Handbook of
Special Librarianship
and Information Work

Fifth Edition

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L. J. Anthony

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PREFACE TO THE FIFTH EDITION

IT is now twenty-seven years since the first edition of the *Aslib Handbook* was published, a period during which there have been far-reaching developments in information technology and in the techniques of information management. This is particularly true of the period since 1975 when the last edition of the *Handbook* appeared and the present edition has been entirely recast to take account of these developments.

The increasing importance of machine-readable information storage and retrieval systems is reflected in the introduction of completely new chapters on computer-based housekeeping systems and online retrieval systems and on the library and information networks through which they operate. The opportunity has also been taken to recognise the increasingly widespread use of non-book media in special libraries by devoting a separate chapter to audiovisual materials.

Despite the rapid developments in techniques, the essential principles of information work remain little changed and these still form the core of the *Handbook*, albeit presented by new contributors bringing a fresh viewpoint to the topics on which they write. For their skill and patience in meeting the demands made upon them I am deeply grateful.

L. J. ANTHONY
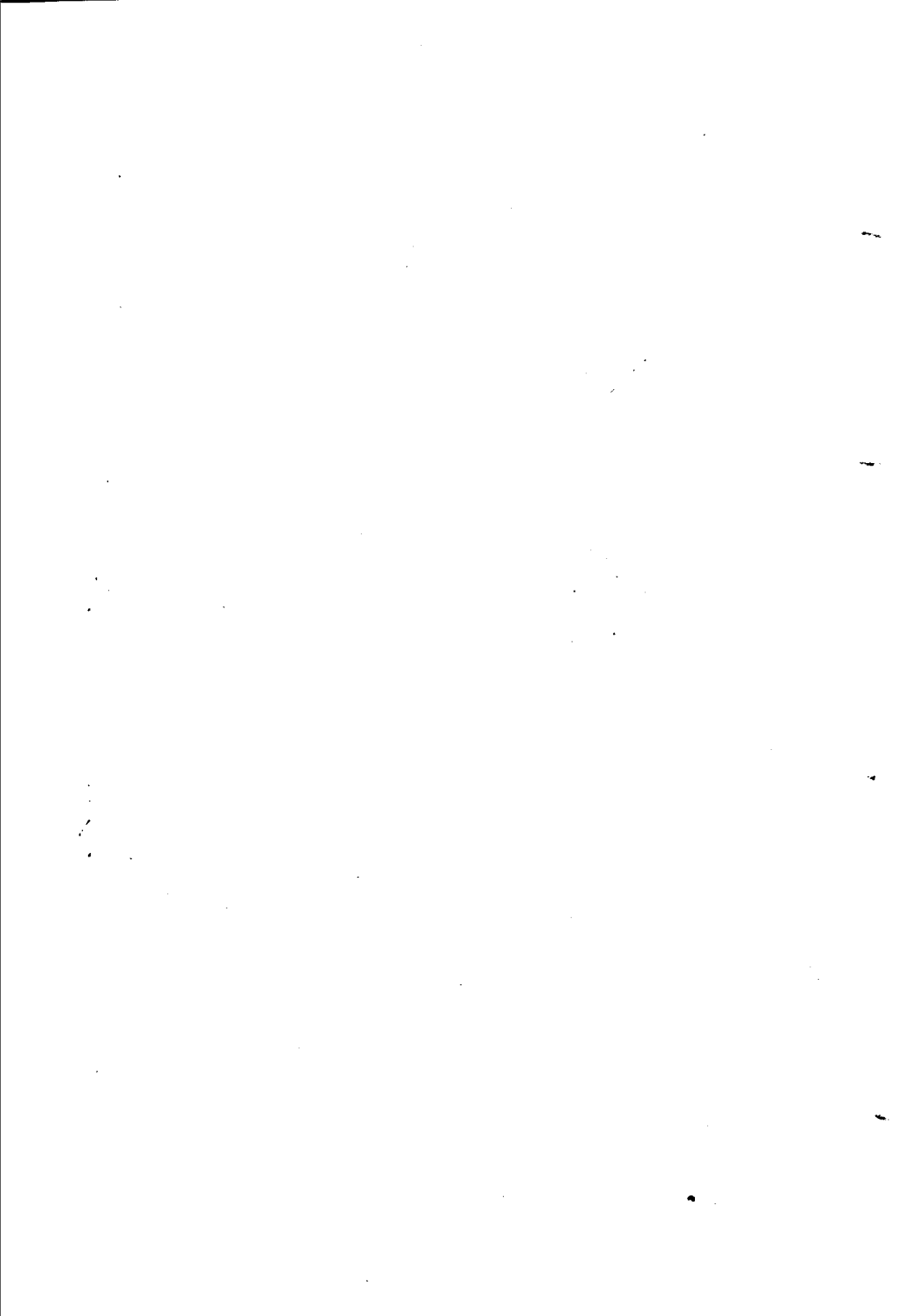
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Preface to the fifth edition

SECTION 1

Introduction

Chapter 1—Information management L. J. ANTHONY

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INFORMATION MANAGEMENT

L. J. Anthony

IN his opening address to the Joint Conference of Aslib, the Institute of Information Scientists and the Library Association in September 1980, Professor Saunders described information as the 'unscarce' resource and suggested that many of our present problems arise from the sheer abundance of this resource for, no matter how much use is made of it, it is never consumed in the manner of material resources, and continues to grow at an explosive rate.

To many people this is an accepted feature of the post-industrial society in which the emphasis is on services rather than material products and in which information provision, stimulated by revolutionary developments in technology, will be one of the fastest growing of all services. Few would doubt that the present marriage of computer science and telecommunications will enormously increase the availability and accessibility of information of all kinds, and some have suggested that, eventually, as the services provided by the electronic processing systems become more sophisticated, the librarian and information specialist, in the role of intermediary, will no longer be needed.

However, that time has not yet come and, as many people have said many times, information is not knowledge and the capacity of the human mind to absorb information and integrate it into an existing store of knowledge has not changed significantly in thousands of years. Eventually, no doubt, that particular barrier will be overcome by the machine itself but in the meantime the intermediary's task remains, as it has always been, to select, organize, control, analyse, evaluate and disseminate and thus, for each individual user, to provide only what can be usefully absorbed and is relevant to a particular situation. This complex of activities is now generally recognized as belonging to the field of information management and this is what this handbook is all about.

It so happens that these activities, which often require the exercise of different skills, have been implicit in the work of special libraries and information units from the beginning although information management as an activity is becoming more and more relevant to all kinds of libraries.

And not only to libraries, since a great deal of human activity is information based and failure to understand the information transfer process and to provide adequate information handling systems may lead to some very costly mistakes being made. Decision making in industry and government is an obvious example but there are many others, perhaps not so well recognized. One very relevant example of information breakdown which has been commented upon in recent years relates to the social welfare services where failure to deal adequately with a 'case' often stems from the lack of an effective information transfer system between the multiplicity of agencies involved.

What has changed in the last five years is the degree to which new tools are being made available to the information manager to carry out these functions more effectively than ever before. Systems for the electronic processing of information are now firmly established in a great many information units and libraries, at least in developed countries, and some knowledge of computerized methods for dealing with library routines and for information retrieval is now an essential requirement. The computer, inevitably, imposes a stricter discipline on those designing information handling systems and has led to changes in the education and training of library and information staff. There has also been a significant change in the range of materials which libraries are expected to acquire and make available: not only books, periodicals and other printed records, but a great variety of audiovisual and other materials in which information is recorded.

Above all there has been an increasing awareness of the fact that information does not recognize national boundaries. There have been significant developments at the international level in such areas as bibliographical control and interlending and in the creation of information transfer networks. These developments have encouraged many national governments to look again at their policies in the information field and to play an increasing part in the creation and support of national networks and their constituent parts. In Europe, in particular, the work of the Commission of the European Communities, not only in creating the Euronet/DIANE network, but in supporting developments in a wide range of activities including document delivery, database production and machine translation systems, has stimulated attempts to create within Europe an information industry comparable with that already existing in North America.

The most important effect of all these developments is that it is now possible for most libraries to use external services of one kind or another on a demand basis to supply many of the needs previously met by anticipatory acquisition and local recording, thus removing many of the restraints imposed by local inaccessibility. There is, of course, a cost attached to this method of operation which may or may not be less than that incurred in doing the job by traditional methods. Whether it is less or not, it is certainly more explicit and immediate and has led to a trend

towards cost recovery not only in relation to external users but within the special library's parent organization itself. In those libraries funded from the public purse it has led to some heart-searching since there is an inherent conflict between pricing information to recover costs and encouraging the use of information which contributes to national or corporate goals and this problem remains to be resolved.

The majority of special libraries and information units, particularly in industry, are concerned with both internally-generated and externally-generated information; the former may be much less than the latter in terms of quantity but is often more demanding in terms of the effort which has to be devoted to it. The present trend in many organizations is to reduce to a minimum the in-house processing of externally generated material and to rely on external services which are set up to do this, provided, of course, that these services are reliable and of the necessary high quality.

None of these developments reduces the emphasis that must still be placed on the basic tasks of the information manager: selection, organization, analysis, evaluation and communication; and of these the most important is communication. The provision and management of effective systems for communicating information within an organization is a task which falls squarely within the information manager's responsibility since it is an integral part of the information function. This is an area in which recent developments in information technology will have a rapid effect particularly for those organizations whose individual establishments are widely dispersed geographically.

It is, of course, not the only area. There will be far-reaching changes of all kinds in information transfer systems in the next decade which will lead to new organizational structures for handling and disseminating information. The present tendency is for the information function to become more closely integrated with the total objectives of the organization which it serves and to do this the information manager and his staff will need to:

1. study continuously and monitor the current and long-term objectives of the organization;
2. study the communication pattern of the organization and identify the prime movers, the technological gatekeepers and organizational entrepreneurs who act as catalysts in the innovation process;
3. provide information sub-systems to meet particular and often temporary needs, e.g. the attachment of information specialists to study groups and decision-making teams;
4. be capable of tapping a wide range of external information sources and ensure that information provided is as accurate and reliable as possible;
5. adapt information by repackaging and reformatting to the various functional needs of the different levels of users;

6. provide a corporate memory;
7. monitor the performance of the information function itself to ensure that it is constantly in tune with the objectives and needs of the organization.

and be willing to seize opportunities to become involved in any aspect of the organization's activity which might benefit from the specialized knowledge and experience which he and his staff possess.

It is no longer sufficient for the information unit to be merely reactive to the demands made upon it. The most significant characteristic of information is that it enables all other resources to be used more effectively and the information manager should be continuously seeking ways in which interactions of this kind can take place within the organization.

In spite of the considerable progress that has been made in the application of technology to information handling since the last edition of the *Handbook* was published, and which is reflected in the inclusion of chapters on mechanization and information networks in the present edition, the conceptual framework which underlies much of this activity has changed very little. The operation of the most sophisticated online retrieval system is based on intellectual concepts which were well known and used twenty years ago. Present technological developments may well enable the information manager not only to carry out traditional functions more effectively, but to introduce new services and functions which would not have been possible before for economic or technical reasons, i.e., they would have taken too much effort or cost too much. However, the technology has the potential to do much more than this but only on the basis of new conceptual developments now in the research stage.

Dr Batten, in his introduction to the fourth edition of the *Handbook*, suggested that that edition might be regarded as a transitional one. The same might be said of the present edition in spite of the significant changes which have been made. Current practice in the operation of special libraries and information units is still rooted in the traditional principles of information management with which this Handbook deals, in spite of the technological developments, which may assist but do not replace the exploitation of these principles. The real transition will come when, instead of adapting electronic devices to existing conceptual methods of handling information, new ideas are developed for information storage and retrieval which can exploit more effectively the capability of electronic processing systems and thus provide services more closely related to the needs and behaviour of information users.

SECTION 2

Management of library and information services
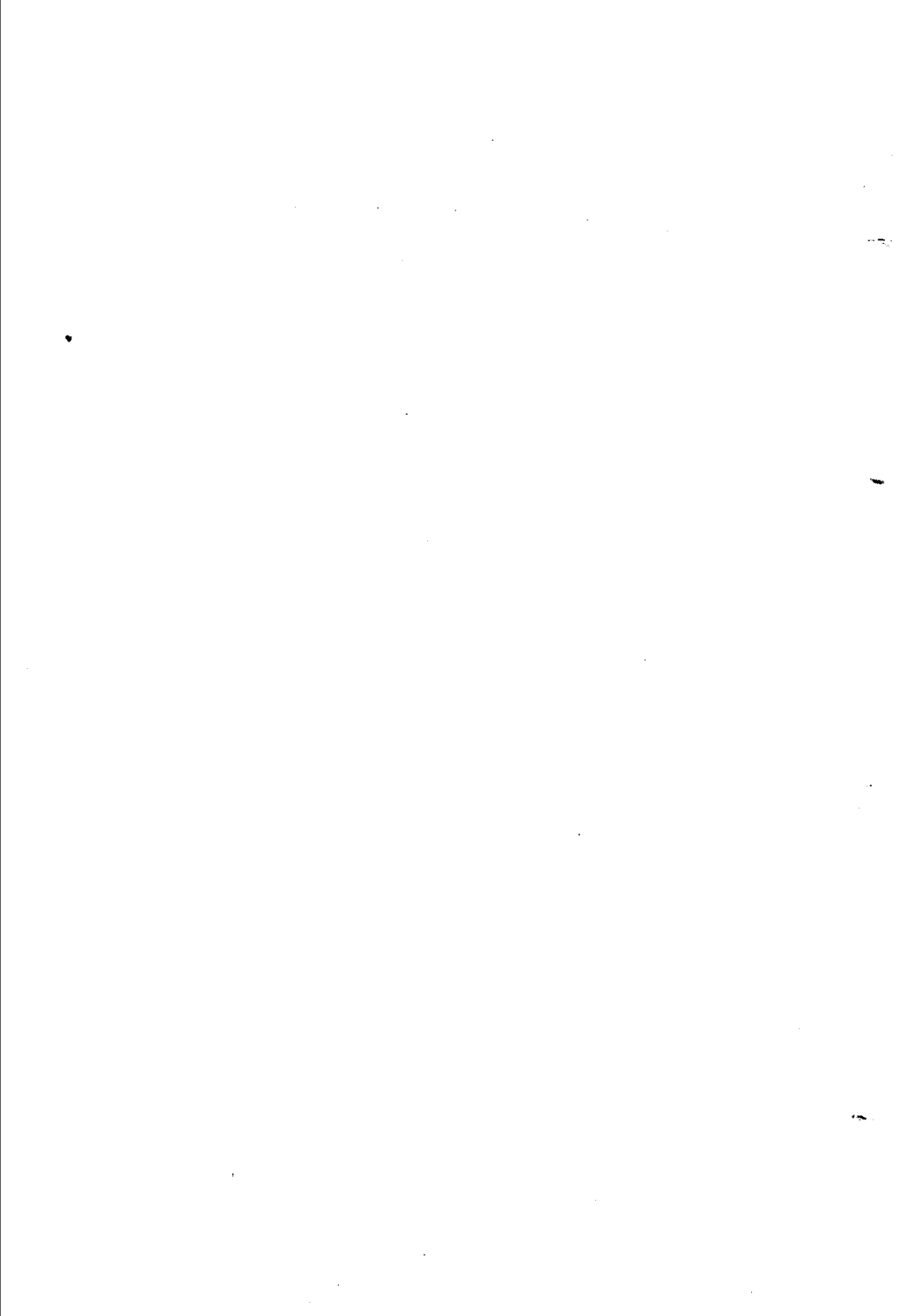
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SYSTEM DESIGN AND PLANNING

A. Gilchrist

INTRODUCTION

ALL libraries and information units are information systems, however small, and all those in charge of such systems are managers, even if they employ no staff. In a sense, every individual enjoying any degree of freedom in his or her job is also a manager, in that work has to be planned and controlled within the constraints of time, cost and the rules of the system. This chapter then, despite its somewhat grandiose title should be relevant to units of all sizes, though obviously the larger units will tend to be more complex and to demand more sophisticated management techniques. ·

One factor which will be discussed later is that information units should always be viewed as being part of larger systems either providing a service to the staff of an organization or to a defined population in the open market. A related factor is that information systems involve people, operators and users and that this is the main reason for the complexity of systems. Each human component of the system has different levels of knowledge and experience, different goals and aspirations. Inevitably, each will have a different understanding and interpretation of the aims of the system and of individual roles within that system, and the success of the organization will depend on effective communication within that organization. The inherent problem can be expressed mathematically: there is one channel of communication between two people, three between three, but six between four. The general formula is $^nC_2$ so that in a unit employing fifty people there are no less than 1,225 channels, which provides ample scope for the creation of ambiguity.

Many people nowadays, will automatically think of mechanization as the end product of systems analysis and design, but this is too narrow a view. The approaches and techniques, discussed in this chapter, are relevant whenever change is contemplated. It is certainly true that mechanization usually involves particularly radical change and always true that

$$^nC_2 = \frac{n!}{(n-2)!2!} = \frac{n(n-1)}{2} \text{ where } n \text{ is the number of people.}$$

its implementation presents more problems. The computer needs to be instructed how to perform each task in the minutest detail and this requires a greater degree of analysis on the part of the designers and computer programmers. But there are other agents of change which require disciplined thought and argument. In these days, where economic stringency obtains in the UK and others of the developed countries, cutting back is an exercise which should be carefully planned. In the developing countries the optimum allocation of limited resources is the analogous situation. Another facet of change is the subject of much professional debate, and concerns the effect of the new information technology on the librarian and information scientist.[1] This is not the place to discuss the problem, but it is a matter of great concern which should be kept in mind by the designers of information systems. It is undoubtedly true that the new technology will allow, or even dictate, all sorts of functional regroupings which will require great adaptability from all concerned, not least from those working in libraries and information units. It should always be remembered that librarians and information scientists are not merely the managers and operators of libraries and information services, but that they possess certain skills which can often be deployed more widely. The sensible manager and designer should always look outside his own unit and be ready to assume new responsibilities which do not fall into the conventional, and increasingly historical, view of his job.

The study of large systems is now an advanced specialism involving such disciplines as operations research, cybernetics, systems engineering and many others. The design and implementation of computer systems is the province of the computer specialist. The content of this chapter lies between these two extremes and has the objective of introducing the reader to accessible techniques within the framework of systems thinking.

GENERAL SYSTEMS THEORY

A useful way of looking at systems is through what has become known as General Systems Theory,[2] based on the attempt to categorize all systems into eight levels. These are called:

Frameworks—simple *static* systems (e.g. a table of logarithms) in which both input and output are fixed.

Clockworks—simple *dynamic* systems (e.g. clocks and steam engines) in which variable inputs and outputs also occur, but are *predetermined.*

Thermostats—simple *cybernetic* systems (e.g. temperature thermostats on water heaters) in which the outputs are measured and this is used to control the inputs. This is the concept of *feedback.*

Cells—simple *self-maintaining* systems, *open* systems interacting with their environment.

Plants—*organized* aggregates of cells.

Animals—organized aggregates of cells, but with *brains* and *specialized information receptors* such as eyes and ears.

Humans—animals capable of speech and of using symbols. Man not only knows but knows that he knows.

Social organizations—consisting of sets of roles linked by communication channels.

Apart from the fact that this classification of systems introduces useful distinctions such as static and dynamic, and concepts such as feedback, it reminds us that we are always dealing with complexity. Libraries and information units, and the organizations of which they form a part are level eight systems, though of course they will incorporate lower levels which can be recognized and treated as such. Checkland,[3] in a perceptive essay, relates the development of management science to General Systems Theory. He says 'historically, management science has taken the management situation and has sought to isolate and work on subsystems within the overall system. As time goes on attempts are made to isolate and treat higher-level subsystems.' He goes on to discuss the early view, proposed by F. W. Taylor, the founding father of Scientific Management, of the workmen in his engineering workshops as completely mechanistic systems; and of financial accounting procedures based on the isolation of thermostat-type control systems. In conclusion, he says that overtly simple mechanical models are not adequate when considering social systems, and that somehow the human beings must be included in the models. This chapter is based on that belief. To quote from another paper; 'Social structures are essentially contrived systems. They are made of men and are imperfect systems. They can come apart at the seams overnight, but they can also outlast by centuries the biological organisms which originally created them. The cement which holds them together is essentially psychological rather than biological. Social systems are anchored in the attitudes, perceptions, beliefs, motivations, habits, and expectations of human beings.'[4]

THE SYSTEMS APPROACH AND SYSTEM DESIGN

The systems approach is exactly what it says it is, an approach to the better understanding of systems so that analysis, design and evaluation may be more effectively carried out. It is an approach which has been usefully adopted in all areas, including those of libraries and information units.

The approach is defined by five components:

(*i*) The total system objectives.

(*ii*) The environment and fixed constraints.

(*iii*) The resources of the system.

(*iv*) The components of the system, their activities, goals and measures of performance.

(*v*) The management of the system.

Of these, from the point of view of this chapter, the first is by far the most difficult and vague. It is either impossible to discover what are the total system objectives, or they are laid down in such general terms as to be obvious and unhelpful. Nevertheless, the unit manager should acquire as clear an understanding as he possibly can of the directions in which his superiors intend the organization to move. This is probably best done by continuing dialogue and by ensuring that he has access to development plans and the minutes and papers of planning committees. Because company plans rarely include details concerning the goals and activity of service functions it becomes the responsibility of the managers of these functions to link their own objectives to their understanding of the objectives of the organization. It is also useful for the designers to have some understanding of the nature of the organization he works for; how it is structured and what sort of management style obtains.[5] This will help him to design his service in such a way that it fits comfortably into the organization as an integral component, rather than as an adjunct—a service, more vulnerable to the plans of those looking for easy economy.

The word 'environment' is used in this context to mean that which lies outside the system and is outside the control of the manager. This is particularly important, because many mistakes have been made by assuming that some useful component may be incorporated into the system being designed, only to find that it later changes radically or ceases to exist because it is, and always was, under somebody elses' control. It is thus to be seen as a constraint, rather than a resource, in the same light as others imposed from outside such as limits on budget or staff. The manager should also be aware of those elements in the environment which might affect his own system, and should keep them under review so as to be able to react quickly if necessary.

The resources of the system are measured in terms of capital assets, space, money and labour. But resources can also be reviewed more abstractly as invisible assets; good will and the elastic nature of physical resources. Good design and management can be capable of maximizing the potential of the fixed assets.

The fourth heading is the focus of this chapter, and as various aspects of it will be discussed later, in this section it will be enough to mention briefly the three concepts of levels, boundaries and objectives. In general, all systems can be viewed hierarchically. This is often shown in organization charts which might show the Library as being part of the Information Department and the Library being divided into sections dealing with accession, indexing and so on. Whether or not the system has been formalized in this way, it is a useful analytical technique well explored by Thomas and East[6] and Thomas.[7,8] The concept of boundaries allows the designers to set up demarcation lines for the definition of appropriate system activity and to admit numbers and other factors into the system. Typically, the users may be regarded as part of an information system