
O = Observations
F = Feedback forms

AM = 10.20 - 11.40 a.m.
LUNCH = 12.50 - 2.10 p.m.
PM = 2.30 - 3.50 p.m.

Appendix G1 : Observation Plan New Cairns Library



Appendix G2 : Observation Plan of the Radcliffe Science Library



Appendix H1 : Procedure for library staff in Reference Tracing Experiment

Steps:

1. Fill out request form Nos. 1 - 6.

2. Do search.

3. Fill out request form Nos. 7 - 8.

4. Ask reader if he is willing to participate in the survey.
   If he is:
   a) show statement of what is required;
   b) have him ring references on duplicate print out;
      or if references are offline
   c) tell him he will receive a duplicate copy of the print out and that he is to ring the references on it and return it as soon as possible in the envelope provided.

5. When offline print out arrives send out duplicate + reminder note + envelope for return as well as the original.

6. If user is not present at search send out duplicate + letter of explanation + envelope for return as well as the original.

(See next page for statement, reminder note and letter)

FORMAT AND WORDING OF STATEMENT

Oxford Region Library and Information Service • Cairns Library

Cairns Library John Radcliffe Hospital Headington Oxford OX3 9DU
Telephone Oxford (0865) 81

We are asking readers to participate in a library survey.

If you are willing to take part please tell Linda Dorrington or Anne Cowie.

1. Please consider which references you are likely to pursue and ring them on the computer output before you leave; also, when appropriate, mark a duplicate copy of the offline printout.

2. Sometime in the following two months I will contact you for a brief interview lasting a few minutes.

Thank you,

Virginia L. Brember

Virginia L. Brember
September 1980

WORDING FOR REMINDER NOTE

Please ring the references you are likely to pursue on the duplicate printout as soon as possible after you receive it and return the duplicate in the envelope provided.

WORDING FOR LETTER

Dear

We are asking readers to participate in a library survey.

If you are willing to take part please do the following:

1. Consider which references you are likely to pursue and ring them on the duplicate output from the computer search. Please return the duplicate as soon as possible in the envelope provided.

2. Sometime in the following two months I will contact you for a brief interview lasting a few minutes.

Appendix H2 : Online search request form

CAIRNS LIBRARY

ONLINE SEARCH REQUEST

1. DATE

---

2. NAME

STATUS

DEPARTMENT

ADDRESS

---

3. TITLE OF SEARCH

---

4. PURPOSE OF SEARCH (Tick relevant answer)

a) Patient/problem oriented

b) Research

c) Preparation of book, journal article, etc when not related to b)

---

5. ROUTE (Tick relevant answer)

Telephone

Letter

Personal

---

6. USER PRESENT AT SEARCH YES/NO

---

7. BRIEF STATEMENT OF SEARCH REQUIRED / MeSH HEADINGS

---

8. LIMITATIONS

Language

Years covered

Review articles only

Other

---

* This form served the dual purposes of management and research. Only parts 1 - 6 are relevant to the experiment.

Appendix I1 : Number of requests and individuals making them for each service by clinical status

Service	Clinical status											
	cons	sr	reg	ho	hon cons	clin lect	res	rw	pg	librarian		total
RSL INTERLIBRARY LOANS												
Requests 1979	1	2	1	0	14	3	3	25	10	0	=	59
1980	3	2	1	0	2	18	21	35	12	0	=	94
Individuals 1979	1	2	1	0	5	3	2	13	8	0	=	35
1980	3	2	1	0	2	3	12	12	7	0	=	42
RSL BOOK LOANS												
Requests 1979	14	1	0	0	15	16	0	37	19	9	=	111
1980	4	10	0	0	4	11	50	33	1	15	=	128
Individuals 1979	7	1	0	0	6	8	0	25	2	2	=	51
1980	4	3	0	0	3	7	12	19	1	3	=	52
RSL JOURNAL LOANS												
Requests 1979	35	2	0	0	8	20	9	56	9	70	=	209
1980	10	6	5	0	11	37	50	59	12	58	=	248
Individuals 1979	7	2	0	0	3	11	3	23	3	3	=	55
1980	5	2	2	0	4	9	18	28	6	3	=	77
RSL PHOTOCOPIES												
Requests 1979	23	10	1	1	54	113	247	170	238	11	=	868
1980	22	11	2	18	50	62	134	473	298	16	=	1086
Individuals 1979	10	7	1	1	12	12	20	43	49	3	=	158
1980	8	6	2	5	10	19	23	61	45	5	=	184
CAIRNS INTERLIBRARY LOANS												
Requests 1979	62	37	10	14	91	37	170	93	87	0	=	601
1980	50	17	22	24	33	124	101	153	17	0	=	541
Individuals 1979	22	15	8	10	14	13	33	23	16	0	=	154
1980	16	12	13	12	10	12	38	37	7	0	=	157
CAIRNS BOOK LOANS												
Requests 1979	51	28	30	57	3	16	27	33	20	3	=	268
1980	not available											
Individuals 1979	27	16	16	34	3	13	20	19	14	2	=	164
1980	not available											
CAIRNS JOURNAL LOANS												
Requests 1979	113	59	37	19	21	85	60	63	94	1	=	552
1980	not available											
Individuals 1979	38	21	22	11	12	26	26	31	23	1	=	211
1980	not available											

Appendix I2 : Number of requests and individuals making them for each service by pre-clinical status

Service		Pre-clinical status prof	ul	dd	rw	pg	librarian	total
RSL INTERLIBRARY LOANS								
Requests	1979	5	7	2	18	9	1 =	42
	1980	5	5	1	6	13	2 =	32
Individuals	1979	2	7	2	7	7	1 =	26
	1980	2	4	1	6	11	2 =	26
RSL BOOK LOANS								
Requests	1979	4	40	5	29	0	12 =	90
	1980	1	64	6	18	8	11 =	108
Individuals	1979	3	21	3	12	0	3 =	42
	1980	1	22	6	9	2	4 =	44
RSL JOURNAL LOANS								
Requests	1979	8	83	8	27	0	9 =	135
	1980	1	87	16	46	4	6 =	160
Individuals	1979	5	28	5	12	0	3 =	53
	1980	1	25	9	16	2	3 =	56
RSL PHOTOCOPIES								
Requests	1979	15	43	5	205	102	9 =	379
	1980	11	34	4	86	121	9 =	265
Individuals	1979	4	12	5	54	41	2 =	118
	1980	2	12	4	37	48	2 =	105

Appendix I3 : Summary of chi-square tests on record analysis data

PRE-CLINICAL USERS

Service		Difference in user characteristics Status	Subject	Difference between 1979 and 1980 Status	Subject
RSL photocopying	Requests	-	-	0.001	0.01
	Individuals	0.01	x	x	x
RSL interlibrary loans	Requests	-	-	invalid	invalid
	Individuals	x	invalid	invalid	invalid
RSL book loans	Requests	-	-	x	0.001
	Individuals	0.001*	x	x	x
RSL journal loans	Requests	-	-	0.01	0.001
	Individuals	0.001*	x	x	x

CLINICAL USERS

		Status	Orientation	Specialty	Status	Orientation	Specialty
RSL photocopying	Requests	-	-	-	0.01	-	0.01
	Individuals	0.001	0.001	0.001	x	-	x
RSL interlibrary loans	Requests	-	-	-	0.001	-	x
	Individuals	invalid	0.001	x	invalid	invalid	invalid
RSL book loans	Requests	-	-	-	invalid	0.001	0.001
	Individuals	0.001*	0.001*	x	invalid	0.01	x
RSL journal loans	Requests	-	-	-	0.001	0.001	0.001
	Individuals	0.001*	x	x	x	x	x
Cairns interlibrary loans							
	Requests	-	-	-	0.001	-	0.001
	Individuals	x	0.01	x	x	-	x
Cairns book loans	Requests	-	-	-	} data not available for tests		
	Individuals	x	x	0.01			
Cairns journal loans	Requests	-	-	-			
	Individuals	x	x	0.01			

x = not significant but tested

- = not relevant or not tested

invalid = test not applicable

0.01 etc. = level of significance, p

* These significant differences are caused by the RSL loans policy which limits borrowing to senior members of the University.

Appendix J1: Illustration of the statement of the library function

This is an illustration of how the formal statement of the detailed library function can reveal potential pitfalls when considering the effect of relative demand on ways of meeting needs. The intention is to raise questions, not to supply answers.

Suppose:

(i) Characteristics A, B, C and D affect information needs and that they are present in the population served in the proportions A 20%, B 0%, C 30% and D 50%;

(ii) The types of information need, a to e, are related to these characteristics thus,

A	a b c
C	a c d e
D	a d

(iii) These types of information need can be met by these alternatives,

a	alt 1	alt 3	alt 9	alt 10
b	alt 1	alt 2	alt 7	
c	alt 3	alt 6	alt 9	
d	alt 4			
e	alt 3			

The formal statement of detailed library function would look something like this:

Information need	Group(s) associated with need	Proportion of need in population	Selected alternative for meeting need
a	A + C + D	100%	alt 3
b	A	20%	alt 7
c	A + C	50%	alt 3
d	C + D	80%	alt 4
e	C	30%	alt 3

Now if we consider alternative 7 for meeting needs we see that the potential demand from the whole population is relatively low (20%) and is associated with one particular group. The potential demand for alternative 4 is higher (80%) and is associated with two groups. The potential demand for alternative 3 is even higher (180%) because it can satisfy three different needs. Thus higher demand for and use of one service than another does not make that second service less effective.