

THE PLACE OF CATALOGUING AND CLASSIFICATION
IN THE CURRICULA
OF SOUTH AFRICAN UNIVERSITIES

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CHAPTER 1

INTRODUCTION

1.1 Statement of the problem

Before formal education and training¹ for librarianship became a general phenomenon, the library community trained its own novices by means of apprenticeship. In the course of time this method of training disappeared and institutions of higher education made themselves responsible for the task of preparing students for the profession of librarianship.

1.1.1 Hypotheses

The education for a profession should meet the requirements of and conform to the aims of that profession. In view of the diverse needs of library users in different countries, curricula for library and information science cannot be identical in all countries. In South Africa, expansion and development of education programmes for librarianship have tended to follow those in major Western countries, especially Great Britain and the United States of America. After World War II, however, South African universities responded to the demand for qualified librarians by providing the necessary facilities, and education for librarianship developed its own character, complying with the needs and anticipating the demands of our society.

1.1.1.1 Relationship between library services and education for librarianship

A strong relationship should exist between the education and training

1. The issue of education and training will be explored in Chapter 5.

of librarians and practices maintained in library and information services. Libraries are disseminators of information and they have to cope with all information requirements as well as adapt to new media and technologies in the field. Programmes for the education of librarians must change accordingly in order to supply libraries with staff competent to cope with the challenges of their profession. Different levels of education should be offered to provide for different levels of personnel required by libraries, i.e. a professional level for educating prospective librarians in leading positions; a para-professional level, training library assistants to perform technical tasks; and special education for school librarians.

1.1.1.2 Education must follow as well as anticipate practice

Education for librarianship should not only follow developments in the field of library and information service, but can often anticipate it. An important new trend is resource sharing. Networks of computerised information systems are being developed, offering, inter alia, cataloguing facilities to member libraries. In South Africa, a move towards establishing such a network is evident. This implies, inter alia, standardisation of cataloguing, data stored in the data bank, and consequently standardisation of codes used for bibliographic description.

Education for librarianship will inevitably be influenced by such development. Institutions offering courses in library and information science must anticipate this and adapt their programmes accordingly, especially with regard to bibliographic description. The latest standardised code should be taught, as well as all the

most recent retrieval systems employed in libraries today. Classification schemes should be studied to illustrate the principles, although students should not be expected to acquire a detailed knowledge of specific schemes. Comprehension of the principles of classification will enable classifiers to use any classification scheme in practice..

1.1.1.3 Time devoted to teaching cataloguing and classification

During the time of closed-access libraries, descriptive cataloguing was of more practical value than subject classification. In such libraries the catalogues were the only key to the collection. This is reflected in the early education for librarianship programmes. Today the majority of libraries have open access, and many users are inclined to go to the shelves first to find what they are looking for, or to "browse". To accommodate this pattern of behaviour, the arrangement of material in the library is very important. This should be reflected in the curricula for library science, by giving classification priority treatment and more emphasis than descriptive cataloguing. In order to do this effectively, it is necessary to devote at least as much time to a study of theoretical principles of subject analysis as to bibliographic description.

The rapid extension of knowledge, especially in the field of science and technology, has increased the problem of speedy and exhaustive retrieval of information. New methods for retrieval have been developed and these should occupy an increasingly important place in the syllabus for the subcourse comprising cataloguing and classification. The substitution of electronic

data bases for card catalogues can be anticipated, and consequently a decrease in the demand for library staff trained in technical skills. These skills, however, are still important for the organisation of knowledge in libraries and cannot be excluded from curricula for library and information science.

1.2 Aim and proposed methodology

The aim of this study is to determine the place of cataloguing and classification in the library and information science curricula of South African universities today, and to determine whether, in compiling the syllabus comprising bibliographic description and subject analysis, new developments and changes are being taken into consideration.

With this in mind, attention has been given to the following:

- (a) Developments in general have been reconstructed by means of a review of the history of cataloguing and classification, from ancient to present times;
- (b) a review of the comprehensive development of education for librarianship overseas and in South Africa; and
- (c) an investigation of the present position of bibliographic description and subject analysis in the curricula of library and information science of South African universities.

Information relating to (a) and (b) has been obtained from secondary sources. In the case of (c), information was obtained by means of a questionnaire sent to all universities in South Africa offering courses in librarianship, as well as to one university planning

to reinstitute a course in 1981. With the exception of one, all these universities responded.

CHAPTER 2

HISTORICAL REVIEW OF CATALOGUING AND CLASSIFICATION FROM
ANCIENT TIMES TO THE 19th CENTURY2.1 Origins

"Be the collection of Books, were it of fifty thousand volumes, it would no more merit the name of a Library, than an assembly of thirty thousand men the name of an army, unless they be martially in their several quarters, under the conduct of their Chiefs and Captains."

(Gabriel Naudé, cited in Irwin 1958: 134-5)

The first principle relating to cataloguing and classification of libraries is that a library collection must be arranged in some kind of order. It is also shown in the history of libraries that not only must the contents of a library be arranged in some order, but that a list of the contents must also be provided.

2.1.1 Ancient times

Although there is not always agreement among writers on all points regarding ancient libraries and their catalogues and the way they arranged their collections, a reasonably clear picture can be formed about these matters by means of the writings of prominent historians/librarians such as James Westfall Thompson, Edward Edwards, E.A.Parsons, Alfred Hessel, H.L.Pinner, J.W.Clark, S.L.Jackson, Elmer D. Johnson, N.R.Ker, T. Gottlieb, K.O.Meinsma, H.J. de Vleeschauwer and W. Wattenbach. D.M.Norris wrote a thesis on the history of cataloguing from 1100-1850.

As examples of catalogue entries she used mostly the catalogues of libraries in England. Some of those examples are taken up into this chapter to illustrate catalogue entries during those times.

James Westfall Thompson recounts that at Edfu in Egypt, the library building known as 'House of Papyrus' had its catalogue of priestly books engraved on its walls. This catalogue comprised two registers, one covering twelve coffers of works, and the other twenty two. There is also evidence of classification, for the second register is concerned with works on magic (Thompson 1977: 139) .

Furthermore, in the clay tablet libraries of Babylonia and Assyria the tablets were numbered in different series, designating their locations in each of the libraries. To indicate the location of each tablet, the title of every series was derived from the words or phrase which was used to identify the first tablet. The tablets, in turn, were numbered. Thus a tablet may be "Sixteenth tablet of the evil spirits" (Thompson 1977: 140). To ensure that the tablets would always remain in their initially designated sequence, the first line of the tablet next in sequence was added to the inscription of the preceding one. The tablets were arranged on shelves. Every shelf was supplied with a list containing the titles of the tablets arranged on that shelf. Many tablets had a colophon, giving the tablet's place in the series, the name of the writer, and sometimes a date.

As far as is known, the Babylonians were the first people to

found libraries, says Norris, and the first librarian who was famous enough to have his name handed down to posterity was Amilanu. Edward Edwards (1865: 4 ff.; 1859: 12 ff.) relates a story resting on the authority of the historian Diodorus Siculus and a miscellany compiler Athenaeus of Naucratis and supplemented by researchers of modern Egyptologists, of Osymandyas, a king of Egypt, some fourteen centuries B.C., who is said to have established a library, on the door of which was an inscription which may be translated as "The Soul's Dispensary" or "Dispensary of the Mind".

Recent discoveries, however, point to an older library than those of the Babylonians. These discoveries, made in Northern Syria between 1964 and 1975, uncovered the remains of a city which was identified as the city of Ebla, and dated 2000-1600 B.C. (Wilson 1977: 6). A library was found in the palace of the King of Ebla, containing 15 000 clay tablets. Wilson (1977: 15) calls it a "subsidiary" library, because the excavators are of the opinion that this is not the main library and that the major collection is still to be uncovered. The history related on the clay tablets shows great similarities with the writings of the Old Testament. It is not yet known whether the clay tablets in the Ebla library were arranged in any specific order, nor whether a catalogue of the collection exists, as occurs in some ancient libraries.

In the Kalakh collection, under the direction of a librarian called Nabu-zugub-gina (in charge 716 B.C. to 684 B.C.) the catalogue entries included the title of the work, the number of lines, the contents, the opening words and each of its important parts (Thompson, J. 1977: 140).

The largest and most significant library of the Assyro-Babylonian civilization was, according to Hessel (1955: 2) that of Ashurbanipal, king of Nineveh (668-626 B.C.), under the librarianship of Nebo-zuqub-yivin (Norris 1939: 3). The record rooms or library in Ashurbanipal's palace were classified and catalogued. The library was kept in many rooms in the palace (Johnson & Harris 1974: 20) and there was apparently some subject arrangement by room. John Willis Clark (1901: 2) suggests a plan to indicate the position of the rooms, and rooms with entrances easily accessible from the entrance to the palace, he calls the 'chambers of records'. They appeared to have contained the decrees of the Assyrian kings as well as the archives of the empire. Clark suggests (1901: 4) that the position of the rooms shows that their contents might have been available for consultation by persons who were on the whole denied permission to enter the private apartments of the palace. Elmer D. Johnson recounts (1974: 20-21) that the clay tablets were kept in earthen jars, each tablet provided with an identification tag indicating the jar, the shelf and room in which it was to be found. It is assumed that there was some arrangement by rooms. One room, for example, would be devoted to tablets relating to history and government, another to legends and mythology. The tablets were grouped under the headings: History, Law, Science, Magic, Dogma, Legends. (Clark 1901: 4) Inside the door of each room, on the walls, were lists of the works in that room. Also, near the door in each room, were tablets serving the purpose of subject catalogues. The entries in this catalogue gave the titles of the works, the number of tablets of each work, the number of lines, opening words, important

subdivisions and a location symbol.

Another principle of librarianship that emerges from Johnson's reconstructive account is that libraries are most effectively arranged according to subject. The identification of an item in Ashurbanipal's library did not depend on or include the name of the author. Catalogues of ancient libraries were always classified subject catalogues, and if author catalogues had been compiled at any stage, no trace has been left of them.

Four centuries after the founding of Nineveh, the library of the Ptolemies at Alexandria came into being. It was founded during the reign of Ptolemy Soter (Edwards 1859, VI: 19) circa 300-290 B.C. (Parsons 1952: 89). Books were now in the form of rolls of papyrus, written in ink (Norris 1939: 4-5). The names of the first five librarians of Alexandria have been handed down, but of the five only one is important to us - that of Callimachus of Cyrene (circa 310-240 B.C.) (Edwards 1859, VI: 22). He was a Greek scholar and poet who lectured in the suburbs of Alexandria until he was summoned by Ptolemy Philadelphus to the Museum, where he became president of the library in about 260 B.C. and where he stayed till his death in about 240 B.C. (Sayers 1943: 79). The preservation of our knowledge of ancient literature, states Sayers (1943: 79), is credited to him more than to anybody else. This he achieved by cataloguing and classifying the Books in his library. The classified catalogue of Callimachus was arranged in 120 classes (Thompson, J. 1977: 141). It was made on slips of paper called Pinakes and on each slip was written a short title which corresponded exactly with the label on the appropriate

papyrus roll. The main divisions of the catalogue given by Norris (1939: 4) were:

1. Epic writers
2. Dramatic writers
3. Writers on law
4. Philosophical writers
5. Historical writers
6. Oratorical writers
7. Rhetorical works
8. Miscellaneous works.

These divisions were further subdivided and in each subdivision the entries were arranged alphabetically according to author or chronologically.

Elmer D. Johnson gives the following eight classes (1974: 48): Oratory; history; laws; philosophy; medicine; lyric poetry; and miscellany. However, James Westfall Thompson (cited in Thompson 1977: 142) in the absence of firm evidence, is only prepared to accept confirmation of the evidence of five main classes, since the Pinakes is lost. He lists: poetry; history; philosophy; oratory; miscellaneous. Sayers (1943: 79) is of the opinion that, although the Pinakes is lost, the classification deduced from tradition is based upon the characteristic of "kind of writer" and proposes the following categories: Poets; lawmakers; philosophers; historians; rhetorians; and miscellaneous writers. He also recognises subdivisions such as: Poets: epic; comic; tragic; etc.

Parsons (1952: 209) insists, however, that our knowledge of Callimachus's subject divisions is largely conjectural. As the fragments of the Pinakes are small in number and content, we have no means of verifying the number of divisions, classes or pinakes (meaning Tablets) into which the entire body of Greek literature was divided. He suggests that there were ten divisions. Of these only three (Laws, Oratory and miscellaneous) are pinakes fragments and five (Laws; Philosophy; History; Oratory and miscellaneous) have Callimachian reference. Of the eight divisions given by Norris, Parsons does not include 'Rhetorical works' but does introduce three other classes: Medicine; Mathematical Science; and Natural Science (1952: 210-211).

Although, as has been seen, historians differ about the precise classes in Callimachus's scheme, there is common agreement that the Alexandrian library was arranged by subject.

H. L. Pinner believes that the collection of Aristotle was the first library "to be designed and arranged on a definite plan. It became the example upon which the great libraries of Alexandria were later constructed. It is difficult to imagine how Aristotle could have written what he did without the continuous use of a scientifically ordered library, for his works included every branch of knowledge known at the time." (1958: 50).

Parsons also notes (1952: 217 ff.) that Assyrian enthusiasts believe that Nineveh was the forerunner of the Alexandrian library and that Callimachus followed the rules found in the library of Ashurbanipal. The Pinakes, however, in Parsons' view, constituted

the first great library catalogue of Western civilization and contained the essentials of all modern systems worthy of the name. "Thus the Greeks fixed the canons of cataloguing, which have been incorporated, more or less, in our Library of Congress, European, and other systems" and "Callimachus recognised that a systematic scientific work covering the field of Greek literature was only possible after inventory of stock available. He made that inventory and opened the golden gates of learning for generations, of scholars that followed him." (Parsons 1952: 218).

Concerning classification, Vickery (1959: 159) says that the first writers to attempt a survey of knowledge were the philosophers of Greece. From the philosophy of Plato and Aristotle arose the triad of the Stoics: Logic, Physics and Ethics. Plato, in his Republic divided the sciences ('science' applied in its broadest Germanic sense) into three groups - physics, ethics and dialectics. This triadic division is known as the Greek Triad. Although this division is generally attributed to Plato, there is some disagreement on this point among writers on the topic. It seems certain, however, that it originated with the Greeks. Plato saw 'dialectics' as the highest study (Vickery 1959: 59) and leading up to it were four sciences: Arithmetic, Geometry, Astronomy and Harmonics, all of which he regarded from an abstract point of view, and the only four studies he considered to be 'sciences'.

Aristotle took a wider view. He divided knowledge into three parts: Theoretical - which aims at knowledge for its own sake;

Practical - which applies knowledge to the conduct of life; and Productive - the making of beautiful things. Practical knowledge included ethics, politics, economics and rhetoric, whereas productive knowledge included poetics and arts. It is mainly theoretical knowledge which covers the modern conception of science. Aristotle further divided theoretical knowledge into: theology or metaphysics; mathematics; and physics. His mathematics included Plato's four sciences - arithmetic, geometry, astronomy and harmonics, but added to them optics and mechanics. His physics incorporated fields of knowledge neglected by Plato, e.g. meteorology, mineralogy, biology, botany, zoology, physical astronomy, etc.

The triadic division of logic, physics and ethics persisted throughout Greek and Medieval philosophy with variations in some of the terms. In the place of 'logic' the term 'dialectics' often appeared. Instead of physics the term 'theoretical philosophy' was usually preferred, and for 'ethics' the more comprehensive term 'practical philosophy'. Aristotle's system of sciences and the corresponding basis of this classification of knowledge were accepted for about 2000 years and remained, in its essence, the framework for knowledge until nearly the end of the 17th century. Clark (1901: 5) says "With regard to Aristotle, Strabo has preserved the tradition that he was the first who made a collection of books, and taught the Kings of Egypt how to arrange a library." These words may be taken to mean that Aristotle was the first person to establish the arrangement of books in a definite system which was subsequently adopted by the Ptolemies at Alexandria.

2.1.2 Medieval times

The influence of Aristotle was still felt in the Middle Ages. It became systematized in the seven groups of liberal arts which became known as the trivium and quadrivium, "the disciplines to be studied preparatory to the higher studies of theology, metaphysics and ethics" (Vickery 1959: 160). The seven studies were specified by Cassiodorus in his De Artibus et disciplinis liberalium litterarum as Scientiae sermocinales (sciences of words) and Scientiae reales (science of things). They were:

Trivium: Grammar, dialectics, rhetoric

Quadrivium: Geometry, arithmetic, astronomy, music.

The quadrivium coincided with Plato's four sciences. In his encyclopaedic work, the Satyricon, Martinus Capella gave an exposition of the quadrivium in about 470 A.D. In the 7th century Isidore of Seville added Medicine to the list and in the 9th century Rabanus Maurus added Mechanical Arts (Vickery 1959: 160).

During the Middle Ages the principle of arranging libraries according to subject continued. Johnson & Harris note (1974: 107) that when the size of a medieval library warranted it, the books were roughly classified by subject and sometimes by size or acquisition. The first division might be between theological and secular books; between works in Latin and in other languages; between textbooks and treatises. Religious works might then be subdivided into scriptures, commentaries, bibliographies, service books, and the secular works arranged according to the trivium

and quadrivium.

The broad classification sufficed for small collections, but later in the Middle Ages more complicated schemes were planned. John Willis Clark (1901: 194 ff.) refers to a description of the system used by the Benedictine Priory of St. Martin at Dover, given in a catalogue made in 1389 by John Whytfield. The library was divided into nine classes, or "distinctions", marked according to the first nine letters of the alphabet, "which are affixed to the classes themselves in such a way that A marks out to him who enters the first class, B the second, C the third, and so on in order." Each of the nine classes was divided into seven shelves (grades) marked by the addition of Roman numerals following the letters which denote the classes. The shelves were numbered from the bottom shelf up. To these class-letters Arabic figures were added to show the position each book occupied in the order of placing on the shelf concerned.

Johnson & Harris (1974: 122) suggest that in early university libraries the books were not only shelved roughly by subject but at the end of each shelf was a list of the books shelved there. There were some local classification schemes but these were usually little more than systems of location symbols, referring to desk, shelf and book numbers. The book lists were arranged more or less alphabetically, "but sometimes indiscriminately by author, title, catchword, or size" (Johnson & Harris 1974: 122).

Meinsma (1903: 54) states that a pure alphabetical arrangement

of books, be it according to author or title, was not popular during the Middle Ages, and that even in catalogues alphabetical arrangement of entries is rarely found.

Concerning the signatures - i.e. the classmark on the spine of the book - Meinsma (1903: 63) is of the opinion that although no thorough study has been made of systems followed in different countries, enough is known about it to enable us to deduce from the signatures on the books how a particular library has been organized at a particular time. Gottlieb (1955: 310-11) quotes examples of cases where bibliographers were able to determine according to its signature to which library a particular book belonged.

The broad classification systems used were adequate until the collections began to grow. Later in the medieval period more complete schemes began to be formulated.

Catalogues of medieval libraries were made from the earliest times (Thompson 1977: 144) and examples of catalogues survive from the 18th century. N.R.Ker comments (1964: XIX) that the primitive stage of such catalogues was of short titles and arrangement was roughly by subject, without any means of identifying a particular book from the catalogue description. Illustrating this are the oldest catalogues of Durham and Lincoln, the Bury and Reading catalogues, the Glastonbury catalogue and the second Rochester catalogue (1202 A.D.). He records that the late 12th century catalogue of Christchurch (Canterbury) is the first to give reference letters, which, by corresponding to letters

in the books themselves, act as a means of identification and location.

According to Meinsma (1903: 59), the majority of medieval library catalogues were no more than inventories and lists ("breves") of books, which were compiled with the aim of giving an overview of the available books at a certain time in a library. No information concerning the content of the books or other particulars about the books was included in the entries.

In many catalogues the opening words of the manuscript are noted besides the name of the author and title of the book (Meinsma 1903: 65). In some entries the closing words are also noted. There are also catalogues in which the opening and closing words of the second and penultimate pages of the manuscript are noted. The reason for this, Meinsma (1903: 65) presumes, is because the first and last pages are in more danger of being lost or damaged.

Meinsma (1903: 65) thinks it not impossible that different countries used different systems of cataloguing "doch men mag niet veronderstellen, dat eene gewoonte die in het eene land algemeen was, in een ander nooit nagevolgd werd."

In some of the older medieval catalogues the script in which the codices are written is noted in the entry. Meinsma (1903: 65) sees this not as an attempt at exact description of the manuscripts, but as a warning to people who were unable to read that particular script. An example is found in the catalogue of St. Gallen, where the "libri scottice scripti" are mentioned separately from other manuscripts (Meinsma 1903: 66).

Remarks concerning the paper or ink used for a specific manuscript are sometimes found in medieval catalogues. Thus, books written on purple velum or in gold or silver letters, are indicated as such. Such treasures were found in many churches and monasteries (Gottlieb 1955: 321). From the catalogue of the Benedictine monastery at Lorsch, Gottlieb (1955: 49) cites the following example:

BREVIARIUM LIBRORUM SANCTI NAZARII

saec IX med

Inc: Evangelium pictum cum auro scriptum, habens tabulas
eburneas

Fin: Passio sancti sebastiani martiris

and from the catalogue of the Dombibliothek in Cologne (Gottlieb 1955: 26):

Inc: Habet Ermbaldus adsum ministerium evangelium cum
argento scriptum, auro et lapidibus paratum

Fin: sacramentarium.

According to Meinsma (1903: 66), descriptions of the physical form of very precious manuscripts seem to have been an old custom, but it is only since the 14th century that such notes are found in every codex entry in catalogues. Sometimes the number of leaves is noted, for example in the inventory of Francesco Gonzaga (1407):

Inc: Libri sacre scripture (fol 50)

(Gottlieb 1955: 208), and in the catalogue of the Karmeliterkirche (1391):

Inc: item uno messale, grosso. carte 364.

(Gottlieb 1955: 197)

The catalogue made by Henry de Estria, Prior 1285-1331 (Clark 1901: 102) enumerates about 1850 manuscripts. As the collections grew, it became impossible to accommodate them according to the old method and other places were found to keep the books. At Durham, for example, the catalogues made at the end of the 14th century enumerate "books in the common press at Durham in sundry places in the cloister"; "books in the common press at Durham at Spendment"; "the inner library at Durham called Spendment"; "the books for reading in the frater which lie in the press near the entrance to the farmery"; "the books in the common press of the novices at Durham in the cloister" (cited in Clark 1901: 103).

Ker also remarks (1964: XIX) on the improvements in library catalogues of the 13th and 14th centuries. Books were grouped according to donors; opening words were recorded; books were arranged in the catalogue according to the actual arrangement on the shelves, and the different presses or shelves, as well as press marks, were recorded.

D.M.Norris gives a more complete description of medieval library catalogues in England on the basis of a detailed examination of a number of outstanding examples (1939: 14 ff.) A medieval catalogue of the period 1100-1200 (e.g. that of the Durham Cathedral Library of 1162) consisted of brief entries, roughly grouped by subject, e.g. Libri Anglia; Classics; Hii Libri de Phisica; Breviaris; Psalters: etc. The entries in the Durham catalogue had gaps for additions, the end of each entry being indicated only by a full stop. In many instances the entries in medieval catalogues, says Norris (1939: 17) are so brief that

identification is difficult. The name of the author is frequently given only in incomplete form, as, for example, 'Seneca' or 'Juvenal'. There is an indication of the number of volumes comprising a work and annotations reflecting such characteristics as size and age of the volume. Beyond such sparse details there is nothing but a bare title. The Durham catalogue also gives no indication as to where the items listed are located, information which must have been important, because Durham did not have a library until 1416. Thus, in 1162 the books must have been scattered through the monastery, and this scattering of books seems the most important reason for making a catalogue (Norris 1939: 17).

The catalogue of the library of Christchurch, Canterbury (1170) was found to occupy four leaves at the end of a manuscript of Boethius' Music and Arithmetic (Norris 1939: 18 ff.). There are 223 items listed without any indication as to where they might be found in the monastery. No subject headings are given, but there is a system of classification according to subject, entered in the order: Grammar; Rhetoric; Music; Philosophy; Poetry; Astronomy; Miscellaneous; Logic; Dialectic and Law. The entries are extremely brief. In some cases no more than the author's name is given, e.g. Macrobius. Some entries provide a name other than the author, which Norris suggests may be the donor. Some stock phrases are used by the cataloguer, relating to the binding of the book, the state of the book - whether it is in a good state or not, e.g. "imperfectus in pargameno"; "in asseribus", etc. When several items were bound together only the first is catalogued while the others are indicated by phrases such as "cum multis aliis".

In the period 1200-1300 Norris examines (1939: 26 ff.) the catalogues of Glastonbury Abbey Library (1247); the Registrum Liborum Angliae (1250-1296) and the Tabulae Septem Custodianum super Bibliam.

The first catalogue of the Glastonbury Abbey Library was compiled in about 1017 (Norris 1939: 28). In 1170, Henry of Blois, abbot from 1126-1171, had an inventory of the library drawn up. But the most important catalogue was the one of 1247, listing about 340 volumes. In this catalogue an entirely new method of arrangement as regards classification is used. A book is classified according to whether it is of most value from the point of view of its author or subject. If a book was considered to be a real contribution to its subject but its author was not well known, then the book was classed under its subject. But if the author was famous, the book would appear under his name with no entry under subject.

The Registrum is a union list of the holdings of 183 monastic establishments, each entry consisting only of the title of the work with a list of locations (Norris 1939: 30-40; Hessel 1955: 29-30). It was compiled on the basis of a general inquiry which the Franciscan organisation carried out in 160 church libraries. Jackson (1974: 82) is of the opinion that Registrum Liborum Angliae was compiled by the Friars Minor, locating chiefly biblical and controversial works of 94 authors not in Franciscan libraries in England, but reportedly in one or another of 138 English and Scottish monasteries. The Registrum is, however, at variance with earlier catalogues, which were only concerned with listing and identifying the holdings of one particular library.

Jackson (1974: 82) mentions various other union lists dating from the first half of the 13th century. The Savigny catalogue (1210 or 1240) listed, in addition to its own holdings, those of other abbeys in the vicinity. The Sorbonne compiled a register listing the holdings of libraries in Paris open to theology students. In 1347, the Benedictines of Emmeram in Regensburg made union lists of the catalogues of several libraries in the Upper Danube community.

The Tabulae Septum is also a union list, probably of a later date than the Registrum. It contains a list of monastic libraries, followed by a list of about 80 authors, arranged in alphabetical order. The entries merely consist of a title, which is at variance with monastic catalogues which contain some comments on the condition and value of the books. At the time it was also customary to give the opening words of the second folio of each book (Norris 1939: 32). This was done to distinguish different copies of the same book. The author list is followed by a digest of commentaries on the Bible. According to Norris (1939: 34) the reason why the Tabulae is considered to be of a later date than the Registrum is that it is in alphabetical order, an order which seemed to be unknown at that time.

Library catalogues continued to follow the shelves (Jackson 1974: 80 ff.). A common practice was to list separately what had been donated, by donor, also to list separately books kept in different rooms. Within subject groups of well-known titles by different authors, the arrangement was often author-chronological. In 1338 the Sorbonne's reference library catalogue listed the language

subjects of the trivium first; then logic, physics and morals; then the mathematical quadrivium. There were also analytical entries under these subjects for the individual titles in the 330 codexes. The larger circulating collection was however presented in the traditional way, i.e. the Bible at the head, and without analytics.

Jackson alleges that there were no noteworthy advances in the late Middle Ages in the classification of knowledge (1974: 81). The earliest known Sorbonne catalogue (1289?) expanded the quadrivium to include Alchemy and Medicine. In spite of an increased demand for reading matter in libraries, subject analysis and control was rather accidental. There was also limited progress in descriptive cataloguing. In the early 13th century catalogue of the Abbey at Savigny in Normandy, many works customarily attributed to one of the Fathers were credited to their true, if less noted, authors. This was unusual. Although books did not yet include the place of publication, the publisher and the date, they did sometimes have a record of the Scriptorium of origin. This information was not, however, entered in the catalogue, nor was the pagination indicated in this catalogue. At that time it was customary to assign sequence symbols only to the gatherings and not to individual pages, because the Roman numeric system did not facilitate this.

Like arrangement on the shelves, the layout of the catalogue underwent little change (Jackson 1974: 82). Occasionally lines were left blank for the insertion of added items, as for example in the Durham catalogue mentioned earlier.

In the catalogue of Admont, a Benedictine Abbey in South-Eastern Austria, each author has his individual page. The catalogues could not meet the expansion of a collection and the framed lists of items at every desk were more reliable in indicating available items.

Of the catalogues of the period 1300-1400 Norris observes (1939: 71 ff.) that on the whole a subject arrangement continues to be favoured. A new feature here is a method of press-marking by some, and alphabetical order is not commonly used. She examines the catalogues of seven libraries, six of them monastic: Christchurch, Canterbury; Exeter Cathedral; Austin Friars, York; Martin's Priory, Dover; Durham Cathedral; and Meaux Abbey. The seventh was that of Trinity Hall, Cambridge. Five of the seven libraries, four monasteries and Trinity Hall adopted subject catalogues, Exeter an author catalogue, and Meaux an arrangement according to the location of books. The four religious houses adopting subject catalogues started with Bibles or Theology, but the university placed it last. Only Christchurch had a class for English books; Austin Friars provided for Prophecy and Superstition, St. Martin for poetry and Durham for Lives of Saints and classical writers. Exeter's author catalogue had form headings for Service books and one subject heading, *Libri Istoriarum*.

According to Norris (1939: 71) the catalogue of Meaux would be of more value than the others she examined. Because monasteries did not have special rooms serving as libraries, the books were

stored at different places in the monasteries. Having established from the catalogue that a specific book was in the library, nobody could locate such a book without the assistance of the librarian as a result of inadequate notation to facilitate location.

The Meaux catalogue, however, tells one not only whether a book is in the library, but also where to find it. St. Martin's method was to number Distinctions or presses alphabetically and shelves numerically. The marking of the shelves is repeated on the books. Both systems mean fixed location.

On the whole, claims Norris (1939: 74), less bibliographical detail is given in these catalogues than in earlier ones. Of the seven examples she examined, only Meaux gives introductory remarks at the beginning of the catalogue. Lincoln in 1200 and Glastonbury in 1247 made some effort to do this, but from 1400 onwards this practice grew, and eventually constituted several pages in catalogues of the 18th and 19th centuries.

Only in the Christchurch catalogue under the heading Theology does alphabetical order make an appearance. Before that time Callimachus used it in the Alexandrian catalogue and it occurs in the Tabulde Septum Custodianum super Bibliam, of the 13th century, but up to 1400 it was not in common use.

Norris summarizes the distinctive features of British catalogues of the 14th century (1939: 75) by claiming that: (a) subject arrangement was mainly used; (b) the provision of second folio initial words in the entries was considered essential; (c)

introductions were becoming popular and some system of press marks was being evolved.

In the period 1400-1500 collegiate and cathedral catalogues predominated, followed in prominence by monastic catalogues, and subject arrangement was still preferred. Norris examines eleven catalogues from this period (1939: 77ff.), five belonging to Cambridge colleges, two to cathedrals, three to Benedictine monasteries, and the Catalogus Scriptorium Ecclesiae. She divides these catalogues into four groups:

1. Author
2. Subject
3. Libraries arranged according to subject, but the catalogues do not show this arrangement.
4. Catalogues with no order.

The Catalogus Scriptorium Ecclesiae, built on earlier efforts such as the Registrum, is still attributed by Norris (1939: 77) to John Bosten of Bury, but according to Jackson (1974: 82) it was built by Henry of Kirkestede of Bury St. Edmunds and it forms a landmark in the late 14th century. It dealt with 195 libraries, saying "regrettably little about them" (Jackson 1974: 82), but the list of works had lengthened and considerable bibliographical information was given. This catalogue belonged to the first group.

The subject catalogues used subject arrangement which varied from library to library. In the Peterborough Abbey Library catalogue, for example, medicine is scattered amongst other classes.

According to Norris, such confusion occurs in the bulk of the catalogues. Subject divisions are very similar to those of the 14th century. The entries also do not differ much from those of the 14th century, and press marks are not a very common feature, though there are two systems, one, (Durham Cathedral library) where books are marked, each book having a letter of the alphabet inscribed on its fly leaf, and another, (St. Augustinus Library, Canterbury) in which shelves are marked. The only new practice of this century is the introduction of cross references by St. Augustines (Norris 1939: 115). It is the only example of cross references to be found in medieval catalogues. Norris illustrates their method with the following examples:

1. Dialogus Gregorii 2° fo in libro c15 G3
 cum A firmis in exemplum
2. Dialogus Gregorii 2° fo perpendo c15 G3
 cum B
3. Dialogus Gregorii vetus 2° fo licent c15 G3
 et debilis
4. Dialogus Gregorri non hic quia infra in colleccionibus
 H. de Hegham cum C

The first three items are entries for three separate volumes of Gregory, all located on the same shelf, the opening words of the second folio being given in each case. The fourth entry has no words of identification and no press mark - it is a cross reference to another copy of Gregory bound together with a miscellaneous volume given to the library by Hamo Hegham.

Only four of the eleven libraries examined by Norris (St. Paul's, Peterborough, St. Augustine and Cambridge University) list titles

of all works bound in one volume. Biographical remarks and other comments are rare. Durham makes remarks on such facts as the value of the books, who borrowed them, where they are shelved, doubtful authorship and stolen books. Peterborough notes the size of the book and whether the books are complete, but in most cases nothing is added to the title and second folio words.

It is Norris's opinion (1939: 123) that the monastic catalogues are far in advance of the collegiate ones, some of them being of very little use as library catalogues, but considered to have been compiled for the use of the librarians only.

With the 16th century came the idea that some system was needed in the making of catalogues. In medieval cataloguing, books were listed more as an inventory of property than as a key to the library.

2.2 Development of conventional classification systems

2.2.1 16th - 17th centuries

The breakdown of Aristotelian synthesis began, says Vickery, (1959: 162) in the later Middle Ages, and was completed during this period. The history of classification from this time on "has been an account of the attempt to find a new rational system of the sciences to replace that of Aristotle" (Vickery 1959: 159). In distinguishing between a philosophical and utilitarian classification, Sayers (1943: 85) mentions the scheme of Aldus Manutius. A utilitarian scheme is one without philo-

sophical or scientific basis, which is entirely intended to serve as a way of arranging subjects in a practical order. Aldus Manutius (1498) used his scheme to arrange his Libri Graci impressi or sale-list of Greek books from his own printing press, as follows:

1. Grammatica
2. Poetica
3. Logica
4. Philosophica
5. Sacra Scriptura.

Important in this period is Konrad Gesner (1516-65) whose classification was, in Vickery's view basically that of Aristotle (1959: 162). Sayers (1943: 80) describes the classification of Gesner as an "interlude between the ancient and the modern". Of Gesner's works the Bibliotheca Universalis (Tiguri, 1545) concerns us (Sayers 1943: 80). It was designed in three parts: the first part was an alphabetical author list of all books in Latin, Greek and Hebrew, with titles, subjects and connotations.

The second part, Pandectum sive partitionum universalum (1548-9) was a systematically classified arrangement of all books catalogued in the first part, with various additions. It was designed in 21 books, but only 19 appeared with the 20th, Theology, published separately in 1549 and the 21st, Medicine, not at all. The third part was to have been an alphabetical subject catalogue of the books in the second part, but Gesner ultimately contented himself with a subject index to part two. It is thus the second part which contains the classification, based on the trivium

and quadrivium.

Gesner was working towards some sort of scientific order, but, according to Sayers (1943: 82) it is simplest to regard his arrangement as "the order in which the successive studies in a university were pursued."

The same principle lay behind the classification of the Bodleian Library when it appeared in 1602 (Thompson 1977: 146). The library was divided into four subject groups: Theology, Law, Medicine, Arts. The books were divided by size. Within the subject classes, the books were arranged on the shelves in alphabetical order of surname of the author (Norris 1939: 144).

Gesner's scheme was broadly divided into:

1. 'Substantial' sciences, which included Natural philosophy, with subdivisions following exactly Aristotle's Physics; Metaphysics; Ethics; Economics; Politics; Law; Medicine; Theology.
2. 'Preparatory' sciences including the trivium and quadrivium.
3. 'Ornamental' preparatory sciences including mechanical and other arts (Vickery 1959: 162).

In the monastic libraries of the 16th and 17th centuries classification is scanty (Sayers 1943: 83) and depends upon dividing the orthodox from the unorthodox. The collegiate press marking system was applied in libraries with a limited stock and not much prospect of new books being added. This system is not a classification system dividing books according to subject, but a series

of bookcases each of which is given a symbol. Each shelf in turn is given a symbol and each book a "press mark" consisting of the bookcase and shelf symbols and a running number. So the press mark AA5 will indicate the fifth book on the first shelf of the first case. Thus the shelves, and not the subjects, are numbered.

Of the earlier scholars, Francis Bacon (1605) influenced most modern classification schemes to a greater or lesser degree. Bacon rejected the idea that knowledge could be divided into theoretical, practical and productive, and suggested instead a division into History, Poetry and Philosophy (Vickery 1959: 162), based on the three mental faculties of memory, imagination and reason. Under these three main divisions he groups all fields of knowledge.

Although Bacon frequently attacked Aristotle in his writings, the relation of his scheme to that of Aristotle appeared in several subordinate divisions. The basic groupings of Aristotelian physics and mathematics appeared almost unchanged in Bacon's scheme. The underlying structures of the trivium and the quadrivium were, however, submerged in the details. For Aristotle, Physics dealt with "changeable, independently existing things, and Mathematics with unchangeable things which had no separate existence" and for Bacon, "Natural History dealt with the variety of things, and Mathematics with the fixed, formal causes of those same things" (Vickery 1959: 163). The same basic groupings were set out by Thomas Hobbes in his Leviathan (1651), but his interpretation was once again different. To him, physics dealt with

the qualitative aspect of things and included meteorology, physical astronomy, mineralogy, botany, zoology, optics and music. The quantitative studies included geometry, arithmetic, mathematical astronomy and geography, mechanics, engineering, architecture and navigation. This differed in a few details from the Aristotelian scheme, e.g. optics and music were transferred to physics. Hobbes advanced the theory of progressive states of knowledge in all branches. Thus theoretical physics is not separate from, but developed from the descriptive physical data (Vickery 1975: 152).

In 1643, Gabriel Naudé published his Bibliothecae Cordesiane catalogus. Naudé was librarian for Cardinal Mazarin, in Paris. He used the following classification in his catalogue (Thompson 1977: 147):

Theology, Medicine, Bibliography, Chronology, Geography, History, Military Art, Jurisprudence, Council and Canon Law, Philosophy, Politics, Literature.

Edward Edwards (1859: 772) remarks that Naudé "disclaimed all desire to achieve reputation as a daring innovator."

Naudé preferred a small collection of high quality books to a large collection of inferior quality (Irwin 1958: 133). With "quality" must go comprehensiveness. "There is nothing which renders a Library more recommendable, than when every man findes in it that which he is in search of ...; there is no Book whatsoever, be it never so bad or decried, but may in time be sought for by some person or other." (Cited in Irwin 1958: 133-134).

Naudé also discusses the order and disposition of the books "without this, doubtless, all inquiring is to no purpose, and our libraries fruitless..." (cited in Irwin 1958: 134). For a classification scheme he favoured the "most facil, the least intricate, most practified, and which follows the faculties of Theology, Physick, Jurisprudence, Mathematicks, Humanity and others, which should be subdivided each of them into particulars, according to their several members, which for this purpose ought to be reasonably well understood by him who has charge of the library." (Irwin 1948: 135).

The schemes of Gesner, the Bodleian and Naudé, all suggest a basic principle of librarianship, viz. that practical convenience should dictate how subjects are to be grouped in a library.

Also reflecting this principle is the "French System". Although the originator of this scheme is somewhat uncertain, French opinion favours Ismail Bouilleau (1679) (Edwards 1859, vii: 773) or his contemporary, Jean Garnier (1678). Bouilleau constructed a catalogue of the library of De Thou. It was published in 1679, rehandled by a number of Paris booksellers, mainly by Gabriel Martin in a series of catalogues issued between 1711 and 1760, and by Guillaume de Bure (1763) and "reached its apotheosis when Jacques-Charles Brunet adopted and expanded it to form the basis of the arrangement for the classified part (vol. 6) of his Manuel du libraire et d'amateur de livres" in 1810 (Sayers 1943: 86).

Bouilleau's main classes were: Theology; Jurisprudence; History; Philosophy; Literature (Edwards 1859, v.2: 773). Garnier's were: Theology; Philosophy; Medicine; Literature; History; Economy or

Jurisprudence; Heterodoxy. Brunet's main headings were: Theology, Jurisprudence; Science and Arts; Belles-lettres and History.

In volume 2 of his Memoirs of Libraries, Edward Edwards (1859: 773 ff.) examines the French system and also more elaborate schemes. One of these is that of Girault of Auxonne, "who, like so many of his predecessors, was far more intent on displaying his philosophical acumen in dealing with the vexed questions of metaphysics, than on simplifying the storing and handling of his books" (Edwards 1859, v.2: 790). Describing the scheme as showing the "plentiful crop of practical absurdities" which can grow out of a "super subtle theory", Edwards shows that he approves the hospitality and simplicity of the French System and condemns the others. For him, all schemes for classification of libraries fall into two groups, "the first of which aims at the systematic and consecutive arrangement of all human knowledge, in accordance with some theory either of the power and functions of the mind itself, or of the order and sequence in which the phenomena of the material world may be conceived to present themselves to its contemplation; and the second of which, with far humbler pretensions, seeks but to assert after some convenient and manageable fashion the instruments of knowledge for ordinary employment and daily use" (1859, vol. 2: 783).

The first group is based on scientific beginning and a philosophical precision and the second trying to be useful in arranging things according to similarities and separate them according to differences. Thus he praises the scheme of Bacon for classification of human knowledge, but thinks that "it is far better adapted

to the purposes of the Historian of Learning and of the Sciences than to those of the Librarian" (1859, vol 2: 766). Edwards approves of the principle that subjects should be grouped in a library according to practical convenience, but observes, however, that "it is certain that a good catalogue will require a much more minute classification than would be either useful or practicable in the presses of a Library" (1859, vol 2: 783). He also observes that whichever plan of arrangement is chosen depends on the character and contents of the collection to be catalogued.

2.2.2 18th and 19th centuries

The 18th and 19th centuries were characterised by a great many conflicting theories and almost as many conflicting schemes.

In 1725, in the first volume of an abridgement of the Philosophical Transactions of the Royal Society, the subject matter was disposed under a number of headings which provided an indication of the fields of study of the time (Vickery 1959: 164):

Mathematics	Shipbuilding	Magnetics
Surveying	Perspective	Botany
Optics	Music	Zoology
Astronomy	Physiology	Anatomy
Mechanics	Meteorology	Medicine
Acoustics	Pneumatics	Pharmacy
Hydro mechanics	Hydrology	Chemistry
Geography	Mineralogy	
Navigation		

The list shows the final disintegration of the old Aristotelian Physics into a number of separate disciplines - Physiology to

Chemistry. Two new disciplines appeared, viz: Magnetics and Pharmacy. During the 19th century more disciplines were added, e.g. Electricity, Geology, Palaeontology, Atomic physics, Bacteriology, etc. These traditional disciplines, says Vickery (1959: 164), henceforth formed the 'raw material' out of which classifications of science were constructed. How these disciplines were to be arranged was the problem on which 19th century classification concentrated. There were two main approaches:

1. Can sciences and disciplines be grouped?
2. If grouping proves difficult, can they be arranged in serial order?

The dichotomies* (Vickery 1975: 154)

Even during medieval times a distinction emerged between pure and applied sciences. The same distinction was made by 18th and 19th century classificationists and scholars such as Masaryk, Bacon, and Dewey. Not all classifiers did this, however. Thomas Young and Neil Arnott kept technologies with the sciences on which they depend, and were later followed by Brown, Hulme, Ranganathan, Bliss and others. Throughout the centuries sciences were divided into two polarised groups. Bacon had speculative and descriptive sciences, Hobbes qualitative and quantitative, Coleridge pure and mixed, Wundt formal and empirical, Pearson abstract and concrete, etc. Thus throughout the century a series of dichotomies was used. Speculative and descriptive, pure and

* 'Dichotomies' is a term used by Vickery (1975: 154) to reflect the tendency to classify by identifying opposites or polarities.

mixed, pure and empirical, formal and empirical, normative and physical, abstract and concrete, general and special, general and applied, pure and exact, exact and synoptic, etc., were all terms being used in repeated and contradictory attempts to group the sciences. Vickery states that "the fact that the attempt was so often repeated, and that earlier terminology was so often discarded as unsuccessful, leads one to suspect that the aim itself was false, and justifies the characterization of this period as one of intellectual confusion." (1959: 168) No science, adds Vickery, is wholly speculative, pure, formal, abstract, etc., but contains elements from each designated polarity.

Serial order

Parallel to the attempts to put sciences into groups was the endeavour to establish a serial order of the main disciplines. This means, briefly, to place sciences in an order in which each science in a series is dependent on those that precede it, but not on those that follow it. It was, according to Vickery (1959: 166), in part a development of Comte's abstract-concrete or general-special dichotomy. He put sciences in what he called an order of decreasing generality and increasing complexity: Mathematics, Astronomy, Physics, Chemistry, Biology. Spencer developed the idea of serial dependence. His order was: Logic, Mathematics, Mechanics, Physics, Chemistry, Astronomy, Geology, Biology. Each science, says Vickery (1959: 167), was instrumental with respect to those that followed it and supplied subject matter to those that preceded it. These ideas of serial order

expressed the fact of dependence, but did not reveal the essential natures of the sciences.

According to Vickery (1959: 168), the characteristic features of 19th century classification are:

1. What Bliss calls "scientific and educational consensus."

Common consensus of educated society has already divided knowledge into homogeneous groups, i.e. the natural historical development of knowledge has already been assembled into areas of subject matter and this consensus is taken as a basis for classification.

2. 19th century classification carried the divisions only a few steps down. Detailed subdivision of the classes was not attempted and dichotomies offered no guidance as to the principles which could be applied to carry out such divisions, if required.

Although the subjective approach dominated the classification theories of the 19th century, a more realistic and practical approach emerged towards the end of the century. Theories that the classification of sciences should ideally be founded on material relations of phenomena were expressed from about 1870 onwards by writers such as Frederick Engels, Alexander Bain and Pearson. "The sciences can thus be differentiated by the fact that each treats a different level of organisation (the nucleus, the atom, the molecule, the cell, the organism, the community, etc.) or a different form of motion (electrical, thermal, optical, etc.). The serial order of the sciences is the arrangement of these levels and forms of motion in their inherent sequence."

(Vickery 1959: 172). However, the materialists went little further than the subjective classificationists in formulating actual principles by which subdivisions could be affected should detailed classification become necessary.

In about 1700, the philosopher and librarian Leibniz made a classification in which he proposed the ten main divisions of:

- I. Theology
- II. Jurisprudence
- III. Medicine
- IV. Intellectual philosophy
- V. Mathematics
- VI. Physics
- VII. Philology
- VIII. Civil history
- IX. Literary history and bibliography
- X. Collective works and miscellanies.

(Edwards 1859, vol. 2: 776)

It was published in 1718 as Idea bibliothecae publicae secundum classes scientiarum ordinandae.

Brunet's Manuel du Libraire et de l'amateur des Livres was mentioned earlier as being based on the French System. While in philosophical circles the systems of Comte and Spencer were dominant, in bibliographic circles that of Brunet predominated until the end of the 19th century in England, France and Italy. It became one of the most influential schemes of the 19th century. It has five main classes: Theology; Jurisprudence; History; Philosophy; Literature (Sayers 1967: 113). His approach was

practical, reflecting the urge to arrange books by their predominant characteristic. Although claims have been made of a philosophical basis for Brunet's scheme, according to Sayers (1943: 89) that basis can only have been accidental. They are groupings which their maker found 'practically convenient'.

Various other 19th century schemes were derived from Brunet's classification, e.g. that proposed by Thomas Hartwell Horne for the British Museum in his Outline for the classification of a Library in 1925. His main classes were: Theology; Philosophy; Arts and Trades; History; Literature, and are, according to Sayers (1943: 89), certainly a version of the French system.

Edward Edwards' own scheme for a Town Library (1859, vol. 2: 815-831) - Theology; Philosophy; History; Politics and Commerce; Sciences and Arts; Literature and Polygraphy - seems to have the same derivation. The British Museum scheme, dating from about 1836-8, although it shows other influences, is, according to Sayers (1943: 90) "more nearly related to the French System than to any other". Its outline is: Theology; Jurisprudence; Natural history and Medicine; Archaeology and the Arts; Philosophy; History; Geography; Biography; Belles Lettres; Philology.

Thomas Kelly (1973: 91-92) recounts that public libraries in Great Britain used a very simple classification, usually based on broad subject divisions. Nearly all the classifications begin with Theology, a tradition going back to the medieval monasteries, "and indeed in many ways the public libraries, both in their classification and in their cataloguing, were merely continuing

a system which had been handed down to them through the subscription libraries and the libraries of mechanics' institutes and similar bodies" (Kelly 1973: 92).

The year 1876 was a landmark in the history of library classification. In this year Melvil Dewey's Decimal Classification was published. Although Dewey rightfully belongs to the 19th century, his scheme became universally popular only in the 20th century, and thus he will be discussed in the next chapter.

2.3 Development of cataloguing and cataloguing codes

It was noted in the beginning of the previous chapter that earliest library catalogues were arranged according to subject. The catalogue of the library at Edfu, in Egypt, one of the first libraries in the world, was arranged by subject and so were those of the ancient libraries of Babylonia and Assyria, of Ashurbanipal's library and of the Alexandrian library. Catalogues of the libraries in the medieval period also kept to this principle, and it continued into the age of the printed book. Thompson (1977: 161) mentions the examples of Aldus Manutius in 1498, who arranged his list of Greek books into Grammatica, Poetica, Logica, Philosophia and Sacra Scriptura; Robert Estienne in 1546 who grouped publications in his catalogue in divisions such as Graeca, Grammatica, Historia, etc.

2.3.1 16th century

In the 16th century appeared the catalogue of Conrad Gesner, as mentioned earlier. The first part of the catalogue was an alpha-

betical author list of all books in Latin, Greek and Hebrew, with the second part, the Pandectum, (1548-9) a systematically classified arrangement of the books catalogued in the first part. The third part was to be an alphabetical subject catalogue of the books in the second part, but in the end Gesner only made it a subject index. Norris (1939: 130 ff.) describes Gesner's methods of cataloguing: First divide the books in two groups, large and small, and arrange them in some order on the shelves. Each book must have a running number followed by M (Magnus) for large books or P (parvus) for small books. The first catalogue must be in the order of the books on the shelves, first the large, then the small, e.g.

Catallus	M I
Tibullus	M II
Beda	M III
Galenus	P IV
Dionysus	P V
Musa	P VI

Then there must be an alphabetical index according to author's names:

Beda	III M
Cattulus	I M
Dionysus	V P
Galenus	IV P
Musa	VI P
Tibullus	II M

Although Gesner saw this as a sufficient catalogue for a stationary

library, he thought another index might be of value in case books should get lost, viz. one in accession number order:

- I Catullus
- II Tibullus
- III Beda
- IV Galenus
- V Dionysus
- VI Musa

For a growing library, however, there will be difficulty with additions in the first catalogue, not so with the alphabetical index or the accession index, where names and numbers can be added. Suppose the following volumes are to be added:

- Aulus M VII
- Serapio M VIII
- Cato P IX

Aulus and Serapio must be added to the end of the M-series of the first catalogue. Now the accession number will lose its value as finding number. Galenus is no longer the fourth book on the shelves, nor is Aulus the seventh. To solve this, Gesner added an arabic number to the first catalogue to serve as finding number:

- Catullus M I 1
- Tibullus M II 2
- Beda M III 3
- Aulus M VII 4
- Serapio M VIII 5
- Galenus P IV 6
- Dionysus P V 7
- Musa P VI 8

The disadvantage was still that whenever a book was added to the M-series, the shelf numbers of the whole P-series would require alteration. Gesner realized this and suggested that additions should be allowed to accumulate for a time before being entered in the catalogue (Norris 1939: 132). Gesner also suggested that libraries should use his catalogue instead of compiling their own, and insert their own press marks against entries for books in the library. Items not in the Bibliotheca could be written in the margin. Norris sees this as a step in the history of co-operative cataloguing (1939: 132).

In 1560, Florianus Treflerus, a Benedictine monk, published a work on library economy with the title Methodus exhibens per varios indices, et classes subinde, quorum libet liborum, cuiuslibet bibliothecae, breve, facilem, imitabilem ordinationem (Thompson 1977: 162). He believed that no library should be without a catalogue and recommended five catalogues (Norris 1939: 135):

1. An alphabetical list of authors
2. A classed catalogue with the classes arranged according to the sequence of the books on the shelves
3. A subject index to all the books in the library
4. An alphabetical index to the last
5. An index of books held in reserve.

In the first catalogue each entry must receive a shelf mark consisting of three letters - the first letter indicating the size (e.g. I for ingens, P for parvus, M for mediocris), the

second letter to represent the colour (e.g. A for albinus, R for rubeus, N for nigricans) and the third letter indicating the class, the classification running from A, civil law, through R, German writers.

Also in the 16th century, Andrew Maunsell, a well-known bookseller in his day, issued the first part of his proposed three-part catalogue in 1595 (Norris 1939: 136), listing books of divinity. The title was "The first Part of the Catalogue of English Printed Books: which concerneth such matters of divinitie as have bin either written in oure owne tongue, or translated out of anie other language; and have bin published to the glory of God, and the edification of the Church of Christ in England. Gathered into alphabet, and such method as it is by Andrew Maunsell, bookseller" (Norris 1939: 136-7). The second part of his catalogue was published in the same year and dealt with "the sciences mathematicall, as arithmetick, geometric, astronomie, astrologie, musick, the art of warre and navigation and also of physicks and surgery" (Norris 1939: 138). The third part was never issued because Maunsell died the same year. It was to have covered the humanities - grammar, logic, rhetoric, law, history, poetry and 'policie'. Maunsell's rules for his catalogue were that it should be classed according to subject, with the entries arranged alphabetically under author's surname; anonymous works were to be entered under title or subject or both, and translations to be entered under author, translator and subject.

The 15th century had been a great library era, with every conceivable institution - monasteries, colleges, universities -

having its own library and rivalling to be able to lay claim to the best one. The 16th century, however, was different. It brought hostility to the clergy and between 1536 and 1539 monastic culture was swept away with suppression of monasteries and their libraries were destroyed and dispersed. By 1540 the only libraries left by the Commissioners of Henry VIII were those of Oxford and Cambridge and some of the older cathedrals. The bulk of monastic libraries in England were sold for scrap.

In 1549 John Bale, who seemed the only one interested in preserving the books, wrote to Edward VI: "Our posterity may well curse this wicked fact of our age, this unreasonable spoil of England's most noble antiquities, unless they be stayed in time." (cited in Edwards 1859, vol. 1: 361)

University libraries were not spared. Edward VI sent Commissioners in 1549 to destroy all superstitious literature. They were so thorough that manuscripts were destroyed when they contained a single rubric, in mathematics books a cross was condemned for Popish, circles for conjuring (Edwards 1859, vol. 1: 362). This time the Oxford library was completely ransacked of books. It was later refunded by Bodley. The wealthy classes began to collect books and form private libraries.

Norris (1939: 129) describes two monastic catalogues of this time, viz. those of Syon Monastery (1526) and of Bretton Monastery (1558). The monastery of Syon in Middlesex was founded in 1415 and was of the Brigettine order. The catalogue seems to have been compiled at two different periods - part of it was finished in 1504. It is a subject catalogue with entries

grouped under the letters of the alphabet, e.g.:

A Grammar and classics

B Medicine, astrology and some classics

C Philosophy, etc.

Each book has its class letter followed by an arabic numeral, representing an accession number. Above the entry is given: on the left, the name of the donor, in the middle the press mark, and on the right, the second folio words (Norris 1939: 127):

Raynolde	C10	Illos apud
----------	-----	------------

b71	Simphorianus Camperii de	
	triplici disciplina cum aliis	

Fewterer	C43	Illos
----------	-----	-------

b30	Simporiani Camperii opuscula	
	cum aliis	

There is no clue in the catalogue as to the meaning of the press mark to the left of the entry. Syon also compiled the first index - an alphabetical index according to authors' names, but it is, according to Norris (1939: 140) not very reliable.

The Priory of Bretton, in Yorkshire, was very small and of Cluniac foundation. The most remarkable point about its catalogue, says Norris (1939: 134), is that it was compiled after the Dissolution and after the monks had left the monastery. In 1558 the library had 150 books. Notes in the catalogue imply that the books were scattered. There is no arrangement apart from the fact that theological works are grouped first, and, for the first time in catalogues, the names of editors and translators are mentioned, e.g.

Distionarius per Fratrem Petrum Barcharii editus, in

tres libros distinct,' ordine alphabetico.

Erasmio translatore

Edwards (1859, vol. 1: 310 ff.) cites examples from the catalogues of inter alia, the libraries of the Franciscan convent of Annaberg, the Franciscans of Orschatz and the Benedictines of Tegernsee.

The catalogue of the library of Annaberg is undated, but its contents suggest the end of the 15th or beginning of the 16th century (Edwards 1859, vol. 1: 31):

B Thomae, P.iii.

Nicolai de Lyra, P.V.

Thom. Aquinatis Considerationes de virtitibus et vitiis
Tractatus de quator novissimis

The catalogue (or index) of the Orschatz library dates from 1541 and reads (Edwards 1859, vol. 1: 313):

Concordanti majores

Textus Biblie

Prima Pars Lire

Secunda, tertia, quarta pars

Inventarium in Augustinum

Testamentum codicum D.Thome

Elucidarius Ecclesiasticorum

Primus et secundus Thomas adamanti
Origenes

In the opinion of Edwards (1859, vol 1: 313), this catalogue "but poorly compare with the preceding Benedictine catalogues of any date."

In the catalogue of the Benedictines of Tegernsee, dated 1494, the author's name and the title of the book is given, also the author's rank, birth- or dwelling place, and often his birthdate (Edwards 1859, vol 1: 330). Christian names are used and appear in the

catalogue "according to the peculiar though very flexible orthography of the period." Thus 'Wilhelmus' and 'Wolfgangus' are entered as 'Bilhelmus' and 'Bolfgangus', 'Horatius' as 'Oratius' and Cicero as 'Tullis'.

Part of the brief example cited by Edwards (1849, vol. 1: 331) is:

FRANCISCI ds. Florencia PETRARCHAE hermitae et poetae laureati

Liber de vita solitaria E.53.

_____ Secretum de contemptu mundi per modum dialogi cum
S. Augustino C.29. E.53.

_____ Epistola ad solitarium quemdam de laude vitae
ejusdem, et Epistola ipsius solitarii responsalis ad
eundem de dispositione vitae suae. E.15

_____ Epistola exhortatorio ad germanum ejus cartusianum.
G.58.3

.

FREDERICI III Imperatoris, Ducis Austriae Scripta
aliqua ad quendam Papam et e contra metra
responsalia ejusdem Papae ad eundem. N.19.2°

Norris sums up cataloguing of the 16th century as follows (1939: 141):

"With the close of the sixteenth century, haphazard and individual methods of cataloguing begin to vanish. Although the first code of rules did not appear until the next century, there is a vague realisation that some system is necessary, but what that system is, cannot yet be defined."

2.3.2 17th century

A landmark in the 17th century was the publication of the catalogue of the Bodleian Library in 1605, the first general catalogue of a European library. It was compiled by Thomas James, the first librarian of the Bodleian. Although James did not agree with the

arrangement of the catalogue according to four Faculties - Theology, Medicine, Law and Arts - and sub-arranged alphabetically according to author, he had to obey Sir Thomas Bodley who insisted on this arrangement. The catalogue included both printed books and manuscripts and no rules were actually observed in the compilation of the catalogue. Norris (1939: 145) gives the following negative points about the catalogue:

1. The entry was not always a transcription of the title page and often varied to a great extent.
2. Anonymous works were put under the most striking word in the title or under the first word of the title.
3. Works with pseudonyms or only initials of the author on the title page were treated as anonymous.
4. Persons known only by forename were not entered under it.
5. The author's surname was not put first.
6. Editions were ignored.

The catalogue consisted of 425 pages with 230 pages of appendix of recent additions. Jones objected to a classified library, not to a classified catalogue, and the 1605 catalogue, on Bodley's instructions, was only a list of books as they stood on the shelves. Jones found so many books impossible to classify correctly, and also because books by one author were scattered throughout the catalogue, that he felt the 1605 arrangement should be abandoned.

The second catalogue, published in 1620, consisted of 529 pages containing both printed books and manuscripts, with an appendix of recent additions. Some rules were followed, e.g. that the author's name is separated from the title and printed in italics

or capitals above it; surnames are not placed first; anonymous works are entered either under first or most striking word in the title; books with several authors have an entry under the name of each author; books in English are printed in black letters; and cross references are made.

James retired in 1620 but spent much of his time during retirement making subject catalogues of the Bodleian. The entries were divided into main classes with sub-sections arranged alphabetically by heading, and under these, entries arranged alphabetically according to names of authors. The subjects he dealt with were Grammar; Geometry; Astronomy; Architecture; Arithmetic; Optics; Cosmography; Geography; Chronology; Music; Logic; Military Arts; Moral Philosophy; Politics; Natural Philosophy; Rhetoric; History (Norris 1939: 149). This catalogue was compiled about 1624-25, and published under the title Synopsis subiectorum in singulis facultatibus auctorumque qui de iis scripserunt. It was used not only in the Bodleian, but in all college libraries, which shows its value.

After some ventures to compile new catalogues for the Bodleian, which all failed, a new official catalogue was published in 1674, having taken nine years to compile. Only printed books were included, and it was compiled by Emmanuel Prichard of Hart Hall. Compilation was based on certain rules which in some instances differed from the rules used for the 1620 catalogue. They were (Norris 1939: 151):

1. Anonymous works are grouped under large subject headings and are sometimes entered under first word of the title.

2. Author's name is separated from the title and printed in italics or capitals, but surname is still not put first.
3. Persons known only by a forename are entered under it.
4. Books with several authors are entered only under the first one.
5. Names of persons using pseudonyms or only initials have been traced. Frequently the real name and pseudonym stand in the catalogue as two separate headings.
6. Translators are noted and cross-references are made to authors of the works.
7. Biographies are put under subject of the biography.
8. Dictionaries are entered under the name of the author and under the heading 'Lexicon'.
9. An effort has been made to give exact transcriptions of the title page.
10. There is a tendency to use the Latin form for subject headings.

An example of the form of entry is:

Nath. COLE

Preservatives against sin. Lond. 1618 4° C95 Th

Sermon on Math. 25.34. Lond. 1625 4° I12 Th

This piece of Bodleian history, says Thompson (1977: 164) "encapsulates a conflict which has dominated modern cataloguing": on the one hand, the need for an accurate finding list in a library, on the other, the principle that a library must have a subject catalogue. The Bodleian needed a finding list, hence the 1620 catalogue, arranged alphabetically by author. But the store of knowledge in a library needs a key to it.

Norris characterises the 17th century as the time which saw the beginning of present-day cataloguing methods (1939: 178). In 1650 appeared the first dictionary catalogue - authors and subject headings in one alphabetical sequence. It was the catalogue of Sion College, founded by the Rev. Thomas White for the use of all clergy in London who were licensed to preach. It was however a very rudimentary version of a dictionary catalogue. Books received only one entry - and only when there was no author were they entered under subject. There is no apparent order for entries under the headings.

Printed catalogues were the rule in the 17th century and press marks were always included. They were kept up to date by means of printed supplements issued every three years.

Norris (1939: 178) discusses cataloguing methods of such men as John Durie and Frederic de Fostgaard, (a Dane who had a considerable personal library and drew up a cataloguing scheme as a consequence) and in her view they (and James) gave particular consideration to the students who might use the library and devised schemes to meet their needs, which was a great difference between past and future.

Durie advocated a subject catalogue, subdivided according to language. De Rostgaard's catalogue was to be divided into 24 subject classes, according to what the library contained. It was to be written straight across two pages divided into four columns headed Folio, Quarto, Octavo, Duodecima. Subject divisions were marked with letters of the alphabet. Accession numbers were noted and an exact transcription of the title page was made. Entries were made chronologically under the appropriate

sizes. Works bound together were given a full entry under the first work and brief entries for all the other items in the work. An alphabetical index of subjects and authors completed the catalogue.

Another feature of this period was the growing number of cataloguing codes, Trefferus, Gesner and Maunsell in the previous century, had a vague realisation of the necessity for uniformity. In the 17th century the realisation became more definite.

Thomas Hyde, who was supposed to have compiled the 1674 Bodleian catalogue, but who in reality only wrote the preface (Norris 1939: 150), gives the rules followed in compilation in that preface. These rules (quoted earlier) can be seen as the first code of rules, says Norris (1939: 179).

People wrote about the way in which catalogues should be made. Durie in his Reformed Librarie Keeper (1650), described how a printed catalogue, which was the rule, should be kept up to date. He also recommended selective cataloguing - and that a committee should decide which books are worth full cataloguing.

The prefaces to all the Bodleian catalogues contain notes about the rules followed. This shows that a change was taking place and that a catalogue became something more than an inventory of books. Norris (1939: 180) sums up cataloguing in the 17th century - we see the forerunners of the dictionary catalogue and the classified catalogue, the start of cataloguing codes, the practice of selective cataloguing, and the printed catalogue which became more problematical as time went on.

2.3.3 18th century

Norris (1939: 196) sees the 18th century catalogue as having less variety than previous centuries, and characterises it as a period "well on the way towards the general uniformity of method of modern cataloguing." All of the catalogues she examined were either author-alphabetical or subject-classed, with the author catalogue in the majority.

Divided opinion on the matter of author and subject-classed catalogues was already there and was shown in that some libraries changed from one to the other. In author catalogues, chronological arrangement under author was popular. Subject catalogues were subdivided by size.

Because of expensive printed catalogues, entries were brief, with a tendency to make each entry fit one line of type. The only real contribution to the development of cataloguing in the 18th century was, according to Norris (1939: 197) the appearance of the first national code of cataloguing rules, the French code of 1791, which was an outcome of the French Revolution during which time private libraries became Government property.

The custodians of the books received in 1791 instructions as to how the collections were to be catalogued. The instructions consisted of rules for the formation of a card catalogue. A card had to be made for each book. Near the top of the card was to be written the number of the volume (the books being numbered from top left to right consecutively, and no attempt was to be made to classify the library). The number on the card was to be

followed by the title, copied from the title page, and also the author's name. The place of publication, printer or publisher, date and size were to be included, also description of the book, such as large paper, vellum, Gothic type etc. The author's name was to be underlined, and for anonymous works, the keyword to the subject of the book. The following is an example from Norris (1939: 196):

310 Monumens de la monarchie française, par Bernard de Mountfaucon, Paris, 1729 et années suivantes, in fo., 5 vol. fig. gra. pap. reg., mar. vert.

Below the entries the library where the book could be found must be given. The cards were arranged in alphabetical order according to the name or word underlined, then strung in bunches and sent to Paris. Copies were to be kept in the library.

2.3.4 19th century

The 19th century was the most important and influential period in the history of modern cataloguing methods, as it was in the history of classification. Crucial developments occurred in Great Britain - at the British Museum, the Bodleian and the newly established public library system.

The library of the British Museum came into being through the uniting of four book collections known as the Royal Library; the Cottonion Collection; the Harleian Collection and the Sloanian Collection (Edwards 1859, vol. 1: 415). Its first catalogue was issued in 1787 in two folio volumes with the title Liborum impressorum qui in Museo britannico adservantur catalogus.

Samuel Ayscough started on this catalogue in 1773 and he catalogued all the manuscripts and about a third of the printed books. Then, in 1785, he gave it up in order to go into the Church (Norris 1939: 201). The rest of the catalogue was compiled by Paul Henry Maty and Samuel Harper.

The next edition appeared in 1813-19 in seven octavo volumes, compiled by Sir Henry Ellis and H.H.Barber. Work on this edition was started in 1807, when the Trustees decided that one alphabetical catalogue of the separate collections should be made and that a general classed catalogue should also be compiled. The principle adopted in this catalogue was to catalogue solely from the title page, with the result that many works were attributed to people who lived in a different century, and many more glaring mistakes occurred (Norris 1939: 201).

In 1825 the Rev. Thomas Hartwell Horne presented the trustees with his Outlines for the classification of a library. His aim was to "make the Classed Catalogue of the British Museum - what no existing Catalogue of any Royal or National Library in Europe is - a standard work of perpetual reference" (Norris 1939: 202). His classification scheme was followed by Observations on the manner in which titles of books are to be entered and classed, which was actually a code of cataloguing rules, even if it was not very detailed or comprehensive. There were 17 rules, dealing with (Norris 1939: 202):

Form of title

Spelling of title

Authors' surnames

Authors' initials

Anonymous works

Dates in black letters

Biographical rarities

Books printed by early printers on vellum

First editions

Books with manuscript notes by famous people

Books without dates

Books which are answers to other works

Editors

Reprints

With regard to subject entries, Horne said: "As facility of reference is a very essential feature in a classed catalogue, all books which (there is reason to think) may be looked for under two or more heads are to be entered under such heads"

(cited by Norris 1939: 202). Horne's scheme was accepted by the Trustees and he was engaged in 1826 to compile a classed catalogue. Eight years and £7000 later, the project was abandoned as a failure.

In 1834 a Select Committee was set up to enquire into the affairs of the B.M. They found that only two catalogues existed - the printed author catalogue of 1813-19, and the five-volume catalogue of the library of George III. Both were alphabetical by authors' names, and there was no subject index.

The committee soon became involved in a debate on the merits of author versus classed catalogues. Sir Henry Ellis, Director of

the Museum, supported author catalogues and Edward Edwards classed catalogues. Sir Henry meant (Norris 1939: 204) that any intelligent man using the library must know his subject so well that he would know the names of all authors who had written on it, and he would not need a subject catalogue - also, he argued, the librarian is a living catalogue, and can be consulted. Edward Edwards's answer to Sir Henry's argument was: If a reader knew all the authors who have written on a particular subject, how did he find them out? Why did readers in the B.M. look up the bibliographies in Bibliotheca Britannica, and then wade through the author catalogue to find what they wanted? As for the librarian being a living catalogue, Sir Henry had shown that he could not remember to within 20 000 how many volumes there were in the library.

In 1836, when the Committee was still taking evidence on the catalogue, Anthony Panizzi, appointed Extra Assistant Librarian in 1830, was given an opportunity to express his views. He thought a classed catalogue was quite unnecessary, but a subject index should supplement the author catalogue (Norris 1939: 205). In his opinion, classed catalogues were impossible and every scheme that had yet been put forward was absurd. Moreover, continuous discoveries in science made any classification ridiculous.

In 1837, with things still very unsatisfactory, Barber retired and Panizzi was appointed Keeper of the Printed Books. He insisted on the compilation of a new catalogue and drew up a set of rules for making an author catalogue in collaboration with James Watts,

J. Winter Jones, Edward Edwards and J.H. Parry. The result was the famous ninety-one rules for the compilation of the B.M. Library. The Committee sanctioned the Rules in 1839 and they were published in 1841, the first English code of cataloguing rules.

The Trustees instructed that each letter of the alphabet must be printed as soon as it was prepared. Panizzi and Barber intended to catalogue shelf by shelf, but this instruction meant they had to catalogue in alphabetical order. Compiling the catalogue according to the Rules started in 1839 and in July 1841 the letter A of the catalogue was published. That was the first and last volume issued, because the difficulties foreseen by Panizzi and Barber has arisen. It was discovered, as the work progressed, that more had been left out of A than was put in, and continuous necessary cross references sprang up after the volume had gone to the printers.

Cataloguing continued in manuscript and it was not before 1900 that a printed catalogue was issued. It consisted of 47 volumes with a 10 volume supplement of books added between 1882 and 1889.

The Bodleian Library produced another catalogue in 1843 (Thompson 1977: 169). This catalogue was much criticized and it was decided that the Bodleian should adopt the B.M. Rules drawn up by Panizzi (Norris 1939: 156). The B.M. was to be imitated in that single titles were to be duplicated on slips of paper and the slips mounted in alphabetical order. Two copies of the catalogue were to be made in this manner and the remaining slips

were to be sorted into a classed catalogue. The catalogue was finished in 1878 and consisted of 741 volumes. This was only the author catalogue; the classed catalogue was not started until 1878.

The B.M. code was used in the Bodleian until 1882 when E.W.B. Nicholson, the librarian, drew up a set of 54 rules based on the Library Association code. The rules were divided into the following groups (Norris 139: 156):

- Rules 1 - 5 deal with the title
- 6 deals with the number of volumes, place of publication, date, size.
- 7 deals with language of title and imprint
- 8 - 9 deal with contents and notes
- 10 - 35 deal with headings and cross references
- 36 - 54 deal with miscellaneous.

The Compendicus Catalogue Rules for the Author Catalogue of the Bodleian Library was issued in 1885. These rules were in reality the 1882 rules with some additions, and were printed in 1893. In 1918 a revised edition appeared with the growth in number from 54 to 68. In 1921 it was decided to start a supplement to the main catalogue for works issued in or after 1920. A separate code of rules was framed for the supplement. It appeared in 1923, and was revised and reprinted in 1930. In 1933 the 1923 and preceding codes were amalgamated.

The classed catalogue of the Bodleian was started in 1878. A Professor H.W.Chandler attacked it in 1885, when the librarian asked for more cataloguing staff. Norris quotes Chandler on the

subject (1939: 157):

"Who tied the millstone of a classed catalogue round the Librarian's neck, I do not know, but the classed catalogue and all the work it entails is so much labour thrown away. No real scholar, no man who is capable of literary research, wants a classed catalogue; he hates the very sight of such a thing; it serves no useful purpose; it is a snare and a delusion. The sciolist, and he alone, thinks how delightful it would be to turn out any given subject and there see all the books that have been written on it. He does not know how impossible the thing is, or what mischiefs result from the attempt to compass such a work. Most French catalogues are classed, and he who has had the ill luck, as I have, to consult them, retains a lively sense of detestation for those who were foolish enough to class the books. Could men of real knowledge be consulted, I am quite sure that a large majority if not all, would infinitely prefer the alphabetical arrangement under authors' names, to the best classed catalogue that could be devised."

Nicholson's defence was simply that the value of classed catalogues was sufficiently demonstrated by the use made of them.

Classed catalogues were actually common in this period. Henry A. Sharp (1950: 314) cites a number of examples. In 1805 Georg Sandy, librarian of Signet Library, Edinburgh, issued a classified catalogue of that library. It had an alphabetical index of authors and subjects, and was arranged according to the classification of De Bure.

In 1809 the Royal Institution of Great Britain published A Catalogue of the Library of the Royal Institution of Great

Britain, methodically arranged, with an alphabetical index of authors, compiled by William Harris. New editions appeared in 1821, with a single index of authors and subjects, and in 1857 appeared A new classified catalogue of the library ... with indexes of authors and persons and subjects.

In 1812 the Surrey Institution published its catalogue, arranged by the classification of Thomas Hartwell Horne, with an author index. Horne himself in 1827, produced a catalogue of the library of Queen's College, Cambridge.

Between 1835 and 1852 the London Institution issued a "systematically classed" catalogue in four volumes, arranged under class headings such as Zoology (with sub-divisions); Architecture, Fine arts, etc. Sharp (1950: 315) mentions that Edward Edwards regarded this as one of the best examples of its kind. Sharp also observes that the preface to this catalogue "contains a justification for the classified catalogue that makes interesting reading a hundred years later, if only because it may cause us to wonder how much, if at all, we have really progressed in our views on the functions of library catalogues" (1950: 315).

Thompson is of the opinion (1977: 166) that the truth of the matter is that during the intervening hundred years a basically historically-established principle of librarianship - that a library must have a subject catalogue - has been neglected.

Sharp quotes as follows from that preface (1950: 315-16):

"In concluding this preface with some remarks upon the subject of classification in catalogues, it will be

scarcely requisite to notice the great and numerous advantages which a methodical arrangement of books possesses over a list that is simply alphabetical. With whatever accuracy the latter may be compiled, it can be effectually useful to those only who are already well acquainted with authors in general, or at the least with such as have written upon the subject in which they are interested. Such a list, on the contrary, is of little benefit to the reader who is desirous of being informed what books are to be found in a large library upon any particular branch of knowledge; but a Classed Catalogue immediately furnishes that information and exhibits at the same time, the peculiar excellence of the collection."

Norris (1939: 225) criticizes the classed catalogues of the period 1800-1850 for the 'artificiality' of the classification used. She also observes that, in all of them, no systematic arrangement, either alphabetical by author or chronological, is used under the various headings. Indexes referred only to page and not to particular item, which made consultation a lengthy process, and "they show excellently whence came the rooted objection of the later half of the century to classed catalogues." She also comments: "Knowledge was neither scientifically nor logically divided; each librarian concocted a scheme to suit himself." As a result of these difficulties, says Norris, the dictionary form of catalogue was introduced as being simplicity itself compared to them.

In England the Parliamentary Committee of 1849, appointed to enquire into public libraries, referred to the necessity of providing catalogues and stated that a classed catalogue with an alphabetical list of authors would be best. It has already been mentioned that Edward Edwards preferred a classified cata-

logue to an author catalogue. In most libraries then, however, mere class lists were to be found with an alphabetical list of authors following the main sub-divisions - including Edwards's library at Manchester (Thompson 1977: 170).

Edwards started on a detailed classified catalogue for the reference library at Manchester, but it was abandoned by his Library Committee as being too costly. The committee called in the help of Andrea Crestadoro, who later became Librarian, and, in the space of two years, he produced a completely new catalogue, an author catalogue with an author and subject index. For branch lending libraries, he invented a catalogue known as an Index Catalogue in which authors, titles and subjects were combined in one alphabetical sequence. This was in crude form, as Kelly notes (1973: 93), the type of catalogue which, under the name of index or dictionary catalogue, soon became the most popular in all English public libraries. It was first used at the Hulme branch, Manchester, in 1867.

A more elaborate example of the same type was D.J.Mullin's catalogue of the Birmingham Reference Library in 1869, and this method was also adopted at Liverpool (1872), Rochdale (1873), Plymouth and Westminster (1877) and Newcastle upon Tyne (1880). The spread of the public library movement in Great Britain and the United States, observes Sharp (1950: 321), created a public which wanted books about specific subjects just as much as by specific authors.

So 1876 saw the publication of Charles Ammi Cutter's Rules for a

dictionary catalogue. Cutter was not the inventor of the dictionary catalogue and he never claimed to be. He wrote the history of the dictionary catalogue in a United States Special Report and traced it back to 1815 as far as America is concerned. Cutter's Rules, however, still constitute the standard code. In the first edition there were 205 rules. By the fourth edition (1904) the number of rules had grown to 369.

According to Horner (1970: 64) Cutter is the most comprehensive code apart from the Vatican code. The overall arrangement is logical and it includes rules for the form and entry of personal authors and titles; main entries, added entries and references; description, subject and form; limited cataloguing and filing, definitions and certain special materials; manuscripts, music, maps and atlases, and even an acknowledgment of paintings, drawings and statues as 'bibliographic' units.

The most basic guiding principle of Cutter is the convenience of the user. He assumes that the catalogue is there for the public and not only for the librarian, so the cataloguer must follow public usage and not shape it. This principle, being directly in opposition to the principle of rigid rule, caused much discussion in the past. Cutter compiled the dictionary catalogue of the Boston Athenaeum which appeared in five volumes between 1874 and 1882 (Sharp 1950: 323).

Earlier than Cutter's code, in 1852, the librarian of the Smithsonian Institution, Charles C. Jewett, produced a set of 39 cataloguing rules on the lines of Panizzi's code. Both the

American and British Library Associations each produced cataloguing codes before the end of the 19th century. After the establishment of the Library Associations, the American in 1876 and the British in 1877, problems of cataloguing and an endeavour to secure greater uniformity in cataloguing engaged their attentions. America had a code in 1878 which was published in 1893, together with those of the Bodleian and British Museum libraries.

In other countries work on cataloguing codes also went on. In 1886, Dziatzko published his Instruktionen für die Ordnung der Titel im alphabetische Zettelkatalog der Königlichen und Universitäts Bibliothek zu Breslau. This German code formed the basis for the Prussian Instructions and was also the framework for K.G.Linderfelt's Eclectic card catalogue rules, 1890, which compared Dziatzko's rules with those of the British Museum, Cutter and other authorities. The Prussian Instructions were applied with success to the German Gesamtkatalog which drew many German and Austrian libraries into conformity with the rules. The philosophy was agreement on essentials, freedom on details (Quigg 1966: 23). Thus co-operative cataloguing became a working reality among German libraries in the early part of this century, when it was still little practised elsewhere. The most outstanding feature of the Prussian Instructions is that it does not recognize the concept of corporate authorship. Works the English-speaking world would regard as of corporate authorship would be treated as either:

- (a) personal authorship, e.g. entered under editor or personal element of the firm's name, or

(b) as anonymous works.

For anonymous works, external sources are used to establish the authors. If no author is ascertainable the work is entered according to "rather curious rules" (Horner 1970: 62) unique to Prussian Instructions, and quite complex, where a 'real title' is worked out by selecting and possibly rearranging certain key words from the title page of the work. According to Horner (1970: 63), Prussian Instructions has been important for two reasons:

1. It facilitated the compilation of a pioneering national union catalogue
2. It has ventilated alternative methods of entering anonymous works and works of 'diffuse authorship' and has therefore served a useful academic and practical purpose.

CHAPTER 3

CLASSIFICATION AND CATALOGUING IN THE 20th CENTURY

3.1 Twentieth century classification3.1.1 General developments and features

Important main trends that developed during the 20th century and are discernible as such, are seen by Vickery (1959: 172 ff.) to constitute the following traits:

3.1.1.1 Sub-division

Most classifications developed during this period have been notable for the many sub-divisions they have introduced. They give great detail and the sub-divisions are taken far down, often resulting in long notations.

3.1.1.2 Empiricism

A second feature of the 20th century classification is the emphasis on empiricism. Practical usefulness rather than scientific and philosophical considerations were stressed - a reaction, says Vickery (1959: 173) "against the inadequacy of subjective theories, but it is itself an admission of failure." Theory cannot be avoided since every scientific activity has its theoretical basis. Even when operating with undeniable facts, we are not free from philosophical theories and we cannot be satisfied with lack of reflection. "A rejection of subjective theories should not lead us to abandon the search for a rational basis for the classifi-

fication of science" (Vickery 1959: 174). This was a viewpoint stressed by Bliss.

3.1.1.3 Scientific and educational consensus

Bliss' (1939) overriding premise is that common consensus of educated society has already divided knowledge into homogeneous groups, that is, the natural historical development of knowledge has already been assembled into areas of subject matter with some degree of accuracy and this consensus should be taken as a basis for classification. He is of the opinion that even though the fundamental sciences may develop, they will not develop in such a way that they will acquire new positions, thus they will stay in the same order they have been for nearly a century - because it is the order of nature. All writers and classificationists did not agree with Bliss. Some of them, notably Wyndham Hulme, thought a classification scheme should be based on "literary warrant" (Vickery 1959: 175) - i.e. the need for a book classification to be based on knowledge as recorded in books. The order and extent of sub-division in a classification scheme should be, in the opinion of Hulme, "conditioned by an actual stock of books and the use made of them" (Phillips 1961: 30). Phillips (1930: 31) is of the opinion that the practical success of the Library of Congress classification scheme, which is based on the actual stock of the Congress library, may be taken as "an indication of the fundamental soundness of Hulme's theories."

The views of Bliss and Hulme represent the conflict between practical usefulness and educational and scientific consensus

during this period.

3.1.1.4 'The order of things'

This is based on the theories of Ernest Cushing Richardson. In his book Classification, published in 1930, he declares: "Classification is the putting together of things... A thing as a subject for classification is whatever has separate existence... Ideas are, therefore, the subject of classification just as much as anything else... because they are individual separate things existing in a certain place at a certain time in a certain definable nature... Things therefore, as the subject of classification include the things in man and the things outside. The things outside include in turn the things which make man (nature and environment) and the things which man makes, or art. Things, therefore, include nature, ideas and art" (Richardson 1964: 2). Things of nature, he says, are already classified, so man has to do with ideas and art, and "The classification of the sciences is simply the order of nature paralleled" (1964: 2). On this basis Richardson distinguished various levels of complexity among natural things. He started with 'ions' (1964: 16 ff.), which unite to form atoms, which "themselves unite with one another in various degrees of complexity to form another series of things, each of which moves about as a whole." They are called molecules. Groups of molecules are formed into masses, and these in turn into planets. "This same process continues among complex molecules... which ... become organized into independent groups which we call cells." The cells unite to form organisms of various degrees of complexity up to the human, which is most complex. And among human organisms "there

is again a tendency towards union into societies."

On this order of things, asserts Richardson, the order of sciences must be based, and confusion comes from the notion that classification is one of subjects rather than of objects. Vickery (1959: 178) is of the opinion that modern classification schemes are too often based on subjective principles of division, in spite of the mass of details they give. Richardson also emphasized (1964: 11): "The starting point ... of all progress toward getting a clear conception of the order of the sciences is the axiom: The order of sciences is the order of things."

3.1.1.5 Analytic-synthetic classification

This is the major and most important development of the 20th century. It became necessary as a result of the exponential growth of knowledge in the 20th century, and the need to be able to classify multi-dimensional knowledge. In multi-dimensional knowledge each subject is usually a synthesis of several concepts. A one-place or enumerative classification is inadequate for classification of modern complex literature. There must be provision for building compound numbers to represent compound subjects. So the outstanding feature of 20th century classification is the attempt to formulate schemes which can classify in depth, indicate relationships and indicate in one notation a combination of concepts. Examples of such schemes are Ranganathan's Colon Classification and the Universal Decimal Classification, which will be discussed later.

3.1.1.6 Depth classification, hospitality and flexibility, facet and phase analysis

Concepts and developments of the past few decades, closely linked with the above development, are depth classification, hospitality and flexibility, facet and phase analysis. These concepts, especially faceted classification, are now regarded as essential for classification for the purposes of advanced information retrieval. The terms "facets" and "facet analysis" have been given to this method by the Indian librarian Shiyali Ramamrita Ranganathan, who, in the opinion of P.C.Coetzee (1975: 153) may have derived them from the French writer Gordonnier, and the terms were soon taken over by others. The word "facet", says Coetzee (1975: 154) is recognisably the French word facette which literally means "little face". In European languages it has been adopted "in the sense of a 'side', an aspect or quality of a factual complex such as society, literature, a political association, etc." Ranganathan used the word "facet" to denote classes consisting of a sequence of members called "isolates". When we call something an isolate, states Coetzee (1975: 155) "... it is in some way or other a component of an object or of a fact that can be isolated by analysis. A facet is a group of isolates of the same, or some, or all objects provided that these isolates belong to the same genus."

Although facet analysis has been discussed only since the mid-20th century, the technique, Coetzee (1975: 156) claims, is not new. According to his analysis, it was first used by Callimachus to form the main classes of his catalogue. He had the facet of

origin (authorship) and divided his main classes by facet of literary genre or scientific discipline. Gesner employed the facet of scientific discipline and was followed by others such as Naudé and Leibniz. Melvil Dewey's Decimal Classification can, in Coetzee's opinion, be regarded as the first fairly successful system with a facet notation, and Brown's Subject Classification shows the first traces of the realization that relational facets in "subjects" are very important for information retrieval. The Universal Decimal Classification provides auxiliary notations on various facets and numbers reflecting relations can be built (Coetzee 1974: 156).

3.1.2 Principal classification schemes of the 20th century

Phillips (1961: 58) regards the following schemes as the principal schemes of book classification:

- Dewey's Decimal Classification (DC)
- Cutter's Expansive Classification (EC)
- Library of Congress Classification (LC)
- Universal Decimal Classification (UDC)
- Brown's Subject Classification (SC)
- Bliss' Bibliographic Classification (BC)
- Ranganathan's Colon Classification (CC)

3.1.2.1 Dewey's Decimal Classification (1876)

The three principles of librarianship relating to classification, viz. that a library must be arranged in some kind of order; that the order should be according to subject; and that practical convenience should dictate how the subjects should be grouped,

are manifested in Dewey's scheme. The first edition of Dewey's work consisted of twelve pages of tables and eighteen pages of index, plus twelve pages of introductory matter - 42 pages in all, and was titled A Classification and subject index for cataloguing and arranging the books and pamphlets of a library (Thompson 1977: 149). Nine years later, in 1885, a greatly expanded second edition appeared, containing 486 pages.

Dewey's scheme has only 10 main classes including General works (000); Philosophy (100); Religion (200); Social sciences (300); Language (400); Pure Science (500); Technology (600); Arts (700); Literature (800); History (900). The main classes are again sub-divided into ten sub-classes which are again sub-divided into ten sub-sections, and then decimally 1-9, indefinitely, if required.

The scheme uses many mnemonic devices in its sub-divisions, e.g. in geographical divisions, wherever they occur, the numbers representing areas (Europe 4; England 42; Germany 43; France 44; Asia 5; Africa 6; etc.) form a regular and familiar pattern of digits. Apart from its simplicity and good notation, the scheme also offers a convenient index. Dewey himself considered the relative index the most important feature of his scheme. "Relative", explains Sayers (1943: 129) "merely means that each subject which is indexed is shown in its relation to a larger subject (or class division) or after the entry word the phase of the subject is indicated." thus:

Railroad

accidents, public health

transportation

corporations, commerce

electric

engineering

elevated

locomotives

transportation

business

sociology

Sayers (1943: 122 ff.) attempts to trace the source of various features of Dewey's scheme. He recounts how Dewey studied intensively, for six months, all the classification schemes in vogue in his day, and 'received suggestions' from the classifications of Natale Battezzati (Nuovo sistema de catalogo bibliografio generale), W.T.Harris and Jacob Schwartz. According to Sayers, it is difficult to trace any likeness between the schemes of Dewey and Schwartz or the variant of Brunet proposed by Battezzati, but we can see that he copied most from Harris, an American philosopher and educationist, "who devised his invention and expansion of Bacon's intellectual chart in 1870 for the arrangement of his catalogue of the St. Louis Public School Library" (Sayers 1943: 122). Bacon's chart (1605) was based on the mental faculties of Memory (History), Imagination (Poesy) and Reason (Philosophy). Harris's outline was (1870): Science, Art, History, Miscellany. Sayers adds that "while Bacon and his successors determined the curious outline, the internal order is really that which subjects were studied in 1876 in a particular

college" (Sayers 1943: 123). That is, the grouping of the subjects by Dewey was dictated by practical convenience, and Sayers indeed records (1943: 123) that the classification was developed after three years application at Amherst College.

As for the decimal notation, Sayers notes that a decimal system has been applied as early as 1583 to library rooms and alcoves, such as the system devised by Lacroix du Maine for Henry II of France. This system, however, numbered the shelves decimally, not the books. The library contained 100 book cases, each of which would hold 100 volumes. In outline, the subject order is:

1 - 17 Religion

18 - 41 Arts and sciences

42 - 62 Concerning the human race

(Sayers 1943: 114)

Succeeding classes, similarly numbered, were Celebrated Soldiers; Works of God; Memories and Miscellany. The convenience of a decimal arrangement of books had been recognized, and Edward Edwards describes in the second volume of his Memoirs of Libraries (1859: 928) a publication by Shurtleff of Boston in 1856, called Decimal system for libraries. He declares "although I am wholly unable to discern the propriety of applying the new term 'Decimal System' to an account of manipulations and arrangements which have been well known in European libraries for scores of years" (Edwards 1859, vol. 2: 928) He does not, however, mention any of the "well-known" schemes and Sayers records (1943: 115) that, apart from du Maine, he has been unable to find any examples. Thus, after du Maine, nearly three centuries elapsed

before Shurtleff's book appeared. He, like du Maine, numbered decimally the shelves and not the books. Sayers concedes (1943: 130) that Dewey had no intention of providing a system "which should follow the categories of the scholar". His aim was purely practical, and he reports that Dewey himself described his system as a series of pigeon holes into which material might be fitted, even declaring that it mattered less in what pigeon hole a book was fitted than that all books on the same subject should be in the same pigeon hole, and that that pigeon hole should be indexed. Dewey regarded his system as one for classifying nine special libraries:

"The library is first divided into nine special libraries which are called Classes. The Classes are Philosophy, Theology, etc., and are numbered with the nine digits:

- 1 Philosophy
- 2 Theology
- 3 Sociology
- 4 Philology
- 5 Natural Science
- 6 Useful Arts
- 7 Fine Arts
- 8 Literature
- 9 History

"Thus Class 9 is the Library of History, Class 2, the Library of Theology. These special libraries or classes are then considered independently, and each one is separated again into nine special Divisions of the main subject. These divisions are again numbered from 1 to 9 as were the classes. Thus 59 is the 9th Division (Zoology) of the 5th Class (Natural Science):

50. Natural Science
51. Mathematics

- 52 Astronomy
- 53 Physics
- 54 Chemistry
- 55 Geology
- 56 Paleontology
- 57 Biology
- 58 Botany
- 59 Zoology

"A final division is then made by separating each of these divisions into nine Sections which are numbered the same way with the nine digits. Thus 513 is the 3rd Section (Geometry) of the 1st Division (Mathematics) of the 5th Class (Natural Science):

- 510 Mathematics
- 511 Arithmetic
- 512 Algebra
- 513 Geometry
- 514 Trigonometry
- 515 Descriptive Geometry
- 516 Analytic Geometry Quarternians
- 517 Calculus
- 518 [left blank for new subjects]
- 519 Probabilities

(Quoted from Dewey's earliest preface in Sayers 1943: 124-125).

The effect is thus that of nine special classifications combined. The order derives from Harris's inversion of Bacon's intellectual chart:

Bacon	Harris	Dewey
Memory (History)	Science	General Works
Natural	Philosophy	Philosophy
Civil	Religion	Religion
Imagination (Poesy)	Social & Poli-	Sociology
Narrative	tical Science	Philology

Dramatic	Natural Science	Science
Parabolic	& Useful Arts	Useful arts
Reason (Philsoophy)	Art	Fine arts
Divine	Fine art	Literature
Natural	Poetry	History
Human	Fiction	Geography
Theology	Literary miscellany	Biography
	History	
	Geography & travel	
	Civil history	
	Biography	
	Miscellany	

From this comes the inexplicable separation of Language from Literature and Social Science from History.

According to James Thompson (1977: 151) "it is curious to reflect a point which entirely escapes Sayers, viz. that these blemishes on the practical convenienc of the Dewey system arise entirely from this minor and uncharacteristic dalliance with a philosophical basis for a library classification." Sayers (1943: 131) is of the opinion that the great practical strengths of Dewey's scheme are that of hospitability, flexibility and a splendid notation, and the fact that constant attention is paid to revision. Edward Edwards said (1859, vol. 2: 810) for a good library classification, "the requisite qualities are not logical concatenation, subtle analysis, or striking analogy; but simplicity, clear definition and (as far as may be practicable) familiar and, time-honoured names", Dewey's scheme surely meets these criteria.

The Decimal Classification (DC) has made its way since its inception in 1876, when it was to the librarians of those days "the dawning of a new day" (Rider 1944: 31), through edition after edition, and has grown from 42 pages to 2692 pages in the 18th edition, "solely in answer to persistent professional demand". No other classification system has received the general acceptance that Dewey's has.

It is the opinion of Rider (1944: 36) that the D.C. has actually suffered from subsequent additions and excessive enthusiasm for it, and many expert classificationists did not realize that "because a certain amount of classification is a good thing, an infinitely larger amount of it is not necessarily better." He is also of the opinion that the widespread adoption of a "uniform, efficient, easily understood, and usually logical library classification" has meant much to a developing library world.

The D.C. became a sort of international bibliographical language, it made the teaching of classification in library schools simple, it made co-operative cataloguing ventures possible. Rider considers the essential quality of D.C. Dewey's basic classificational concept - which Dewey implied in his "memo" to the Amherst faculty: "a progressively, and infinitely more minute classification subordination, expressed by means of decimally placed nomenclative characters" (cited in Rider 1944: 37). The second classificational concept emphasized by Dewey was what he termed a "relative location" in contradiction to "fixed location" between book and shelf (Rider 1944: 36).

Through successive editions the D.C. elicited favourable and adverse criticism. With the 1st, 42-page edition, Dewey was accused of providing the scheme with too much detail of subdivision to be used in any but the largest libraries. Dewey, however, expanded his scheme until the 14th edition, published after his death, contained 1927 pages. A new revised edition is still being published approximately every eight years (Maltby 1978: 153). For example, the 18th edition was published in 1971 and the 19th in 1979.

The Standard edition (1951) indicated that at the time Dewey was being used in the U.S.A. by about 96% of public libraries, 89% of college and university libraries, and 64% of the special libraries (cited in Maltby 1978: 153).

In the late 1960s there was a move away from Dewey to the Library of Congress Classification in the U.S.A., mainly by large academic libraries, but, according to Maltby (1978: 153), this has lost some momentum lately.

A survey, conducted in 1975, in which 10% of the public libraries, 10% of the junior college libraries and 10% of the university libraries in the U.S.A. and Canada participated, revealed the fact that 85,4% of the total sample were using D.C. Of these libraries, however, only 37,7% in the U.S.A. and 27,8% in Canada contained 5000 000 volumes or more (Bakewell 1978: 14).

It was also found that different editions were being used by libraries, from the 18th back to three libraries using an earlier edition than the 8th. The report revealed that D.C. is still a

thriving scheme, but it "certainly does not please all librarians all of the time" (Bakewell 1978: 15).

A similar survey in Britain, done in 1972, showed that of 940 libraries returning questionnaires, 744 (i.e. 79%) used D.C. The editions used varied considerably, one even using the 5th. The British Library's Working Party on Classification and Indexing found that in 1973 approximately 47% of all libraries in Britain used D.C. (Bakewell 1978: 16). According to Bakewell (1978: 13) one reason for the popularity of D.C. in the English-speaking world is the inclusion of D.C. numbers on the printed catalogue cards, MARC tapes and bibliographies/catalogues issued by the Library of Congress and British Library Bibliographic Services Division.

In some libraries in Britain, D.C. has been adapted to suit their requirements. Bakewell describes some of these (1978). The University of Bradford adopted D.C. for some sections of its stock, after having used U.D.C. before, but retained U.D.C. for science and technology. The library of Bedford College (University of London) chose D.C. when they decided to reclassify because it came nearest to satisfying the five features suggested by the librarian as being desirable in the new classification (Bakewell 1978: 19):

- (a) It is reasonably up to date,
- (b) apart from the separation of language and literature, the order of the main subjects is acceptable,
- (c) the notation displays order clearly and is practical, memorable, easily expansible and adaptable,

- (d) it has a useful relative index, and
- (e) it is familiar to library staff and, through their use of public libraries, to the users.

Apart from these points D.C. also has in its favour the fact of its use in B.N.B. Here the D.C. schedules were also adapted to suit the library's particular requirements. All the libraries using D.C. discussed by Bakewell made some amendments to the scheme or part of the scheme to suit their purpose.

Other countries, except Britain, U.S.A. and Canada mentioned by Bakewell (1978: 34) as using D.C., are, inter alia, Denmark, Egypt, France, Iceland, India, Iran, Italy, Norway, Rhodesia, Singapore, South Africa, Tanzania, Turkey, Ethiopia, Ivory Coast, Malaysia and Sierra Leone. All French public libraries use it, as well as the Bibliothèque Nationale, and the French translation is used in Quebec. In addition to the full French translation, there are also authorized abridged editions in Icelandic, Indonesian, Japanese, Korean, Malay, Norwegian, Turkish and Vietnamese, and a selective abridgement in Hindi.

Batty mentions (1976: 305) that D.C. is used widely in Indian libraries in spite of Ranganathan's Colon Classification which is specially designed for Indian needs. There were also surveys in Australia in 1972 and New Zealand in 1973 (Batty 1976: 304-5) which showed that of 98 responding libraries in Australia, 87 were using Dewey including all public libraries and state cataloguing agencies; in New Zealand the survey showed that all public libraries were using D.C., but the overall percentage was much lower (54,51) than in Australia (88,77).

Although a few large libraries, such as the university libraries of Port Elizabeth and the Witwatersrand use L.C. classification, D.C. is used extensively in South Africa.

One of the reasons that many libraries throughout the English-speaking world use D.C. is the inclusion of D.C. numbers on L.C. MARC-tapes (Bakewell 1978: 13). But these numbers are not always compatible with the practice in the libraries using them, and thus numbers cannot always be used as they appear on the tapes, but must be adapted to the specific library's needs and practices. But nevertheless, D.C. is widely used and it seems as if this will be true in future.

3.1.2.2 Charles Ammi Cutter's Expansive Classification

The year 1891 saw the development of the Expansive Classification by Charles Ammi Cutter in America.

Its main classes are: Philosophy; History; Science and Art. It was, in Sayers' phrase, "of the inverted Baconian order" (1943: 93). Also according to Sayers (1943: 94), the name "expansive" is explained by the fact that the classification consisted of separate sets of tables, each covering the whole field of knowledge. The first table is very broad and suitable only for small collections; the second is sub-divided at greater length; the third at still greater, and so on, each scheme or set progressing in fullness, until the seventh, which, according to Cutter, "is full and minute enough for the British Museum, with a capacity of increase that would accommodate the B.M. raised to the tenth power" (cited in Sayers 1943: 94). The idea was that

while a library is still small, it can use the earlier schemes and expand to later schemes as the library grows. Sayers, however, maintains (1943: 94) that this cannot be accepted without reservation, so far as the notation is concerned, as the first scheme is:

- A Works of reference and general character
- B Philosophy, Religion
- E Historical sciences
- H Social sciences
- L Sciences and Arts, both Useful and Fine
- X Language
- Y Literature
- YF Fiction

which becomes in the 6th scheme:

- A General works
- B Philosophy
- BR Religion
- C Christianity
- D Historical sciences
- E Biography
- F History
- G Geography and travel
- H Social sciences
- I Demotics, Sociology
- J Civics
- K Legislation
- L Sciences and Arts
- M Natural history

- N Botany
- O Zoology
- R Useful arts, technology
- S Constructive arts
- T Fabricative arts
- U Art of war
- W Athletic and Recreative arts

Although the expansion of the classes is clear, it is also clear that if a library started with too early a scheme:

E Historical sciences

would become in the sixth scheme:

D Historical sciences

E Biography

F History

G Geography and travel

and this would mean re-marking most of the class and its divisions on the shelves. Thus, although the classification schedules expand one into another, the notation does not.

Cutter declared the order of the classes to be 'evolutionary', i.e. in the natural sciences, the parts of each subject appear "in the order which that theory assigns to their appearance in creation. Its science proceeds from the molecular to the molar, from number and space, through matter and force to matter and life; its botany going up from cryptograms to phanerograms; its zoology from protozoa to the primates, ending with anthropology" (cited in Sayers 1943: 95).

The notation is pure alphabetical, alphabetically divided while

form divisions have a numerical notation:

1. Theory of the subject
2. Bibliography of the subject
3. Biography of the subject
4. History of the subject
5. Dictionaries
6. Handbooks
7. Periodicals
8. Societies
9. Collections

Further numbers are also used in the Local List Classes: F - History and G - Geography, are sub-divided by a decimal number. F without a figure is Universal History; F01 to F07 are periods of Universal History and F11 to F99 are history of particular countries. The numbers are the same in History and Geography: F45 - History of England; G45 - Geography of England; F452 History of Norman period etc. The local numbers may be applied to any part of the system, thus Camping out in England: VDA45, where:

- V = Fine and recreative arts
- VD = Outdoor sports
- VDA = Camping out

Cutter died when the 7th Expansion was in progress, and though work was continued by experts under general editorship of his nephew, W.P.Cutter, it has not been maintained.

3.1.2.3 Library of Congress Classification

The beginning of the 20th century saw the inception of the L.C. classification scheme. This scheme has been described by everybody as an entirely practical one, devised from a comparison of existing schemes and taking into consideration the particular condition of the Library of Congress, the character of its collections and their probable use. Sayers comments (1943: 102): "The L.C. scheme has grown from actual work in a cataloguing room."

Just after Herbert Putnam became librarian of Congress in 1899, a new building became available at Washington to house the library. The opportunity was seized to introduce a new classification to suit the library. The system did not seek to follow a scientific order of subjects, but a convenient sequence of the various groups, "considering them as groups of books, not as groups of mere subjects" said Dr. Herbert Putnam (cited in Thompson 1977: 154). According to Thompson (1977: 154) and Sayers (1943: 100), Dr. Putnam described the function of a classifier in a library to be to arrange the books on the shelves in an orderly sequence, and declared that in a library which is to be used and grow, the arrangement is to be not only orderly but also systematic and expandable and must bring together books on the same subject, and within that subject books by the same author. It must also give alphabetic, or, under certain subjects, chronological sequence to authors. Further, it must designate each volume by a symbol which will identify its location and yet be hospitable to new subjects.

The L.C. scheme that developed is based on the three historic

first principles of library classification: that a library should be arranged in order; that the order should be of subject; and that the grouping by subject should be of practical convenience to the users of the library.

The classifiers in the Library of Congress, each a specialist in his subject, built up the scheme. The books were roughly divided into main classes, as History, Economics, Art, Music, Mathematics, etc. and distributed to the classifiers. Each specialist classifier first arranged his books in what "appeared to be their most practical groups" (Sayers 1943: 103). The most important factor here was the way in which people asked for books or made use of them. Then each group was divided into its component subjects as minutely as possible.

Each classifier did not, however, work his subject irrespective of the others. So, although the details were worked out separately by separate classifiers, there is a connection between all the parts of the scheme. The outline of the scheme was drawn up in 1901 and the entire classification has taken some forty years to reach approximate completion. The scheme was worked out according to a ground plan or outline "constructed mentally by the initiator of the scheme" (Sayers 1943: 103). Several schemes were examined, but, according to Sayers (1943: 104), Cutter's scheme had most direct influence, though "it is only in regard to a few suggestions that it is so" (Sayers 1943: 105). To some extent the order of the main classes was determined by Cutter, and he also suggested letters of the alphabet as the initial mark for main classes. The outline is as follows:

- A General works
- B Philosophy and Religion
- C History: Auxiliary sciences
- D History and topography
- E-F History: America
- G Geography, Anthropology, Sports
- H Social sciences
- J Political science
- K Law
- L Education
- M Music
- N Fine Arts
- P Language and literature
- Q Science, General
- R Medicine
- S Agriculture, plant and animal industry
- T Technology
- U Military Science
- V Naval Science
- Z Bibliography and Library Science

For sub-divisions, the notation used is normally a second letter of the alphabet, e.g.:

- R Medicine. General works
- RA State medicine
- RB Pathology
- RC Practice of medicine
- RD Surgery
- RE Ophthalmology

etc.

The letters I, O, W, X, Y, are not used in the main outline and there are some gaps left for insertions at the second letter stage. Further sub-divisions are obtained by the use of arabic numerals, read arithmetically, beginning at 1 in each of the main divisions, e.g.:

TC	Hydraulic engineering
TC353	Sea Locks
TC355	Docks
TC357	Piers, etc.
TC361	Dry-docks
TC363	Floating docks
TC365	Other special docks

The numbering is rarely continuous and even where there is little anticipation of further intercalation, some places are usually left open for future use. Where developments are expected, the numbering is wide open and usually there are substantial gaps between sections.

The general disposition of the main classes shows clearly the requirements of a library used by a legislature (Thompson 1977: 155) - the emphasis on historical, social and judicial sciences, on the country itself, on military and naval matters, and on agriculture.

Each class was published as a separate volume, the first (E-F : American history) in 1901 and the last (K : Law), in the 1970s. There is no general index to the scheme, each volume has a separate index, of the relative variety. Two general indexes were however published by other organisations (Bakewell 1978:

55). In 1974 the Canadian Library Association published An index to the Library of Congress Classification and in the same year the U.S. Historical Documents Institute published Combined indexes to the Library of Congress Classification schedules in 15 volumes.

Although this classification scheme was only intended for the Congress Library, it has also been used elsewhere with success, particularly in academic libraries. Revision is continuous and more drastic in character than that received by D.C. (Sayers 1967: 207). According to an investigation mentioned by Bakewell (1978: 55-6), L.C. is used by a majority of large U.S. academic and research libraries and some major public libraries, and the literature has revealed a trend towards the scheme in recent years. An analysis by Mowery (1975: 389-397) shows that in the period 1968-1971, 159 college and university libraries changed from D.C. to L.C. He quotes the following figures for the use of L.C. and D.C. in 1160 college and university libraries in 1967 and 1971:

	1967	1971
L.C.	40,8%	54,7%
D.C.	50,7%	37%

Among the advantages of using L.C., outlined by Phyllis Richmond (cited in Bakewell 1978: 57) are its ability to cope with vast areas of knowledge; its practical and functional nature; its use on L.C. cards and MARC tapes, and the quarterly L.C. additions and changes. Disadvantages are, inter alia, the lack of an instruction manual for its use, the lack of logical order and

the relative nature of the scheme. In Britain, surveys have shown that L.C. is a poor third to D.C. and U.D.C. (Bakewell 1978: 57).

3.1.2.4 Universal Decimal Classification

The outcome of an international conference held in Brussels in 1895 was the publication, in 1905, of the Universal Decimal Classification. This scheme, based on Dewey's Decimal Classification, was meant for a comprehensive classified index to published information (Thompson 1977: 156). The system was initiated by the International Institute of Bibliography (I.I.B.), now the International Federation of Documentation (F.I.D.). The originators of the I.I.B., Paul Otlet and Henri de la Fontaine, became the secretaries of the project.

The Dewey system was taken as a whole and examined critically by a number of specialists who amended, while preserving the general order and character, the original Dewey system. Two kinds of numbers have been employed:

1. The simple decimal numbers of D.C., which form the notation of the main tables, and
2. compound numbers, consisting of the main table numbers combined with other main table numbers and, where desirable, with signs from the auxiliary tables provided

(Sayers 1967: 183 ff.).

The scheme has a powerful synthetic apparatus in a series of auxiliary tables, which may be regarded as a development of the D.C. standard sub-divisions and area tables. The auxiliary

tables are supported by a series of signs, which may be called facet indicators:

<u>Symbol</u>	<u>Significance</u>
+	two topics
/	several consecutive topics
:	relationship between two subject fields
[]	similar to the colon
=	language in which a document appears
(o)	form sub-divisions
(1/9)	place sub-divisions
(=)	sub-division denoting race
" "	time sub-division
.oo	points of view
-	(
.o	(special analytic sub-divisions
	(

Some examples using these facet indicators or signs are:

53	Physics
53(03)	Dictionary of Physics
385	Railways
385(4)	European railways
62	Engineering
62"18"	19th century engineering
62"18"(05)	a periodical on 19th century engineering
62(05)"18"	a periodical on engineering published in the 19th century
31	Statistics

63	Agriculture
31:63	Agricultural statistics
622	Mining
622=2	on mining, written in English

One basic difference between D.C. and U.D.C. discernible from the above examples, is the fact that while in U.D.C. a notation can consist of only two numbers, e.g. 62 engineering, in D.C. it must always be at least three digits: 620 engineering.

A second edition of the scheme was published in four volumes in 1927-33. The scheme has come to be widely used, particularly because of its ability for depth classification, in special libraries. It was also found that U.D.C., being language independent, thus facilitating international exchange of information and lending itself to mechanization, is chosen by some institutions for use in computers. This use has been reported in countries like the Netherlands, Denmark, U.S.A. and Canada (Bakewell 1978: 47-8).

A U.D.C. project mentioned by Bakewell (1978: 48) in the United States, is the Freeman/Altherton investigations for the American Institute of Physics. The practical results of this project have included the development of a machine-readable file of U.D.C. schedules, for mechanised U.D.C. file maintenance, automatic typesetting and composition of U.D.C. schedules, keyboarding U.D.C. schedules and the statistical evaluation of U.D.C. as a retrieval tool. Claimed to be the first on-line interactive retrieval system to use one of the traditional classification

schemes was Project AUDACIOUS (Automatic Direct Access to Information with On-line U.D.C. System). It is an experimental system for remote direct access to files of computer-stored information consisting of 2330 items from one issue of Nuclear Science Abstracts indexed by U.D.C.

Major advantages of U.D.C. are its flexibility, hierarchical notation, specificity, and the fact that it lends itself to mechanization, which is today a very real point in its favour. Disadvantages are its complex notation and the problem of filing order associated with the auxiliary signs and symbols. Doubts have also been expressed about its future, partly because of its slow revision process and its dependence on an outdated structure as originally set forth in D.C. (Bakewell 1978: 51).

3.1.2.5 James Duff Brown - Subject Classification

Of the three classification schemes of James Duff Brown, the first was the Quinn-Brown system, devised in 1895 for smaller libraries only, in collaboration with John Henry Quinn, librarian of Chelsea (Thompson 1977: 153). In 1898 this became the Adjustable Classification, published in his Manual of Library Classification. This scheme was, according to Sayers (1943: 146) one of Brown's many contributions to open-access libraries. Both these schemes were too rigid for fast growing libraries, and in 1906 Brown published his Subject Classification, which had been adopted in many British libraries. The 3rd edition, revised by James Douglas Stewart appeared in 1939. Sayers (1943: 146) considers this system as perhaps the best achievement in England of the classificatory art for library use. "It is simple,

expansible and complete; and its outline is the most attractive of all classifications that exist."

This was Sayers' opinion in 1943. The theory that lay at the basis of the system was that every form of knowledge can be traced to a root class or principle from which it develops. Thus each technology is linked with the pure science on which it is based, and there is no class for Useful arts, the idea being that each theory is immediately followed in the classified sequence by the appropriate application.

This principle is endorsed by Bliss (1939: 280) and is considered extremely useful if not carried to extremes, by Sayers (1967: 169). "But they were carried to extremes by Mr. Brown" claims Bliss (1939: 280). This produced results such as Sound leading up to Music, and thus the whole literature of Music - history, theory, technology - is thrust between branches of Physical science, and followed by Astronomy. Similarly the subject of Time is followed by Clock and watch-making; Physiography leads to Meteorology, then to Storms, then to Pneumatic drills, Aerial Engineering and Aeroplanes.

Another principle of the S.C. is its purpose to provide a 'one-place' classification; Brown ignored the purpose for which books are written, the fact that a subject or object may be discussed from various viewpoints. He selects certain concrete topics and groups material around them, disregarding the emphasis or viewpoint from which the 'concrete' is regarded in the books; e.g. books on the human heart are all together at one place,

whether it is treated from an anatomical, pathological, physiological or therapeutic viewpoint; all books on money are together, be they about numismatics, economics or business.

A third principle is that practical use has been considered all through the scheme, and, according to Brown, "it has been sought to obtain this by dispensing with conventions, distinctions, and groupings, which are arbitrary rather than scientific" (cited in Bliss 1939: 280).

All these sound principles, however, were carried to "extremes that are neither practical nor scientific and which will prove very inconvenient" (Bliss 1939: 281).

Another feature of the S.C. is that it endeavours to follow "an approximate sequence of scientific development in its main outline" (Sayers 1967: 170). This sequence was assumed to be: Matter and Force, giving rise to Life, which produced Mind, which made its Record. The main classes and basic notation are (Sayers 1967: 166):

A	Generalia
<u>Matter and Force</u>	
B-D	Physical science
<u>Life</u>	
E-F	Biological science
G-H	Ethnology, Medicine
I	Economic Biology, Domestic arts

Mind

J-K	Philosophy and Religion
L	Social and Political science

Record

M	Language and Literature
N	Literary forms. Fiction, Poetry
O-W	History and Geography
X	Biography

The notation is of a mixed kind, the main classes indicated by letters, the sub-divisions by numbers. The following examples are of a specimen class and a division with its sub-divisions:

A	Generalia
A0	Generalia
A1	Education
A3	Logic
A4	Mathematics
A5	Geometry
A6	Graphic and Plastic Arts
A9	General Science
A500	Geometry
A501	Euclidian geometry
A502	Modern geometry (non-Euclidian)
A503	Fourth dimension
A504	Analytic geometry
A505	Plane geometry
A506	Solid (Volumetric) geometry

A507	Curvilinear geometry
A508	Quadrature
A509	Conic sections
A510	Descriptive geometry
A511	Projection
A512	Perspective

etc.

The Generalia class differs from that in other schemes in that it includes Logic, Mathematics, and the Plastic Arts "on the very debatable ground that they are pervasive of all other classes of knowledge" (Sayers 1943: 148).

Vacancies are left in the notation for new topics, but the figures may also be sub-divided decimally. Form divisions are obtained by the categorical tables. They are numbers which are added, after a point, to any part of the notation. In the 3rd edition there are 980 of them. A specimen is:

.1	Bibliography
.2	Encyclopaedias, dictionaries
.10	History
.61	Recipes
.63	Patents
.67	Lectures

etc.

For geographical divisions, Brown adds the number from the History and Geography class directly to the number. Thus, if we, for example, wish to classify a book on the Botany of Berlin,

we take the class mark E172 - local Floras - and add to it the number for Berlin S725. To this a categorical number can be added, so, if we have a history of the flora of Berlin:

E172S725.10.

The notation permits synthesis to a high degree, which can be achieved in three main ways: linking subject numbers; using geographical division, and employing the categorical numbers. There is also a Date Table of lower case letters.

One question arising from this synthetic apparatus is that of filing sequence. Should A750.41, for example, be filed before A750T800? According to Sayers (1967: 175) the answer is that a class mark followed by a categorical number is filed before the same class mark followed by a geographical number. The scheme is easy to apply, claims Sayers (1967: 175), especially in comparison with many of its rivals, "although the results which it gives will often be far from satisfactory." The notation is also not very mnemonic.

The index to the scheme is a specific one, giving one place for each topic. Sayers notes (1967: 167) that the S.C. has only been applied in British public libraries, all medium-sized or small, but that many of them have since changed to D.C. (1967: 176). He gives as one of the reasons for the lack of support for S.C. the fact that Brown's personal theories sometimes lead to unhelpful groupings, and another, very important reason, the lack of revision policy. A modern edition was prepared by Stewart, but was never published, and after Stewart's death in 1965 it is very doubtful if a new edition will ever materialise.

3.1.2.6 Henry Evelyn Bliss - Bibliographic Classification

Henry Evelyn Bliss devoted a large part of his life to the study of classification, but his scheme, the Bibliographic Classification was not published until 1953, two years before his death. Before his scheme was published, however, he published several articles and books on classification, all of which pointed to a new scheme that he must have had in mind.

His book The organization of knowledge and the system of the sciences, published in 1929, was a philosophical examination of library classification. This book was the result of his study of all methods of organization - in nature, society and in intellectual occupations. It examines the ideas of philosophers and scholars in arranging subject fields and the underlying structure of the universe of knowledge.

John Dewey says in his introduction to the book:

"The reader learns to understand as he follows the thought of Mr. Bliss, that a library is not a mere depository of books, and that a merely arbitrary classification does not satisfy even the practical needs. A classification of books to be effective on the practical side must correspond to the relationship of subject matters, and this correspondence can be secured only as the intellectual, or conceptual, organization is based upon the order inherent in the fields of knowledge, which in turn mirrors the order of nature. The library serves a practical end, but it serves its best when practical tools and instrumentalities agree with the intrinsic logic of subjects, which corresponds to natural realities. The right organization of knowledge in libraries embodies,

moreover, a record of attained unification of knowledge and experience, while it also provides an indispensable means to the development of further knowledge." (Bliss 1929: viii)

In 1935 Bliss published his scheme under the title A System of bibliographic classification. The 2nd edition appeared in 1936 and the full version appeared in four volumes in 1940-53. A second edition of this version, under the aegis of the Bliss Classification Association, was due to appear in 1975, but it appeared finally in parts from 1977 onwards, and in the beginning of 1978, those already published were: J - Education, P - Religion; Q - Applied Science; and the general introduction. Other classes, such as Psychology, Anthropology and Health Sciences, were nearly ready and the scheme should be completed, with index, by the early 1980s (Maltby 1978: 219).

The original principles and features of B.C. have been maintained - these are to "seek out and reflect the consensus of expert opinion in all areas; to collocate related subjects, and to subordinate each special topic very carefully to the appropriate general one; to provide alternatives in cases where consensus is difficult to determine; and to employ a concise notation" (Sayers 1975: 208).

The four main divisions of Bliss are Philosophy; Science; History; Technologies and Arts. These he divides into appropriate classes, placing side by side those classes which are most like in subject matter, or interest. His sequence begins with Philosophy, develops into Science, Social Sciences, History, Geography, Religion, Politics, Law, Economics, Technology, Fine arts, Language, Literature, Biography.

The notation is alphabetical. He used non-hierarchical notation when brevity and hospitality could be gained and also sacrificed detail when necessary in the interests of notational economy.

Examples of main classes are:

- A Philosophy, General Science, Logic and Mathematics
- B Physics
- C Chemistry, including chemical technology
- D Astronomy, Geology, Geography, and Natural History (Geography comprises only the General and Physical)
- E Biology, including Paleontology
- F Botany
- G Zoology
- H Anthropology, General and Physical, including Medical Sciences
- I Psychology
- J Education
- K Social Sciences
- L History, Social, Political and Economic, including Geography
- M Europe
- N America
- O Australia, East Indies, Asia, Africa, and Islands. Geography, Ethnography and History
- P Religion
- Q Applied Sciences and Ethics
- R Political Science, Philosophy and Ethics, and Practical Politics
- S Jurisprudence and Law
- T Economics
- U Arts: Useful and Industrial

- V Fine arts, Indoor recreation
- W Philology - languages other than Indo-European
- X Indo-European languages and literature
- Y English language and literature
- Z Bibliography and libraries

B.C. is basically an enumerative scheme. Synthesis is provided by systematic schedules, many of which have sub-schedules for more detailed expansion. Symbols from the schedules are added to the symbols denoting the subject of the book, and they can be added without confusion at any stage of sub-division by topic. All are mnemonic and consistent throughout their field of use. Schedule 1, for example, is for numerical sub-division (1-9) for form:

- 1 reference books
- 2 bibliography
- 3 history
- 4 biography
- 5 documents
- 6 periodicals
- 7 miscellanies
- 8 study of the subject
- 9 antiquated or superceded books

Schedule 2 is for geographical sub-division and uses lower case letters, e.g. e = England, i = Italy.

Schedules 3 and 4 are for sub-division by languages and historical periods respectively. They contain sub-divisions represented by capital letters, and are differentiated from the main notation by means of a comma. Schedule 5 is for sub-divisions of the philology of any language and its sub-schedules 5a, 5b and 5c are all

restricted in application to classes W-Y. Schedule 6 is for expansion under a particular author and schedule 7 for dealing with any personage. Schedules 8-22 are limited in scope to single classes or to sub-classes.

The index is a relative one and includes the names of persons and places.

According to Maltby (1978: 215) B.C. is used by about 70 libraries in Great Britain, and its popularity is confined to academic and special libraries, and institutes of education - which Maltby does not find surprising, as education was a discipline that specially interested Bliss. Class J - Education, is generally acknowledged as the best in the scheme. Bakewell (1978: 81) mentions the National Foundation for Educational Research (NFER) as a user of B.C. They adopted the system in the 1950s because of its suitability for education. NFER has, as the other users of B.C. have done, made a number of amendments to the original B.C., mostly expanding classes which do not allow specific enough classification. The University of Lancaster adopted B.C. for a number of reasons: Its flexibility, with many alternatives, attracted them in view of the interdisciplinary nature of many proposed courses at the university. They, too, had to make amendments to the original B.C., due partly to academic pressures, partly to the special needs of the library. Other libraries using B.C. discussed by Bakewell (1978: 86 ff.) are the library of the Zoological Society of London and the Tavistock Joint Library in London. In connection with the future of B.C., Bakewell (1978: 91) names various libraries which have been using

B.C. and rejected it in favour of D.C. or L.C. Reasons given are inter alia the failure of the scheme to keep up with modern developments; the fact that no cataloguing service includes B.C. on its records; the fact that many other libraries changed from B.C. to another scheme, including Bliss's own, the New York City College library. Bakewell is of the opinion that it remains to be seen whether the revised edition of B.C. has come, like the first edition, "too late to challenge the big three of classification (D.C., L.C., U.D.C.), especially as two of these are included on MARC tapes and there seems little prospect of B.C. being granted this accolade" (Bakewell 1978: 92).

3.1.2.7 S.R.Ranganathan - Colon Classification

The 20th century also witnessed the appearance of S.R.Ranganathan's Colon Classification.

When he was appointed, without prior library experience, librarian of Madras University Library in 1924, Ranganathan was sent to England to study methods at the British Museum. At the suggestion of the Director of the B.M. he studied librarianship at the University of London School of Librarianship and found that the only subjects that really interested him were library administration and classification.

He devised and developed the Colon Classification Scheme in the 1920s and it was first published in 1933. The 6th edition was published in 1960 and the 7th is in preparation (Maltby 1978: 241).

The Colon Classification is completely different from any previous scheme in that it is not an enumerative scheme, with each subject

developed from its broad outline to its most specific points and with a notation for every subject so listed. Apart from the enumeration of broad conventional subject areas which can be submitted to facet analysis, the C.C. is an entirely synthetic scheme, recognising that most topics are compound and can best be specified by linking the different elements. Elements (called isolates by Ranganathan) are arranged systematically as foci within categories or facets, each category consisting of concepts produced by a single characteristic of division. Batty (1966: [iii]) explains the underlying theory of C.C. thus:

"Almost all library classifications were constructed according to a conventional pattern of classes divided into subclasses each of which was further divided, and the printed classification scheme was virtually the sole authority for the assignment of class numbers of books. If a topic was not named specifically in the scheme, the librarian was compelled to find the nearest approximate place, so that the accuracy and helpfulness of class numbers depended on how recently the scheme had been revised, how wide and how deep was the knowledge of the inventor, and how closely the range and level of the library matched the preconceptions on which the scheme was based Dr. Ranganathan saw how the principle of 'synthesis' of joining different terms together, could produce a far more useful and supple scheme than the old principle of identifying the required items in a hierarchy of systematic sub-divisions. He separated not only the general aspects that might occur with any specific subject, but also different aspects within the specific subjects themselves, and in doing so recognized that even among quite different specific subjects were different kinds of aspects that were repeated over and over again and could thus form the basis of a 'synthetic' scheme."

In C.C., classification marks are constructed by combining isolates or foci from the various facets in the order prescribed in the scheme. Punctuation marks are used to link the foci from different categories together. Within each area facet analysis must take place before a compound topic can be classified. The classifier selects the appropriate main class and analyses a compound subject into its facets. Then he assembles the foci concerned from these facets and builds up a class number by linking all the appropriate foci together, using the facet-symbols. All facets are seen as manifestations of five fundamental categories: Personality, Matter, Energy, Space and Time, in that order (usually written as P M E S T). An example where all five categories can be found is "The cataloguing of manuscripts in monastic libraries in Great Britain during the Middle Ages, where:

Monastic libraries	-	P
Manuscripts	-	M
Cataloguing	-	E
Great Britain	-	S
Middle Ages	-	T

In a complete class mark the facets which are present can be picked out since each is introduced by a distinctive punctuation mark:

Personality	,	(comma)
Matter	;	(semi-colon)
Energy	:	(colon)
Space	.	(full-stop)
Time	'	(apostrophe)

Thus 'Monetary Economics in the U.S.A. during the 1960s will have the class mark:

X,	61.	73'	N6
Main class	[P]	[S]	[T]

Many subjects, however, need more than five facets to describe them, and Ranganathan catered for such examples by introducing the concept of "Rounds and Levels". If, for example, two foci relating to personality are required before introducing Energy, it is said that there is more than one Level of Personality. Thus, it can be said of a compound term denoting entity within a fundamental category, which can be analysed into more than one term of the same category, that it shows more than one Level of that category. For example, in Agriculture there are two basic facets, the P facet (crops) and the E facet (cultivation and problems). But crops can be divided according to different characteristics, e.g. according to use (for food, fodder, stimulants, etc.), according to part mainly used (root crops, grain crops, etc.) as well as individual crop (wheat, maize, peanuts, etc.)

These are all compositions within the P facet and are "Levels" of Personality. "Rounds" are expressions of the same fundamental category separated by another category, e.g. "X-ray therapy of tuberculosis of the lungs". Here "lungs" represents the Personality concept in the first Round, and "X-rays" is P. in the second round, following the application of energy: "Therapeutics".

The probable facet formula for fairly complicated subjects in any class is shown at the head of that class in C.C. For example, in class W, Political Science, appears the formula: W(P), (P₂): (E)

(2P). This means that after W, we may have a number from the P facet, then a second Level of P, then Energy and then a second round of P.

Although the consensus of opinion is that PMEST is a useful order, Maltby (1978: 63) points out that it is not always the best, and mentions some problems:

1. It is doubtful whether the categories P.M.E.S.T. cover all concepts.
2. The order P.M.E.S.T. is not always the best citation order. We have seen in the Colon Classification that Ranganathan also had to find a way of extending the scope and effect of the PMEST sequence by his concept of "Rounds" and "Levels".
3. The definition of Personality gives rise to problems. Some concepts appear in Personality in one class and in Matter in another. Ranganathan's contention is that P is the most concrete concept and S and T the most abstract, but mostly it is most difficult to define P, and always easy to define S and T.

Another problem in classification distinguished by Ranganathan in his Colon Classification, is that of complex or multi-phased works. These are works which deal with the inter-relationship between two subject fields. Sayers defines a phase as "the portion of a complex subject which has been derived from any one class (1967: 58). Thus "Teaching methods in the primary school" is single-phased, both foci - teaching methods and primary schools - coming from the same main class, Education, while "The influence of the Bible on English Literature" has two phases, from the classes Theology and Literature.

Where facets are closely related to the subject, being part of the primary subject, phases are loosely assembled and can easily be separated from one another. The interaction of two normally distinct subjects is called a phase relation. Ranganathan identified various phase relations:

1. The bias phase is when a book on a particular subject is written with a bias towards the needs of readers in another subject field, e.g. "Psychology for nurses".
2. The influence phase where one subject field has been influenced by another, e.g. "The influence of the Puritans on the growth of Capitalism".
3. The tool phase where a subject is used as method to examine another, e.g. "The use of statistics in the study of demography".
4. The comparison phase, e.g. "A comparison between natural and political sciences".
5. The difference phase, e.g. "The difference between philosophical and religious notions of evil".

In the introduction to the 6th edition of C.C. the problem is clearly defined and dealt with. Each book must be classed by the symbols denoting the facets in its primary phase, then the secondary phase can be introduced by means of an assigned lower case letter preceded by an ampersand, which indicates a change of phase. Up to the 6th edition, this symbol indicating a change of phase was a zero. Thus Educational Psychology will be:

S = Psychology
& = indicating change of phase

b = "bias relation"

T = Education

S & b T

Other tools in C.C. are known as Devices. They include Classic Device (CID), Chronological Device (C D), Geographical Device (GD) and an important Subject Device (SD) which is always bracketed (Maltby 1978: 197). Here a notation is borrowed for an isolate in one class to specify the same isolate in another class, e.g. in class Q, Hebrew Religion is specified by 5 in the Personality facet. To classify "The society of the Jews with special reference to marriage customs", it must go in class Y, where Y,73 is sociology of ethnological groups, the groups being specified by (SD). Marriage is specified by 317 in the Matter/Property isolates, thus the class mark is Y,73(G5); 317.

All this apparatus of facet or phase analysis and the use of devices, says Maltby (1978: 197) "is woven into a complex yet extremely logical and comprehensive unity to form the schedules of C.C."

The notation of C.C. is extremely mixed. It uses numbers, letters, brackets, Greek symbols and punctuation marks. It is hospitable to new topics, expressive of the structure of the scheme and clearly shows each change of facet and phase. It is entirely synthetic and the only general scheme "which recognises the need for the breaking down of subjects into their constituent parts, the listing of each of these parts once and for all by the classificationist in its appropriate category, and the provision of rules for the fitting together of the parts from the various

facets" (Maltby 1978: 199). Because the scheme is entirely synthetic, and each isolate is always represented by the same symbol whenever it is used, it has a tremendous mnemonic value.

The outline of the major subject fields is (Sayers 1967: 228):

- z Generalia
- 1 Universe of knowledge
- 2 Library Science
- 3 Book Science
- 4 Journalism
- A Natural sciences
- B Mathematics
- C Physics
- D Engineering
- E Chemistry
- F Technology
- G Biology
- H Geology
- HZ Mining
- I Botany
- J Agriculture
- K Zoology
- KZ Animal husbandry
- L Medicine
- LZ Pharmacology
- M Useful arts
- △ Spiritual experience and mysticism
- N Fine arts
- O Literature

P	Linguistics
Q	Religion
R	Philosophy
S	Psychology
Σ	Social sciences
T	Education
U	Geography
V	History
W	Political science
X	Economics
Y	Sociology
Z	Law

A list of anteriorising common isolates is common to form divisions of other traditional schemes. The symbols are applicable before the space facet. They are, e.g.

a - Bibliography	c - concordance
d - Table	e - formula
f - Atlas	k - cyclopaedia
m - periodical	v - history
w - biography	

Common space isolates are, e.g.:

4	Asia
5	Europe
53	France
561	England
56121	Surrey
562	Wales

Common time isolates:

- L 1700 - 1799 A.D.
- M 1800 - 1899 A.D.
- N 1900 - 1909 A.D.

Symbols used to link phases of complex subjects are:

- a general phase relationship
- b bias phase
- c comparison phase
- d difference phase
- g influence phase

Ranganathan's scheme as such has had very limited success.

According to Copinath (1972, in Maltby: 81), C.C. is used in a variety of libraries in India - public, school, college, university and special libraries. But outside of India, the C.C. is used in only a few libraries. Bakewell (1978: 95) mentions that it is not thought to be used in American libraries and in Great Britain only by Christ's College, University of Cambridge, and Metal Box, Limited, London. At Christ's College are housed several important Oriental collections.

According to Maltby (1978: 201) the scheme has, like Bliss's B.C., suffered from the fact that it arrived in the world of librarianship at a time when most general collections were committed firmly to earlier systems. Revised editions appeared regularly, but radical changes make things difficult for libraries which have adopted an early edition. (Maltby 1978: 202) points out, for example, that Christ's College uses the 4th edition and makes no attempt to recognise ideas introduced

in later versions unless it can be done without undue difficulty. Until the 4th edition, all facets were introduced by a colon, and phases by a zero. To change this can involve a great deal of alteration to catalogue records and the spines of books. As well as those problems, Maltby (1978: 204) mentions that critics of C.C. draw attention to the difficulty of the terminology, the uneven development in classes, the emphasis on the East and on Indian library requirements.

Even if C.C. is not used in the West, it, and particularly the analytico-synthetic methods associated with it, have influenced recent classification study greatly. Maltby (1978: 205) states that if we ignore the prejudice of some writers against the scheme and review it objectively we find that "it has given enormous impetus to classificatory research and that the methods expounded, or some of them, may prove to be of great seminal consequence and possibly more important than the scheme itself." It has also in its detail influenced and can continue to influence classification for mechanised retrieval systems. Copinath (1972, in Maltby: 82) mentions that the Documentation Research and Training Centre in Bangalore has developed a Program Package which includes programmes for synthesizing component numbers to form class numbers using C.C. schedules. And Maltby says (1978: 326): "Ranganathan's work seems on reflection to have been an unconscious anticipation of what future technology would make possible for classification."

3.1.3 The subject catalogue

Most libraries have, in addition to reference works such as bibliographies, also a catalogue of their own collection. The objec-

tives of a subject catalogue are: to show what a library has on any given subject, to enable a user to find a book of which the subject is known to him but not the author or title, to allow the user to trace books on subjects related to his subject and also on different aspects of his subject. The growth of science and technology has emphasized the importance of the subject approach to material in the library, because in those subject fields, authorship is of slight importance compared with the subject content. There are three traditional types of subject catalogues:

1. The alphabetical subject catalogue
2. The dictionary catalogue
3. The classified subject catalogue.

In the case of alphabetical subject and dictionary catalogues, headings are assigned to every document, indicating the subject content of the book. These headings are called subject headings. If entries with subject headings are arranged in one alphabetical file separate from entries for authors and titles of the books, it is called an alphabetical subject catalogue and if the subject entries are filed in one alphabetical sequence together with author and title entries to result in one single catalogue, it is called a dictionary catalogue.

3.1.3.1 Alphabetical subject and dictionary catalogues

A book can only be classed in one place in the classification schedule. Most books treat compound subjects, in which case the classifier must decide on one subject and assign the class number for that subject to the book. That will also be the

place of the book on the shelves. In the catalogue, however, provision must be made for users to find the book if they search for the other subjects treated in the book.

Early catalogues sometimes made 'catchword' entries for anonymous books, e.g. for the book "Guide to insects", a catalogue entry would be made under "Insects, Guide to" and then, a book with the title "Handbook of entomology" would be entered under "Entomology, Handbook of". Thus, though both books deal with the same subject, in the catalogue their entries would be separated. Two British public libraries, asserts Bakewell (1972: 71), viz. Birmingham in 1869 and Liverpool in 1872, showed transition from 'catchword' entries to true subject entries. The most important development of this trend was, however, the publication of Charles Ammi Cutter's Rules for a Dictionary Catalogue in 1876. Of this publication, Coates states (1960: 31): "In about twenty five pages of rules and comments Cutter virtually laid the foundations of subject cataloguing for the next three quarters of a century." Cutter was the first person who made it clear that the title alone should not be the guide for subject entries: "Enter books under the word which best expresses their subject whether it appears in the title or not", says rule 172 (cited in Bakewell 1972: 71).

Alphabetical subject arrangement has the advantages of: simplicity - everybody knows the alphabet and is used to telephone directories, etc. - ; a more direct access to information, i.e. access to each subject is directly by means of the words in a natural language; new subjects can be introduced at any time when needed; and the possibility of consolidating author, title and subject entries

into one alphabetical sequence. On the other hand, the alphabetical approach scatters related subjects throughout the catalogue, depending on their place in the alphabet; it is difficult to decide how specific the terms used should be; and there is the problem of the tremendous variety of terms. The first problem is that of synonyms. For example, suppose a user wants material on movement to and fro. Authors can discuss this concept under many names: vibration, undulation, pulsation, swing, beat, oscillation, etc. If in every entry the author's own word is used, with no link between the different words, the searcher will miss all the entries except the one he looks under.

Whereas a natural language uses synonyms as alternatives on different occasions, and the same subject may be referred to in different terms by various people, in alphabetical subject classification one term must be chosen for all future entries of the subject. To solve the problem of users looking under a term not used, see references are made from the terms not used to the one used. Alternative but non-synonymic terms which are also used as entries, are linked by see also references. Such references would be made to terms on the same hierarchical level, from a term to its subordinate terms, and sometimes from a term to its containing form.

Another problem in natural language subject classification can be homonyms, which differ in meaning when they are used in different contexts with different referents, e.g. "tire", which can mean weary, or the rubber wheel of an automobile, and here a qualifying additional term may be needed. There are also the problems of singular and plural and compound terms. It is thus

clear that in alphabetical subject classification there must be control of terminology, and rules according to which subject headings should be chosen.

When Cutter's rules for constructing subject headings came into being, some of the problems of alphabetical subject classification were solved, but he was "handicapped by his acceptance of natural language as the only possible kind of terminology. For Cutter, subject names existed only insofar as they were generally accepted and used by educated people" (Foskett, D.J. 1972 in Batten: 102). Cutter is still being used in a few libraries. A survey undertaken by Mowery (1976: 154) showed that of 67 American, Canadian and British libraries who were past users of Cutter's Rules, 12 continued to use it.

In 1914 appeared the first edition of Subject Headings Used in the Dictionary Catalog of the Library of Congress (LCSH). The 7th edition was published in 1966, and it has quarterly supplements, cumulating annually, from January 1966. This list, claims Bakewell (1972: 77) is the most comprehensive list of subject headings in existence, and it is widely used in larger libraries. It gives approved subject headings and indicates headings to which see and see also references may be made.

Sears' List of subject headings was first published in 1923 under the title List of subject headings for small Libraries in response, says Wynar (1967: 252), to numerous requests for a list of subject headings less comprehensive than those issued by the Library of Congress. It is, observes Bakewell (1972: 78), a simplified version of the Library of Congress list. The 11th

edition appeared in 1978. It follows the L.C.S.H. form headings with modifications to meet the needs of smaller collections. Despite its American origin, claims A.C.Foskett (1977: 378), Sears is probably more widely used proportionately in British libraries than in American, where L.C.S.H. is more popular. It is doubtful, however, if it would be able to "carry the burden of an intensive exploitation of today's literature" (Foskett, A.C. 1977: 378).

There are many other lists, mostly specialized, of subject headings, but none as well known as L.C.S.H. or Sears'. Bakewell (1972: 80) mentions some, such as Subject Headings for Children's Material by Eloise Rue and Effie Laplante, published in 1952, and Aviation Subject Headings and Classification Guide, 1966.

A disadvantage of using lists of subject headings is, according to Needham (1964: 142), that they, like enumerative classification schemes, try to list every subject and combination of subjects likely to be needed by a cataloguer and are out of date as soon as they are published. It is more satisfactory to have an approved method for establishing subject headings. Coates (1960: 39) discusses three attempts made after Cutter to "get to closer grips with the problem of the relative significance of the various components of a compound subject." The first was that of J. Kaiser, whose approach was "essentially concerned with the extraction of detailed pieces of information from a heterogeneous collection of documents" (Coates 1960: 30). Kaiser emphasized that subject indexing policy must be entirely guided by the purpose for which the collection of documents was made. In his Systematic Indexing

published in 1911, he lays down the rule that all subjects should be broken down into what he called a Concrete, followed by a Process. Concretes include things, places, and abstract terms not denoting actions or processes. Thus a work on "Painting" could be entered under

PAINT - Application

but a work on "Painting of boats" would be entered under

BOATS - Painting

Thus a Concrete will always be the entry word, and if a place is involved, a double entry is made, once under concrete and once under place. Locality is entered under country sub-divided by the locality. Thus "Steel production in Sheffield" would be entered:

STEEL - Great Britain, Sheffield - Production

and

GREAT BRITAIN - Sheffield - Steel - Production.

Concretes are linked by a network of cross references. When concretes are specified by more than one word, e.g. "aluminium windows", Kaiser uses natural language order.

Although Kaiser did not solve all the problems of subject cataloguing, his contribution has been of great importance and his solution for compound subjects, viz. to divide all terms in the two classes of Concrete and Process, is still a fundamental theorem in subject cataloguing (Coates 1960: 41).

Another attempt was that of S.R.Ranganathan, who tried to fit all terms into a "set of categories in order of importance" (Coates 1960: 41). He used the structure derived from these

categories or "facets" as the basis for the order of component terms both in dictionary catalogue subject headings and in classified catalogue subject index entries. He used the same five categories as in his Colon Classification, viz. Personality, Matter, Energy, Space, Time (P.M.E.S.T.), as a basis for construction of compound headings for a dictionary catalogue. The order for this purpose is broadly: Energy, Matter, Personality, Space, Time, but energy can, in the form of a main class caption occur after P, and S, or Locality becomes the P in certain main classes. The extended facet formula for dictionary catalogue subject headings is (Coates 1960: 44):

E M P E (main class heading) S T

A simple example of how the technique works is: "The harvesting of grapes". In the classification notation this subject is represented by a combination of two symbols, meaning 'harvesting' and 'grapes'. According to the facet formula for class number construction, the symbols are arranged in the order:

Grapes (P) Harvesting (E)

The facet formula for dictionary catalogue subject heading construction gives the heading

HARVESTING, Grapes (E P)

There can be little doubt, claims Coates (1960: 45), that Ranganathan's five categories of terms are a useful improvement on Kaiser's two. The basis of both Kaiser and Ranganathan is the classification of isolated terms into categories with a given order of precedence of the categories. Thus, the indexer only has to analyse the subject, assign each component to its

category and then arrange the categories in the prescribed order.

An alternative approach is, according to Coates (1960: 46), to consider the relationships between the components, instead of the components themselves. Thus, the categorisation

(Concrete) Grape (Process) Harvesting

might be described as an 'action' relationship between two concepts, without reference to any attributes of the concepts themselves. J.E.L. Farradane made an approach to classification and subject indexing along these lines. He distinguished nine relationships governing the way in which terms can be placed together. He based his system on a study of the development of the learning process given by psychologists. All human beings learn by developing power of discrimination in time and space, then stages of discrimination can be established in each area (Foskett, A.C. 1977: 74-75). In time, the first stage is 'non-time' i.e. the co-occurrence of two ideas without reference to time. The second stage is 'temporary', i.e. the co-occurrence of two ideas from time to time, but not permanently. The third is 'fixed', i.e. the permanent co-occurrence of two ideas. In space, there are the following stages of discrimination:

1. 'Concurrent' - two concepts which it is hard to distinguish
2. 'not distinct' - two concepts which have much in common
3. 'distinct' - two concepts which can be completely distinguished.

The two sets of gradations form a matrix, the points of intersection denoting the nine kinds of relationships (Farradane 1961 in Sayers Memorial volume: 131; Foskett 1976: 75).

INCREASING ASSOCIATION \longrightarrow

INCREASING CLARITY OF PERCEPTION	COGNITION (Awareness)	MEMORY (Temporary)	EVALUATION (Fixed)
RECOGNITION (Concurrent)	Concurrence /e	Comparison and Self-activity /m	Association /;
CONVERGENT THINKING (not distinct)	Equivalence /=	Dimensional (Time, Space, State) /+	Appurtenance /(
DIVERGENT THINKING (distinct)	Distinctness /)	Reaction /-	Functional dependence (causation) /:

Concepts may be joined by operators indicating the relations, each operator consisting of two parts. Some examples to illustrate the relationships are (Coates 1960: 47):

1. 'Signing a will in the presence of a witness':

Will (action) signing (co-presence) witness

Expressed in operator notation, it will be:

Will /- signing /e witness

2. 'A depression bringing rain to the British Isles':

Depression (causation) Rain (dimension) British Isles

In operator notation:

Depression /: Rain /+ British Isles

3. 'Soil friability affecting ploughing':

Ploughing (action) Soil (belonging) Friability

In operator notation:

Ploughing /- Soil /(Friability

The actual order of compounds chosen will depend on the known point of view of the users of the library. Farradane has claimed, according to Foskett (1977: 75) that his system can be applied very easily, but this is not born out by other workers and it was found that the amount of time taken to index a document using his system made it highly uneconomic, with results no better than with other systems.

Undoubtedly the most important contribution to the theory of alphabetical subject headings is the work of E.J.Coates (Foskett 1977: 109). He used Kaiser's Concrete-Process idea, but called it Thing-Action. However, he developed the idea much further. Thing must come first, he said, because it is always the most significant in a concept. It is difficult to visualize "heat treatment" on its own, but we can visualize a piece of steel undergoing heat treatment. Further, if we think of a Thing and the Material it is made of, it is once again the Thing that is more significant. So we can develop the significance order further:

Thing - Material - Action

Then we can move on to Parts, which must depend on the Things to which the belong, giving us:

Things - Parts - Material - Action.

Other variants can be built up by the same principle.

Coates also pointed out a valuable corollary of his ideas of

significance order (1960: 52). We translate the idea of Thing being acted on by an action, into natural language, using a prepositional phrase, e.g. the two ideas 'Conveyor Belt' and 'Belt Conveyor' are not the same. 'Conveyor Belt' is 'Belt of conveyor', meaning part of the conveyor, while 'Belt conveyor' denotes a kind of conveyor, translated with a prepositional phrase: 'Conveyor with belt'. The prepositions indicate how the component words are related. The simplest of all relationships between concepts, asserts Coates, is represented by the genitive 'of'. For subject heading purposes the phrase is reversed and the preposition omitted, e.g.:

"Heat treatment of aluminium"

becomes:

Aluminium, Heat treatment.

To show how, in this way, a subject heading can be constructed for a very complex subject, A.C.Foskett (1977: 109) gives the following example from British Technology Index:

"Manufacture of multiwall kraft paper sacks for the packaging of cement"

It can be split into two parts:

1. Manufacture of multiwall kraft paper sacks,
2. Packaging of cement

In the first part, Thing is sacks, action is manufacture, giving:

Sacks, manufacture

Paper is material, giving:

Sacks, paper, manufacture

Kraft and multiwall are type-specifying terms for paper, giving for the whole of this part:

Sacks, paper, kraft, multiwall, manufacture

In the second part it is easy to derive:

Cement, packaging

To link the two parts, we think of sacks for packaging, giving us:

Packaging, sacks

So for the whole we have:

Cement, packaging, sacks, paper, kraft,
multiwall, manufacture

To set against the disadvantages of not having headings in a natural use of language, which are also lengthy and complex, there are the advantages of consistency and specificity, and a first element which is the one most likely to come into the mind of the seeker of information on the topic (Foskett 1977: 110). Coates distinguishes twenty kinds of relationship, which he tabulated (1960: 55) to show their relation to the corresponding prepositional phrase, for example:

Type of compound	Subject heading order	Subject heading agrees or reverses significance order	Subject heading agrees or reverses amplified phrase order	Usual relationship word is amplified phrase
1. Action on Thing	THING, Action	Agrees	Reverses	of
2. Action on Material	MATERIAL, Action	Agrees	Reverses	of
3. Action A on Action B	Action B, Action A	-	Reverses	of, in
4. Material of Thing	THING, material	Agrees	Reverses	of
5. Part of Thing	THING, part	-	Reverses	of
.....				
9. Thing distinguished by citation of material	THING, material	Agrees	Agrees	of
	etc.			

Although some critics have complained that the kind of entry such as demonstrated above is no longer a direct entry to the specific subject, it is, in the opinion of A.C.Foskett (1977: 110) difficult to see how entries could be made more direct.

Another contribution to the theory of alphabetical subject headings is that of P.C. Coetzee.

His approach to subject indexing is also based on relations between isolates in a compound subject. A subject, asserts Coetzee (1962: 59) can be analysed into relata and relations.

The analysis will indicate the components that will be best to use for descriptors. He established two main kinds of facets and subject facets. Bibliographic facets are not always important, but sometimes they are. It is, for example, important to indicate whether a work retrieved is a dictionary or an encyclopaedia or a monograph.

Assigning symbols to indicate different facets, Coetzee (1958) formulates formulas for different kinds of subjects and arranges them in a citation order. Some of his facets are:

f = form: f.b. = bibliographic form

 f.l. = language form

 f.g. = genre

w = discipline or science

s = subject-tie

m = milieu

D = record of learning

In the analysis of a compound subject to find the relata and types of relation, Coetzee's approach is to regard the relation

itself as an isolate in the subject (1962: 61). He established the following groups of relations:

1. Compositional relations, which are obtained between:

(a) A whole and its parts. The relation symbol for "part of a whole" is " \angle ". The formula for the subject "a house and its window" would be: S/\angle (S/\angle = house; \angle_s = window)

(b) A thing and its substance or raw material. The relational operator is " \angle ". Thus:

S/\angle (S/\angle = house; \angle_s = bricks)

(c) An object and its qualities. The relational operator is " \angle ".

$S \cdot \angle_s$ ($S \cdot \angle$ = house; $\cdot \angle_s$ = comfortable)

2. Casual relations or functional relationships. These are relations between the concepts: agent; act, process, influence or function; patient; instrument or technique; result. Operators used are:

s/\angle = agent

\angle/s = action or function

-s = patient

"s = instrument

:s = result

A formula using all these operators,

s/\angle "s -s :s

could, for example, stand for:

s/\angle father

\angle/s punishes

"s (with) a cane

-s his son

:s obedience (the result of the punishment)

3. Generic relations. They are the relations between a class and its subjects. The operator "(" is used:

s(= a class

(s = a member of a class

4. Serial relations. They are the relations between a series and its members. The operator is ")"

s) = s is a series

)s = s is a member of a series

s^1) s^2 s^3 s^4 = s^2 , s^3 and s^4 are members of the series s^1

The position of any concept in a subject heading formula depends on its relation to other concepts in the formula - i.e. on whether it is a whole or part of a whole; whether it an agent, action, instrument, patient or result (Coetzee 1975: 168). The operators listed above are used to indicate the relational position of the isolates in the "s" facet. In a subject heading formula the constant "P" (prius) is used for the main element in the subject heading and the constant "s" (secondi) for sub-divisions of the heading.

A subject to be indexed is analysed into its constituent isolates and an analet formula is constructed. This formula is then converted into a subject heading formula indicating the prius and secondi. For example:

A monograph on the rivers of South Africa

Analet formula: D.w.fb.m/s

Subject heading formula: Pm.S/s

Subject heading: SOUTH AFRICA. Rivers

Bliss (1939: 162) voices his misgivings about the nature of the dictionary catalogue in these terms:

"The dictionary catalog is misnamed: it is not like a dictionary of words in one series, with subordinate terms, but more like an index. A dictionary catalog lacks the simplicity and directness of a dictionary; it bats the terms hither and thither across the courts of terminology, keeping the quest on the jump. It is an uneconomic out-growth of the economics of small public libraries in America. Which of the three forms of subject catalog is the simplest, the least confusing - the alphabetic, the classified, or the 'dictionary'? This librarian confirms that the dictionary catalog is the least simple and the most confusing."

3.1.3.2 The Classified catalogue

The classified catalogue has considerable potential as a controlling device in information retrieval. It contains the main entries for the library collection arranged according to the classification scheme used in the library. It is not merely a duplication of the sequence on the shelves, containing only main entries, but also added entries as necessary, e.g. a document on Chemistry and Physics must be shelved at the class number for Physics or Chemistry, but entries for this document can be made in the classified catalogue under both subjects. The classified catalogue consists of three parts:

1. The classified sequence in notational order,
2. The alphabetical subject index to the classified file.
3. The alphabetical author/title sequence.

The alphabetical subject index serves as a key to the classified

sequence and does not refer directly to individual documents, but lists topics along with their relevant class marks. It is customary to use Ranganathan's chain-indexing procedure for indexes to the classified file. This procedure is, according to Maltby (1978: 251), probably easier to apply with a fully faceted scheme, but is independent of any particular scheme and can be used with any other system. "Chain indexing links the process of verbal subject analysis very closely with the general to specific chain of progression exhibited by the classification's hierarchy." The indexer would begin with the most specific topic in the hierarchical chain and progress to the most general, making an entry for each, e.g. in the topic:

Wedding etiquette: class number 395.22, the chain of classification leading to the specific topic would be:

300	Social sciences
390	Customs
395	Etiquette
395.2	Etiquette for special occasions
395.22	Wedding etiquette

It is necessary to make entries for synonyms, and terms under which users are unlikely to make enquiries are known as unsought links (Maltby 1978: 252) and no entries are made for them. Our index entries for the above topic would be:

Weddings: Etiquette	395.22
Marriages: Etiquette	395.22
Etiquette	395
Customs	390

The main purpose of the classified catalogue is to bring documents

on related subjects together. This is done mainly through the main and added entries in the classified file, where all the entries for documents in the collection on Economics, Education, Psychology, etc. are brought together according to the classification scheme used in the library. But, states Needham (1964: 121), "no matter how perfect the scheme used, the only relationships that are immediately apparent are those between a subject and the subjects immediately preceding and succeeding it in the file, this limitation is inevitable with linear order." There are relationships not revealed by juxtaposition, e.g. an entry for the teaching science in the elementary school would be filed by Dewey Decimal Classification in 372.3, relating to other books on teaching various subjects in the elementary school. An entry for science teaching in the secondary school would be filed in 507. This kind of distribution would be brought together in the subject index where the subject entries may be:

SCIENCE TEACHING

elementary schools	372.3
secondary schools	507

3.1.3.3 Faceted classification

Knowledge is organized into main classes and within each main class we distinguish categories, aspects or facets. A facet may comprise different foci.

Faceted classification is based on the realisation that most subjects are compound subjects, consisting of two or more basic elements. If a classification recognises these fundamental elements and lists them, providing rules for their assembly, there

is no need to give ready made class numbers for all subjects as in an enumerative scheme. " A fully faceted scheme divides a subject field (or, if it is a general system, each subject field) into categories or facets and each category consists of the elements produced by a single characteristic of division."

(Maltby 1968, in Bakewell p.33) This idea of faceted construction is illustrated by Ranganathan (1959: 56 ff.) by means of a simple example: Take the subject "The treatment of tuberculosis of the lungs by X-ray treatment" and place it in the frame:

Medicine: [lungs] : [tuberculosis]: [X-ray treatment]

This framework separates the terms in the name of the subject according to the trains of characteristics of classification they are related to. "Lungs" is related to the "origin" characteristic, "tuberculosis" to the "problem" characteristic, and "X-ray treatment" to the handling (of the disease) characteristic. According to the framework we can say that the subject has three facets and they can be called respectively:

1. Organ facet
2. Problem facet
3. Handling facet

The parts of the subject can also be described as follows:

1. "Lungs" is a focus in the organ facet of the subject "Treatment of tuberculosis of the lungs by X-rays"
2. "Tuberculosis" is a focus in the problem facet of the subject "Treatment of tuberculosis of the lungs by X-rays"
3. "X-ray treatment" is a focus in the handling facet of the subject "Treatment of tuberculosis of the lungs by X-rays"

By using the same method of expression, we can now make the following statements in respect of the subject: "Treatment of tuberculosis of the lungs by irradiation":

1. "Lungs" is a focus in the organ facet of the subject
"Treatment of tuberculosis of the lungs by irradiation"
2. "Tuberculosis" is a focus in the problem facet of the subject
3. "Irradiation" is a focus in the handling facet of the subject ...

The subject can be put into the following framework:

Medicine [lungs]: [tuberculosis]: [irradiation]

Comparing the frameworks of the two above-mentioned subjects, we can make the following statements:

1. Both subjects have three facets.
2. All three facets are of the same quality in both subjects.
3. The focus in the organ facet is of the same sharpness in both subjects.
4. The focus in the problem facet is of the same sharpness in both subjects.
5. The focus in the handling facet is sharper in the first subject than in the second.

In the subject "Tuberculosis of the lungs", we find, for example, no handling facet, only an organ facet and a problem facet.

Thus we can say that the handling facet is vacant. In the subject "Infectious diseases", the organ facet and the handling facet will be vacant. In a work on "Medicine" there will be no

facets, only the basic subject of the class "Medicine".

The notation of a classification system should determine the desirable order of knowledge, whichever growth takes place requiring extension of the system. A faceted notation can do this by means of its method of construction. A facet formula is imperative in such a system. The order in which facets should be combined is called the citation order. The problem of order of specific subjects within a single subject area lies, according to Maltby (1978: 59) at the core of the task of classification. No system can display in linear order of books or catalogue entries all the relationships, and the classifier must decide what shall be collected and what scattered. Maltby says (1978: 59): "The primary part of the problem concerns the sequence in which we move from general topics to specific ones."

When a citation order has been chosen, it can be seen which relationships are to receive precedence in the sequence. Thus Maltby gives the following example (1978: 60):

Subject area: Education

Facets in order of citation: (1) Educand; (2) Curricula;
(3) Teaching method.

Foci: (1) Primary schools; (2) History; (3) Lectures

(1) Secondary schools; (2) Mathematics; (3) Seminars

(1) Higher education; (2) Physics; (3) Tutorials

etc.

A subject such as 'Teaching history in higher education by means of tutorials would have, if the facet citation order is 1-3 as

above:

Higher education/history/tutorials

In practice this will keep all related documents on the first facet cited together, there will be much collation but some scattering in the second and a considerable amount of scattering in the third.

In order to combine facets, facet indicators are necessary, i.e. symbols should be used to introduce each new facet. We have already seen that this is done in the Colon Classification and U.D.C.

There can be no doubt of the use and value of facet analysis in practical classification. Knowledge of faceted classification is imperative for detailed and correct classification, especially in academic and special libraries. Faceted classification can well be said to be the basis of all information retrieval. Some of the advantages of faceted classification given by Maltby (1978: 38) are:

1. Elements are arranged into facets, each facet consisting of all the elements or foci produced by a single characteristic of division. This removes the possibility of cross-classification and clarifies the issue for the most helpful order. In each subject field an indication is given of the order of facet combination.
2. A faceted classification provides detail and accuracy in classification. An enumerative scheme cannot possibly enumerate all compound topics. In a faceted scheme any compound topic can be indicated by means of synthesis.

3. A fully synthetic or faceted scheme can keep pace with the growth of knowledge more readily than an enumerative scheme. Many "new" subjects are in reality only a new compound of elements already listed in their facets.
4. The more synthetic a classification, the shorter and easier to handle and consult will be its schedules.
5. A synthetic classification has a high mnemonic value through constant use of the same symbols.

Facet analysis, however, though valuable in classification, leaves unresolved the issue of order. No classification, faceted or otherwise, can display in linear sequence all subject groupings, so that only the primary facet of a subject determines the sequence of books on shelves. Also, the need to use facet indicators to introduce each new facet (e.g. in U.D.C. = for language, " " for time, etc.), is a problem for shelving and filing.

There are a number of special classifications based on facets and synthesis, but the only general classification that is truly synthetic is Ranganathan's Colon Classification. The U.D.C. also applies facet analysis but is not as completely synthetic as C.C. A general classification such as U.D.C., though offering enough detail for most special libraries in nearly all subject fields, lacks the right amount of detail in the one field in which the library specializes. Usually the more detailed numbers a general classification provides, the longer the class numbers. Other reasons that make a general classification undesirable for a special library are: absence of speedy and thorough revision of schemes covering all branches of knowledge; lack of helpful

order; users of a special library look at other branches of knowledge from the viewpoint of their own subject, and a general scheme must be neutral in this respect (Maltby 1978: 302).

There are a number of special classification schemes and many of these, created within the last two decades, are faceted schemes. Some schemes, built on traditional lines, named by Maltby (1978: 303) are L.C.Barnard's Classification for Medical libraries and Harvard Business Classification, the first showing the influence of Bliss and the latter of Cutter.

The oldest example of a faceted special classification is, according to Maltby, the building industry's SfB system which originated in Sweden. Today there are faceted schemes for many diverse subject areas such as soil science, library science, food technology and performing arts. All these special classification schemes list basic concepts from the subject field and provide for synthesis according to a constant citation order. They do not slavishly follow the PMEST citation order, but select their order according to the needs of the users and the nature of the subject field. Some special classification schemes practice pre-co-ordination, i.e. co-ordination takes place at the time of indexing, and some are post-co-ordination schemes where the concepts are co-ordinated at the time of searching. Here, claims Maltby (1978: 305) we are "emancipated from the irksome restrictions of controlled but rigid citation order", but it does not, on the other hand, tell us how concepts are to be associated, and "we are back to the problem of linguistics and semantic control."

3.2 20th century cataloguing

In 1908 the Library Associations of Britain and America produced their first joint code, Cataloguing rules: author and title entries. This became the most standard code for English speaking countries (Horner 1970: 67) until ALA 1949 supplanted it in most countries other than Britain. According to Horner (1970: 67) the 1908 code is among the more rigid codes and it is an example of a 'case' code with the disadvantage of enumerating comparatively few cases. It deals with choice and form of personal and corporate author and title main headings, added entries, references and description.

The British and Americans continued to co-operate in preparing a revised A.A. code, but when World War II started, the British became preoccupied with that event and the revision emerged in 1941 as an ALA draft code, covering, like AA1908, both author/title headings and description. The rules for author/title entry were further revised and published in 1949. The description part was not continued with, but was replaced by a separate work, Library of Congress Rules for Descriptive Cataloguing.

These two works became the basic combined code for most English speaking countries. It is applied in the L.C. printed catalogues, and in 1970 AACR 1967 was only gradually being introduced in L.C. cataloguing (Horner 1970: 70). It is the "ultimate" in case codes, says Horner, and was the immediate object of Lubetzky's critical attention. Lubetzky was at the time working in the cataloguing division of the Library of Congress. The ALA 1949 code had 158 rules, with numerous sections and sub-sections to each rule. They are organised into 4 groups:

1. rules of entry and heading,
2. personal authors,
3. corporate bodies as authors, and
4. geographic headings.

In 1951, the ALA invited Lubetsky to prepare a critical study of cataloguing rules, and in 1953 he published his Cataloguing rules and principles: a critique of the ALA rules for entry and a proposed design for their revision. He criticized the code on having too many rules, with overlapping, duplication and inconsistency, and proposed that a revised code should be based on general principles rather than attempting to enumerate all possible difficulties and problems (Quigg 1968: 16). He provided, says Quigg (1968: 16) a penetrating analysis of the theory and practice of cataloguing against which the codification of cataloguing rules had to be re-examined.

A less complex code, was the opinion of Lubetsky (Quigg 1968: 30), could be based upon well-defined principles recognising more generalized 'conditions'. He asked three main questions about each rule (Homer 1970: 78):

1. Is it necessary?
2. Is it properly related to the other rules in the code?
3. Is it consistent in purpose and principle with the other rules?

Lubetsky also states two main objectives of a library catalogue (Thompson 1977: 174): 'The first objective is to enable the user of the catalogue to determine readily whether or not the

library has the book he wants.' - 'The second objective is to reveal to the user of the catalogue, under one form of the author's name, what works the library has by a given author and what edition or translations of a given work.'

He sees the title page of a book as a prominent identification tag, and the name of the author and title of the book as the most important clues by which a book can be identified. Thus, the principles and rules for entry of books must be based on these two elements. Lubetsky's theory is not to be denied, thinks Thompson (1977: 175), but the false step from this reasoning is that therefore a library needs only an author/title catalogue, and it has been shown by library history that a library needs a subject catalogue.

Lubetsky was appointed editor of the new code and in 1960 he produced his Code of cataloguing rules: author and title entry: an unfinished draft. The code was never finished and published. Some librarians preferred the 'legalistic' style of codes, while others feared the recataloguing that would be necessary should they adopt a new and radically different code.

Arguments about the C.C.R.1960 ensued and it was attacked, for example, by J.L.Dewton, Assistant Chief of the Union Cataloguing Division of the Library of Congress, who wrote an article, "The grand delusion" in Library Journal, in which he maintained that above all a code was required which would promote uniformity in entries submitted by libraries for the Union Catalogue. For this purpose a code of precise rules was required, not the "abstract philosophy" of the draft code.

The C.C.R.1960 then got into the hands of committees who, claims Horner (1970: 79), "kicked it around until it got lost."

Lubetsky gave up being editor of the proposed new code and left the Library of Congress.

The International Federation of Library Associations (IFLA) sponsored an International Conference on Cataloguing Principles (ICCP), which was held in Paris in 1961. The principles worked out by Seymore Lubetsky virtually formed the basis for the discussions at the conference and also for the evolution of principles which emerged from the conference. At the conference, working papers on various problems of rules, prepared by various delegates were also discussed and a final version the 'Statement of principles' was adopted. Participants agreed to work in their various countries for revised rules which would be in agreement with the adopted principles.

After the ICCP conference, contact between British and American revision committees continued and culminated in the Anglo American Cataloguing Rules 1967. Although general agreement on rules was reached between the committees, several points remained which could not be resolved and in the end two different codes were produced: a North American text, published by the ALA, and a British text, published by the LA. Although substantially the same, they differ in appearance, some rules are differently worded, and a few are also different in content. Inevitably, some imperfections were found in the code immediately after publication and Code Revision committees continued their investigations in all countries. The Anglo American Cataloguing Rules Amendment Bulletin is published irregularly and contains additions and changes to AACR. In 1978,

the 2nd edition of the AACR was published. Circumstances leading to this second edition will be discussed in the next chapter.

Of cataloguing codes in other countries, the Prussian Instructions have already been discussed. Another noteworthy code is the 1931 Vatican Code. It came about as part of the reorganisation of the extensive Vatican Library in the 1920s. There had been an Italian code, of 1911, and this was added to from AA1908 (Horner 1970: 75). The code was reworked and consolidated, and the first edition published in 1931. A second edition was published in 1939. According to Horner (1970: 75), the code is noteworthy because it is the only really complete code in one volume for printed books of the 20th century. It includes:

- (a) Author/title entry,
- (b) description,
- (c) subject entry,
- (d) filing, and
- (e) appendices dealing with early printed books, abbreviations, glossary, transliteration and 'sample cards'.

It also has a very detailed index.

In the 1950s, declares Horner, one would have considered seriously adopting this code for English-speaking countries. But, unfortunately, all the main components have since been overtaken by events:

- (a) We have a new author/title description code, catering for special materials not included in the Vatican code.
- (b) There has been new thought and practice in the alphabetical subject field, and

- (c) There has emerged a radically simple view of dictionary catalogue filing, in the second edition of the ALA rules for filing catalogue cards.

The end of the 19th century and the beginning of the 20th century saw the printed catalogue at its climax. The British Museum catalogue was compiled at the turn of the century. The London Library issued a one-volume catalogue of 1,626 pages in 1903, to be followed by eight annual supplements; in 1913-14, a new two-volume catalogue of 2,754 pages was issued. Edinburgh University Library began a three volume catalogue in 1899 - printing started in 1915 and was completed in 1923. The London and Edinburgh catalogues each covered 400 000 volumes. The Bibliothèque Nationale started its Catalogue générale des livres imprimés in 1877, and reached authors whose names started with I in 75 volumes, but the cost was too high (Thompson 1977: 172).

In British public libraries, printed dictionary catalogues were mostly used until the 1890s. Growing libraries, however, made this form of catalogue increasingly difficult and expensive to maintain. James Duff Brown and Louis Stanley Jast promoted class lists (Kelly 1973: 187) and maintained that they were more scientific, quicker and cheaper to produce, and could easily and frequently be revised. Many of their colleagues, however, clung to the dictionary catalogue.

By the turn of the century, card catalogues became more and more common. By the mid-1930s the card or sheaf catalogue was standard practice in municipal libraries (Kelly 1973: 304). Kelly asserts (1973: 94) that the card catalogue was a technique adopted from

business practice and was introduced in Britain from the United States.

Cutter recommended its use at the first British conference of Libraries in 1877, and the Newcastle-upon-Tyne reference library, opened in 1884, was entirely catalogued by this method. At the time there were two doubts about this form of catalogue in the minds of librarians:

- (a) Would the public be able to use it? and
- (b) Would a single catalogue suffice when a crowd of people wanted to consult it at the same time?

James (1969: 57) sees the card catalogue as going back to the era of playing cards, and is of the opinion that Britain and America can certainly not be claimed as having invented it, as cards were used in the Bibliothèque Nationale, Paris, at an early date. Americans realised its vital principle and improved and perfected its details to a great extent.

Not taking into account the early French card catalogues, the first modern card catalogue in actual use, according to James (1969: 58) was that of Sir Frances Reynolds in 1820, which was used in the library of the Society of Telegraph Engineers in London. In the library of Trinity College, Dublin, a card catalogue was used from 1827. Between 1853 and 1855, C.C. Jewett adopted the card catalogue and used it in the Boston Public Library. In 1856, Esra Abbot planned and began an alphabeticoclassed catalogue on cards in Harvard College.

The spread of the use of the card catalogue is a significant feature in library history. In its time it was the only real alternative to the printed catalogue. This was pointed out by Jewett in 1851 in his publication A plan for stereotyping catalogues by separate titles, and for forming a general stereotyped catalogue of public libraries of the United States. Various American and other libraries began printing cards for their own use between 1890 and 1900. The British Museum cards were 10" x 4", Jewett's cards 15 x 20 cm., etc. After deliberation, the A.L.A. adopted the 7.5 x 12.5 cm. card which is punched in the centre of the lower edge. The size is now library standard, and this form was strongly advocated by Dewey who realised the necessity of uniformity.

The A.L.A. undertook to supply printed cards for certain sets and serials through its Publication Board. In 1899, the L.C. began to print cards for copy-righted books and undertook in 1901 to apply this method to all its books and to sell its cards to other libraries, so becoming in effect a central cataloguing bureau for the United States and for other countries. It was Herbert Putnam who launched the production and distribution of L.C. cards to other libraries, and it is he and Jewett, declares Thompson (1977: 173), who can take most credit for the promotion of the concept of co-operative cataloguing.

The same concept lay behind the launching in Britain in 1950 of the services of the B.N.B. The culmination of the concept came with the L.C.'s MARC project, which supplies cataloguing data centrally for current books in the form of magnetic tape, which

individual libraries can use, through the medium of a computer, to produce their own catalogue entries. MARC co-operates with other national cataloguing agencies, and there is now an international network supplying cataloguing data to L.C. The MARC project led to a new awareness of international standards, and this will be discussed in the next chapter.

. C H A P T E R 4

COMPUTERIZATION AND ITS IMPLICATIONS FOR SUBJECT ANALYSIS
AND BIBLIOGRAPHIC DESCRIPTION4.1 Present situation and modern trends in classificationIntroduction

When libraries first realised the necessity of arranging their books according to subject, the process of classification was seen purely as a means of arranging books on the shelves. When the requirements for the retrieval of information demanded a change in approach, classification was no longer merely considered an instrument to effect the orderly arrangement of books, but evolved into an important aspect of information retrieval.

The development of education and the growth of knowledge, in science and technology in particular, have placed greater demands on libraries in respect of information-orientated - as opposed to document-orientated - retrieval. It is therefore self-evident that the traditional classification systems outlined in chapter 3 are not adequate to cope with library needs in terms of retrieval. Their acknowledged inadequacies, however, are not of such an order as to negate the role of classification as a fundamental technique in bibliographic arrangement.

It was not merely the growth in size of collections that compelled librarians to develop the sophistication of methods of information storage and retrieval as a means of supplementing traditional schemes for the physical classification of library material. A

factor of material significance was the growing complexity of the subject content of documents.

Indexing or classifying documents presupposes the analysis of their content and a grouping of subject matter into related classes. These classes are labelled in order to facilitate reference to them. Lancaster (1968: 6) remarks that we "name the classes and the names we give to them are our index terms" (his italics).

Austin (1974: 9) defines a "term" in the context of subject indexing as:

"..... a verbal representation of a concept and [it] may consist of one or more words."

In traditional library practice, two approaches to subject indexing or classification are manifest. Each approach is based on a system of controlled vocabulary. Lancaster describes these systems as follows:

"..... when a controlled vocabulary is set up in the form of an alphabetical listing of index terms, the individual terms are known as subject headings and the controlled vocabulary as a list of subject headings. When, on the other hand, the class labels are organized systematically so that related terms are brought together, and specific terms are shown subordinated to their appropriate generic terms, the controlled vocabulary is known as a classification schedule" (Lancaster 1968: 7, his italics).

In a classification schedule the concepts underlying the terms are represented by symbols. The symbols may be letters of the alphabet (usually Roman) or numerals, or a combination of the two. A symbol representing a subject concept is referred to as a

class number or a class mark (Encyclopaedia of librarianship 1966: 105). The "ordered series of symbols that stand for the ordered series of terms in the classification schedules" is the notation of a schedule (Encyclopaedia of librarianship 1966: 105).

Applying a classification schedule for the purpose of indexing, class numbers or class marks are generally used as substitutes for the conceptual expression in natural language. This process is called classification. When we assign subject headings, the process is generally referred to as subject indexing or subject cataloguing (Lancaster 1968: 8). Information retrieval is "selected recall of recorded information" (Cushing 1964, in Sharp: 213), and, according to Sharp, it "cover[s] all the techniques ... which are used to provide for the recovery from a store of documents [of] those items which are relevant to a stated information need" (Sharp 1967: 141).

Before information can be retrieved, however, it has to be stored in a way that will make its recovery possible. Traditional classification schemes, as was pointed out earlier, are no longer capable of coping with the needs of retrieval. The complexity of the subject content of documents rather than the number of subject-related documents in any collection, has become the critical factor in information storage and retrieval (Sharp 1967: 182).

Sharp (1967: 141) sees card indexes and printed catalogues as conventional retrieval tools and, consequently, classification and cataloguing as storage and retrieval methods based on conventional principles. He regards as non-conventional tools those involving devices such as punched cards, microform, magnetic tape and disc systems.

Mechanized retrieval systems are, according to Kent "those that are characterized by some device, manipulative technique, recording medium, or other non-conventional feature that distinguishes them from the traditional tools of the library" (Kent 1966: 23). Such systems are found to handle material dealing with complex subjects more satisfactorily than the conventional systems.

Sharp is of the opinion that:

"the newer vehicles usually imply the use of post-co-ordination principles with which provision has to be made for the bringing together of terms in some way at the time of search, such provision usually requiring the use of a mechanical, optical electronic, etc. device, whilst older forms of index involve the principle of one-place look-up in an ordered file" (Sharp 1975: 211).

From this exposition it can be inferred that non-conventional indexing methods are based on methods of post-co-ordination.

4.1.1 Indexing

The process of indexing information contained in documents presupposes the attempt to identify those concepts which constitute the core of the document. This process involves selection of terms (known variously as descriptors, keywords, index entries, aspects, uniterms, or subject headings) from the record on the basis of well-defined rules (Kent 1966: 112). The purpose of indexing is "to facilitate the identification or selection of desired documents after they have been sorted and shelved or stored " (Kent 1966: 113).

The number of index entries made for one document will depend on the depth of indexing required for the specific collection of

of documents and on the level of complexity, specialization and diversity in the content of each document. To a document dealing with "the design of mosaic windows" can be assigned the terms "design", "mosaic" and "windows" to represent its content. A more multi-faceted document, "running temperature as a contributory cause of fatigue failures in ball-type thrust bearings in clutches", will require a minimum range of terms extending from "temperature effects", "fatigue", "failure", "ball", "thrust" and "bearings" to "clutches" (Sharp 1967: 183).

When the terms assigned to a document to describe its subject content are combined at the indexing stage to constitute a multi-term heading, the system is referred to as pre-co-ordinate. Pre-co-ordinate systems include the classification schemes and lists of subject headings discussed in chapter 3. In such systems, rules are necessary "to govern the order in which the diverse concepts are cited within such headings, i.e. an order in which the various concepts or terms representing them, are to be combined" (Ramsden 1974: frame 71).

The need to determine an appropriate citation order poses a problem which many librarians have tried to solve. Proposed solutions offered by some well-known librarians and library scientists have been discussed in chapter 3 under the topic of alphabetical subject catalogues. During the last few decades an alternative method of indexing to solve the problem of citation order and the number of entries to be made for secondary terms in a string^{*} has

* A string being "an organised sequence of terms or other symbols

been developed. The method is based on the principle of concept-co-ordination (more specifically, post-co-ordination) of the terms representing the subject content of documents.

4.1.1.1 Co-ordinate indexing

Almost all writers on modern methods of subject indexing have devoted their attention to the principle of concept co-ordination on which modern systems of information retrieval are based. Sharp (1967: 185 ff.; 1975: 229 ff.) gives the following exposition of this principle:

Concept co-ordination is based on three logical operations, each of which answers three basic questions that can be asked of a documentation system. The three logical actions are:

- (a) The logical sum
- (b) The logical difference
- (c) The logical product.

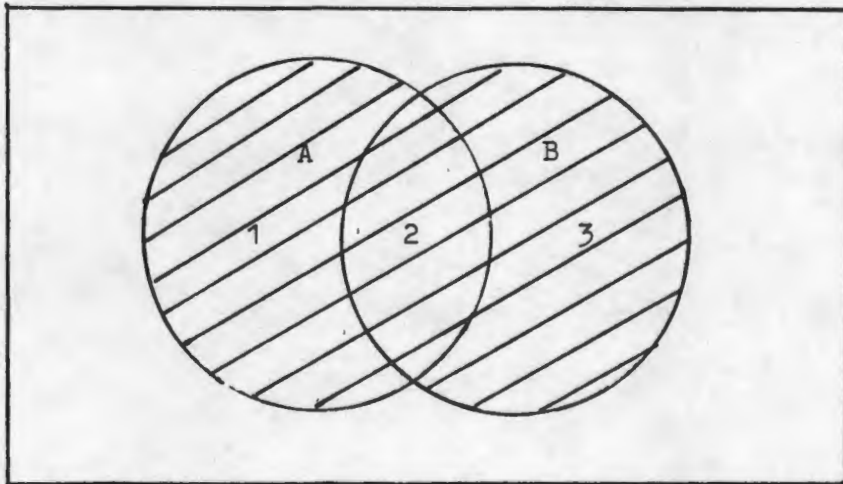
The diagrams used to illustrate these principles were devised by the British logician, J. Venn, to illustrate Boolean algebra, and are known in professional literature as Venn diagrams (Sharp 1967: 185-187):

(a) The logical sum

The logical sum is the result of a demand for information about one or more aspects of two or more subjects. It is the result

having semantic content ... and which lacks certain adjuncts of natural language (such as articles, connectives, some prepositions etc.) and is set down in a prescribed order" (Austin 1974: 9).

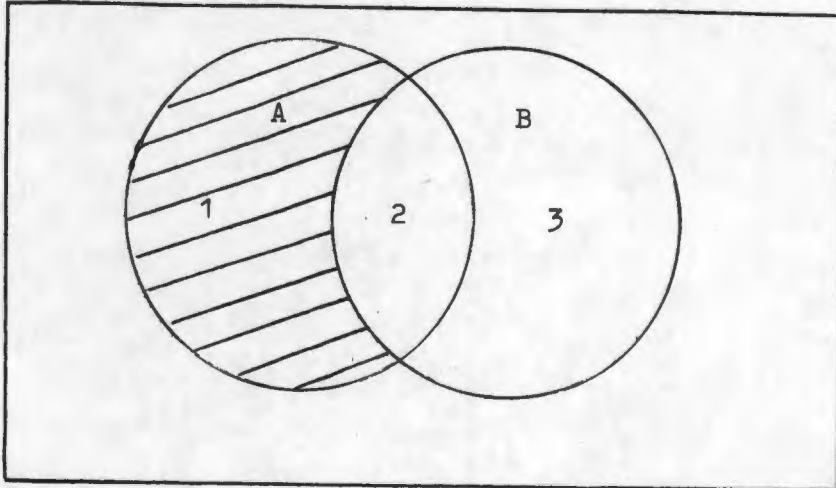
of the action of logical addition, which means that a thing can belong to one or another class of things, or to both. In the following Venn diagram, circle A represents 'buses' and circle B 'trains', and the whole area of the two circles, including the over-lapping area (2) represents either one (1) or the other (3) or both (2). Within the square fall all the components of transport vehicles which may be covered in other documents of the information system.



When a search is done through a post-co-ordinate system, the Boolean connective OR may be used to define the classes of documents here (Artandi 1968: 34).

(b) The logical difference

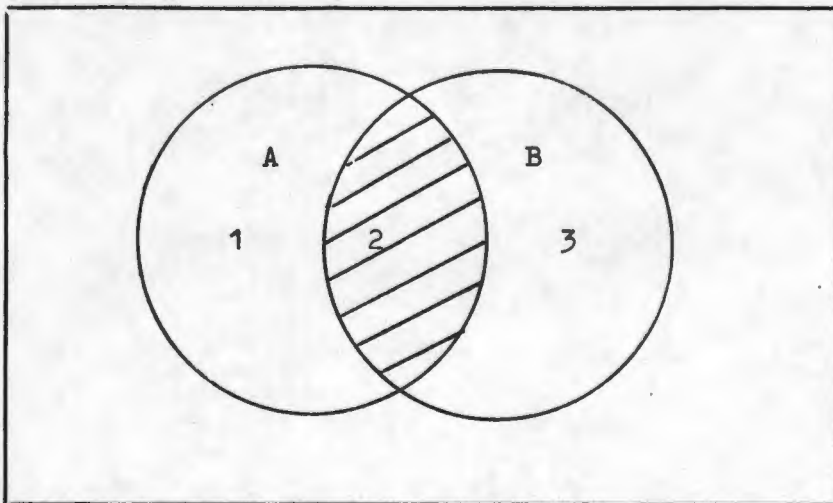
The second question requires information about one of the classes, but specifically not about the other, i.e. the Boolean connective NOT can be used. For example, only documents containing information about buses are required and specifically not documents about trains.



The shaded area represents the logical difference.

(c) The logical product

The logical product is the answer to a request for information in which two or more attributes are represented simultaneously, in which case the Boolean connective AND is used:



Area (2) is the logical product.

The primary principle of co-ordinate indexing lies in concept co-ordinating, which allows the actions of logical sums, differences and products when searching for information.

When a retrieval system provides facilities for searches involving all three logical operations, highly complex questions can be asked of the system (Sharp 1967: 188).

4.1.1.2 Item-entry and term-entry systems

In designing a documentation system for a specific purpose, the combinations principle can be used, for example, in edge-punched cards or machine-sort cards. There are two main series of punched cards, viz. item-entry cards and term-entry cards (Sharp 1967: 190). The same groups are referred to by Kent (1966: 42) as "document system" and "aspect system" respectively.

In an item-entry card system, a punched card is made for every item or document in the collection. The slots representing given aspects of a subject contained in each document are punched round the edge of the card. The body of the card is normally used for other data concerning the document, for example, author, title, or an abstract of the document.

With term entry cards, a separate card is assigned to each term describing the contents of a document. The documents to which the term has been assigned are then listed or punched on the card. Perhaps the best known indexing method using term entries is Mortimer Taube's 'Uniterm' system (Sharp 1975: 234 ff.).

During a search, the searcher withdraws the cards for the terms describing the subject he is looking for and compares the numbers on the cards. The numbers which are common to all the term cards will be for documents containing information on the compound subject (Sharp 1975: 234).

Here the principle of concept co-ordination has been applied in a post-co-ordinate system, i.e. co-ordination is effected during the search.

The comparing of accession numbers on the cards tends to become increasingly cumbersome as the collection grows. Thus new methods have been developed to facilitate this task. Using 'optical stencil cards', also called 'feature cards', 'Batten cards' or 'peek-a-boo' cards (Sharp 1975: 236), the same principle of term-entry is applied to the cards, but instead of entering the numbers on the cards as on uniterm cards described above, holes are punched to represent the accession numbers of the documents. The position of a hole on a card determines what document it represents: thus, if a document is indexed and seven terms are assigned to it, the holes punched into the cards to represent the document will be in exactly the same horizontal and lateral position on all seven term cards.

During a search concept co-ordination can be applied by superimposing the term cards for all the terms describing the search topic. A light will shine through where all the cards have been punched in the same position. The hole in that position represents the document in which information on all the terms on the cards in the stack will be found.

While each retrieval system differs from the others in its method of application of the basic principles of item-entry and term-entry, these principles, according to Sharp (1975: 239) "pervade all concept co-ordination systems to a greater or lesser degree".

If, when indexing, the terms, as they appear in the document, are used without any modification, it presupposes the exclusive employment of natural language. Natural languages are those that "have evolved and have been refined over the centuries" (Kellogg 1968, in Boroko: 327) and are "used by human beings to communicate with each other" (Sedelow 1968, in Boroko: 181). Using natural language for indexing can, however, lead to many problems, for example, the fact that different authors use different words for the same concept (synonyms); the same idea can be described in different ways by using the same words but altering the phrase, e.g. 'animal behaviour' or 'behaviour of animals'. It is for reasons such as these that in every indexing system some measure of control must be introduced over the terms used in describing concepts - i.e., we use a controlled vocabulary or thesaurus.

4.1.1.3 Indexing language

According to Sammet & Tabory (1974: 633) an artificial language "appears as the planned construct of a single author or group of authors. It is created in its entirety, at a given moment in time and subsequent changes to it take place in a controlled manner, through explicit decision by language designers."

Concerning an indexing language, Ramsden asserts that:

"An index language is an artificial language which is adapted to the requirements of indexing."

(Ramsden 1974: frame 2), and Artandi maintains that

"The total number of index tags available for use in the subject description of a document constitutes the index language of the system."

(Artandi 1968: 35)

Lancaster (1688: 79) defines an indexing language simply as "the complete set of terms used in indexing to describe document content". He continues, however, by saying that there is a great deal more to an indexing language than this definition implies.

A complete index language will consist of:

- " a) A vocabulary (i.e. a set of terms)
- b) A syntax (i.e. grammatical structure)
- c) Rules for use of the language and for controlling changes in it."

(Lancaster 1972: 115)

The rules for use are instructions for use of the vocabulary, for example, "how sub-headings may be added to main-headings in an alphabetical subject catalog, or in what sequence facets are to be cited in an analytico-synthetic classification" (Lancaster 1968: 79).

4.1.1.3.1 Vocabulary

Lancaster (1972: 115) distinguishes three types of terms comprising the vocabulary: descriptors, specifiers and entry terms. In an earlier book he called descriptors "code terms" and specifiers "index terms" (Lancaster 1968: 79). He finds it important to distinguish between their respective functions, because they play different roles in retrieval (1968: 79).

4.1.1.3.1.1 Descriptors

They are "the terms an indexer assigns to a document to describe its subject matter" (Lancaster 1972: 115). Descriptors can be of various kinds, viz. either generic or specific; single-word or multi-word, etc. Lancaster calls descriptors the "working terms" of a vocabulary. Indexers as well as searchers use descriptors and they refer to documents. Descriptors can, for example, be the notation of a classification system. They can also be the same terms as those used for specifiers.

4.1.1.3.1.2 Specifiers

These terms uniquely identify (specify) a particular document class (Lancaster 1972: 115). A specifier can be a single pre-coordinate term, or two or more terms that will be combined post-coordinate.

4.1.1.3.1.3 Entry terms

These are "words and phrases that are used in documents and requests to express notions recognised in the indexing operation and translated into the code terms [(descriptors)] of the system" (Lancaster 1968: 81).

Lancaster illustrates the distinction between descriptors, specifiers and entry terms by using a sample entry from the Thesaurus of F.A.A. descriptors (1968: 81):

AIRCRAFT CLOCKS use CLOCKS

AIRCRAFT WHEEL BRAKES use VEHICLE BRAKES

AIRPORT RADAR SCANNERS use AIRPORT RADAR SYSTEMS and
RADAR SCANNING
AIRPORT RADAR SYSTEMS

"Aircraft clocks" and "Aircraft wheelbrakes" are entry terms only. They are not used as index terms (or descriptors), but are subsumed under the more general forms "Clocks" and "Vehicle brakes" which are, in turn, descriptors, specifiers and entry terms. "Clocks" and "vehicle brakes" will have their own entries in the index in their appropriate alphabetical sequence because each of them "uniquely defines a document class" (Lancaster 1968: 81). "Airport radar scanners" is a specifier (labelling a class of documents) as well as an entry term which will be translated into the descriptors "Airport radar systems" and "Radar scanning" when indexing is done. "Airport radar systems" and "Radar scanning" are descriptors and also specifiers and entry terms.

Lancaster considers that the descriptors included in an indexing language have little influence on the performance of the system "as measured by recall and precision", although it will affect searching time and costs (Lancaster 1968: 82).

Recall signifies the ability of a retrieval system to uncover relevant documents while precision is the ability to perform as a screen to hold back documents not relevant to the subject request (Lancaster 1972: 107; Doyle 1975: 337-339).

The specifiers and entry terms have a great influence on the recall and precision performance of a retrieval system. The greater the number of specifier terms included in the vocabulary, the higher

will be the precision of recall, because in putting a request to the system, we are able to describe the topic precisely and will recall only relevant documents. The number of documents recalled will, however, be low because documents dealing with our topic in a more general context will not be recalled. Those documents will be indexed under a broader term while it may contain information on the more specific topic. Unless the system's specifier vocabulary is sufficiently specific, the topic cannot be defined very precisely, thereby necessitating a search under a more general term. The recall will then be higher, but containing more irrelevant material.

The entry vocabulary controls the recall capabilities of the system while the size of the descriptor vocabulary need not affect recall (Lancaster 1968: 83). However specific a term we choose for our search, the entry vocabulary will indicate under which term, broader or related, that topic has been indexed, enabling the user to retrieve it; he may then also retrieve irrelevant material if the entry terms are not very specific.

4.1.1.3.2 Index-language devices (syntax)

Apart from the vocabulary of different terms, an indexing language needs additional devices to improve precision and recall.

Lancaster (1972: 121) divides these devices into two groups: recall devices and precision devices. Cleverdon (1967: 173) also suggests that the devices which supplement the basic vocabulary fall into the two categories of recall devices and precision devices.

4.1.1.3.2.1 Recall devices

They are devices that "group terms together into classes of one type or another. [They] will reduce the size of the specifier vocabulary and will allow improvement in recall" (Lancaster 1972: 121). Recall devices listed by Lancaster (1972: 121) as the most important are:

synonym control

quasi-synonym control

word form control

hierarchical grouping

grouping by statistical association, or clumping and clustering

4.1.1.3.2.1.1 Synonym control

Where natural language often has two or more expressions to describe the same object or concept, artificial languages aim to have only one. This can be achieved by restricting natural language, i.e. forms of natural language can be used "in a standardized, controlled manner, eliminating ambiguity and redundancy" (Hutchins 1978: 9).

To standardize natural language for indexing purposes, elimination of synonyms as primary terms is necessary. Although there are few true synonyms in a natural language, it is not as generally true of scientific and technical terminology (Gilchrist 1971: 18). In information retrieval, when we refer to synonym control, we usually mean near-synonyms. Near-synonyms are "terms that, while not completely synonymous, are sufficiently close that we feel the distinction is not worth making within the confines of a particular retrieval system" (Lancaster 1972: 121).

We control synonyms (and near-synonyms) by choosing one version

and referring from the other(s). Synonym control improves recall, since documents dealing with the same topic will be indexed under the same term, whichever synonymous alternative the authors have used. References facilitate retrieval by any version of a synonym the searcher may use.

Concerning the choice of a term from synonymous alternatives, Metcalfe suggests that one should "generally choose with regard to a balance of the following considerations:

- (a) degree of common usage and understanding by users ... and
- (b) comparative freedom from ambiguity"

(Metcalfe 1959: 281).

He also states that scientific names should be selected if they are familiar to those using the system, otherwise popular names should be chosen; that current names of subjects are preferable, and that a concrete name for a subject should be chosen rather than an abstract name (Metcalfe 1959: 282).

Whichever term is chosen for use as a descriptor, references should be made from all the terms not used.

4.1.1.3.2.1.2 Quasi-synonym control

In certain subject contexts words which are not generally regarded as synonyms may be used synonymously (Lancaster 1968: 86).

Lancaster gives the example of terms such as "supersonic speed", "supersonic flow" and "supersonic flight", which, in aerodynamics, may be used interchangeably to denote motion above a speed of Mach 1. In this particular context, they can be regarded as

"quasi-synonyms". Quasi-synonyms also include words that are usually regarded as "opposites", e.g. 'stability' and 'instability', 'roughness' and 'smoothness'. Quasi-synonyms are controlled in the same manner as synonyms. Lancaster (1972: 122) and Gilchrist (1971: 19) agree that although control of synonyms and quasi-synonyms will tend to improve recall, it will at the same time reduce precision.

4.1.1.3.2.1.3 Word form control

Controlling word forms also promotes recall. Words are usually reduced to root-form and only the root is used as a descriptor in the vocabulary. Salton (1975: 20; 87) refers to the process as "suffix cut-off procedure". References are made of other forms of the word. Lancaster (1972: 122) justifies this procedure by the fact that words derived from the same root or stem are semantically related. He gives the example of "weld", "welds", "welding", "welded", "weldable", "weldability" and "welder" which may be reduced to the root "weld" which will then be the descriptor in the vocabulary.

Apart from controlling the form of the word to be used as a descriptor, Gilchrist (1971: 21) contends that at the most elementary level, spelling needs to be standardized, for example, variations in spelling between Standard English and American usage. This applies also to the forms to be used for abbreviations, which manifest themselves in contractions, acronyms and initials.

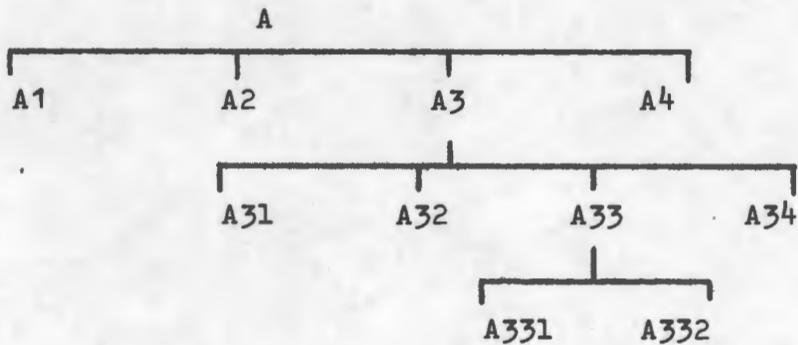
With word-form control, as with synonym control, "we are losing a fine gradation of meaning" (Lancaster 1972: 122). We enlarge

the class defined by the descriptor, which will improve recall at the expense of precision, resulting in the recall of unwanted documents.

4.1.1.3.2.1.4 Hierarchical linkage

By linking terms in the vocabulary hierarchically, we can improve recall. Hierarchical structure can be imposed on a vocabulary "by means of a formal classificatory organization (overt classification¹) or through an appropriate network of cross-references (covert classification²)" (Lancaster 1972: 122).

Lancaster (1972: 122) illustrates this by means of the following partial hierarchy:



If a search is started with the most specific term (A331) and an

-
1. In overt classification, the terms in a vocabulary are organized systematically, resulting in semantically related terms being brought together in series of chains leading down from the most generic term to the most specific.
 2. When the terms in a vocabulary are arranged alphabetically, semantically related terms are scattered according to their appropriate positions in the alphabet. By applying covert classification, closely allied terms can be strongly related through the use of cross-reference.

adequate recall is not obtained, we can go up the hierarchical tree to the parent term (A33) and search this larger class. Recall will be higher, but, obviously, precision will be reduced. From this term we can go up to term A3, which will allow the searching of a still greater document class and will result in a still higher recall and more reduction of precision. The hierarchical structure may also be used to guide a searcher in the progressive narrowing of a search, starting with term A3, being led down to A33 and then to A331. If A331 represents the topic we are searching for, the refinement of the search from A3 to A331 will improve precision but reduce recall (Lancaster 1972: 123).

Rules for indexing languages, for example those of the Engineers Joint Council (E.J.C.) employ 'connectors' to indicate the relationship between terms (Gilchrist 1971: 25). These connectors are:

BT = Broader term

NT = Narrower term, and

RT = related term (i.e. related other than hierarchically).

The inclusion of a network of semantic relationships in an indexing language increases the range of a search by suggesting other terms - substitute or additional terms - that can be used as search points.

4.1.1.3.2.1.5 Statistical association (clumping and clustering)

Clumping and clustering of terms on the basis of statistical association between them can be used to enlarge a document class in order to improve recall (Lancaster 1968: 87).

A count of the frequency of word occurrence in the literature is not sufficient to indicate the desirability of inclusion as a

descriptor because words with a high frequency-occurrence are predictable, low in information content and can usually be excluded. Hutchins (1975: 113) claims that the counting of word occurrences in a natural language text can never really indicate semantic content, but that when two words co-occur frequently in texts, there is likely to be a semantic relationship between them wherever they appear in the same sentence.

The statistical characteristics of terms can be used to form classes. If terms A, B and C co-occur frequently in a class of documents in which terms B, C and D also appear together, it can be assumed that a relationship exists between A and D and that they may be substituted for each other when a search is conducted (Lancaster 1968: 87).

Clumps, it can be said, are groups of terms in which each term is strongly associated with one or more others (Foskett, A.C. 1977: 221). A descriptor is chosen to represent a clump or a cluster of related terms in the indexing vocabulary. The descriptor "will be a generic representation of a concept underlying that group" (Gilchrist 1971: 35). References are made for all the terms in the cluster.

The aim of clustering, says Gilchrist (1971: 35) is to reduce the entry vocabulary of an indexing language, because "an indexing language must always be smaller than natural language."

4.1.1.3.2.2 Precision devices

A retrieval system may yield a high number of documents available on a subject during a search, i.e. it may have a high recall

performance, but at the same time much of the material recalled may be irrelevant - its precision will be low (Sharp 1975: 251).

Devices which increase precision in retrieval concern the syntax of an indexing language (Gilchrist 1971: 41). Ramsden (1974: frame 30) contends that "the syntax in an index language is essentially a question of the recognition of certain relationships between terms in the language, or, more precisely, the recognition of the relationships between the concepts represented by those terms."

Lancaster (1972: 121) considers co-ordination, term weighting, linking of terms and relational (or role) indicators as being the most important precision devices.

4.1.1.3.2.2.1 Co-ordination

Lancaster calls term co-ordination "the most potent precision device" (1972: 123). It reduces the size of document classes and increases the size of the descriptor vocabulary. A compound subject will receive descriptors representing each concept in the compound topic. During a search, should the inquirer demand concept A only when it co-occurs with concept B, he will be asking for class AB, which will be smaller than the class A + B.

Class co-ordination may take place at the time of indexing (pre-co-ordination) or at the time of search (post-co-ordination). To achieve high precision in a post-co-ordinate system, all the facets of a complex topic should be included in the search strategy. This will improve precision, but at the same time recall will be lower (Lancaster 1972: 123).

Except for straight co-ordination of descriptors, search formulas involving the Boolean operators and, or and not can be used in co-ordination.

4.1.1.3.2.2.2 Term weighting

Instead of deciding whether or not a term should be assigned to a document - whether it is important enough - terms can be weighted to indicate their relative importance in representing the subject of the document (Lancaster 1972: 132). Lancaster illustrates weighting by using a three-point scale on six terms describing a subject:

A	3
B	3
C	2
D	2
E	1
F	1

Terms A and B are highly specific and cover the major subject of the document. Terms C and D are treated in less detail and E and F are dealt with only peripherally. In a search for a very specific topic, we can ask for retrieval of documents only if our topic has a value of 3 in them. Thus we can avoid retrieving documents in which the topic is mentioned only peripherally.

We can also use a "threshold" search strategy, for example retrieving documents indexed under terms A and B and C, but only when the combined weights of the terms are equal to or exceed 7. At least one of the search terms will then have a maximum weight.

Lancaster (1972: 133) suggests that most retrieval systems have some form of weighting. When we combine the notations for various concepts in a compound subject in an analytico-synthetic classification scheme, we apply a form of weighting in that the most important concept will be placed first in the class number. In the same way the citation order of subject headings implies a form of weighting, with the term representing the major concept of the topic cited first.

Lancaster (1972: 133), Gilchrist (1971: 55) and Sharp (1975: 253) discuss a scale of weights proposed by Maron, Kulms and Ray. This scale is based on an eight-point weighting method. Lancaster (1972: 133) finds this too refined for practical application, because "how do you distinguish between a term with value 7 and one with value 8?"

Concerning weighting, Gilchrist (1971: 55) affirms that "the allocation of weights to descriptors allotted to particular documents is a precision device which takes account of the fact that the meaning of a descriptor is not invariable and depends on the other descriptors with which it is correlated."

4.1.1.3.2.2.3 Linking of terms

In post-co-ordinate retrieval systems it is possible to retrieve irrelevant or unwanted documents as a result of false association of terms at searching. This can be eliminated to some extent by the use of 'links'. Gilchrist (1971: 45) defines links as "mechanical devices to avoid false combination of terms from the set allotted to an item."

Linking is a precision device which provides for the linking of

terms which are actually associated in the document being indexed. Sharp (1975: 251) finds it acceptable that for a document dealing with two discrete subjects, to prevent false association of the terms representing the two subjects, two separate accession numbers be assigned to the document. It is however more common to assign one accession number and then to qualify it:

CATTLE	7942.1
BREEDING	7942.1
SHEEP	7942.2
SHEARING	7942.2

Linking shows which terms are related but it does not show how they are related. Linking of related terms becomes very important as the number of indexing terms allotted to a document increases. Gilchrist (1971: 45) illustrates this as follows:

Document No. 2307 deals with 'the manufacture of army weapons and the import of hospital equipment of South Africa':

SOUTH AFRICA	2307 A B
MANUFACTURE	2307 A
ARMAMENT	2307 A
ARMY	2307 A
IMPORTS	2307 B
EQUIPMENT	2307 B
HOSPITALS	2307 B

The letters A and B indicate which descriptors should be coordinated. This will ensure that, for example, the combination 'armament imports' cannot occur.

The linking together of words in a particular theme is referred to

as partitioning (Lancaster 1972: 124) - "whereby a document is partitioned into various themes." This partitioning is also used where a document is treated as a number of separate parts or "indexable items" as Jonker (1964: 9) calls them.

A problem in the use of links, mentioned by Gilchrist (1971: 45) is that when different hierarchical levels are present in the descriptors assigned to a document, true generic combinations are also excluded. For example, in the item:

SHATTERPROOF	WINDOWS	for	PRIMARY	SCHOOLS
100A	100A		100B	100B

the false combination 'shatterproof schools' is avoided, but at the same time the true generic combination 'windows for schools' is also excluded. Thus, while the linking of terms improves precision, recall is lower.

4.1.2.3.2.2.4 Role indicators

It was claimed above that links indicate that a relationship exists between terms in a topic but that they do not specify the nature of the relationship. This creates the problem of incorrect term relationships (Lancaster 1972: 125). Lancaster illustrates this problem using the subject:

'toxins produced by fish'.

Should a search in a post-co-ordinate retrieval system be carried out with a view to determining the co-ordination of the class 'fish' and the class 'toxins', documents dealing with substances toxic to fish may also be retrieved.

In the retrieved documents, the terms are not related in the desired

way. This type can be avoided by the use of role indicators or relational indicators, which are "syntactical devices used to display relationships between terms" (Lancaster 1968: 90).

Gilchrist (1971: 48) defines a role indicator as:

"a signal which is attached to a thesaurus term at the indexing stage in order to indicate the context or the sense of use of that term in the set of terms making up a descriptive statement concerning an item."

The necessity for role indicators differs for systems based on different languages, depending on their syntax (Gilchrist 1971: 48). English, being an analytical language, in which meaning relies on syntax and the meaning of a word depends on its context in a phrase, is greatly dependent on role indicators.

There are two fundamental kinds of relationships between terms (Lancaster 1972: 125; Gilchrist 1971: 41), viz. paradigmatic and syntagmatic:

"Snakes" is paradigmatically related to: animals; reptiles; adders; rattlesnakes.

It is syntagmatically related to: pets; zoo; parks; serum; shoes.

That is, it is permanently related, as a species, to 'animals', 'reptiles'; as a genus to adders and rattlesnakes, but it is only related to the terms 'pets', etc. when it appears together with one of them in the same context.

The hierarchical structure of an index language takes care of the paradigmatic relationships in a retrieval system. The syntagmatic relationships, however, are frequently ambiguous in post-co-ordinated

retrieval systems (Lancaster 1972: 125). For example, aluminium can be used as a coating or it can itself be coated. If, in indexing the topic "design of transmission systems for cars, using computers", we simply assign the descriptors 'design', 'cars', 'transmission systems' and 'computers' to it, it will be retrieved in a post-co-ordinate system if a search is done for the combination 'design' and 'computers' - the search topic being 'design of computers'. If, however, we assign roles to the descriptors:

DESIGN

CARS (1)

TRANSMISSION SYSTEMS (2)

COMPUTERS (3)

where (2) represents the role "object of action" and (3) the role "tool, agent, means of accomplishment", and we use the search strategy

COMPUTERS (3) and DESIGN

we will retrieve documents on the use of computers in design.

Role indicators have been used in assigning headings to documents for subject catalogues by Farradane and Coetzee. This was discussed in Chapter 3. In these cases, they were applied in pre-co-ordinate indexing systems. Role indicators can be employed in both pre- and post-co-ordinate systems. They can be utilized either implicitly or explicitly (Foskett, A.C. 1977: 79). When used explicitly, a symbol serves to indicate the role, for example in the heading (from BT1):

CONTAINERS; polystyrene, moulded

the semicolon before 'polystyrene' indicates that it is a material and the comma following it indicates that it is a kind of poly-

styrene.

When applied implicitly, the relative position of the descriptors specifies the roles, for example in the DC class number 882, 8 denotes the main class, literature, because it occupies the first position in the notation, the second 8 represents the particular language, because, in the literature class the second division is according to language, and the 2, in the third position, connotes literary form.

4.1.1.4 Recording the results of analysis

When the documents in a collection are being analysed, an indexing language is employed to record the results of the analysis into some medium that can later be searched to retrieve the information stored in it. Item-entry or term-entry approaches can be utilized, as described earlier. The medium for recording can be a conventional 7,5 x 12,5 cm catalogue card, various types of punched card, punched paper-tape, magnetic tape or disc, or film. Film can be used to store indexing data in the form of opaque and transparent spots, and it can also hold a reproduction of the document or an abstract of it, in microform (Kent 1966: 41ff.).

Except in the case of conventional catalogue cards and hand-sorted punched cards, machines are utilized to search through a file recorded on the other media. A computer can be employed to search a file and also to print indexes which result from analysis of documents (Doyle 1975: 291).

4.1.2 Computer-printed indexes

Until the end of the 1950s, computers were used in information retrieval mainly as searching instruments (Doyle 1975: 291). Delays of batch-processing were partly responsible for the development of new uses of computers, viz. to generate indexes which users could consult in their own time. The application of computers in the production of alphabetical subject indexes can, according to Doyle "be looked upon as the first form of language processing to experience widespread practical application" (Doyle 1975: 291). He sees this development as "an idea that made a great deal of sense."

4.1.2.1 Permuted indexes

The first machine-produced indexes were distributed at the International Conference on Scientific Information held in Washington, D.C. in 1958 (Doyle 1975: 291). These indexes, distributed by H.P. Luhn and Herbert Ohlman, were both based on the permuted principle. Luhn's index, called Keyword-In-Context (KWIC) was generated by computer, and that of Ohlman by punched-card machines "with the aid of some tricky plugboard wiring" (Doyle 1975: 294).

Today permuted indexes are commonly referred to as KWIC indexes. Since its introduction by Luhn, KWIC has become widely adopted in information services. Lancaster (1968: 97) calls KWIC the "simplest form of machine-generated index". Bakewell (1978: 163), Doyle (1975: 294) and Gilchrist (1971: 143) all remind us of the fact that the principle of KWIC indexing is by no means new, but was originally introduced by Andrea Crestadoro in 1856. (Bakewell contends that the true date was 1864.) Crestadoro called the method 'Keyword in titles' (Bakewell 1978: 163) and discussed it in his work The art of making catalogues, published in 1856.

In KWIC indexing, a computer is utilized to sort titles and print an alphabetical index, with significant words in the titles appearing in their correct alphabetical sequence, surrounded by words preceding and following them in the title - which Gilchrist calls their 'wrap-around' (1971: 144).

The hypothesis of the principle of KWIC indexing is that the author of a document has taken care to prepare a title which will indicate the subject of the material. Thus, it is assumed, many of the keywords which indexers normally would have chosen, will be found in the title (Kent 1966: 115).

KWIC indexing is based on cyclic interchange of words, i.e. an entry is made under each significant word in the title (Sharp 1975: 258). Words such as articles, conjunctions and prepositions, as well as those with such a high-frequency occurrence that they are not expected to be useful as index terms are listed, and stored in the computer as a 'stop-list'. When the title of an article is fed into the computer, it is compared with the words on the 'stop-list' and words not appearing on the list are processed as index words. Each of these index words will be placed automatically in alphabetical order in the middle of the page, with the rest of the title on either side. For example, the title "The effects of rain on timber buildings in tropical regions" will give rise to the following entries:

EFFECTS OF RAIN ON TIMBER BUILDINGS IN TROPICAL REGIONS > < THE
 TROPICAL REGIONS > < THE EFFECTS OF RAIN ON TIMBER BUILDINGS IN
 PICAL REGIONS > < THE EFFECTS OF RAIN ON TIMBER BUILDINGS IN TRO
 < THE EFFECTS OF RAIN ON TIMBER BUILDINGS IN TROPICAL REGIONS
 RAIN ON TIMBER BUILDINGS IN TROPICAL REGIONS > < THE EFFECTS OF

This method does not require intellectual effort and the effectiveness of the index will depend upon the descriptiveness of the titles used by authors (Lancaster 1968: 97).

A variation on the KWIC index is the KWOC (Keyword-Out-of-Context) index. Here the keyword is taken out of the context and is placed as a heading above the entry (Sharp 1975: 259). For example:

ARCHITECTS

THE PROFESSIONAL EDUCATION OF ARCHITECTS IN FRANCE

According to Highcock (1968: 90), the KWIC index was used to aid current awareness systems and was not intended to replace other indexes. For effective use in information retrieval, some problems appear, mainly as a result of unsuitable and vague titles. Another weakness, according to Highcock (1968: 90), is the limitation on the length of the title to fit into the line-size of conventional computer print-out. A title may have to be truncated to fit into the space. For example, the title 'The influence of the United States on foreign relations between Canada and Cuba' may receive the entries:

RELATIONS BETWEEN CANADA AND CUBA > < THE INFLUEN
 BETWEEN CANADA AND CUBA THE INFLUENCE OF THE UNI
 THE UNITED STATES ON FOREIGN RELATIONS BETWEEN CANA
 THE INFLUENCE OF THE UNITED STATES ON FOREIGN RELA

It may then be necessary to look up the title under all the other entry words in order to read the whole title.

In addition to possible unsuitabilities of titles, Doyle (1975: 294-5) cites the problem of synonyms which may require human inter-

vention in KWIC indexing. Synonymy can result in the scattering of a group of entries which should have been under the same heading. KWIC indexing, however, presents little difficulty in the case of homographs and homonyms because words always appear in their textual setting in the entry, which makes the meaning clear.

Another variation on the KWIC and KWOC index is the KWAC (Keyword-And-Context) index which is a variation in principle rather than format (Sharp 1975: 259). It is presented as in KWOC indexing but in some cases the keyword used as heading is not a word from the title, e.g.

CLASSROOM DISCIPLINE

THE ONION-SANDWICH PRINCIPLE

This method of indexing will counter the difficulty of meaningless or vague titles.

4.1.2.2 SLIC index (Selective Listing in Combination)

This technique was invented by Sharp (1965: 205-13) in an attempt to "combine the advantages of reference in the normal way to a printed index with the virtues of concept-co-ordination" (Sharp 1967: 216). In SLIC indexing up to five terms are assigned to a document, according to a controlled vocabulary. A computer sorts out the terms and prints them out as a permuted index. Combinations are made of the terms, but those which are included in a larger group are omitted, for example, the combination ABC includes the combination AB, for which an entry will not be made. If the terms ABCDE are assigned to a document, entries would be made for the combinations:

ABCDE; ACDE; ADE; AE;

BCDE; BDE; BE;

CDE; CE;

DE; E (Bakewell 1978: 161)

4.1.2.3 PRECIS (PREserved Context Index System)

Two fundamental problems in pre-co-ordinate indexing are, according to A.C.Foskett (1977: 82), combination order of the chosen descriptors and the fact that a linear representation of a multi-concept topic gives access only to the term representing the filing element of the entry. The terms after the first are hidden and cannot be found directly.

One solution would be to make one entry and give access to other terms in the entry through cross-references. Another would be to make entries under as many headings as necessary.

Different methods have been invented to keep down the number of possible entry forms and at the same time preserve as much as possible of the syntactic structure of the entry. One method, for example, is cycling, where each term in the string is brought to the front in turn:

A	B	C	D
B	C	D	A
C	D	A	B
D	A	B	C

Terms can be rotated, such as in a KWIC index, where the combination order is retained, but entries are made under each term in the string:

↓

A B C D E

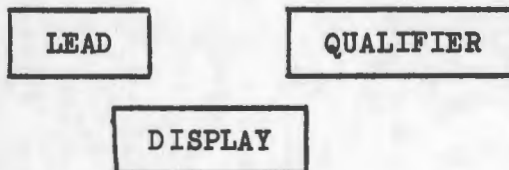
A B C D E

A B C D E

A B C D E

A B C D E

Another method is shunting. The methods cited so far have been linear, i.e. the string of terms remains in a single-line format. The shunting method was adopted by Derek Austin for his PRECIS indexing system. With shunting, syntactic relationships as well as the whole of the string are retained, while separate entries are made for each significant word. A two-line structure is used, the first line containing the lead term (access term) and the qualifier, while the second line contains the rest of the string in display:



If we have a string ABCD, the first entry will be;

A
 \
 B - C - D

where A = lead, B-C-D the display. Then B moves into lead position, A into qualifier position and C-D stays in display:

B - A
 \
 C - D

Then C moves into the lead, B-A into the qualifier position, D stays in display:

C - B - A
 \
 D

and finally D moves into lead - the rest will then be the qualifier:

D - C - B - A

The link between B and A, etc. is retained in shunting.

PRECIS is based on the concept of an open-ended vocabulary, thereby facilitating the admission of terms as they are encountered in the literature to be indexed. Relationships between terms are handled in two different ways, distinguished as the syntactic and semantic sides of the system.

a) Syntax

The syntax comprises a schema of role operators, one of which is prefixed to each term in a string of terms chosen to summarise the subject of the document (Austin 1974b: 47). The order of terms achieved by the role operators is based on the principle of context dependency, each term setting the next term into its obvious context (Austin 1974b: 50). The computer, according to a manipulation code, shunts each term through the three basic positions of lead, qualifier and display in the index entries.

The system of role operators used in PRECIS is expounded as follows by Austin (1974a: 423):

Main-line operators

Environment of observed system
 Observed system (core operators)

0	Location
1	Key system: object of transitive action; agent if intransitive action

	<p>2 Action/effect</p> <p>3 Agent of transitive action; Aspects; Factors</p>
<p>A</p> <hr/> <p>Data relating to observer</p> <p>Selected instance</p> <p>Presentation of data</p> <p><u>Interposed operators</u></p> <p>Dependent elements</p> <p>Concept interlinks</p> <p>Co-ordinate concepts</p>	<hr/> <p>4 <u>View-point-as-form</u></p> <p>5 <u>Sample population/study region</u></p> <p>6 <u>Target/Form</u></p> <hr/> <p>p Part/property</p> <p>q Member of quasi-generic group</p> <p>r aggregate</p> <hr/> <p>s role definer</p> <p>t author attributed association</p> <hr/> <p>g co-ordinate concept</p>
<p>B</p> <hr/> <p><u>Differing operators</u></p> <p>(prefixed by β)</p> <p><u>Connectives</u></p> <p>(Components of linking phrases; prefixed by β)</p>	<hr/> <p>h non-lead direct difference</p> <p>i lead direct difference</p> <p>j salient difference</p> <p>k non-lead indirect difference</p> <p>m lead indirect difference</p> <p>n non-lead parenthetical difference</p> <p>o lead parenthetical difference</p> <p>d date as difference</p> <hr/> <p>v downward reading component</p> <p>w upward reading component</p>
<p>C</p> <hr/> <p><u>Theme interlinks</u></p>	<hr/> <p>x first element in co-ordinate theme</p> <p>y subsequent element in co- ordinate theme</p> <p>z element of common theme</p>

One of these codes is written as a prefix to each term in a string which expresses the subject of a document. The main-line operators "form the backbone of the syntactical structure of PRECIS" (Austin, 1974a: 58). They identify the basic components of a compound subject and regulate the order in which the components should be cited.

The interposed operators can be inserted between main-line operators, representing an extension of a preceding concept, for example:

- (1) rubbers
- (p) perishability

where (p) denotes a 'property' of the concept designated by the main-line operator (1). They cannot start a string.

The differencing operators have semantic rather than syntactic functions. There are four sets of operators, the choice of which of a pair to use depending on whether a term is needed as a lead or not.

The connective is used frequently, introducing a downward (βv) or upward (βw) reading connecting form, for example:

- (1) primary schools
- (p) teachers
- (s) attitudes βv of βw to
- (z) pupils

This string will generate the entries:

PRIMARY SCHOOLS

Teachers. Attitudes of pupils

TEACHERS. Primary schools

Attitudes of pupils

PUPILS. Primary schools

Attitudes to teachers

Semantic structure

It is a rule of PRECIS that two terms should not occupy adjacent positions in a string if the first serves only to establish the general class to which the second belongs (Austin 1974b: 51). Thus, it should never be BIRDS - Penguins, but only the second, more specific term is included in the string and a see also reference is made to this term from the first.

When a new term is admitted, terms which are semantically related to it are determined from dictionaries, thesauri, classification schemes, etc. A machine-readable record is created for each term. The record contains, inter alia, a number, called the Reference Indicator Number (RIN). This number is struck from a computer-generated list and is assigned to each term. It will identify the address of the term in a machine-held file (Austin 1974b; 51).

When indexing, the indexer attaches the RINs of the terms in a string. When an index is produced, each RIN serves as an instruction to the computer to proceed to the address indicated, find the term stored there, and print the appropriate references to the term in the index entry.

The numbers which represent the addresses of the terms are linked together by a system of codes which:

"a) specify the kind of relationship which exists between

terms held at different addresses. These are generally equivalent to BT/NT and UF/USE relationships found in standard thesauri.

- b) determine the kind of reference, i.e. see or see also, which should appear in the printed index whenever the number which represents the address of the target term is quoted as part of the PRECIS input." (Austin 1974b: 52)

The procedure to be followed in PRECIS indexing is summarised as follows by A.C.Foskett:

1. The document is studied to identify the overall subject.
2. The concepts involved are put into the form of a title-like statement in natural language.
3. The subject is written down as a string of terms, each preceded by the appropriate operator and with any necessary additional operators included within a multi-word term. The terms to appear in the lead position are indicated, usually by placing a tick over them, and any other conventional signals are added, for example (LO) = (Lead only), which means the term to which it is added must only be printed when it appears in the lead position for the printing of references. Any necessary instructions are added, as well as the computer manipulation codes.
4. "The computer then does the rest."
(Foskett, A.C. 1977: 227)

Thus the input is "a string of terms with appropriate coding and the output is a set of entries" consisting of a lead, qualifier and display. The lead term is printed in bold type, the

qualifier in roman, the display in roman or italics, depending on which role operator has been affixed to the term. The terms in the output are always in natural language order and never in inverted form (Foskett, A.C. 1977: 227-8).

An example of entries produced for the subject 'The application of digital computer systems in the design of heat shields on space vehicles' is:

String

- (1) space vehicles
- (p) heat shields βw on
- (2) design βw of
- (s) applications βv of βw in
- (3) digital computer systems

Entries:

Space vehicles

Heat shields. Design. Applications of
digital computer systems

Heat shields. Space vehicles

Design. Applications of digital computer systems

Digital computer systems

Applications in design of heat shields on space vehicles

During a search, the index may be entered at any one of the significant terms comprising the compound subject. In the entry the full context in which this term is dealt with in the document will be found.

A survey (Bakewell 1979) of indexers' reactions to PRECIS indexing was undertaken by the Liverpool Polytechnic's Department of Library and Information Studies in 1977. Bakewell (1978: 156) gives a selection of the divergent comments made by respondents in the survey:

'The intellectual process of PRECIS appeals to indexers.'

'The specificity is an advantage

'A problem with a PRECIS index to a classified catalogue is that PRECIS strings cover individual documents but class numbers don't: it may be necessary to make a long search through class numbers for specific documents.'

'PRECIS indexing is time-consuming.'

'.... the great advantage of PRECIS is the ability to manipulate a string of information terms to produce multiple lead terms for print out or interrogation.'

'PRECIS entries seem unnecessarily complex, producing a bulky layout which would require much concentration on the part of the user.'

Some conflicting opinions were expressed by indexers (Bakewell 1979). Certain features of PRECIS were regarded as advantageous by some indexers while others found the same features a disadvantage. These conflicting opinions included, inter alia, the flexibility of the system, the open-ended vocabulary and the document-specificity.

Concerning the time-factor, it was generally felt that PRECIS indexing is slower than either chain-indexing or LCSH. Some indexers remarked, however, that the extra time needed to con-

struct PRECIS strings was justified by "a more detailed and meaningful index" (Bakewell 1979: 172).

The full subject statement in entries and the large number of entry points proved an advantage to many indexers, as well as its suitability for computerization.

Although some indexers remarked on the disadvantage of the undesirability of PRECIS for a manual index, nine out of twenty-five users of the system were identified in the survey as using it manually.

The survey revealed the fact that, in spite of the use of PRECIS in BNB, the British Education Index (BEI) and elsewhere, "the impact of PRECIS on the total British library community had been minimal" (Bakewell 1979: 174). Only 6,6% of the survey sample employed PRECIS. Bakewell relates, however, that it was pointed out to him by C. Derek Robinson that, PRECIS being a new system, it "has made more of an advance than has any other system of subject retrieval during the first six years of existence" (cited in Bakewell 1979: 174).

Indexers stressed the need for a thesaurus of PRECIS terms, as well as a simplified or modified version of the system to suit the needs of different users. According to Bakewell (1979: 175), Derek Austin is already engaged in compiling a thesaurus.

The expressed need for a modified PRECIS suggests to Bakewell that continuing research on PRECIS is justified.

A.C.Foskett (1977: 244) is of the opinion that although many features of PRECIS are replicated in other systems, "PRECIS is the only system to incorporate so many of the refinements that help to make life easier for the user as well as the indexer."

Experimental work has shown that, because it is based on linguistic principles, PRECIS can give good results in any language (Foskett, A.C. 1977: 244).

4.1.3 Recent developments in classification and indexing

A.C.Foskett (1977: 203 ff.) discusses three developments in classification and indexing which he sees as being representative of recent trends:

1. The work done by the Classification Research Group of Great Britain.
2. UNISIST and the Broad System of Ordering (BSO).
3. The development of computer-generated classification.

4.1.3.1 The Classification Research Group (CRG)

The CRG was formed in 1952, "a typically British affair, with no resources beyond the native wit of its members, no allegiance to any existing classification, no fixed target, no recognition by the British Government (naturally) and at first only an amused tolerance from the library profession" (Foskett, D.J. 1962: 127).

Although they had "no fixed target" as Foskett claims, the reason for the establishment of this research group was "to make a study of classification" (Foskett, D.J. 1962: 127).

During the 1950s the CRG concerned itself mainly with the application of facet-analysis to special classification schemes. The members agreed that existing classification schemes were unsatisfactory and consequently "began discussions from first principles" (Foskett, D.J. 1962: 127). The first report on their discussions was published in 1955, concluding that "any subject index, alphabetical, classified or mechanical, relies for its efficiency on the co-ordination of concepts or ideas expressed in documents" (Foskett, D.J. 1962: 128).

Although they rejected existing classification schemes, the CRG decided "that the basis for a new scheme would be found in a study of the principles of faceted classification as laid down by Ranganathan" (Austin 1974b: 56), and to adopt "at least some of the colon terminology and method" (Foskett, D.J. 1962: 128).

They adopted the term 'facet' to denote the categories resulting from the division of a subject into its appropriate categories, but they did not accept Ranganathan's five fundamental classificatory categories of Personality, Energy, Matter, Space and Time, though it proved useful in some specialist schemes such as food technology. Here, the field can be divided into the categories of "Product (= Personality) as resulting from Raw Materials (= Matter) subjected to Processing Operations (= Energy)" (Foskett, D.J. 1962: 129). They decided to use specific names to denote the facets in a subject rather than Ranganathan's five categories. For example, in Education there would be a Schools facet, a Curriculum facet, and so on.

Having agreed that facet analysis was "the basic tool for organising the terms in a particular subject" (Foskett, D.J. 1962: 129), the CRG turned its attention to notation. Various faceted schemes in special fields had already been constructed by various members of the CRG and points that emerged are summarised by Austin (1974b: 56):

1. Although the schemes were for different subjects, "something approaching a common set of principles" being applied in the construction became apparent.
2. It was noted that the same basic set of categories or facets were applicable to various fields of knowledge. They were categories such as 'operations', 'agents', 'patients', 'properties', etc.
3. It was also noted that these elements were often cited in the same order.

The findings on notation were codified by Vickery, and incorporated in his book Classification and indexing in science which was first published in 1958 (Vickery 1975: 73ff.). He analysed the features of notation into the following functions:

- (a) to solve the problem of locating a heading among all the other headings;
- (b) to identify facets and terms in facets;
- (c) to indicate relations between facets and classes, and
- (d) to insert new terms, both co-ordinate and subordinate, into an existing series. (Foskett, D.J. 1962: 129)

Vickery (1975: 32) established the citation formula:

Thing (product) - part - constituent - property - measure -
patient - process/action/operation - agent.

Austin (1974b: 56) finds this clearer and more explicit than Ranganathan's PMEST formula. Vickery (1975: 32) emphasised, however, that his set of 'fundamental' categories can only serve as a guide, and that the priorities implicit in the formula may not suit all subject fields.

The CRG also gave attention to the analysis of relations between facets. Farradane devised a set of codes which he called 'relational operators' to represent relationships between concepts. Farradane's system has been discussed in some detail in Chapter 3 (cf.p.127 ff.). Although his technique applies to making alphabetical indexes, it is nevertheless a concept-co-ordinating system.

In 1960, B.C.Vickery published his book Faceted classification: a guide to construction and use of special schemes, which he prepared for the CRG. This work reflected the stage the CRG had reached in their work at the time (Foskett, D.J. 1962: 133).

In 1963, the CRG received a grant from NATO. A conference was held to discuss problems and to report their progress. Their work on schemes for special fields of knowledge led to the realisation that special schemes need a general scheme to draw on for many terms, secondary materials and processes and marginal fields which fall outside the 'core' of the specific field (Foskett, D.J. 1975: 189). It was decided that the CRG should devote most of its efforts to the formulation of faceted principles for a new general classification scheme for special libraries.

The grant from NATO enabled the CRG to appoint a research assistant to work on the project full-time. Helen Tomlinson was engaged from 1964 until 1968, and Derek Austin from 1968 to the beginning of 1969 (Austin 1974b: 56).

Austin summarises the aims of the project laid down at the conference to serve as a set of guidelines:

- (a) The new classification should be devised for both the manual retrieval of books on the shelves and for compiling entries in indexes;
- (b) it should aim to reach the maximum possible compatibility with machine-readable retrieval systems;
- (c) The first task should be to propose a systematic arrangement of 'organized fields of knowledge', and
- (d) to design a system of categorisation of terms and at least a minimum set of basic relations between concepts. (Austin 1974b: 57)

It soon became apparent that the aims listed as (a) and (b) were mutually incompatible (Austin 1974b: 57). For shelf classification, a notation should be as brief and straightforward as possible. In a mechanized system a concept should be denoted by the same symbol consistently to make programming possible. Austin (1974b: 57) illustrates this by using the subject 'Iron ores considered as biological species of economic importance'. The class number for this compound subject should be an aggregate of codes specifying the individual elements 'economic factors', 'ores', 'iron' and 'geological species' to assist the searching of computer-held files for citations dealing with each component. To achieve this, how-

ever, the notation would be of such a length that it would be unsuitable for arranging books on the shelves. It would not be as brief as, for example, 553.3, which is the UDC number for this subject.

Austin (1974b: 57) also finds a contradiction implicit in (c) and (d). A 'systematic arrangement of organised fields of knowledge' would lead to a system of classes resembling those in traditional classification systems. The 'categorization of terms' entails an analytical approach to individual concepts and not to knowledge. Terms would be organized "into basic categories according to their meaning without taking account of the subjects in which they may occur."

During the period 1964-68, the CRG concentrated on two aims (Austin 1974b: 58), viz:

- (a) Establishing a system of categories capable of accommodating concepts likely to be encountered in literature.
- (b) Devising rules for combining individual concepts to represent compound subjects in any field.

The scheme proposed by the CRG would take the notion of 'general categories' found in all traditional schemes to the limit (Austin 1974b: 58). Instead of having general categories of, for example, place, time and bibliographic form, the CRG scheme would assign all concepts to general categories. Compound subjects would then be constructed out of these separate components, "using a generalized decision-making formula to determine their filing order." (Austin 1974b: 58).

The universe of concepts was first divided into two primary classes of 'things' and 'non-things'. 'Things' was then classified into 'naturally occurring things' and 'artificial things'. 'Artificial things' was divided into 'concrete objects' and 'mental constructs'. The primary class 'non-things' was divided into 'properties' and 'actions'.

Although a new general system has not yet been produced, Austin feels that it "could reasonably be claimed that the aims of a pilot project had been achieved by demonstrating that straightforward classificatory techniques can be applied successfully to the organization of basic concepts, and this should lead to categories which are capable of accommodating terms encountered in any subject field." (Austin 1974b: 59)

In 1974 the following main components of a faceted classification scheme had been established in provisional form (Austin 1974b: 62):

- a) An outline thesaurus of categories, with an experimental hierarchical notation
- b) A set of relational operators with an inbuilt filing order
- c) Provisional 'Rules of classing'.

A.C.Foskett (1977: 210) considers the influence of the CRG on the development of classification theory very important. Austin (1974b: 63) suggests that the proposed system they are still working on "would differ in several basic respects from its main progenitors such as CC and UDC." A.C.Foskett also points this out:

"Starting with the theories of analytico-synthetic classification developed by Ranganathan, the Group has moved

forward in a rather different direction from Ranganathan himself; for a variety of reasons, it seems probable that future developments are likely to be along the lines indicated by the CRG rather than those used in CC." (Foskett, A.C. 1977: 210)

It still remains to be seen whether the general classification system envisaged in 1963 will ever materialise. A.C. Foskett (1977: 211) cites as reasons for this, inter alia, the fact that the new kind of computers is able to handle strings of terms while earlier computers could only use numbers, so that the need for a scheme compatible to computer manipulation had disappeared. PRECIS, for example, can be linked to any method of arrangement. Furthermore, the increasing international use of MARC implies that BNB, for example, will continue to use DC because it is used widely throughout the world.

4.1.3.2 UNISIST and the Broad System of Ordering (BSO)

With the exponential growth of information, existing methods of publishing and dissemination of information were found wanting. New lines were investigated and new methods developed. At first the computer was seen as a way "with glittering prospects of good things to come" (Foskett, A.C. 1977: 212). But although the computer does play a significant role today in information retrieval, developments tended to be more on conventional lines, linked to the improvement of existing services.

During the 1960s the need of the Third World came to the fore. Countries well developed in science and technology also found problems in handling information, but managed to keep them under

control. The Third World, however, felt that they did not have access to scientific information. In 1967 UNESCO and ICSU set up a committee to investigate the possibility of a world science information system. The system was to be named UNISIST. The detailed report produced by the committee was largely approved at an international conference in 1971. One of the recommendations Foskett cites (1977: 212) was that:

"The attention of scientists, learned societies and information science associations should be drawn to the need for joint efforts in developing better tools for the control and conversion of natural and indexing languages in science and technology."

There was a particular need for a universally acceptable 'switching language' which could be applied to all publications to indicate their subject fields. The generally accepted meaning of a 'switching language' had been that it is an indexing language "into which one could translate any existing indexing language as an intermediate stage in converting it into any other indexing language" (Foskett, A.C. 1977: 212). Foskett gives UDC as an example of a switching language. A German indexer faced with the term 'optical character recognition devices' could look this up in the English edition of UDC and find the notation 681.327.5'12. Then he could look this number up in the German edition of UDC to find the equivalent of this notation in German.

This was, however, not the kind of switching UNISIST had in mind, but a much broader classification to be applied to whole blocks of information, e.g. an abstracting journal rather than to individual

documents. Existing classification schemes were examined and found unsatisfactory. It was decided that a completely new scheme should be developed, to be known as the Standard Reference Code (SRC). A sub-committee was set up to develop the scheme and an initial draft of the scheme retitled Broad System of Ordering (BSO) has been circulated. Work is currently being done on a larger revised draft, the broad outline of which is as follows (Foskett 1977: 213):

General, Formal and Structural sciences

Physical sciences

Space and Earth sciences

Life sciences: biology, agriculture, medicine

Behavioural sciences

Social sciences, including economics

Technology

Humanities and Arts

This outline shows great resemblance to the outline of Bliss's B.C. Foskett (1977: 214) questions UNISIST's decision that no existing scheme was suitable for their purpose. One major criticism about the traditional schemes is that they do not reflect the modern structure of knowledge, and in Foskett's opinion, there is no guarantee that BSO will not also become obsolescent. Furthermore, he says, if BSO bears a strong resemblance to Bliss's scheme, has the overall structure of knowledge really changed as much as they have reasoned? Foskett thinks that it would have been better if the money used to develop BSO had been used to bring UDC up to date and to use that as a 'switching language'.

4.1.3.3 Computer-generated classification

The third development in classification reflecting recent trends Foskett mentions, is the work done by Sparck Jones on developing computer-generated classification. There were, however, other projects of research in this respect, which resulted in automatic classification systems, e.g. Gerard Salton's SMART system and the Text Organising System of the Moore School, University of Pennsylvania. We shall look shortly at these systems.

4.1.3.3.1 SMART

One of the projects of Gerard Salton's SMART system has been language analysis by computer with a view to assigning linguistic symbols as content and class identifiers to documents (Moberg 1974: 91). The system was designed at Harvard between 1961 and 1964 (Doyle 1975: 343). It was implemented in 1964, using an IBM 7094 computer (Salton, Keen & Lesk 1967: 337). It now operates on an IBM 360/65 (Doyle 1975: 343).

SMART accepts both documents and requests in natural language form. It does not rely on keywords assigned by indexers to identify documents, nor does it use primarily the frequency of occurrence of words in texts (Salton, Keen & Lesk 1967: 337).

The system uses a variety of "intellectual aids" in the form of various dictionaries such as a suffix dictionary, a statistical phrase dictionary, a syntactic phrase dictionary, a negative dictionary, word stem dictionaries, concept hierarchies (Moberg 1974: 93), synonym dictionaries and also statistical and syntactic

phrase generating methods (Salton, Keen & Lesk 1967: 337).

A suffix cut-off procedure is used which unites all words of the same root. The synonym dictionary groups together semantically equivalent words and assigns a common 'concept number' to them. Concept hierarchies display relationships between concepts and phrase dictionaries combine uniterms into significant multi-terms (Lancaster 1968: 113 .

Document texts are stored in the computer. For input, the text is read into the computer and various programmes are applied - for example the suffix deletion programme, a programme to eliminate common function words, and a programme to count the frequency occurrence of the remaining stems (Lancaster 1968: 113). There is also a programme that will perform syntactical analysis and convert statistical phrases into syntactic phrases.

During a search there is also a variety of operations to help the matching process. Some of them, mentioned by Doyle (1975: 343) are:

1. It will look up synonyms and other related words to increase recall.
2. It will display portions of the vocabulary used in the system to help the searcher formulate his request.
3. It will inform the searcher how many times the words he used in his request appear in all the documents. By using less frequent words, precision will be greater.

Although none of the functions performed by SMART, declares Doyle (1975: 343), is unique to the system, "it is unusual to have such a large number of them available in one system."

4.1.3.3.2 Karen Sparck Jones

Classification is a way of showing semantic relationships, i.e. it arranges subjects together so that a reader will find related subjects arranged together and in a helpful order. In the context of information retrieval, the purpose of classification is "to provide us with groups of terms, each of which may be substituted for one of the others if we need to alter our search strategy" (Foskett, A.C. 1977: 215). Can a computer be used to form groups of terms which would function in this way? Sparck Jones, in her work done at the Cambridge Language Research Unit, suggested that it may be so. The approach is based on the theory of clustering or 'clumps', which are groups of words or related concepts which are shown to occur regularly together, and though the total assembly of each clump may be loose, each concept is related to at least one other (Maltby 1978: 324). For experiments, a set of 200 documents in the field of aerodynamics was used. A total of 1500 keywords was selected from the documents, including the titles, every document being indexed by an average of 35 keywords. Because each document may contain more than one theme, the same keyword might be used to index more than one theme in the same document. Keywords used only once had been eliminated. Finally a vocabulary of 712 terms, with an average of 32 terms per document was used. Four kinds of groups of terms were selected as suitable for the experiment (Foskett, D.J. 1974: 105).

1. Strings: This is a set of terms, each one most strongly associated with the next, the last in the string of a maximum

length of 7 terms being associated with the first in the string, thus forming a loop

A - B - C - D -

2. Stars: These are groups formed by one term and those other terms most strongly associated with it.



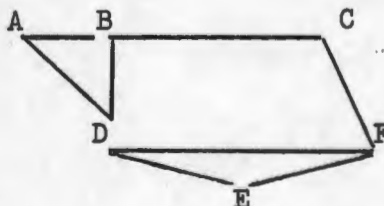
Three sizes of stars were used, containing 4, 6 or 8 terms.

3. Cliques consist of sets of terms each of which is connected to each of the others by a minimum number of occurrences:



Here the threshold was set at three different levels, 13, 16 or 21 links.

4. Clumps or groups in which each term is strongly associated with one or more of the others:



Though the test conditions were somewhat restricted and artificial, the results were promising, and A.C.Foskett (1977, 221) sounds a caution about research done on automatic classification: Firstly, that nearly all the work done has been carried out on small collections in physical sciences and there is no guarantee that it will

also work with the same success in, for example, a large collection in political science. Secondly, in a classification tied completely to the collection of documents, each document means the reprocessing of the total collection to establish the revised classification.

4.1.3.3.3 Text Organising System

The goal of the Text Organising System at the Moore School, University of Pennsylvania, has been the production of a total system for processing data bases, incorporating advanced techniques in information storage and retrieval into one practicable package (Moberg 1974: 97). The system is the product of applied research for use with specialized private data bases. The unifying component of the system is a classification algorithm called CLASFY, which successively subdivides items to create a hierarchy based on occurrence of index terms assigned to items, until document or keyword groups of the desired size are obtained. First, aspirant index terms are taken from the text automatically. The terms that will eventually be used in the classification algorithm are then selected manually, assisted by computer print-outs of word frequencies and similarly spelled words. A vocabulary of index terms determines which terms shall be used to represent the documents. Then the classification algorithm is applied to the documents represented by the terms, successively subdividing the collection hierarchically, to produce a recorded data-base, arranged in an order reflecting similarity of groups. Similar documents are assigned to common "cells" of approximately equal size, moving up the hierarchy or the tree. The terminal nodes are the cells, the

actual location sites of the documents (Moberg 1974: 98). The classes at the nodes are denoted by numbers and descriptions of the documents are built by combining the numbers of successive nodes under which the document is grouped to make up a class number. CLASFY is a three-step algorithm. Each time it is applied, it divides the collection into more groups. The first pass partitions the keywords of the collection or sub-group. The next two passes assign documents on the basis of matching similar keywords in them to one of the groups. The algorithm is reapplied until groups of like documents reach the specified optimum size. Synthesized class numbers classify documents and not concepts (Moberg 1974: 98).

4.1.4 Classification and the computer for information retrieval

Many of the faceted schemes, in particular the New General Classification which the CRG is still in the process of constructing, have machine manipulation in mind, and the use of classification in computerised information systems may become one of the most important future developments in information science. The magnitude of the task of information retrieval calls for mechanical methods. Considerable research has already been done in this respect, as we have seen. Research is still going on. The traditional classification schemes are incapable of dealing with the degree of detail required particularly in special libraries. Enumerative schemes are completely unsuitable for use in computers and this has led to attempts to devise faceted schemes with notations that can be used effectively for machine retrieval purposes. Information can be fed into the computer in a classified or alphabetical form, translated into spots on magnetic tape or disks. Computers can store a vast amount of data, make a search of the stores

extremely rapidly, and pinpoint results. A computer is able to tackle work loads beyond the limits of human brain or manual storage systems and is able to merge new data quickly into an existing file. It can be relied upon to do what it has been programmed to do. There can, however, be problems, for example, the high cost of computer applications and the fact that computer time or space could have to be shared with other users. An information store must be large and must involve many thousands of documents before the use of a computer is justified in terms of efficiency or economy (Maltby 1978: 319).

Computers are of great value, but they are "not all-wise machines either; they accept their electronic signals in inexorable fashion, but if given wrong, incomplete or ambiguous instructions in their programming, 'theirs not to reason why' - or to reason at all Nor will computers carry out the intellectual work of classifying or indexing documents - they can 'index' in a sense ... but they do not contribute the creative and original intellectual work of a skilled indexer in subject analysis" (Maltby 1978: 319).

Computers are used for retrieval of information, to make up and print indexes, e.g. KWIC, MEDLARS, KWOC, etc. and now also to index documents, for example in PRECIS. A computer is used in cataloguing, for example, MARC. In relation to classification, Maltby says (1978: 317) that, for one thing, computers can help to speed up the revision of traditional schemes, a fact which has often been suggested for UDC, whose revision is very slow due to international consultation. He is also of the opinion that UDC is, of the three most widely used classification schemes, the

most suitable for computer adaptation.

The whole operation of recalling items from a classified store consists, according to Vickery (cited in Maltby 1978: 320) of:

- a) Naming the subject searched for in terms used by the index;
- b) locating the terms in the index;
- c) locating the documents to which the machine refers us; and
- d) to study and integrate the retrieved documents.

Vickery suggests that only step (b) may lend itself to mechanisation and the computer will never be able to accomplish step (d). Thus, while the computer can save much time and work in large-scale operations, it is definitely not the remedy for all indexing problems and can also not remove the need for control devices or thesauri.

Farradane (1961, in Sayers Memorial volume: 124), in discussing fallacies in different methods of classification, says about mechanical classification:

"Many have been dazzled by the large memory capacity and fantastic speeds of the computer into thinking that new principles of organization of knowledge have thereby been introduced: they have not."

In contrast to traditional classification, he says, the computer can keep all concepts separated and uncombined, making the necessary combinations at the moment of scanning. Any given document or subject, however, must previously have been stored in its memory to be available for scanning for a complex subject. These operations are the same as free facet classification, and have not the advantage of the possibility of 'browsing' in closely

allied subjects or a more comprehensive term that will include the subject when the exact sought term is not present.

Thus, there are problems too in mechanised classification in spite of important improvements, and the need for skilled subject analysis, states Maltby (1978: 320). Mechanised ISAR systems are legion, proceeds Maltby (1978: 321), and more continue to be produced. Many are, however, nothing but variations on existing ones. Some of the most interesting are those which have used UDC. They cover a wide field - geographically and in subject, e.g. in the U.S.A., people such as Freeman, Rigby, Atherton and Caless have experimented on UDC file organisation and search strategy in the fields of meteorology, metallurgy and nuclear science. In Germany, Schneider has experimented with UDC organised machine-produced indexing of the KWOC variety. Other systems which involve mechanisation are MEDLARS, PRECIS, the LC and ENB MARC projects, and systems which have received less attention in literature, such as Gardin's Syntagmatic Organisation Language (SYNTOL), which is, according to Maltby, not an easy system to study, but warrants attention.

Automatic classification is achieved by a consideration of the natural language from the text of each document, and an examination of the frequency with which each word is used (Maltby 1978: 323). The computer can list words according to their frequency of occurrence and can be programmed to select all words with a given minimum of frequency as index terms. It has also been found that regular word associations may be more telling than frequency of occurrence of a single word. Work on this has been

done, as we have seen, by Salton, Lesk and Sparck Jones. The statistical measurement of such associations by computer, claims Maltby (1978: 325), are certainly classifications, and the work done by Sparck Jones and her associates "illustrate admirably the thesis that classification of some kind or other, do what we will, is ubiquitous in storage and retrieval methods." Even in this highly technological age most librarians will, in the opinion of Maltby, settle for traditional indexing methods. For instance, British Technology Index uses a computer for the 'housekeeping' aspects of production, but prefers to leave even quasi-intellectual tasks to human indexers. He also mentions (1978: 325) that Robert Freeman has drawn attention to Cuadra's remark that computer-generated classifications are as yet rarely relevant because of costs and the acceptance by libraries of established systems. Another role computers can play in indexing is that schedules can be updated with their help, and particular procedures could be mechanised. Thesaurus construction can be aided by mathematical selection of terms from the literature. They could be used to provide a comprehensive index to LC, and to remove waste, inconsistency or ambiguity from vocabulary. Much of Ranganathan's work, claims Palmer (cited in Maltby 1978: 326), seems to have been an unconscious anticipation of what future technology would make possible for classification. Maltby suggests (1978: 327) that the future for classification will be just as interesting as its long history, and that "the fully effective role of classificatory principles in large specialized information centres may be only just beginning."

4.1.5 The future of classification

When, about a hundred years ago, William Jevons said that classification is a "logical absurdity", he was not the only one who held that opinion. The loss of faith in classification has led to the development of various alternative systems for organising knowledge, using a different basis from deductive logic. One area investigated as a new basis was words, index terms, and subject headings. Mortimer Taube with his Uniterm system took this path, and so did many others, such as Coates, Farradane, Austin, etc. Another area was inductive logic - i.e. classification systems built from the ground up - and this resulted in various faceted classification systems. As we have seen, systems based on words had problems and weaknesses resulting from the richness of language. Efforts to escape classification by means of words alone, argues Richmond (1974: 105), was not an unqualified success, nor a total failure. The development of thesauri has proved that a controlled vocabulary can be very useful in a homogeneous subject field, and verbal indexing is used a lot today in special libraries. In this the computer has taken an important place. Research in verbal indexing has shown that relationships between concepts for which words stand are important. This has led to compilation of word lists, and from word lists to thesauri to attempts at mapping by means of directed graphs and such devices. The mapping has reintroduced a factor of classification into subject analysis. Thus, "in the area of words as an alternative to classification, the trend has led right back to classification" (Richmond 1974: 106).

In faceted classification, based on inductive logic, the problem of relationships turned up too - a fact which has been emphasized

by Farradane and Coetzee for many years. Derek Austin made use of the relationship-in-classification idea in developing his PRECIS system. PRECIS terms, says Richmond (1974: 106) carry enough of their content with them to be a miniature multiple-entry classified index to a given title.

Research in classification is going on, and classification is by no means dead, claims Richmond (1974: 107). While research for more satisfactory classification systems is going on, the traditional forms of classification continue. Traditional schemes are being revised and updated. Use of the computer has had a great influence on classification. Besides being used in automatic keyword classification, it has also been applied to classification, for example in a project using UDC; it can be used as a sorting device with the notation of almost any classification system; it is used to print and maintain LC Subject Heading system; "it is the mainstay of all automatic classification attempts and a good many indexing ones as well" (Richmond 1974: 108).

Whichever new systems and projects may develop, such as the combination of cable television, the telephone and the computer, which can bring a variety of services into the user's home, or the concept of the information utility, providing service to a mass consumer group, the technical process of actually calling up the data is going to require classification and indexing. Classification will also always be used in libraries. Documents must be ordered in such a way that they are accessible and the information contained in them can be retrieved whenever it is needed.

"Classification is the basis of all intelligent work"

states Palmer (1961, in Sayers Memorial Volume: 209). It is the basis of all indexing languages, and is also used in searching a collection. Thus Langridge maintains (1973: 116) "..... in the fundamental sense there is no substitute for classification", and Vickery states (1972, in Maltby: 169): "A little reflection makes evident that classification, in one form or another, at one stage or another, is almost universal in information storage and retrieval." Finally, according to Palmer (1961, in Sayers Memorial Volume: 210): "Continuous study of the schedules of a general enumerative scheme of classification, like the Decimal Classification, should be a basic part of the education of the young ... librarian." The reason for this, he says, is that such a schedule lays bare the outline of knowledge, gives us a frame of reference for all knowledge and meaning to the names of units of knowledge.

It looks, says Richmond (1974: 114) as if classification "has taken a new lease on life." Twenty years earlier it seemed as if classification had no value beyond being an "intellectual exercise". But now, with extension of the range of immediate access to information, the recognition of interdependence of subject matter in many disciplines, new technological capabilities unknown twenty years ago, and emphasis on speedy and effective communication, classification is becoming more and more the entry point of choice (Richmond 1974: 114). Partly this is due to the weakness of reliance on terminology alone. "It is rather obvious," says Richmond (1974: 114) "that classification without indexing is just as impossible as indexing without classification."

4.2 Present situation and modern trends in cataloguing

4.2.1 Library networks

A hundred years ago Melvil Dewey stated:

"About once in so long articles appear in different countries rehearsing the follies of the present system of doing the same thing over a thousand times, as we librarians do in cataloguing books that reach so many libraries. But right here they stop. There somehow seems to be an idea among certain leaders of our craft, that such a thing [co-operative cataloguing] is wholly visionary; at least their failure to take any practical steps in the matter would seem to indicate such a belief" (cited in Pope 1973: 1).

Today Dewey would have been reading articles in professional journals indicating that the idea of centralized and co-operative cataloguing is not "wholly visionary" any more. Practical steps have been taken to realize the idea of co-operation in cataloguing, and librarians are still trying to improve on existing systems of co-operation and to solve problems to the satisfaction of all libraries.

Two basic problems librarians have been trying to solve for more than a hundred years are the high cost of cataloguing material when done by individual libraries and the time that elapses between the publication of a book and the time it becomes available to the user (Pope 1973: 1). When the Library of Congress (LC) started in 1901 to provide printed catalogue cards to individual libraries, a third problem was created, viz. the difficulty of identifying the printed card issued by LC with other bibliographic records because of the difference between the form of entry used by LC and the form printed in other bibliographic sources. Thus the need arose

for uniformity in cataloguing.

Different methods have been used in attempts to speed up catalogue card production and at the same time lower the costs, e.g. systems using automatic typewriters; punched tape, magnetic tape and punched cards; sequential card camera systems and computerised off-line batch-processing systems. The use of these methods, especially those that have been computerised, revived interest in the book form catalogue. In recent years there has been an increasing recognition of the economic benefits of providing libraries with bibliographic descriptions produced by a centralised service. Various ideas have been advanced in attempts at coming to terms with the problem of providing cataloguing information for books promptly and economically. Two of these approaches have already demonstrated their practical value, viz. co-operative cataloguing and centralised cataloguing. These two projects have contributed towards the refinement of library co-operation into sophisticated forms of networking.

In library usage, the word 'network' has meant two different things (McCarn 1974, in *Clinic on Library Applications of Data Processing*: 1). "First, it has meant resource sharing, efforts to reduce the cost of duplicating facilities and collections through primarily inter-library loan agreements. Second, it has meant distribution through telecommunications in information services."

The second connotation of the term, i.e. the creation of effective bibliographic communication, which is a prerequisite for source-sharing, is of more recent origin.

The latest application in computerization has opened the door for macro-analytic network services such as those based on MARC as a communication form, for example OCLC, BALLOTS AND BLCMP.

Hunter and Bakewell (1979: 125) give the following basic definition of a library network:

"A group of libraries and/or information service points connected together for the purpose of satisfying specified requirements."

Through the years such networks have developed on regional, national and international level, to provide services to libraries. In this section we are going to look at some networks which assume responsibility for the cataloguing and classification of material and which then make it available to any library which may require it.

4.2.1.1 MARC (Machine-Readable Cataloguing)

When planning for automation at the Library of Congress started, it was undertaken "against the background of the role of the Library of Congress as a national library" (de Bruin 1973: 216). After investigations in and reports on the matter, a meeting was convened in January 1965 under the joint auspices of the Library of Congress and the Committee on Automation of the American Association of Research Libraries. Some of the conclusions reached at the meeting, cited by de Bruin (1973: 216) are:

"Early availability from the Library of Congress, by subscription, of machine readable bibliographic data for current materials, as a by-product of LC's cataloguing

operations, is desirable and will help individual libraries as they face the question of whether or not to automate...."

and

"Agreement on form of input is desirable, and standardization should be more nearly attainable in a machine system. If LC makes the decision on the form of all bibliographical information, this could become the best single source of standardization....."

A further policy indicated by the meeting, relates de Bruin (1973: 216) was that the information normally contained in LC catalogue cards should be included in machine readable form, with the necessary additions. Individual libraries could then use the data and adapt it to their own needs.

Thus the MARC pilot project was initiated by LC in 1965 with the object of providing a format for cataloguing records "that would be machine-readable, acceptable as a national cataloguing standard and that could be used interchangeably in all different computers likely to be used by librarians" (Salmon 1975: 5).

Sixteen libraries were selected to participate in the project. They were chosen to represent as far as possible a wide variety of different types of libraries - research, public, school, special and government (de Bruin 1973: 217). In the pilot project, the form used by LC to prepare printed cards was reproduced on an input worksheet, numerical "tags" were written alongside each item of information and both tags and data were typed on a papertape typewriter. The papertape was used as input for the computer. A

cycle of editing and new proofsheets was repeated until the record was error-free (Salmon 1975: 75). The record was then stored on a master tape. From the master tape, copies were made and distributed to the sixteen participating libraries.

Despite minor problems, the participants were able to put the tapes to a variety of uses, such as producing catalogue cards, book catalogues, special lists for acquisition purposes, SDI and reading lists (Salmon 1975: 78). In the Pilot Project, only current monographs in English were included.

The participants were enthusiastic about the project and it was decided to continue with it (Salmon 1975: 80). Work was started on a revised format called MARC II, which incorporated changes recommended by the participants, also by interested librarians, computer technicians and special committees formed by the United States Standards Institute and American Library Association. Emphasis was placed on "generality and flexibility - i.e. a format that would be an efficient means of communicating bibliographic descriptions of all forms of materials (monographs, serials, maps, music, etc.) between library centres" (Avram 1968: 2605).

Magnetic tapes of MARC II have been made available to all libraries on a subscription basis since April 1969. The process used in the Pilot Project of assigning tags manually and then repeatedly keyboarding and correcting, has proved slow and expensive and in MARC II a new process was developed. It is called "format recognition" and uses the computer to do editing and assign tags; indicators and subject-field codes automatically (Salmon 1975: 82).

In 1971, Cataloguing-in-Publication records were added to the distribution service; in 1972 and 1973 records for other types of materials, such as audio-visual representations, maps, and serials, were added and in 1973 records for titles in languages other than English began to be added. By 1975, MARC records were being produced at a rate of approximately 127,000 titles a year, including all current LC cataloguing in English, French, German, Spanish and Portuguese. The total number of records available had then passed half a million (Salmon 1975: 84). MARC had by this time also become international "and was accepted almost universally as the basis for present and future planning of individual and co-operative cataloguing projects" (Salmon 1975: 84).

The MARC format has been used in more or less standard form by libraries outside the United States. This fact promoted the idea that these MARC records, i.e., created outside LC, should become part of a centralized data base (Rather 1977: 632). So in 1975 a new project, called COMARC (CO-operative MARC) was started. The project was designed to test the feasibility of building a centralized co-operative data base. Libraries using MARC were invited to contribute their records, based on LC cataloguing, to the Library of Congress, who would eliminate duplicates and update access points where these have been changed in the official catalogue of LC. They would then be reissued as part of the MARC Distribution Service.

In time countries developed their own formats to suit their own needs, the first being U.K.MARC. As a result, given the multiplicity of formats, exchange of data in machine-readable form

on an international scale became difficult. In 1973 the IFLA Working Group on Content Designators was formed (Rather 1977: 635) to deal with the situation. Their purpose was to establish an international exchange of data, while countries could continue to use their own national format and only translate records into the international format for exchange purposes. The new format is called UNIMARC (Universal MARC) and its basis is the International Standard Bibliographic Description (ISED).

4.2.1.2 BNB (British National Bibliography)

Half a century later than the United States, the United Kingdom provided a centralised service similar to the service LC started in 1901, making available to other libraries printed cards containing cataloguing data, LC and DC classification numbers and subject headings.

The BNB, now part of the Bibliographic Services Division of the British Library, was established in 1950. Originally it was based on the books received by legal deposit in the British Museum and later on those received by the Agency for the Copyright Libraries (Hunter and Bakewell 1979: 127). The BNB consists of a weekly printed list with entries classified and arranged by DC 18. Author/title indexes are provided and a separate index using PRECIS is included in the last issue of each month. A printed card service was begun in 1956. Cards could be purchased, using the BNB serial number and later the ISBN for ordering. LC services provide a much wider coverage than BNB services, BNB cards were essentially a by-product of a national bibliography, which omits

some categories such as maps and certain government publications. From early 1978 the BNB card service was taken over by BLCMP.

4.2.1.3 Contemporary networks - automated catalogues

Although MARC and BNB may be thought of as networks, declare Hunter and Bakewell (1979: 132), today the term 'network' more accurately refers to systems containing elements of computerization, with machine-readable data bases capable of being accessed either off- or on-line. Within such frameworks the concepts of centralized and co-operative cataloguing still play an important part. The objectives of such networks can be stated as:

1. To reveal the contents of a large number of libraries or a large number of publications
2. To make these resources available to individual libraries when and where they need them.
3. To share expenses or work involved and reduce the rate of increase in cost to individual libraries.

When the work is shared, participating libraries contribute records to centralized data bases. When cost is shared, the organisation does the work and users of its service pay for access to the resultant data. Some contemporary networks are:

4.2.1.3.1 OCLC (Ohio College Library Center)

The records in the data base of OCLC consist of information relating to documents held in the stocks of libraries. OCLC was founded by the Ohio College Association in 1967, with the object of increasing the availability of academic library resources throughout Ohio. Thus it was originally composed of a network

of academic libraries. Its first computerized service became operational in 1970 with a batch-process MARC-based monograph cataloguing system. In 1971 this system was replaced by an on-line remote access system. It expanded so much that it became a nationwide system with some overseas subscribers. In 1977 its subscribers already included academic, public and government libraries as well as a national and a special library (Freedman 1977: 706). Today some 1000 libraries in the United States depend upon it for greater cataloguing efficiency and for its on-line union catalogue of almost ten million locations and resources. Apart from its on-line union and shared-cataloguing designs, it also has designs for serials control; acquisitions control; inter-library loan communication; remote catalogue access and circulation control and retrieval by subject. Although all its facilities are not yet operational, the possibilities are immense, especially the idea of catalogues on-line to users as well as to libraries (Hunter and Bakewell 1979: 134).

A cataloguer can sit down at a Visual Display Unit, 'call up' a record, which will appear on the screen, and can then be amended, edited and altered to suit the individual cataloguing requirements. Hunter and Bakewell report (1979: 137), however, that at the time of writing OCLC was still printing an average of 1,3 million catalogue cards a week for its users.

4.2.1.3.2 BALLOTS (Bibliographic Automation of Large Library Operations using a Time-sharing System)

The system is based on the belief that efficient housekeeping is the first step in providing effective library service (Veaner 1977:

127). The system was developed at Stanford University beginning in 1967, and has been operational since 1972. In 1975 its cataloguing system was implemented and it began extending its services to public libraries and after that to academic, research and special libraries (Berrisford 1977: 256). BALLOTS services include bibliographic searching and catalogue card production. Its data base contains books acquired by the Stanford University Libraries since 1972, and also MARC records. It provides on-line access to its data base and maintains four machine-readable on-line files (Veaner 1977: 128):

1. MARC-file which includes all LCMARC records from 1 January 1972.
2. Cataloguing Data File (CDF) including all titles processed in the BALLOTS system.
3. In Process File (IPF) which includes all titles on order or received but not catalogued.
4. Reference File (REF) which includes cross-references, explanatory references and scope notes. It also serves as an authority file.

The BALLOTS system is fully compatible with both MARC and ISED(M), though that was not the case when it came into operation. It was decided at first not to use all the MARC subfield codes in its internal format. But the rapid development of networking made nationwide adoption of the full MARC format imperative (Veaner 1977: 132).

4.2.1.3.3 BLAISE (British Library Automated Information Service)

The system became operational in 1977 and is an on-line interactive

information retrieval and cataloguing system (Hunter and Bakewell 1979: 143). Files at present available are those originating from the National Library of Medicine in America and those containing information about monographs and first issues of serials published in the United Kingdom and the United States, catalogued by the British Library and Library of Congress - i.e. U.K. Current MARC, U.K. Retrospective MARC, LC Current MARC and LC Retrospective MARC. The U.K. MARC file covers the majority of British copyright material back to 1950 and the LCMARC file currently provides access to U.S. and other material back to 1968.

The system allows MARC files to be searched in a wide range of data field terms. Libraries can use the files to provide information services to their users, select records for cataloguing aids and other library operations. Apart from control numbers such as ISBN, BNB number and LC card number, searchable fields include publication date, country and form of publication, DC, LC and UDC class numbers, authors, titles, LCSH and PRECIS terms. There is an EDITOR subsystem which enables the user to catalogue 'on-line'. Records already in the system can be retrieved and modified, and new records created.

4.2.1.3.4 LOCAS (Local Cataloguing Service)

Linked with BLAISE is the British Library Bibliographic Services Division's Local Catalogue Card Service (Hunter and Bakewell 1979: 145). MARC-based catalogues are produced and maintained for each participating library. The necessary records are selected from central data bases and then modified to satisfy local needs. For

material not included in central bases, locally created MARC records are added. The catalogues resulting from this service are in micro form. With this sort of service, participating libraries need not concern themselves with systems analysis or programming.

4.2.1.3.5 BLCMP (Birmingham Libraries Co-operative Mechanisation Project)

This system was originally established by the libraries of the Universities of Aston and Birmingham and City of Birmingham Library. Today the system has expanded into probably the most important library network in the United Kingdom (Hunter and Bakewell 1979: 145). It offers a national and international cataloguing service. The computer system it has designed and implemented utilises the U.K. and U.S. MARC data bases, and it also produces records locally in the MARC format. The data base is available to any subscribing library. The system is currently a batch mode. Data bases are updated weekly, and catalogues are produced weekly, monthly, quarterly and half-yearly, depending on their medium and user requirement. At the moment plans are in process to install terminals in the cataloguing department of each participating library. These terminals will operate in both off and on-line mode.

4.2.1.3.6 LASER

This library network was set up in 1970 within Greater London and other counties of South-East England. Its object was to promote co-operation between all types of library (Hunter and Bakewell 1979: 146). It helps with inter-library loans, and its union

catalogue currently contains entries for more than 1,5 million titles, of which one million are in machine-readable form and maintained in an on-line mini-computer system. Also available to participating libraries, are micro-film catalogues listing BNB serial numbers and ISBNs, with locations of the material.

4.2.2 Uniformity in cataloguing

For more than a century, efforts toward bibliographic control had as goal the regularization of cataloguing data (Hickey 1977: 565). Although, as mentioned before, Melvil Dewey saw the advantages of one-time cataloguing a century ago, it is only recently that this goal has appeared to be obtainable. Library networks and co-operative and centralized cataloguing, while contributing to the goal of one-time cataloguing also created the need for standardization in cataloguing. If standardization is to live up to what is expected of it, claims Hickey (1977: 579), certain conditions must be established for its adoption:

1. Standardization of bibliographic information systems should elevate rather than reduce the quality of local catalogues. The introduction of an internationally accepted code for selection of entries and headings could, if applied consistently, improve the quality of all bibliographic records. The idea of a standard is to impose consistency, if not uniformity.
2. It must be able to be monitored for consistency of application. Thus, a standard such as AACR, which can be interpreted in different ways in practice, can produce contradictions

and may be worse than no standard at all. Although complete uniformity may be unattainable, reasonable consistency is essential.

3. There should be a flexibility which allows suppression of extensive detail in favour of simplified reformatted listings. In the OCLC system, for example, participants have the chance of adapting bibliographic data to suit their clientèle.
4. There should be more democracy in the process by which standards are developed and adopted, i.e. there should be responsible representation from organisations with legitimate concerns in that field, instead of reaching agreement through the auspices of a small group of recognised experts.

4.2.2.1 ISED and AACR

The idea for ISED was largely instigated by British librarians and bibliographers (Hickey 1977: 575). ISED for current monographic publications first appeared in 1971 and was a little later adopted by IFLA's Committee on Cataloguing. ISED prescribes the type, order and composition of all information in a library record, with the exception of points of access, suggested classifications and certain control codes placed on the card by a cataloguing agency (Sinkankas and Daily 1974: 281). In 1974 appeared a revised edition of AACR 1967 chapter 6, to "bring the rules for the description of monographs and other non-serial publications into line with the provisions of the first standard edition of the ISED(M)" (Library Association 1974: ii).

In 1971 a Joint Working Group of the IFLA Committee on Cataloguing and the IFLA Committee on Serial Publications was formed to draw up an ISED for serials (ISED(S)), following ISED(M) as a model whenever it was practicable. While ISED is concerned with description only and not with entry, ISED(S) "specifies requirements for the description and identification of printed serial publications", stated the Joint Working Group on the International Standard Bibliographic Description for Serials (cited by Pulsiver 1977: 691).

In 1975, IFLA's Cataloguing Secretariat was transformed into the Universal Bibliographic Control Office (UBC), physically located in the new British Library (Hickey 1977: 577). UBC, together with the newly created national library superstructure in Great Britain, bringing together under one administration the major component of British bibliographic control, formed a powerful base for further development of international cataloguing standards.

A major revision of AACR was undertaken "in the hope of laying groundwork for the development of an international cataloguing code to standardize entry and heading rules" (Hickey 1977: 578). The revised AACR will be a unified edition and work on it began in 1974. Although the initial aim was to produce a combined British and North American text, Council on Library Resources insisted that the new edition be seen as a step towards an international code, and that royalties from the second edition of AACR be set aside to fund future revisions and expansions. Out of the code revision process, another ISED Working Group has grown under UBC's aegis, viz. one that would direct its efforts towards creating ISED(S) - a generalized standard "to codify and to place some logical res-

trictions on the possibly excessive number of deviations from ISED(M), which were beginning to creep into proposed ISEDs for early printed books, maps and non-book material" (Hickey 1977: 578).

JSCAACR (Joint Steering Committee for revision of AACR) declared the guidelines by which policy questions and new proposals were to be determined. In the preface to the second edition of AACR (1978: vii) they are summarized as follows:

1. Maintenance of general conformity with the Paris Principles of 1961.
2. Particular attention to developments in the machine processing of bibliographic records.
3. Continuance of conformity with ISED(M) as a basis for the bibliographic description of monographs, and commitment to the principle of standardization in the bibliographic description of all types of materials.
4. Determination of the treatment of non-book materials primarily from a consideration of the published cataloguing rules of the Canadian Library Association; the Library Association and the Association for Educational Communications and Technology; and of the ALA revision of chapter 12 of the 1967 text. AACR 2nd edition was published in 1978.

Of international cataloguing standards, Hickey asks the following questions (1977: 578): "Can international cataloguing standards be developed and promulgated without depriving local libraries of

the opportunity to tailor bibliographic systems to fit the needs of the clientèle whom they serve directly? Is the goal of one-time cataloguing more a 'snare and delusion' than a bonanza?"

4.2.3 SA MARC

In the early 1970s investigations and surveys were initiated by the South African National Library Advisory Council (NLAC) to determine the possible use of LC MARC tapes in South African libraries. These surveys led to the establishment of an experimental MARC service in 1975 and a South African MARC service in 1977.

An increasing number of libraries in South Africa are mechanizing systems or planning to do so. NLAC felt that these mechanized library systems should develop on a co-ordinated and standardized basis (Kingwill 1979: 5). They appointed a Sub-committee on Information Retrieval to study developments in mechanization overseas, their implications for South Africa, to do a survey to determine what has been done and was planned in South Africa and to determine whether libraries in South Africa made use of international services such as MARC. They found that there was little co-operation with regard to mechanization, a lack of standardization in mechanized systems, and that the development of mechanized systems was hampered by the lack of suitably trained staff.

NLAC appointed a Committee on Bibliographic Services in 1971 to carry out a study on the feasibility of subscribing to MARC tapes and similar international services by the State Library who could

provide a national service, and to pay attention to the need for standardization. A Working Group was appointed, and on the basis of their findings (Lodder & Fokker 1973) it was concluded that UK and LC MARC tapes would yield sufficient data for a valid experiment in the use of these services; also that the MARC records would be largely acceptable to most South African libraries and that there were sufficient potential users for a MARC service (Kingwill 1979: 7).

An experimental MARC service was established at the CSIR under the guidance of the MARC Working Group (MWG), appointed in 1973 by NLAC to replace the previous Working Group (Kingwill 1979: 7). A MARC office was established in 1974 and a trial MARC record selection and SDI services were introduced in January 1975, using LC and UK MARC tapes (Lodder & Fokker 1976: 77). Services were provided to six libraries who were then required to report on the service, particularly on the acceptability of the cataloguing information in MARC records. The information supplied was used for the development of a mini-SA MARC format.

In mid-1975 MARC experimental services were made available to all libraries, free of charge, on condition that the libraries provided feedback and statistics for evaluation of the services (Kingwill 1979: 7). In June 1976 NLAC requested the CSIR to take responsibility for the continuation of the MARC experimental services and the RSA MARC Service (1) was established in July 1977. In 1977 NLAC requested the MWG to investigate the possibilities and desirability of implementing a cataloguing network. As a result of a survey (Kingwill 1979: 10), it was recommended inter alia,

that a system should be developed, based on aspects of the record content acceptable to South African libraries; that additional attention be paid to the question of bilingualism and PRECIS indexing; that the MINI-SAMARC and SAMARC formats be accepted as standards; that, after the SAMARC format has been finalised, SANB be converted into SAMARC format; that every attempt be made to make RSAMARC services acceptable to libraries; that the MARC data base should consist of at least the UK, LC and SANB tapes; that SAMARC services be provided on a more permanent basis to all interested libraries.

Also as a result of the 1977 survey, it was decided to begin a project to determine whether a cost effective cataloguing network system could be designed which would provide for the requirements of the South African library community (Kingwill 1979: 10).

One of the main objectives of the MARC project was to encourage libraries in South Africa to develop computerized systems compatible with MARC format (Kingwill 1979: 12). There are, however, quite a number of national MARC standard formats, which were then studied, together with UNIMARC, to find the most suitable for South African requirements. Of these formats, UNIMARC was found the most suitable, with some alterations. This format will be used in the cataloguing network project (Kingwill 1979: 12).

4.2.4 The future of cataloguing

More and more libraries are starting to use computers or planning to computerize in the near future. Many libraries start the mechanization of procedures in the library with the cataloguing

procedure. According to Brodman (1974: 14), cataloguing is one of the most difficult of the library housekeeping procedures to mechanize because the quality of cataloguing and bibliographic description is based on variables that do not lend themselves to programmed manipulation, but require unique judgements by human cataloguers. Because of this, most systems of computer-based cataloguing are more or less printing mechanisms with pure aspects of bibliographic description supplied by human cataloguers.

Systems such as MARC cataloguing have only standardized the order in which elements are stored and retrieved, while the elements themselves are provided by human cataloguers. The purpose of MARC is to be a format for the transfer of bibliographic data. Cataloguing, asserts Brodman (1974: 14) is indispensable in libraries and "without it the acquisition of material is like the stacking up of volumes in huge bins; there is no access to their contents except through the tedious job of turning over each volume in turn." 'Cataloguing' in the sense used here obviously includes classification and indexing. Even in libraries subscribing to an on-line network, each individual library will have to modify the standardized material offered by the network's data base to suit its own requirements. The cataloguer can call forth from the data base the catalogue card in it representing the book in hand, and then he has to know enough about cataloguing and bibliographic description to modify what he receives to conform to the style and needs of his own library, just as for years libraries have modified LC printed cards to suit their own needs.

Increased use of the computer, and of networks, is bound to have

an effect on the management of cataloguing in libraries. Most studies in this respect (cited by Hunter & Bakewell 1979: 176), showed that the results of computerisation and networks were greater efficiency and more bibliographic control and staff economies. Accepting the output of a network, however, confirm Hunter & Bakewell (1979: 178) does not mean that no local cataloguing will be necessary. There will always be items not covered by the network system, e.g. foreign language material and local items, and it is also possible that the classification and subject headings offered by the network system will not be acceptable to a library. Libraries using the services of a network system with a data base containing, for example, LC MARC records, will not really save cataloguing costs by accepting the cataloguing information without regard to local emphasis, local needs, local terminology and local readers. This will only result in higher expenditure of time by users - for example, in frustration by being directed from a local term to an American heading, presenting a false picture of the library's collection by emphasizing the American aspect when copying LC class numbers to books.

Hunter & Bakewell (1979: 178) are, however, of the opinion that there will be a growing acceptance of centralized and regionalized computerised cataloguing services, and that this must have an effect on cataloguing at local level; that the end to cataloguing departments could be foreseen, with subject departments organizing their own cataloguing, and one or two 'Bibliographical Service Officers' co-ordinating catalogue records at local level. Cataloguing staff will have to understand something about how

computers work, though there will be no need for them to be computer specialists. The long term effects of computers and increased use of networks will be a reduction in cataloguing staff at local level, claim Hunter & Bakewell (1979: 179), but there will be many tasks in all libraries that staff trained in cataloguing could undertake, such as helping users to make effective use of catalogues; guiding and display; analysis and annotation. The computer should be regarded not as a monster, but as an ally helping to provide a more effective service to clients.

Although cataloguing is a fast-moving activity where possibly more is happening than in any other area of librarianship, and nobody can predict what will happen in the next decade, Hunter & Bakewell (1979: 179) think that the impact of the computer will increase and that access to catalogues will become available to the user in his own home via terminals linked to domestic television sets. Care must be taken, however, that catalogues and indexes do not become so complex that users will be unable to understand them. Libraries will also have to decide whether to join a network or work on their own. Hunter & Bakewell predict (1979: 180): "Ultimately the 'library' will probably become a computer store, with information being accessed as required."

CHAPTER 5

HISTORICAL REVIEW OF EDUCATION FOR LIBRARIANSHIP OVERSEAS

In this chapter the history of education and training for librarianship in overseas countries is reviewed.

'Education' implies the preparation of students for professional qualifications providing for "the education of staff capable of exercising professional tasks in library and information service and of assuming responsibility in middle management" (South African Library Association 1979b: 7). It involves "educational programmes in tuition in specialised fields of knowledge and technical skills characterising a profession as well as in certain extra-professional disciplines" (South African Library Association 1979b: 9).

'Training' implies the preparation of students for para-professional qualifications, providing for "the training of staff with the knowledge and competence required for the handling of standard library and information techniques, procedures and appliances in a prescribed manner" (South African Library Association 1979b: 7). It involves training programmes emphasizing the technical aspects of the "organisation of collections of records by means of the application of specific systems, procedures, methods and techniques" (South African Library Association 1979b; 71).

Particular attention is given to the development in Great Britain and the United States of America by virtue of the strong influence

these countries had on our own initial approach.

Some European countries are dealt with, firstly for the purpose of comparison, and secondly because of European influence on our approach through the professional philosophy of library scientists, such as P. C. Coetzee and H.J. de Vleeschauwer. Coetzee in particular greatly influenced the theory of education for librarianship in South Africa.

5.1 Beginnings

The real forerunners of library schools (i.e. institutions of higher education offering courses of instruction in library and information science) were, in the opinion of Richardson (1963: 151), the schools of the Scriptoria of the Middle Ages. In these schools the librarians both made and maintained their collections of manuscripts and the art was passed on to newcomers in the Scriptoria. Then there were also the temple schools of Greece and Egypt, where professions were taught, including the craft of producing, editing, acquiring and organising for use the records of Western civilisation. Such schools, according to Richardson may go back as far as 3200 B.C. i.e., at the time of the invention of writing in Sumeria. Richardson speculates that we may trace the origins of education for librarianship to an earlier past, viz. to the schools established for training in memorisation of ancient India (Richardson 1963: 152). A parallel to these schools can be found in the collections of mnemonic books, where keepers of quipus¹

1 Quipu, according to the Oxford English Dictionary, is "a device of ancient Peruvians, and others, for recording events,

were trained in the use of such records. Another similarity can be seen in the initiation ceremonies of primitive tribes in which young men were taught the use of message sticks, secret languages, etc. Richardson considers all these as being the true precursors of the library schools of today, because people were trained in keeping and passing on records on the history and culture of man (Richardson 1963: 153).

Library schools of the future may differ considerably from those of today, because there are bound to be changes in the library world, which will inevitably cause changes in library education.

5.2 Education for librarianship in Europe

Hjelmquist (1968: 29-53) reviews education for librarianship in various European countries. He remarks on the fact that there are almost as many systems of education for librarianship in Europe as there are countries in that part of the world (1968: 30). This can be attributed to the fact that education for librarianship tends to follow the distinct educational pattern of each country, such patterns differing widely among European nations. Also, general library development is closely associated with the socio-cultural identity of the country of its operation. Education for librarianship, in turn, goes hand in hand with library development.

5.2.1 The Netherlands

keeping documents, sending messages, etc., consisting of cords or threads of various colours, knotted in various ways."

In the Netherlands, library education reflects the library situation of the country, with its individualism and provincial and denominational differences (Hjelmquist 1968: 43). Development during the 1960s showed a growing interest in the co-ordination of education for librarianship. Since 1922, the Centrale Vereeniging voor Openbare Bibliotheken has been organising courses for librarians. Two types of certificates are issued: viz. assistants' certificates and directors' certificates. The courses are part-time, combined with practical work. The assistant's certificate requires a two-year course, done mainly at one of five training libraries. To obtain a director's certificate, a study period of ten months is required. Courses were offered at first in The Hague, partly in the Royal Library and partly in the City Library. Now these take place at the new library school in Amsterdam.

Until 1964, librarians for research libraries had in-service training, then a two-year education programme was introduced at the University of Amsterdam (Gemeente Universiteit). During the second year of study, the student has to work in at least one large library.

In 1964, a full-time library school was established in Amsterdam, founded by the Stichting Bibliothek- en documentatiescholen.

Education for librarianship still takes place on two levels:

- 1) a basic two-year course for assistants in all kinds of libraries, and
- 2) an advanced one-year course for leading positions (i.e. for a director's certificate).

For the basic course, the admission requirement is matriculation,

and for the advanced course a diploma in the basic course or a diploma from a part-time course for assistants.

The first year of study and part of the second year are the same for all students, then there is a certain amount of specialisation. The curriculum includes forty weeks practical work in various libraries.

5.2.2 West Germany

In 1883, rules were laid down in Germany for employment of librarians and in connection with this a system of education for librarianship was started (Hjelmquist 1968: 45). Training lasted two years, one year of practical and one of theoretical study in the Royal Library. In 1909, training for assistants in research libraries was started and in the 1930s was extended to assistants in public libraries.

The Federal Republic of Germany is composed of individual states. Although there is a Federal Ministry for Education, the individual states or Länder largely control education at all levels within their borders, and there has been a lack of co-ordination and uniformity in the progress of education in West Germany (Bramley 1975: 97).

To achieve a more unified approach to education, the Länder have established a co-ordinating body, the Ständige Konferenz der Kulturminister der Länder. Although it is only an advisory body, it has secured a considerable measure of agreement on educational and library matters. In addition to uniformity of library quali-

fications achieved through agreements reached at meetings of the Konferenz, library education in West Germany has also been influenced by the evolution of librarianship in pre-war and post-war Germany (Bramley 1975: 97).

As a result of the slow progress made by public libraries in West Germany, there is a division between academic and public librarianship in West Germany which has been slow to abolish the inherited pattern of educational differences between public and academic librarians. This situation is now changing (Bramley 1975: 98). Since the Second World War, the public library movement has made enormous strides and public libraries now offer their public thoroughly professional services, and the status of public librarians has been lifted accordingly. The library profession in West Germany is, however, still divided, with separate library associations for academic and public libraries, and there is also a distinction between the education of public and university librarians.

Another factor that has influenced the course of education for librarianship in Germany is the inflexible staff hierarchy that exists in libraries. To prepare librarians who will fit into the various grades of staff, West German library schools had to tailor their study programmes to the needs of the libraries, particularly academic libraries. The academic library staff structure comprises three grades of librarians (Bramley 1975: 99), viz.:

- a) the administrative
- b) the executive
- c) the clerical.

The administrative grade is usually reserved for those with a degree and professional qualifications, the executive grade for non-graduate qualified librarians and the clerical grade consists of the different categories of non-professional staff. In public libraries there is only the executive grade for professional staff.

The education and training of librarians takes place in library schools described by a variety of names:

Bibliothekor-Lehrinstitut (Training Institute for librarians);
Staatsbibliothek (State Library School);
Bibliotheksschule (Library School).

The position of the library schools is roughly analogous to other professional training schools in West Germany, for example teacher training colleges. Some library schools are now, however, described as 'Fachhochschule', which brings them nearer to the status of universities. Educational links have also been established between the library schools and the universities.

A fundamental barrier to complete integration of librarianship into the university environment, states Bramley (1975: 102), is the insistence of German library schools in retaining practical work in their curriculum. Usually, one out of three years of study is devoted to practical work in a library. The new course at the Hamburg school requires three periods of practical work. This attitude, emphasizing the training aspect of education for librarianship, impedes its progress towards becoming established as a recognised academic field of study.

5.3 Great Britain

In the 19th century, professional associations in Europe watched jealously over the admission of people to their profession, and devised a system of examining for admission. The attitude of the professional associations influenced the start of professional training of librarians in Great Britain. Another factor that put training in the hands of professional associations was the protection by universities of their academic status, thus preventing professional training from penetrating into universities.

The Library Association (LA) was founded in 1878 and in 1880 a resolution was passed in which the Association undertook to aid library assistants in their training "in the general principles of their profession" (Francis 1960: 59). This resolution marks the beginning of formal training for librarians in Great Britain. Bramley (1969: 11) observes that the resolution made two assumptions, viz.:

- a) that it was the responsibility of the Association to supervise the training of librarians, and
- b) that librarianship had attained the status of a profession.

A committee was appointed to consider ways in which the resolution could be implemented. They put forward a 'scheme of examination' which included subjects such as English and European literature besides the professional subject matter. The examination consisted of a preliminary examination in ordinary subjects of a sound English education, followed by a professional examination. The first examinations were held in 1885 and three candidates wrote (White 1976: 47; Bramley 1969: 12). The preliminary examination was in arithmetic, English grammar and composition, English history,

geography, and English literature.

For a 'Second class certificate', the syllabus was English literature, one other European language, principles of classification, elements of bibliography including cataloguing, library management and administration. A cataloguing knowledge of at least two languages besides English was also needed (Bramley 1969: 12)¹.

For the third level of examination, viz. a 'First class certificate', the candidate had to have an advanced knowledge of the subjects for the 'Second class certificate', plus General literary history, a cataloguing knowledge of three languages besides English, and two years' experience in a library. Although this seems formidable, observes Bramley (1969: 12), it did not really require a good academic and professional background from the candidates, as is shown by some questions from the examination papers, for example, from English literature:

"Give the titles of ten selected English novels published within the past ten years."

"Give a list of Dickens' works in order of publication."

and for library management:

"What provision would you make against fire?"

1. As Bramley covers the development of education for librarianship in Great Britain more comprehensively than any other work consulted, most of the information in this section was obtained from his books (Bramley 1969: 1975).

"How would you arrange the leading newspapers so as to be read easily by several readers?"

(cited by Bramley 1969: 12-13)

Up to 1901 there were very few candidates for these examinations, and the only organised instruction for them was a series of summer schools set up by the Association in 1893 (Francis 1968: 60). Few candidates presented themselves for the examinations and the syllabus was changed in an attempt to make the examination more popular. The syllabus was first changed in 1890, then again in 1894, when the preliminary test was abolished and the professional section reduced to three papers, viz.:

- a) Bibliography and literary history
- b) Cataloguing, classification and shelf arrangement
- c) Library management (Bramley 1969: 14).

In 1898 the London summer school was replaced by regular courses of lectures, followed by the examination of the Association (Francis 1968: 62). This not being a great success, the Council of the Association made an arrangement in 1902 with the London School of Economics to conduct courses of lectures in library administration. The first of these courses started in October 1903, and the programme included library economy, library management, cataloguing and classification (Francis 1968: 63).

In 1904, the Association revised its syllabus. The new syllabus consisted of six "sectional certificates" and the practical aspect of librarianship was emphasized. It consisted of practical library administration, practical bibliography, cataloguing, classification, library history and organisation. The only non-professional paper

was on literary history (Bramley 1969: 14). Of this syllabus Bramley says (1969: 14):

"The implication of this was that librarians, while becoming well versed in the techniques of their profession, would ignore the broader philosophical aspects of librarianship."

Though librarians should be proficient in the techniques of their profession, Bramley (1969: 5) sees the fact that they concentrated on it as a failure to grasp the fundamental difference between education and training. Although librarians such as Baker and McKinder tried to convince the Association that scholarship was as necessary for librarians as technical proficiency, the Association "would have none of such heresies" (Bramley 1969: 15), and the 1904 syllabus remained unchanged and in use for nearly thirty years.

The number of candidates steadily increased, in spite of all the requirements they had to meet before being awarded the diploma. Apart from the six sectional papers, they had to write an essay on a selected topic for each paper, pass an oral test, and write a thesis on a topic determined by the Council. In addition to this, they needed three years' experience in a library and an elementary knowledge of Latin and one other foreign language.

The reason for the growing number of candidates, explains Bramley (1969: 16) was partially the establishment of the first official register of the Association's members in 1909. Fellowship was accorded to those obtaining the diploma of the Associa-

tion. Promotion to higher posts depended on qualifications. This ensured the success of the diploma and strengthened the position of the Association as "the body with sole responsibility for the examination and registration of librarians" (Bramley 1969: 17). The Association was also able to prescribe the kind of training librarians were to receive.

The Library Association was against any move to persuade universities to offer courses in Librarianship since such universities would insist on conducting their own examinations and awarding their own diplomas, necessitating the Association's relinquishing of its control of training programmes.

Another development that came with the 1904 syllabus was the provision of correspondence courses for non-London students. This syllabus and the correspondence courses offered by the Association continued until 1931, when there was a reorganisation which made the correspondence courses the responsibility of the Association of Assistant Librarians (Francis 1968: 64). The syllabus was originally designed for library workers who had a poor basic education, with no provision for librarians or would-be librarians in research libraries who usually held degrees in academic subjects. Developments in the syllabus seemed to have been made to meet special circumstances and criticisms rather than to become "expressions of imaginative philosophy of librarianship" (Francis 1968: 65).

The first step towards attaining university standards for professional librarians was the establishment of the first full-time School of Librarianship in 1919 at the University College of

London. A one-year course was offered for graduates and a two-year full-time or three to five-year part-time course for non-graduates.

The Association did not abandon its courses, and the programmes followed by the School of Librarianship and the Association did not differ significantly. The subjects covered by the School were similar to those in the LA syllabus (Bramley 1969: 31): bibliography, cataloguing and classification, library organisation, library history, public library law. The syllabus of the School included palaeography and archives, the only subjects not included in the programme of the Association.

The School prepared students for its own diploma and not for the qualifications of the LA, and it attracted enough students to be seen as a success. Ill feelings, however, developed between the School and the rest of the profession, largely owing to the School's emphasis on education rather than practical training. There was furthermore a feeling that the diplomas awarded by the School were likely to carry more weight with library authorities than the LA certificates, on account of the inscription 'London University' on them (Bramley 1969: 31).

The two institutions flooded the market with qualified librarians. The Association could control the number of diplomas it awarded by raising the standards of its examinations, but it could not force the School of Librarianship to do the same (Bramley 1969: 33).

The original plan of the Education Committee was to establish a network of schools of librarianship throughout the country, with the schools situated in universities (Bramley 1969: 33). But the

experience of the Association with the first School of Librarianship, viz. the degradation of its own diploma and the School supplying large numbers of qualified librarians to an overcrowded market, indicated that it would not be wise to encourage other universities to set up schools of librarianship. The universities were, in any case, not really interested in founding their own schools of librarianship, because "the low academic content of librarianship hardly commended it as a subject suited to a university-based course" (Bramley 1969: 33).

As a result of the Education Acts of 1902 and 1918, many students starting training in librarianship had reached matriculation level (Bramley 1969: 36). Recognising the possibilities created by the Education Acts, the Library Association, in a report on training in librarianship, made the following proposals (Bramley 1969: 36):

- a) That local authorities should require of applicants for library posts a matriculation certificate.
- b) That libraries should have as conditions of employment the requirement that assistants should follow courses leading to LA qualifications, and that promotion and salary should depend upon the results obtained in LA examinations.
- c) That a full-time school of librarianship be established.

Employers were, however, slow to recognise the LA diploma, and universities did not take it into account at all. A new syllabus, "designed to meet the requirements of the vocational schools established under the 1918 Education Act" (Bramley 1969: 36) was

also proposed in the report of the Association on education for librarianship. This syllabus never materialised, and of the period up to the 1930s, Bramley's opinion is that it was not "a particularly distinguished one in the history of the Library Association" (Bramley 1969: 37).

In 1930, the Education Committee of the Library Association introduced a new syllabus. In the new syllabus, which was put into practice with the May 1933 examinations, the six sectional certificates of the previous syllabus were replaced by a "three-tier examination structure" (Bramley 1969: 39). There were elementary, intermediate and final stages. The elementary examination had three sections which had to be passed at one sitting before the candidate could proceed to the intermediate stage. The Intermediate stage consisted of four papers, viz: theoretical classification; theoretical cataloguing; practical classification and practical cataloguing. The final level presented the candidate with a choice of either English literary history, or the literary history of science or of economics and commerce. He could also choose between indexing and abstracting or palaeography and archives, and he could specialise in either public library administration or the administration of university or special libraries. There were also the usual core sub-courses of librarianship, which were compulsory, viz. library administration, bibliography and book selection.

The new syllabus was considered a great improvement on the sectional certificates of the old diploma. It recognised the fact that librarianship was becoming more complex, and an attempt was made to meet the demands of all librarians. Bramley, however,

points out the following flaws (1969: 40):

- a) The intermediate stage consisted solely of cataloguing and classification. This was the qualifying examination leading to the Associateship of the LA;
- b) the syllabus hardly recognised the existence of commercial, technical and children's librarians who could at the time be found in all large municipal libraries; and
- c) theoretical aspects of library science were still ignored.

The LA Council planned to introduce another syllabus, but the outbreak of World War II prevented it.

In 1942, L.R.McColvin, in his report The Public library system of Great Britain recommended that library schools be established, preferably located in universities. The schools, however, should be teaching and not examining bodies. The LA should continue to ensure uniformity through its examinations. British universities, however, refused to submit any of their courses to examination by an outside body. The ideal was that universities would teach theoretical aspects of librarianship, while technical training would be supplied by 'teaching libraries', being large municipal libraries. Neither the universities nor the municipal libraries showed enthusiasm for the plan which, according to Bramley, "deserved a better fate" (Bramley 1969: 48).

Some colleges of further education, however, were willing to yield to the demands of the LA, and in 1946, schools of librarianship opened at Glasgow, Loughborough, Leeds, Manchester, and the

City of London College. In 1947, further schools were opened at Brighton and Newcastle-upon-Tyne (Bramley 1969: 50). University education for librarians was delayed by another twenty years.

In 1960, the LA approached the University of Sheffield to ask whether it would consider establishing a post-graduate school of librarianship. The proposal was accepted and in 1964 the school enrolled its first students for the one-year, full-time post-graduate diploma course (Saunders 1968: 83). After that, a school of librarianship was established at the Queens University of Belfast and also at the University of Strathclyde. The latter acquired its School of Librarianship by absorbing the Scottish College of Commerce which included a School of Librarianship.

Against the changing background of education and training for librarianship, the LA introduced its new syllabus in 1964 (Bramley 1969: 63). After World War II, demands for a specialised training for subject librarians led to concessions by the LA which resulted in the revised syllabus. The 1964 syllabus made provision for a full-time two-year study whereby the LA waived the apprenticeship part-time basis of training (Bramley 1969: 63).

From this time on, education for librarianship has been dominated by full-time study for first qualifications where, before 1964, most people qualified by part-time study through correspondence courses (New 1978: 80).

When the Glasgow Library School was incorporated into the University of Strathclyde, the staff of the School took the opportunity

to convince the University authorities that librarianship was a suitable field for post-graduate study. They were able to establish librarianship as an academic subject in its own right. In 1966 the first B.A. degree in librarianship was offered by the Department of Librarianship at Strathclyde University (Bramley 1969: 65).

The LA was now prepared to allow the library schools in the colleges of further education to examine their own students, while the LA would keep control in its own hands by introducing standards with which the library schools had to comply before they were granted the right to conduct their own examinations. In 1964 the Council for National Academic Awards (CNAA) had been granted a Royal Charter which gave it the power to "award degrees, diplomas, certificates and other academic awards to persons who have successfully pursued courses of study approved by the council at educational establishments other than universities" (Bramley 1969: 66). In 1968, the Council approved the following degrees:

BSc in Information Science offered at the Newcastle College of Commerce;

BSc in Information Science and BA in Librarianship at Birmingham College of Commerce

(Bramley 1969: 67).

Another development in 1964 which was to have an effect on professional education was the passing of the Public Libraries Act. The Act made the Secretary of State for Education and Science responsible for public library services. An office was established within the Department of Education and Science (DES) to advise

the Minister on matters relating to public libraries (Bramley 1975: 22). Experienced librarians were appointed as 'Library Advisers', forming part of an office known as the Arts and Libraries Branch. This office gradually extended its influence to include education for librarianship.

The Public Libraries Act also required the establishment of Library Advisory Councils for England and Wales. These Councils, composed of distinguished librarians, contributed to the development of education for librarianship by reviewing the pattern of library education and training. They investigated the supply and training of librarians, and their findings were published in what is known as the 'Jessup Report' (Bramley 1975: 23). This was at a time when there were fears that the labour market for librarians was overcrowded. The most important factor that contributed to this situation was, according to Bramley (1975: 23), that with students attending full-time courses, the success rate in examinations was much higher than before.

In an attempt to prevent the overflowing of the market with qualified librarians, the Department of Education and Science (DES) imposed restrictions on the number of students being admitted to the schools each year. The effect of this action on education for librarianship was that instead of expanding in numbers, the schools re-evaluated their courses. They also started to campaign for graduate status for librarianship (Bramley 1975: 24).

Other developments influencing education for librarianship were the "rise of the polytechnics and the advance of universities into

the field of vocational education" (Bramley 1975: 24). In 1966 a government White Paper was published, in which a new type of educational institution, the polytechnic, was proposed (Bramley 1975: 26). The polytechnics would be formed by recategorisation of existing colleges. In this way, for example, the Liverpool Polytechnic was formed by administratively linking the former Colleges of Technology, Commerce, Building and Art. Though polytechnics could not award degrees, they were allowed to offer courses approved by the CNAAB at degree level. Seven library schools, formerly situated in colleges of further education, became incorporated in polytechnics in this way and benefited from their change in status.

There was also a growth in university-based courses. In 1960 there was only one library school located in a university. By the end of the decade there were departments of library science at the universities of Sheffield, Belfast and Strathclyde. Furthermore, the College of Librarianship, Wales, offered a course in conjunction with the University of Wales, as did the Loughborough University of Technology with a neighbouring technical college library school (Bramley 1975: 27).

The development of university courses in librarianship resulted in the diminishing of the power the LA had exercised over education for librarianship for eighty years. The LA recognises all the present courses being offered by universities and polytechnics as equivalent to their own qualifications (Bramley 1975: 28). It has not, however, completely abandoned its own courses, and LA qualifications can still be obtained through part-time courses for which the LA sets the examinations. In 1975 the LA also still

supervised a two-year non-graduate course offered at some library schools, though Bramley thought it probable at the time that the LA would cease to admit non-graduates to their register of librarians in 1980 (Bramley 1975: 28).

The university library schools have full control of their courses. They design them, set examinations and mark their own papers, following the usual university practice of appointing external examiners. A similar situation prevails in the polytechnics, but here the CNAAB periodically reviews its approved courses, while universities are not subject to review by the CNAAB (Bramley 1975: 31). Bramley considers it possible, however, that the LA will be considering the introduction of "some form of continuous assessment" of university library schools (Bramley 1969: 32).

Bramley discusses the changes which have taken place in the teaching of cataloguing and classification in Great Britain (1975: 205 ff.). These changes, he states, reflect the general trends in the teaching of librarianship as a whole, with its greater emphasis on theory and an increasing tendency to affirm the interdependence of theory and practice. There is a move away from the mere learning of facts.

As far as cataloguing and classification are concerned, although they are still considered important subcourse elements in the curriculum of complete courses, they are no longer the "cornerstones of librarianship" (Bramley 1975: 205). This is evident from a study of every revised syllabus of the LA and in the curricula of schools of librarianship today.

The 1933 curriculum of the LA was dominated by cataloguing and

classification. The intermediate examination consisted of two theoretical papers and two practical papers, entirely devoted to cataloguing and classification. In the 1946 syllabus, there was a significant change in that the new registration examination, which led to the Associateship of the LA, consisted of six papers, of which only two were concerned with cataloguing and classification. Later a seventh paper was introduced to cover the practical aspects (Bramley 1975: 206). The syllabus required, however, that students should have a detailed knowledge of five classification schemes, some of which were not being applied in the libraries of Great Britain. At the same time, the theory of classification was "usually confined to a discussion of the relevance of the Tree of Porphyry [sic] or the findings of Laymarck to the classification of books" (Bramley 1975: 207). The theory of cataloguing consisted essentially of a comparison of major cataloguing codes. The 1964 curriculum reflected a change in attitude towards cataloguing and classification which was clearly influenced by the developments in education for librarianship as a whole. In the new curriculum, cataloguing and classification still occupied an important place, but a detailed study of these subcourses was optional.

Bramley contends that the following developments were instrumental in effecting fundamental changes in the teaching of cataloguing and classification (1975: 208):

- (a) The growth of centralised cataloguing and classification services, which lessened the need for each library to have

a self-sufficient cataloguing department and reduced substantially the actual amount of original cataloguing any cataloguer would be expected to do.

- (b) The advance of information science, which influenced ideas about cataloguing and classification. Cataloguing and classification became only one of a number of methods of arranging, storing and retrieving information. Related to this has been the introduction of mechanised systems into library operations, and also access to facilities such as MARC tapes, information data bases, and other schemes making machine-readable cataloguing information available.
- (c) A greater degree of professionalism in the teaching of cataloguing and classification, with teachers exploring new methods of teaching and new approaches to the learning process.
- (d) Development of a literature of cataloguing and classification in its own right. A number of new textbooks were published, being a considerable improvement on the few "primers and crammers" (Bramley 1975: 210) which were available to pre-1964 students.
- (e) Differentiation in the education and training of categories of librarians, library technicians and the like.

Although the majority of library schools in Great Britain still expect their students to study a number of classification schedules, emphasis is now being laid on the theoretical principles which underlie the schedules. Bliss' Bibliographic Classification, for

example, is studied in conjunction with his works on classification, and Ranganathan's Colon Classification is studied in conjunction with his wide-ranging theoretical contributions to classification which form the basis of many concepts in modern classification (Bramley 1975: 212). In teaching cataloguing, there is less preoccupation with the specific rules of cataloguing codes and more attention is given "to the logic which has directed the decisions made by the compilers of the codes" (Bramley 1975: 213).

Although there is more emphasis on the underlying theories of cataloguing and classification than before, the library schools still attach importance to the necessity of relating the theories to their practical applications. Thus, study programmes usually include practical assignments in cataloguing and classification. The practical work of students is usually taken into consideration in the evaluation of their progress (Bramley 1975: 213).

The situation concerning classification that existed prior to 1964 in Great Britain has become reversed lately in that theory is being seen as more important than the practical application of classification schedules in the professional moulding of the prospective librarian. Bramley comes to the conclusion that "the old insistence that classification and cataloguing are the heart of librarianship is rarely heard now, and both subjects occupy a more rational place in the curriculum of the majority of library schools" (Bramley 1975: 214).

5.4 United States of America

Shera (1972: 230) divides the history of education for librarian-

ship in the United States into three periods:

- (a) The period of apprenticeship and in-service training up to 1887.
- (b) The period of organised library school training from [†] 1887-1923, with the appearance of the Williamson Report.
- (c) The period of academically centred library school development.

A key factor in the development of education for librarianship in the United States has been the fact that American universities have been prepared to take an active part in the education and training of the professional man at a relatively early stage in the history of librarianship (Bramley 1969: 75). In contrast to the European concept of a university as an establishment where "the élite are prepared for their ordained place in society" (Bramley 1969: 75), a university education is seen in the United States of America as the right of every individual. Every American university endorses this idea, and has always considered the training of professional men and women as its main contribution to the country.

The American democratic ideal notwithstanding, Melvil Dewey's idea of university education and training for librarians was not welcomed without opposition - not from the universities, however, but from his professional colleagues instead. The viewpoint of many of his contemporary practising librarians is epitomised in William F. Poole's statement that "practical work in a library, based on a good previous education in the schools, was the only proper way to train good librarians" (cited in Bramley 1969: 77).

Dewey nevertheless pursued his ideal. In 1883, he succeeded in

persuading the American Library Association (ALA) to endorse an experimental programme. In the same year he was appointed librarian at Columbia College in New York and was given permission by the trustees to open a school of librarianship (Bramley 1969: 78). Things were, however, not made easy for him. No money was allocated for his use and he did not have equipment nor enough space to achieve his ideals. He was also not allowed to admit women as students (Downs 1968: 2).

From 1884 to 1886 he administered provisional classes in library science and in January 1887 the School of Library Economy was opened. In 1888 Dewey resigned to take up the post of Director of New York State Library, and in April 1889 the library school was transferred to the State Library at Albany, New York, at Dewey's instigation. It then became the New York State Library School (Downs 1968: 2).

Early library schools in America emphasised the practical side of librarianship, preparing their students well in library routines. Dewey influenced the direction in which education for librarianship developed through graduates from his school who later founded more schools. For 35 years changes in education for librarianship were gradual, with the emphasis on the production of working librarians (Downs 1968: 4). There were, however, calls for higher standards and for going beyond technical education.

At the end of the 19th century three concepts that were to affect future American library education emerged. This was mainly as a result of the ALA's concern at the different standards of instruction given at the different schools of librarianship. These con-

cepts were:

- a) that library schools should be affiliated to universities;
- b) that college graduation (i.e. a bachelor's degree) should be required for admission to a library school; and
- c) that a co-ordinating examining board should be established (Downs 1968: 4; Bramley 1969: 82).

Although a national certification system had been considered before, the idea had never been accepted in the United States and some reasons for this suggested by Bramley are that:

- a) the size and diffuse political structure of the United States made it difficult to apply national standards uniformly;
- b) the conviction that the American 'federated' system was more likely to produce librarians with originality and initiative;
- c) American distrust of any method that emphasised the final examination rather than the course;
- d) the possibility that schools of librarianship would be reluctant to abandon their own systems of instruction and have their students examined by an external body (Bramley 1969: 82).

Nevertheless, they had to face the fact that education for librarianship was of a low standard generally, and that a system of national standards might present an opportunity of solving this.

In 1917 the Carnegie Corporation of New York which was spending

millions of dollars towards the promotion of librarianship throughout the country, requested Alvin Johnson to carry out a survey of municipal public library building programmes (Bramley 1969: 83). Johnson reported that chief librarians and their staff were frequently "untrained and unintelligent", and appointed because of "local social and political standing" (Downs 1968: 4).

Johnson also stated that among the thirteen institutions then offering professional library training, only seven were of any importance. He criticised the schools for over-emphasis on technical subjects, and suggested that the entrance requirements were too low, resulting in the production of inferior librarians by library schools. He recommended that the Carnegie Corporation should give financial assistance to the schools of librarianship, and that scholarships should be awarded to deserving library school students (Bramley 1969: 83).

Johnson's recommendations led to a survey of education and training for librarianship made by C.C. Williamson. The findings of this survey were published in 1923. Williamson explored the organisation methods of library schools and collected data concerning curricula, faculties, entrance requirements, graduates and financial support (Downs 1968: 6).

The Williamson report concluded with recommendations, inter alia, that:

- (a) Separate levels of education for librarianship be introduced, viz: (i) education of professional librarians for which the library schools should be responsible, and (ii) training of sub-professional staff by special training libraries :

- (b) schools of librarianship be affiliated to universities, either as departments or as autonomous professional schools;
- (c) that a National Certification Board be established to control the certification of professional librarians and accreditation of schools of librarianship;
- (d) that a four-year bachelor's degree be a prerequisite for admission to a school;
- (e) that the curriculum be revised to provide for one year of general basic studies and one year of specialisation, with an intervening year of practical experience; and
- (f) that the educational resources of the parent university be used to supplement the curriculum.

(Downs 1968: 6; Shera 1972: 238; White 1976: 180) .

The effects of the report were far-reaching, and it was "perhaps more than any other single report responsible for making librarianship a graduate profession" (Bramley 1969: 83).

As a direct result of the Williamson Report, a Board of Education for Librarianship (BEL) was established by the ALA in June 1924. This Board was succeeded by the present Committee on Accreditation (Downs 1968: 8).

In 1933 the Board devised a new system of accreditation, in which accredited schools were divided into three categories, viz:

- (a) Schools offering programmes in advanced work in Library Science. At these schools a bachelor's degree was required for admission, and a master's degree in Library Science was

awarded after two years' study. (This category included the leading universities of California, Columbia, Michigan, Illinois and Chicago.)

- (b) Schools offering a programme, usually of one year's duration, leading to the Bachelor of Science in Library Science (BS in LS), and requiring a four-year college education for admission. (This category included the Library Schools at the following universities: Emory, Louisiana, McGill, Syracuse, Washington and Western Reserve, as well as those at the Drexel Institute, Hampton Institute and the Carnegie Institute of Technology.)

- (c) Schools offering courses in Librarianship as part of the undergraduate curriculum leading to a BA or BSc degree. (Included in this category were the library schools of the universities of Denver, Oklahoma, North Carolina and Wisconsin, as well as the New Jersey College for Women, College of St. Catherine, Geo Peabody College and the Pratt Institute.)

(Bramley 1969: 84; White 1976: 200, 209)

These three categories of library schools were accredited by BEL. A number of schools which did not meet the BEL standards, continued to operate as "diploma mills" (Bramley 1969: 85). They also conferred the title of 'Bachelor of Library Science'. There was also a system of accreditation for teacher-training institutions, in which courses were designed primarily for school librarians. The graduates from these school library programmes could, however, like graduates from non-accredited schools, compete for positions in public and college libraries.

Some war-time studies about library education in the United States (as reported by Bramley (1969: 89)), revealed that there had been little change in the core curricula of library schools since Williamson's survey in 1921. Two studies conducted in the 1940s were those by K.D.Metcalf (then Director of Libraries at Harvard University) and Ernest J. Reece (then professor at the Columbia University School of Library Science, New York). Joseph Wheeler (then Librarian of the Enoch Pratt Library in Baltimore and lecturer at various library schools) made a study of education for librarianship in 1946 and so did J. Periam Danton (then Dean of the School of Librarianship at the University of California), who propounded twelve criticisms of contemporary library school education (Bramley 1969: 90). He found, inter alia, that in the courses, excessive attention was paid to the techniques of librarianship, too much was crowded into one year, and, because the programmes tried to meet the requirements for all types of libraries, the curricula were too broad.

In 1948 an important conference was held at the University of Chicago, in which the objectives, methods and problems of education for librarianship were explored. The report of the Conference, edited by Bernard Berelson and published in 1949, shows that views on library education at the time were in conflict, but it "also clearly indicates that there major areas of agreement among American librarians on the direction which library education should take" (Bramley 1969: 90). Topics that were discussed were, inter alia:

(a) The stratification of education for librarianship. Two

forms of stratification were referred to, viz. stratification of library education and of library positions. In the first form of stratification, it was taken for granted that there would be distinctions between "pre-professional, professional and graduate-professional" courses (Berelson 1949 in Education for librarianship: 5). As far as the stratification of library positions was concerned, there was consensus that different levels existed, but the participants were in disagreement as to the specific range of levels. Some considered that there were two, viz. professional and sub-professional, whereas others identified three levels, viz. professional, sub-professional and clerical.

- (b) Another problem discussed at the Conference was the question of general versus specialised education in librarianship. Leigh considered the situation in library schools in the United States at the time as such that:

"Almost impossible demands of generalism are added to formidable requirements of specialism in defining adequate academic preparation for the profession"

(Leigh 1949, in Education for Librarianship: 280).

He was of the opinion that a pure academic man as the product of a 'general' education cannot exist, and that the "fanaticism" about general education should be avoided. There will always be, in a person receiving such a general education, "areas of ignorance and others of great skills."

- (c) The quality and number of library schools were discussed, and there seemed to have been the general feeling that the quality

could be improved. One way of doing this would be to have fewer library schools. Leigh (1949, in Education for librarianship: 279) was of the opinion that fewer schools would result in "having a large enough staff in each school to do the more truly professional job adequately" (Berelson 1949, in Education for librarianship: 5).

In 1951, the Board of Education published its new Standards for accreditation. The new standards, and the resulting new programmes of library schools, were based on the assumption that it was possible to "prepare students for employment in any type of library" (Bramley 1969: 91). Students should receive a good general education and sound instruction in the 'core' subcourses of librarianship before specialising.

Attempts in the years after 1951 to co-ordinate the work of all accrediting agencies by centralisation of the accrediting process failed.

There were two types of accrediting agencies, viz. regional and professional. Regional agencies were concerned with the educational institution as a whole, while professional accrediting agencies were concerned with broad areas of study (Bramley 1969: 92). Professional bodies felt that, if the process of accreditation were to be centralised, the accreditation of professional schools would be in the hands of regional accrediting agencies "who could hardly be expected to be familiar with the problems peculiar to the education of the different professions" (Bramley 1969: 92).

Thus the system of accreditation went on and in 1957 the Board of

Education, later to become the Committee On Accreditation (COA) had visited accredited schools of librarianship and judged thirty-one of them as being of the required standard (Bramley 1969: 93).

These accredited schools were not, however, the only ones offering courses in librarianship and this situation still exists today.

There are about 400 other schools, not all of them offering programmes that reach the standards set by the ALA. The majority of these are undergraduate courses.

It was only in 1958 that the COA published its standards for undergraduate courses in library science, intended to assist educational institutions who offered library science subjects as part of their programme. The standards were not applied by the COA, but were to be used by the National Council for Accreditation of Teacher Education (NCATE) when it examined teacher training institutions offering undergraduate programmes in library science (Bramley 1969: 94). However, by publishing these standards, the ALA "recognised the existence and value of such programmes" (Bramley 1969: 94).

In 1962 a Commission was established by the Executive Branch of the ALA to "consider the feasibility of a national plan for library education" (Bramley 1969: 96). The Commission published its findings in 1967. The report suggested that because of changes in the whole of librarianship, the pattern of education for librarianship should change accordingly.

The technical revolution cited in the report was one factor that would change library services. Downs (1968: 17) also mentions the fact that the use of computers and the emphasis on technological

operations in libraries brought "pressure on the library schools to introduce new courses in electronic data-processing and information storage and retrieval."

In the report of the Commission of the ALA, it was recommended that an office or centre for "research and experimentation in library education and personnel administration" should be established (Bramley 1969: 96). This centre should investigate the problems facing librarianship and education for librarianship, and its findings would provide a basis for the evaluation of education of librarians.

This Commission, observes Shera (1972: 259) "found itself completely impotent, dragged out a moribund existence, and in 1967, voted itself out of existence". Nothing came of its findings and recommendations. By the time it ceased to exist, the new Office of Library Education had been established at ALA headquarters. The Office concerned itself primarily with accreditation of new library schools (Shera 1972: 259).

Conferences on the problems of education for librarianship, held regularly, did not solve the problems. Shera views the ineffectiveness of the conferences as being the result of "failure to recognise that a conference is peculiarly suited to communication of ideas, not to their generation". He is of the opinion that "advances in library education will come, like advances in all education, out of the creative and fertile mind of one individual, not the collective mind of a conference" (Shera 1972: 259). At present the basic professional library qualification in the United States is the Master's

degree. It is a one-year course, preceded by a four-year study at undergraduate level (Bramley 1975: 42). This "5th year Master's degree" replaced the old Bachelor of Library Science (BLS) in the late 1940s and early 1950s (Bramley 1975: 42).

The 1951 Standards denied weaker library schools the status of accreditation and confirmed the 5th year Master's degree as the new basic qualification in the United States. In 1975 there were more than fifty accredited ALA library schools offering the MLS, and more than eighty library schools not accredited by the ALA which also offered the MLS (Bramley 1975: 43).

Generally, the quality of training at accredited schools, according to Bramley (1975: 43), is higher than at non-accredited schools. Non-accredited schools continue to exist, free from any control of the government and the ALA. This apparent state of anarchy in United States higher education, maintains Bramley (1975: 44), makes European librarians sceptical of the quality of education for librarianship in the United States. In the United States, however, librarians distinguish between the qualifications of accredited and non-accredited schools, and a graduate from a non-accredited school will generally find that his qualifications are only recognised in the state in which he obtained them.

The typical Master's programme in the United States consists of a core course in the traditional areas of library practice, e.g. administration, cataloguing and classification, book selection, reference works and bibliography (Bramley 1975: 46). After completion of these subcourses, a student can specialise in whatever

field he is interested. A recent trend is the increase in the number of subcourses in which a student can specialise, the so-called 'electives'. These include information science, audio-visual aids, communications and mass media. New fields of study which have been introduced recently are international and comparative librarianship, library services to the disadvantaged, library education, research methods in librarianship (Bramley 1975: 46). The core subjects have also become more complex, covering new areas of study and new techniques.

The curricula of library schools in the United States do not show the same reduction in the status of cataloguing and classification as those of library schools in Great Britain (Bramley 1975: 208). A number of library schools in the U.S.A., however, distinguish between elementary and advanced study of the two subcourses, and the advanced study is usually one of the electives.

According to a survey undertaken by Alan R. Thomas (1976), cataloguing and classification are taught as compulsory subcourses at the majority of library schools in the U.S.A. The courses take up an average of 8,3% of the total number of contact lecture hours (Thomas 1976: 1). An almost equal amount of time is spent on theory and practice, with a slight balance in the favour of theory, and the subject approach receives slightly greater attention than descriptive cataloguing.

The outstanding contribution of special librarianship to library school courses in cataloguing and classification is, according to Thomas (1978: 119), the "science and art of post-co-ordinate

indexing". It was not, however, quickly absorbed into library school syllabi for cataloguing and classification. Investigations in 1961, and again in 1966, did not cite post-co-ordinate indexing as such. The only reference to the method in the 1966 survey was at doctoral level (Thomas 1978: 119). In the survey done by Thomas in 1976, it was shown that 42% of the library schools who participated in the survey did include post-co-ordinate indexing in their curricula but at most of these schools the attention paid to it was slight (Thomas 1978: 120).

One of the reasons cited by Thomas for the inclusion of post-co-ordinate indexing in compulsory courses in cataloguing and classification is that it is not "simply yet another named technical system but stands as a fundamental model" (Thomas 1978: 121). Post-co-ordinate indexing is, he feels, essential to the student's comprehension of subject analysis and synthesis, and it should not only be taught as a "problem solving device" in special libraries.

CHAPTER 6

EDUCATION FOR LIBRARIANSHIP IN SOUTH AFRICA : A HISTORICAL REVIEW

6.1 Introduction

The public library movement in South Africa can, according to Friis, be divided into three periods:

1. The first period is the pioneer period extending from about 1761 to 1874 and this period saw the development of the private subscription library.
2. The second period extended from 1874, when the 'Molteno Regulations' were promulgated, to the Carnegie Corporation survey of libraries in 1928. Molteno was Colonial Secretary in the Cape Colony and in his early career he worked in the South African Public Library. In his "Memorandum of Regulations under which It Is Proposed to Encourage the Formation and Proper Management of Public Libraries in the Smaller Towns of the Cape Colony", provision was made for an annual government grant-in-aid to libraries, based on subscription rate (Kesting 1980: 170). The system spread to the other provinces and this aid helped to establish libraries in most towns and villages.
3. The third period is from 1928 to the present time.
(Friis 1962: 69 ff.)

It was during the second period, i.e. the time of development of

public libraries, that the need for qualified library staff became evident. This demand was initially met by importing librarians from abroad, the first coming from Great Britain. The first trained librarian to come to South Africa was Bertram Dyer who became librarian of the Kimberley Public Library in 1900 until 1908. After that followed Fred Cooper in Port Elizabeth Public Library, and Ronald Heaton in Pretoria, both in 1902 and in 1904 came Cadenhead to Johannesburg (Kennedy 1954: 52).

The domination by British librarians of the South African library scene at this time of its development resulted in a British-orientated library education in the initial years of education for librarianship in South Africa.

The evolution of education for librarianship can also be divided into different periods. Kesting (1980: 228) gives three different phases of development, based on the Shera model referred to in Chapter 5:

- (a) Until 1887. This was a period characterised by apprenticeship training, provided by individual libraries.
- (b) From 1887 until the 1920s. During this period there was a higher degree of co-ordinated practical-technical training, provided either by educational institutions or by professional associations.
- (c) Up to and including current times. This period shows a trend towards the co-ordination of professional education with the aid of standards of accreditation or evaluation at uni-

sity level. Whereas the inclination before this time was to train students in library skills and techniques, the most recent times show an increasing emphasis on academic and theoretical knowledge. There has been, observes Kesting (1980: 229), "a shift of emphasis from the what and how of library and information service to the why".

6.2 Education and training of librarians in South Africa

The earliest training (i.e. concentrating on the what and how) in South Africa took place in 1904 when a South African enrolled for the examinations of the British Library Association. The first person whose name appeared in the pass-lists of the LA was Miss E. Ramage of the Wellington Huguenot College in 1906 for having passed the examination in classification. The first South African to receive the diploma of the LA was Miss P.M. Speight of the Johannesburg Public Library in the 1920s (Malan 1970a: 37).

The very first classes in librarianship were held at the Johannesburg Public Library. They were informal lectures, designed to improve the knowledge and competence of its own staff (Bramley 1969: 104). From 1924 - when the Johannesburg Municipality decided to make promotion dependent on British qualifications - until 1936, employees at the Johannesburg Public Library were prepared for the British examinations. After 1936 the lectures and practicals were given to prepare students for the examinations of the South African Library Association. This change of attitude came about when the Johannesburg City Council decided to recognise South African qualifications as well as the British (Kennedy 1954: 53).

The beginning of organised library development is generally assumed

to have been in 1928, when the Carnegie Corporation of New York sent two librarians, Messrs. Pitt and Ferguson, to survey library conditions in South Africa. In their report they emphasised the lack of qualified librarians and the absence of education and training facilities for library staff. According to Ferguson:

"It should be emphasized that while leaders may come from overseas, and while selected individuals may seek overseas library schools, South Africa herself must train the large body of assistants and aids." (Ferguson 1929: 25).

Ferguson also expressed the opinion that training librarians through correspondence courses cannot provide for the fact that librarians should be trained according to the specific country's needs and that this can only be done through universities (Malan 1970a: 38).

One of the direct results of the visit of Pitt and Ferguson was that a Library Conference was held in November 1928, at which the founding of a library association was recommended. The proposed aim of the association was to be the development of library facilities and the promotion of professional training of librarians. It was also recommended, inter alia, that the British courses be adopted. If necessary, the courses were to be adapted to South African circumstances and needs, and the Association was to organise its own examinations.

Coetzee divides the history of education for librarianship in South Africa into the following phases (1962b: 138):

(a) The first phase was from 1928 to 1940. Pitt and Ferguson's

survey proved that without trained staff, librarianship in South Africa would not progress. A direct result of this survey was the founding of the South African Library Association (SALA) which initiated courses in librarianship in 1933.

- (b) The next phase was about 1941 to 1950. In spite of World War II, there was progress in existing libraries, which resulted in a greater demand for trained staff. The institution of provincial library services in the Transvaal (1944), Cape Province (1945), Orange Free State (1948) and Natal (1951¹) required staff for a number of new libraries. The SALA was no longer able to meet the demand for trained librarians, and courses were started at universities to train them. The University of Cape Town started in 1939, followed by the University of Pretoria in 1948².

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1. Although the first Director of Library Services was appointed in September 1951, the Natal Library Service was officially inaugurated in June 1952 (Friis 1962: 101).
 2. Goetzee (1954: 72; 1962b: 139) cites 1938 as the date of initiation of courses in librarianship at the University of Pretoria. He states, however, that these courses were started to provide training for the staff of the University library (1962b: 139), and that the Department of Library Science was founded in 1948 (1954: 72). Kesting (1980: 230) recorded the date of the founding of the University of Pretoria Department of Library Science as 1948 and infers that since the courses offered between 1938 and 1947 "did not lead to open certification", education for librarianship at the University of Pretoria effectively began in 1948.

(c) A third phase of development was 1951 to 1962¹. Coetzee gives no indication of why 1951 marks a change in his periodisation. By inference, the date is based on the year when the last of the Provincial Library Services (Natal) was established. During the period 1951 to 1955, librarianship expanded and there was increasing differentiation of library services. The three existing training bodies could not satisfy the demand for qualified staff any more. Departments of Library Science were instituted at UNISA (1955), Potchefstroom (1956), Stellenbosch (1958) and Witwatersrand (1958). During the 1960s and 1970s most of the other universities in South Africa initiated courses in Library Science, some of them, viz. Western Cape (1960), Fort Hare (1962), Durban-Westville (1967) and Zululand (1968) offered their courses via UNISA, until they were granted independence in 1970 and 1971 (Durban-Westville), when they proceeded to offer their own courses. The other universities were the University of the Orange Free State (1964), Rhodes (1966), Rand Afrikaans University (1969), University of Natal (1973) and the University of the North (1976).

Two important developments in 1961 were the acceptance of the principle of degrees in library science (which became effective in 1964) and the decision of the South African Library Association (SALA) to transfer its courses to the University of South Africa

1. 1962 being the date of writing, it is suggested here that, in view of later developments, the third phase in Coetzee's periodisation may be said to be from 1951 to 1963, and that a fourth phase started in 1964, the year after the SALA had finally ceded its courses to UNISA, thereby leaving education for librarianship entirely in the hands of the universities.

(UNISA) (Coetzee 1962: 140).

6.2.1 Training by SALA

SALA started training courses for librarians in 1933. Kennedy (1954: 53) is of the opinion that, although training of librarians by SALA followed the same pattern as that of the [British] LA, the SALA syllabus was better balanced than that of the LA, and that SALA recognised the need for a good basic general education by making a university degree a requirement for its final diploma.

SALA was the major examining body and ran vacation schools and correspondence courses. The first vacation school was held in Durban in 1933 and was intended primarily for library employees in isolated towns (Kennedy 1954: 53). The teaching was of an elementary standard and not intended as a preparation for examinations.

Correspondence courses also started in 1933. The first examinations for the Elementary Certificate, were held in 1934. The syllabus for this Elementary examination was (South African Libraries, vol. 2, No. 1, 1934):

Part 1: Literature of Afrikaans or English

Part 2: Literature not taken under part 1, written in the language of the subject

Part 3: Cataloguing, classification, routine (i.e. functions and departments of a public library, lending, reference and children's work, ordering and accessioning, preparing books for circulation, statistics, repair of books, periodicals, relations of staff and readers, library

co-operation).

The sub-committee who compiled the syllabus followed the syllabus of the British Library Association in order to facilitate transference from LA to SALA courses for those already in possession of certificates (Kennedy 1954: 55).

It is also interesting to examine the list of prescribed books used for those early courses, because revised editions of some of them, or books by the same writers, are still being used today. The prescribed textbooks for this Elementary course were (South African Libraries, vol. 2, 1934: 35-40):

Cataloguing:

AKERS, S.G.	<u>Simple library cataloguing</u>
ORMEROD, J.	<u>Style in card cataloguing</u>
SAYERS, W.C.B.	<u>First steps in annotation in cataloguing</u>

The cataloguing code used was Cataloguing rules, author and title entries 1930, of the ALA and LA, and for subject headings the 3rd edition of Sear's List of subject headings for small libraries

Classification:

SAYERS, W.C.B. Introduction to library classification, 3rd ed.

Practical classification was done according to the Dewey Decimal Classification, 12th or 13th edition (South African Libraries, vol. 2, 1934: 35-40).

Candidates had to be at least seventeen years of age and members

of the SALA. They also had to give evidence of consistent study. If they studied through correspondence, they were to provide such evidence by answering questions during study, and if they studied privately, by handing in notes written in the course of their preparation to the examiners before writing the examination.

In 1934 there was only an examination at the elementary level. From 1935 the Intermediate course was added, consisting solely of cataloguing and classification theory and practicals. The textbooks used for this course were:

For classification:

- BLISS, H.E. The organisation of knowledge and the system of the sciences
- MERRILL, W.S. Code for classifiers
- RICHARDSON, E.C. Classification: theoretical and practical
- SAYERS, W.C.B. Canons of classification,
 and Manual of classification for librarians and bibliographers

Dewey Decimal Classification, 12th or 13th edition

For cataloguing:

In addition to the books by Akers, Ormerod and the 1930 Cataloguing rules used for the elementary section, the following books were prescribed as textbooks:

- CUTTER, C.A. Rules for a dictionary catalogue
- MANN, M.E. Introduction to cataloguing and classification of books

BISHOP, W.W. Practical handbook of library cataloguing

(South African libraries, vol. 2, 1935: 60-63).

English literature had always been part of the syllabus. In 1936 the Final examination was written for the first time, consisting of bibliography, English, and advanced library administration.

The weakness of the syllabus, according to Kennedy (1954: 55) was that the Intermediate section consisted only of cataloguing and classification. When the new syllabus was introduced in 1945, this deficiency was remedied.

The SALA proceeded with its courses and tried to adapt them to the needs of the time and to the prevailing opinions of librarians in the country. The 1934 syllabus was revised and it was published in 1939. In 1941 the SALA council's Sub-committee for Subject Training was reconstituted as its Sub-committee for Education (Malan 1970a: 47). One of the first tasks of the Sub-committee was the total revision of the SALA curriculum (i.e. for the entire course from elementary to final level). R.F.Kennedy, who was secretary to the Sub-committee when the new curriculum was drafted, reported that the intention of the Committee was "to make a syllabus for study rather than a syllabus for examinations" (Kennedy 1954: 55).

An examination, it was felt, should not be an end in itself, but a means to determine whether students had profited sufficiently from the courses to be properly trained librarians.

The new curriculum, introduced in 1945, was in its general structure largely influenced by a draft syllabus of the Library Association, published in the Library Association record in 1935 but which

was never adopted for practical implementation by the LA (Kennedy 1954: 55).

In the 1945 curriculum the syllabus for the Intermediate Certificate was widened to include four general basic subjects, viz. bookstock, administration, cataloguing and classification. The Final Diploma made provision for specialisation in bookstock and library administration. The Intermediate Certificate was intended for students who wished to qualify as librarians in small libraries and as senior assistants in larger libraries, while the Final Diploma was to provide for specialists in university and special libraries, children's libraries, etc. (Kennedy 1954: 55).

When, in 1938, the University of Pretoria instituted lectures to supply their own need for staff, and the University of Cape Town considered starting a course leading to open certification in the following year, the organisers of the SALA training courses saw these actions as a threat to them. They were reluctant to relinquish their monopoly in certifying and educating librarians (Malan 1970a: 45). Consequently the SALA Administrative Council decided to refuse recognition of any course in library science which they did not fully control, unless the courses were instituted at their request. The Education Committee's sub-committee for Subject Examinations recommended that, should the Association recognise diplomas awarded by other institutions, recognition must only be granted by the Council and must depend upon:

- a) the nature of the course offered,
- b) the qualifications and the size of the professional elements,
- c) duration of service in a library of diploma holders, and

d) any other conditions the Association may determine (Malan 1970a: 45).

The first talks between the SALA and the University of Cape Town on the recognition of the University's course held in 1940 failed because the University found the conditions laid down by the Association unacceptable. The University was, however, urged to apply for equation to the SALA's own qualifications, in accordance with the guidelines laid down by the Education Committee. Later that year, as a result of representations on the part of the University of Cape Town, the one-year course of UCT was indeed equated to the Association's Final Diploma (Malan 1970a: 46).

When Kennedy (1954: 55), by means of a questionnaire, obtained the opinions of librarians at university and the larger public libraries relating to the suitability of the 1945 curriculum for the staff of their libraries, the majority replied that they found it satisfactory. Those who did not find it satisfactory either wanted more emphasis on the philosophy of librarianship, or more emphasis on practical work.

Kennedy was a member (and secretary) of the SALA Education Committee and also served as the first external examiner for the University of Cape Town's School of Librarianship. His experience in and knowledge of training by the SALA and by the University, which essentially had the same curriculum and maintained a comparable standard to the SALA convinced him that for librarianship to be regarded as a profession, professional librarians must be educated at a university, where there are librarians, books and other

essential facilities. He thought that the SALA should confine itself to "teaching the elements to sub-professional staff", but that it should nevertheless retain control of the training of librarians by laying down standards for library schools (Kennedy 1954: 56).

Not only was the education at the University of Cape Town superior to that of the SALA in Kennedy's view (1954: 57), but the University also supplied more qualified librarians than the SALA. Furthermore, of the diplomas awarded by the SALA, a great number was to students from places where they were able to attend lectures and practicals and did not have to rely solely on the correspondence courses. Thus Kennedy came to the conclusion that the SALA courses had failed to provide education and training for prospective librarians and library assistants in country districts. In 1954, about half of the librarians and library assistants holding SALA qualifications were employed in Johannesburg. This indicated to Kennedy the need for proper facilities for the education of librarians in that city (Kennedy 1954: 57).

In 1946 the Education Committee adopted its own constitution and regulations as the major committee of the SALA Council. In 1947 it appointed three sub-committees, charged respectively with the task of:

- (a) designing a scheme for the introduction of textbooks for library science;
- (b) compiling standards for education for librarianship at universities; and
- (c) reporting on the best method to ensure that South African

libraries should be bilingual (Malan 1970a: 48).

A change in the attitude of the SALA towards university education for librarians became evident in 1948 when it considered making a bachelor's degree an entrance requirement for its own Final examination. This principle was adopted in 1952, and remained in force until 1963, when the SALA ceded its teaching responsibilities to UNISA.

As a result of its growth into a big organisation and its changed attitude towards university training for librarians, the SALA considered, for the first time in 1953, abandoning its own courses. The survey undertaken by Kennedy in 1952 to determine the need for trained librarians and the types of training required and offered contributed to this decision. Another reason, given by Kennedy, was that their correspondence courses had not been a success during the previous years (Kennedy 1954: 54). The 1953 proposal, however, remained unimplemented until 1959/1960, when the SALA Administrative Council formally adopted the plan to cease its courses and to begin negotiating with UNISA on the terms for a transfer of this responsibility.

In 1952, the SALA's Education Committee decided to review the standards for training. During this time, asserts Malan (1970a: 50), it seemed as if an unconscious effort was made to break with the overseas influences of the past and to follow a uniquely South African pattern. It was not easy to break with the past, and at that stage it was probably undesirable, but the tendency towards a more academic professional education for librarians, especially as represented by Immelman of the University of Cape

Town and Coetzee of the University of Pretoria, began to gain ground. Thoughts on providing for South Africa's own needs and circumstances were perceptible. This is evident from the expeditious succession with which departments of Library Science were instituted at South African universities (Malan 1970a: 51).

In 1960, the SALA decided to transfer its courses to the University of South Africa with effect from 1964. In 1964 new standards for education for librarianship were accepted and they were to be used to evaluate existing courses with a view to recognition by the SALA (Malan 1970a: 53).

The question of the minimum period of education and training became a major obstacle to final agreement¹ on the standards (Malan 1970a: 53). Since 1952 the SALA's point of view had been that the minimum period for the education of librarians should be four academic years. All the representatives of the universities involved in the compilation of the standards were of the same opinion, with the exception of the University of Pretoria. The University of Pretoria insisted on the validity of a three-year degree in Library Science. This attitude caused a great conflict of opinion and concomitant hostility in the profession. Apart from the issue of academic-professional versus technical-practical

1. That is, agreement among all the representatives of the universities offering courses in librarianship at the time, serving ex officio as members of the Education Committee's ad hoc sub-committee on standards for education for librarianship.

training, the issue of the minimum period of preparation for a professionally qualified librarian, was responsible for a great deal of discord and dissatisfaction in the profession (Malan 1970a: 53).

6.2.2 University education for librarians in South Africa

In 1937 the University of Pretoria considered starting with the training of librarians and instituting a diploma in library science (Coetzee 1975: 117). The university found that it could not render satisfactory library service unless it had adequately qualified personnel. The University's Library Committee and Senate considered that the only training offered at the time (that of the SALA) did not satisfy the demands of a large university library.

In a paper read at the meeting of the Transvaal Branch of the SALA, held in Pretoria in February 1937, Coetzee portrayed the librarian as a scholar with a wide knowledge in all subject fields, and not so much as a specialist. He quoted José Ortega y Gasset in support of his contention:

"The form of specialization most dangerous to the library is that which concentrates the attention on the technical aspects of the service. This produces a man, who, apart from his technical knowledge, is essentially ignorant and uneducated, but who demands the consideration and privileges due to an educated person on the grounds of his specialized knowledge. No prospective librarian should be allowed to specialize, until he has laid the foundations of a thorough general education."

(Coetzee 1937: 115)

Coetzee was of the opinion that the education of librarians should

be divided into two sections. The first, covering a period of three years, "should aim at improving the student's general knowledge and imparting only the most essential technical knowledge" (Coetzee 1937: 155). The second section should be in the nature of post-graduate study, which would enable students to specialise in a branch of library science. He visualised a form of education differing fundamentally from that offered by the SALA, and advocated the raising of the standards of education for librarianship in South Africa, not by imposing more exacting examinations but by adopting a different attitude to educating librarians, in which less attention should be paid to details of administrative routine and more attention to general principles. The aim of the course, he said, should be to "test ability and culture, not memory" (1937: 156). He pleaded for an examination system whereby oral tests and other forms of assessment of student progress during the time of study should take the place of final examinations.

As regards the content of the course, Coetzee expressed the view that classification lay at the core of librarianship (1937: 156):

"A good librarian is essentially a good classifier, and if he is a good classifier, the chances are very great that he will also be a good administrator, a not inferior scholar and, at least, a moderately good educator. Classification pre-supposes analysis; and the ability to analyse and classify is of the greatest importance in all kinds of organisation."

It is not the system used for classification, claimed Coetzee (1937: 157), that is important, nor the ability to apply the rules of the system. What is important is the knowledge the classifier

has of the matter being classified. To classify, the abstract is being transformed into something organic, which pre-supposes creative work "which demands not only a large fund of general knowledge, but also real scholarship, and a sense of the relations between things" (Coetzee 1937: 157).

One of the main features of Coetzee's proposed course was that students would be required to read a large number of "popularly written" books on various subjects. Jointly, the books would cover the whole field of knowledge. Students would then prepare a summary of every book, to show that they had understood the essentials of the content. A classification system should then be studied in conjunction with the subject matter of such books. To cover all fields of knowledge, this study should extend over several years. In this way, during the first year of study, students would read prescribed books dealing with psychology, sociology, economics, political science, education and philology. In conjunction with the reading, the DC schedules for these subjects would be studied. In the second year of study, books on the disciplines of the natural sciences and technology, such as mathematics, astronomy, physics, chemistry and chemical technology, geology, biology and medicine would be read and the DC schedules for these disciplines studied. The remaining fields of knowledge would then be covered in the same way during the third year of study.

Coetzee claimed (1937: 157) that a student would benefit more from this thorough study of a classification scheme, and should be able to apply it after a year and to use many other schemes "much more scientifically and with greater confidence, than if he had actually

succeeded in memorizing the whole of Dewey in the same space of time."

Other parts of the curriculum to be studied in conjunction with classification were: reference books; cataloguing (i.e. description of books and compiling bibliographies); history of the book and of libraries. The relative merits of the classified and dictionary catalogues and selective and analytical cataloguing, Coetzee felt, could be left for post-graduate study (1937: 158). Furthermore, instead of library administration, students should be offered a course in Elementary general administration, with special reference to libraries. Further study of library administration and routine should be left for "post-graduate students who wish to specialise in that direction" (Coetzee 1937: 158).

Criticism of Coetzee's proposed course in librarianship came at the time from M.M. Stirling in a letter to South African libraries (vol. 5, 1938: 35):

"Mr. Coetzee appears to have a very high conception of the perfect librarian but does not know how to produce him."

Stirling maintained that the only institution capable of "making librarians" is the library itself and the best training in classification is to classify, that handling the actual books is more educative than prescribed reading.

Stirling also expressed the views that a university degree in library science is neither necessary nor desirable and that training needed to be undergone while a student was working in a

library. A school of librarianship, he said, would do 'incalculable' harm to South African librarianship: students would be spoonfed, and it would endanger correspondence courses, which he considered to be the only suitable form of tuition for South Africa.

Stirling's views were representative of many librarians of that time. During the following years a strife was to develop about the education of librarians in South Africa. One pole was represented by Coetzee, who pleaded for a more academic scientific education, while the other pole, represented by the SALA, was in favour of a pragmatic and purely technical training programme for librarians.

Malan (1970a: 44) discusses an unpublished memorandum drafted by Coetzee for submission to the University of Pretoria, presumably in 1937, in which he expresses a high regard for the American and Italian approaches to education, and his aversion to the British approach on which the contemporary South African system was based. Coetzee suggests four fundamental requirements for the education of librarians:

- (a) a wide general education;
- (b) technical knowledge of librarianship;
- (c) practical experience; and
- (d) knowledge of the history of the profession.

It is necessary, says Malan (1970a: 44), to assess Coetzee's viewpoint in the light of the types of librarians for whom such education is intended:

- (a) persons wishing to prepare themselves for service in university and public libraries;
- (b) persons wishing to prepare for service in special libraries; and
- (c) teachers interested in developing and administering school libraries.

In all cases matriculation exemption should be an entrance requirement. Another requirement should be that the course in library science be taken concurrently with a bachelor's degree, or post-graduate. For group (a) it should be a bachelor's degree with disciplines stipulated by each university's senate on recommendation of the library committee. For group (b) a bachelor's degree with emphasis on the disciplines that would be most useful in the special library of the student's choice. In the case of group (c), part of the course in library science may be taken as part of the Higher Diploma in Education.

As in the case of the University of Pretoria, their own need for qualified staff prompted the University of Cape Town to consider starting a course in library science in 1938. In 1939, R.F.M. Immelman, who had then just qualified at Columbia University, initiated a one-year course. This course was to a great extent cast in the same mould as that of Columbia University and other American institutions (Malan 1970a: 45). Originally the course was planned for undergraduate students, but it was later changed to a post-graduate course and a new course was introduced for undergraduates.

In substance Immelman agreed with Coetzee's approach to education for librarianship. He thought, however, that the courses should take into consideration the requirements of the time. Immelman believed in adopting a formal philosophy of librarians:

"Before considering the professional training of the prospective librarian, one must be clear as to the nature of librarianship itself. The question naturally arises: what precisely is the librarian-in-training being educated for? In discussions on professional education the assumption is usually made that librarianship is a profession. But is it? If librarianship is to make good its claims to professional status, it must be built upon a liberal education. Lack of a professional philosophy hampers the library profession" (Immelman 1941: 152).

Immelman believed that a librarian should be educated, not trained (1941: 153):

"There is a difference, to be sure, between library training, which mainly involves routines and manipulation, while library education is concerned with problems, human situations, the thought process in connection with such manipulations."

He was of the opinion that a library school is mainly concerned with education for librarianship. Of his own course at the University of Cape Town, he said (1941: 153):

"..... stress is laid on the underlying principles, the objectives to be striven for In any consideration of education for librarianship, one must bear in mind that library work involves clerical service, and administrative functions This course in Librarianship is certainly not designed to train technicians only, but rather to cultivate a broad professional outlook in its students. The instruction is related to the needs of libraries today."

The first conference of the SALA devoted exclusively to education for librarianship was held in 1940. This, remarks Malan (1970a: 46), is a sign of the upheavals in this field at the time. The SALA people wanted uniformity, but in later years it became apparent that differences in approach of the various educational institutions could be a good thing (Malan 1970a: 46).

The central figures in the educational strife of the initial years of university education for librarians were Coetzee, Immelman and the SALA, Coetzee and the SALA representing the extreme poles and Immelman a position of conciliation between the two. Thus, in the opinion of Malan (1970a: 46), it can be attributed to Immelman that: a) university education; b) an academic degree as an entrance requirement for study in librarianship; and c) the more academic approach towards library science, became acceptable by 1950 to the country as a whole and to the SALA in particular.

It was only years later that degree education for library science was introduced, and the credit for this should to a significant extent be given to Coetzee (Malan 1970a: 46).

In 1945 the first full-time lecturer in Library Science was appointed, in the person of Miss L.E. Taylor, at the University of Cape Town. Coetzee and Immelman were full-time librarians as well as lecturers, and the SALA had never appointed any full-time lecturers.

Up to this stage teaching units for education for librarianship at South African universities were closely associated with their respective university libraries.

At the University of Pretoria, the Library Committee presented all regulations as well as the curriculum for Library Science to the Faculty Board and Senate of the University. In 1948 the University recognised Library Science as a worthy academic field of study and formally instituted a Department of Library Science on its campus, evolved from its 'experimental' precursor (Malan 1970a: 48). At the same time, degrees in Library Science were instituted at the university. A three-year bachelor of arts degree in Library Science (BA(Bibl)) came into being. Likewise, provision was made for study and research towards honours, master's and doctoral degrees in Library Science. Coetzee had therefore taken the lead in South African advanced post-graduate studies, thereby facilitating specialisation at post-graduate level, as he had anticipated in his talk to the Transvaal Branch of the SALA in 1937.

In moulding education for librarianship at the University of Pretoria, the approach among leading personalities at the Graduate School of Library Science and European continental traditions relating to academico-professional education played a crucial role, maintains Coetzee (1962: 139). Library Science was accorded the status of a full-fledged academic discipline of equal formative value in professional education compared to that of all recognised classical academic disciplines. The aim of the university was to mould librarians who would be worthy professionals, and who would practice librarianship in a scientific manner by encouraging advanced independent research (van Rooy 1959: 89).

This aim determined the very nature of the course. It was assumed

to be intrinsically academic, i.e. the implication was that library science should be taught scientifically as were all other university disciplines. Furthermore, as far as teaching and research methodology were concerned, these should be directed towards alerting students to professional problems requiring formal research for their adequate understanding. Students would also be taught to collect information independently and come to conclusions through original thought. The underlying principle was that the "know why" is more important than the "know how" for the prospective librarian.

In clarifying the nature of his approach to education for librarianship to van Rooy, Coetzee cited these aims as a motivation for the emphasis placed on the historical problem areas in the course (van Rooy 1959: 89). Students received an introduction to research methodology in the human sciences through a study of the origin and development of librarianship down the ages. Particular attention was given to the diachronic development and the synchronic structure of science, to user studies as a means of establishing the literature needs and reading habits of library users, and to the book as a medium capable of providing opportunities for the fruitful spending of leisure time and for self-education.

At the end of 1950, which has been taken to represent the end of the second phase of development in Coetzee's periodisation of education for librarianship in South Africa, two trends in the education of librarians were discernible: on the one hand, the approaches of the SALA and the University of Cape Town, and on the other that of the University of Pretoria (Coetzee 1962: 139).

For a few years these bodies were able to provide adequately for the need for librarians. But the post-war growth of libraries, especially the provincial library services, the expansion of university and government departmental libraries, as well as other special libraries, created, during the 1950s, such a demand for qualified personnel that the existing facilities were inadequate to meet that demand. This need resulted in the introduction of courses in library science at other universities.

In 1955 the University of South Africa (UNISA) launched its programme of education for librarianship with a four-year degree course in which Library Science I and II and Bibliography I and II were compulsory. These courses were modelled largely on the courses of the University of Pretoria, equal emphasis being placed on the historical-philosophical approach. The founder of the course at UNISA was H.J. de Vleeschauwer, a philosopher and wartime Minister of Education in Belgium (Kesting 1980: 230). His ideas, Kesting points out, were "permeated with the spirit of the University of Göttingen and Leibniz". This was undoubtedly why the ideas of Coetzee and their implementation in his teaching and research programmes appealed to him. In addition to the historical-philosophical approach, UNISA seriously endeavoured to do justice to the professional-technical content of its course. The UNISA courses could, according to van Rooy (1959: 91) not be accused of being incomplete, but rather in some respects perhaps over-complete.

In 1956 Potchefstroom University started with a two-year lower diploma and a one-year post-graduate higher diploma course, very similar to that of the University of Cape Town. In 1961 Potchef-

stroom University accepted the principle of degrees in Library Science, as a result of which, Coetzee contends (1962: 140), this university had moved closer to the Pretoria tradition. The Potchefstroom qualifications, it should be noted, however, were recognised by the SALA, in the sense that their two levels of qualification were equated to the Intermediate Certificate and the Final Diploma of the Association.

In 1958 the Universities of Stellenbosch and the Witwatersrand initiated courses in Library Science. As far as the aim, nature and organisation of the Stellenbosch courses are concerned, they reflected a measure of similarity to the courses being offered at Potchefstroom University, and the influence of the University of Cape Town was also discernible (van Rooy 1959: 93). Stellenbosch launched its teaching programme with a two-year lower diploma and a one-year post-graduate higher diploma course.

The course at the University of the Witwatersrand was a one-year post-graduate diploma in librarianship and typography. As at the other universities, the aim of the course was to equip prospective librarians with a basic knowledge that would enable them to hold professional positions in various types of libraries (van Rooy 1959: 93).

During the 1960s and 1970s courses in Library Science were started at almost all South African universities. According to a survey undertaken during 1979 (Fouché 1980), fourteen of the sixteen universities in South Africa provided facilities for the education of librarians. The only two not providing facilities are the University of Port Elizabeth and University of the Witwatersrand,

which discontinued its courses in 1975. (Witwatersrand, however, is considering a resuscitation of its initial teaching programme in the near future (Fouché 1980: 5). The University of the Transkei in Umtata has also indicated its intention of introducing a course in Library Science in the near future.

Facts concerning the education of librarians at South African universities that emerged from the 1979 survey can be summarised as follows:

1. Three types of programme are offered, viz. paraprofessional training; comprehensive professional education; and specialised education at the basic level (i.e. in school library science, usually as part of teacher education).

Comprehensive professional education implies:

- (a) a first level of education, which can be either an undergraduate course leading to a professional bachelor's degree, or a post-graduate course requiring a non-professional bachelor's degree, which leads to a post-graduate or higher diploma;
 - (b) subsequent levels of professional teaching and research involving advanced degrees such as honours, master's and doctoral degrees.
2. The survey showed that all teaching units at the universities providing education for librarianship have full status as academic departments, or, as in the case of the University of Cape Town, it has been organised as a School of Librarianship.
 3. All universities, with the exception of the University of Natal

(Pietermaritzburg) and the Rand Afrikaans University, provide facilities for paraprofessional training. All universities offer programmes for the Higher Diploma and ten universities offer programmes leading to the B.Bibl. degree. Research facilities at advanced professional level are provided by all universities except the University of the North and Rhodes University. At seven universities there are facilities for the education of school librarians (Fouché 1980: 3-10).

When the SALA discontinued its training programme in 1963, the principle of equation of university programmes with that of the SALA was no longer valid. The Education Committee of the SALA then decided to formulate standards according to which programmes offered at universities will be evaluated. The first standards formulated in 1964 (cf. p.294) never had, according to Kesting (1980: 233), a great impact on the universities. Fundamental differences of approach made it difficult to come to agreement about the standards. There was, for example, the issue of the minimum period of education for professional librarians (cf. p.294). At that time the universities of Pretoria and the Orange Free State offered a three-year course leading to the bachelor's degree in library science, while the other universities insisted upon four years as the minimum requirement.

In 1972 the University of Pretoria and in 1973 the University of the Orange Free State converted their three-year to four-year degrees, but even then they did not take the 1964 Standards seriously enough to apply for recognition (Kesting 1980: 233).

At a symposium on Renewal in Education for Librarians and Information Workers, held in Pretoria in 1973, it was resolved that the Education Committee should investigate the whole issue of standards for education and the evaluation of programmes offered by the teaching institutions.

An ad hoc sub-committee was appointed in 1974 to conduct the investigation and to submit proposals for standards and methods for implementing them (Kesting 1980: 234). The first draft of proposals was submitted to departments of library science at universities for comment. On the basis of the comments received, the sub-committee prepared a revised version of the proposals for approval by the SALA's Committee of Education and Research (which succeeded the Education Committee in 1976) and by the SALA Council.

The statement was adopted in principle and the final document was published in 1979. It is the intention of the SALA that the standards will remain in continuous revision for the years to come (Kesting 1980: 234). As from 1980, departments of library science will apply for accreditation of their programmes according to the standards, grace being granted to teaching institutions now enjoying recognition until the end of 1983.

During 1979 the name of the South African Library Association was changed to the South African Institute for Library and Information Science (SAILIS), implementation becoming effective on 1 January 1980. One of the Institute's aims is:

"the promotion of eminent professional training
inter alia by the acquisition of suitable programmes for professional training at educational institutions, the

setting of standards for various levels of education; the evaluation of educational programmes and professional qualifications..." (South African Library Association 1979: 3).

From the data concerning the curricula for library science discussed in this chapter, it can be deduced that during the initial years of education and training for librarianship, the emphasis was on training, with cataloguing and classification constituting the major part of the curriculum. The professional content of the syllabus for the Elementary Certificate consisted of cataloguing, classification and library routines such as book selection and accessioning. When the Intermediate course was added to the Elementary course in 1935, it consisted solely of cataloguing and classification.

When the universities initiated courses in library science, they championed a shift of emphasis to education, i.e. a wider academic and professional programme. Under the influence of the universities the SALA revised its programme in 1945, and rectified deficiencies, especially on the elementary level, to include a wider professional content. Although cataloguing and classification played an important part in the curricula for library science of the universities, it ceased to be considered the most important part of the education for librarians. More attention was paid to theory and underlying principles of cataloguing and classification and the programmes progressively included other aspects of library science.

CHAPTER 7

CATALOGUING AND CLASSIFICATION IN THE CURRICULA
OF SOUTH AFRICAN UNIVERSITIES

The information elicited by the questionnaire (Annexure A) from fourteen of the fifteen departments of library science at South African universities listed in Annexure B, has been summarised first, to present a general profile of subcourses comprising cataloguing, classification and verbal indexing offered. This summary is followed by an analysis of every question in the questionnaire, with tables where required and comments on the data.

Anonymity will be observed throughout the analysis of the data obtained from the departments of library science at the various universities for the following reasons:

- (a) it was assumed that the absence of anonymity might place some measure of restraint on the respondents; and
- (b) as long as it is possible to establish the position occupied by the subcourse(s) of cataloguing and classification in the curricula of South African universities in general, the practice of individual universities is not relevant.

The questionnaire was mailed to the heads of all relevant departments, one of which failed to return it. Consequently the findings with regard to the place of cataloguing and classification in the curricula are based on a 93,3% response. All the other respondents reacted promptly and no reminders were necessary. One respondent

returned the questionnaire only partly completed, while another was not able to answer all the questions in view of the fact that its course in library science will be instituted in 1981 and all particulars concerning the course have not been finalised.

In the questionnaire a course/comprehensive course refers to a unit of study culminating in a full professional or paraprofessional qualification, such as Lower Diploma/Higher Diploma in Library Science, B.Bibl. degree, etc. A course description/outline is a curriculum.

Subcourse refers to a logically structured part of the comprehensive course such as Information science, Library management, etc. A subcourse description/outline is a syllabus.

Classification is the assignment of books to their proper places in a scheme of book classification.

Cataloguing is the process of determining the forms of entry and preparing the bibliographical descriptions for a catalogue.

Verbal indexing is the process of determining the word or group of words under which books and other material on a subject are entered in a catalogue in which the entries are arranged in alphabetical order.

Prescribed books are compulsory textbooks to be purchased by students, covering a substantial part of the syllabus.

Recommended books cover about half of a subcourse or a special angle of it, and possession of them by students should be optional.

Curriculum profile

7.1 General introduction

Courses leading to a paraprofessional qualification (a lower diploma in library science (LDLS)) are offered at eleven of the fourteen participating universities. At nine of these universities it is a two-year course whilst at two it is a one-year course (i.e. time required to complete the course, after matriculation, comprising the joint professional and extra-professional content). Courses leading to various professional qualifications are offered at all the universities, among which the higher diploma predominates, being offered at thirteen of the fourteen universities. One university offers a two-year post-graduate Bachelor of Library Science (B.Bibl.) degree, and one of the universities offering the Higher Diploma in Library Science (HDLS) at present, is planning to discontinue it in 1981 and replace it with a two-year post-graduate B.Bibl. degree. This trend suggests that the traditional predominant position of the HDLS may well be challenged in the near future.

The HDLS is a one-year post-graduate course at ten universities, but at three other institutions the period has been extended to two years. The integrated four-year post-matriculation B.Bibl. degree course is offered at nine of the fourteen universities and enjoys a status of parity with the HDLS.

Special qualifications in school library science can be obtained at eight universities. At five of these, this course is designated the Diploma in Special Education (DSE). In three instances it is a one-year course and in the case of the other two institutions

it is a four-year course. One university offers a two-year course designated University Education Diploma in Resource Centre Management (UEDRCM) in which library science constitutes half of the course content whilst the other half is devoted to subcourses such as resource centre management and educational technology. Two universities offer a B.Bibl.(Ed) degree, which is an integrated four-year course, comprising library science and education.

One university plans to introduce a diploma in information science in 1981.

7.1.1 Designation

The following is a list of designations used at the various universities:

Catalography

Cataloguing and Classification

Catalography for School Libraries

Cataloguing, Classification and Indexing

Cataloguing, Classification, Information Science

Classification and Information Retrieval; Cataloguing

Documentation

Information retrieval science

Information science

Inleiding tot ontsluitingsleer

Inligtingkunde

Inligtingsontsluiting

Ontsluitingsleer

Practical Bibliographic Description; Practical Subject Analysis
and the Retrieval of Information

School Library Practice

Subject Analysis and the Retrieval of Information; Bibliographic description and Cataloguing Systems.

At five universities the designation of the subcourse comprising cataloguing, classification and verbal indexing includes the word 'information' or 'inligting'. These subcourses are entitled, for example, 'Information Science', 'Information Retrieval' and 'Inligtingsontsluiting'. In four instances it is simply called Cataloguing, Classification and Indexing, whilst in three instances it is designated Catalography. The other various designations listed above are used by only one university each.

7.1.2 Degree of representation

Cataloguing and subject analysis are compulsory subcourses at all universities. Verbal indexing is not included in the course for the IDLS at one university, nor in the course for school library science at two universities.

7.1.3 Duration

In regard to comprehensive courses with a duration of more than one year, it was found that the stage (academic year) during which the subcourse comprising cataloguing, classification and verbal indexing is taught, varies. In the majority of cases the content of the subcourse is spread over more than one year. This is especially true for the B.Bibl. degree.

7.1.4 Degree of exposure to lectures and practicals

The number of contact lecture periods devoted to cataloguing,

classification and verbal indexing varies considerably. They also vary in regard to the number of contact lecture periods devoted to each of these subcourses, and to the number of contact lecture periods devoted to practical work and theoretical study.

7.1.5 Similarity and diversity

The syllabuses for the subcourse reflect a significant degree of similarity, especially in regard to cataloguing and classification. Verbal indexing syllabuses, however, display greater diversity, essentially in regard to the range of coverage and the selection of indexing systems used as prototypes.

7.1.6 Innovation

Seven universities have effected changes in their syllabuses in the last five years. All seven cited the need for up-dating course material with a view to including the latest developments in the field as their main reason for such changes. Two universities cited the guidelines laid down in the new SALLIS (Standards for education for library and information service) as a prerequisite for accreditation of their courses in addition to the above consideration as a reason for deciding to introduce change.

Five universities who have not effected any changes in the recent past contemplate doing so within the next three years.

7.1.7 Time devoted to theory and practicals

As far as the factor of time devoted to theory and practical work is concerned, responses show that on the whole more time is

devoted to practical work than to theory. This is especially true in the case of cataloguing, whilst, in classification, there is a tendency to devote more time to theoretical studies.

7.1.8 Fieldwork

Provision is made for students to conduct fieldwork at twelve universities. Nine of these do not require their students to devote part of their fieldwork specifically to cataloguing, classification and verbal indexing. Of the three who have indicated that they do require this, none prescribes a specific minimum period of time to be devoted to these activities.

7.1.9 Preference for types of catalogue structure

In all subcourses in subject analysis, the subject approach to information on the macro-analytic level is effected through both the classified and dictionary catalogue. At four universities, the dictionary catalogue is given precedence; at another four, the classified catalogue, and at the remaining four, equal attention is given to both catalogue structures.

7.1.10 Bibliographic description of non-book material

Attention is given to all ISED categories of non-book material covered in AACR2 by at least three universities. Categories receiving least attention are machine-readable data files and three-dimensional artefacts and realia, while all universities give attention to the categories 'Serials' and 'Cartographic material'.

7.1.11 Facet analysis

On the whole, the teaching of facet theory and analysis do not appear to be considered important for courses leading to para-professional qualifications and qualifications in school library science. However, eleven out of thirteen respondents regard it as an essential part of the syllabus for professional qualifications.

7.1.12 Chain indexing

Chain indexing is regarded as more important than facet analysis for the IDLS, but only four of nine respondents consider it essential. In most instances it is rated essential for professional qualifications. Only one respondent considers it important for school library science courses.

7.1.13 Post-co-ordinate indexing

Post-co-ordinate indexing is generally regarded as essential for professional qualifications and of no importance for paraprofessional and school library science qualifications.

7.1.14 Prescribed textbooks

It is not a common practice among all universities to prescribe books for their students. Books being prescribed vary considerably. From the comprehensive list of books (Annexure C), only one, viz. A.C.Foskett's Subject approach to information is listed by nearly all departments.

7.1.15 Cataloguing code

The cataloguing code used by all universities is the AACR code,

with the majority using the second edition. Two universities offering courses in school library science use McArdell's Cataloguing for school librarianship.

7.1.16 Classification schedules

In the teaching of practical classification, the 18th edition of the DDC is used by the majority of respondents (cf. analysis later in this Chapter), whilst the 10th abridged edition of the DDC is used for school library science. In the theoretical study of classification, schemes dealt with are LC, UDC, CC, Bliss' BC and, in two instances, Brown's SC. At some universities students do practical exercises with these schemes in addition to DDC.

7.1.17 Lists of subject headings

Subject heading lists used in practical and theoretical work are Sears list of subject headings, in twelve instances, LCSH in two, and Coetzee's Notasies en trefwoorde in one.

7.1.18 Other verbalised indexing systems

Of the latest systems of verbal indexing, the PRECIS system is taught to a greater or lesser degree at all universities. Other systems taught at a more detailed level than referring to them as examples of systems of information retrieval, are Uniterm, TEST, ERIC thesaurus, Medical Subject Headings (MeSH) and Thesaurofacet.

7.2 Detailed tables and comments

This section enumerates the questions asked in the survey. The

responses are analysed and, where applicable, tables are given with comments.

7.2.1 Question 1: 'Does your department offer courses leading to any of the following qualifications: LDL; HDL; B.Bibl; DSE; Other?'

Responses: 14

Table 1

<u>Qualification</u>	<u>Number of departments</u>
LDL	11
HDL	13
B.Bibl.	9
DSE	5
Other:	
B.Bibl. post-graduate	1
B.Bibl. Ed.	2
UEDRCM	1

One university is planning to introduce a post-graduate Diploma in Information Science in 1981. This will be a two-year course.

One university plans to introduce a two-year post-graduate B.Bibl. to replace its present HDL, and to discontinue the LDL, both changes to take place in 1981.

7.2.2 Question 2: 'Maximum and minimum duration of course designated in question 1?'

Responses: 14

Table 2

Comprehensive course:	Number of universities offering courses with a minimum duration of:				
	1 yr	2 yrs	3 yrs	4 yrs	Total courses
LDLS	2	9			11
HDLS	10	3			13
B.Bibl.				9	9
DSE	3			2	5
Post-graduate B.Bibl.		1			1
B.Bibl. ED				2	2
UEDRCM		1			1

Most universities have no maximum restrictions on the duration of their courses (i.e. all comprehensive courses). Some respondents indicated that the duration of a course is either one year full-time or two years part-time. One university indicated ten years as the maximum restriction on all courses offered. One indicated only a two-year maximum duration for the HDL, with no indication as to the minimum duration. That university course has been entered as being of a minimum duration of two years in the table.

Two universities indicated the minimum duration for the HDL as being four years. This has been interpreted as being three years undergraduate study for a Bachelor's degree and one post-graduate year for the HDL.

7.2.3 Question 3: 'Is provision made for natural progression from attainment of the para-professional qualification (i.e. LDL) to its professional level (i.e. HDL or B.Bibl.)?'

Responses: 13; Abstentions: 1

Table 3

<u>Answer</u>	<u>Number of universities</u>
YES	4
NO	9
	—
	13

The blank response was from a university planning to introduce courses in 1981, with aspects of the courses not yet having been determined in sufficient detail to enable the respondent to provide a firm answer.

7.2.4 Question 4: 'Designation of subcourses/subcourse units in which cataloguing, classification and verbal indexing are included'

Responses: 14

Table 4

<u>Designation</u>	<u>No. of universities</u>
a) Information retrieval/Information science/Information retrieval science/Ontsluitingsleer/Inligtingsontsluiting/Inligtingkunde	5
b) Cataloguing and classification/... and indexing/... and information retrieval	4
c) Catalography	3

d) Subject analysis and the retrieval of information; Bibliographic description and cataloguing systems	1
e) Practical subject analysis and retrieval of information; practical bibliographic description	1
	—
	14

In some instances the designation of the subcourse coincided for all comprehensive courses (i.e. the same designation is used in the case of LDLS, HDLS, B.Bibl. and DSE), whilst in a few instances different designations are used for every comprehensive course, for example 'Cataloguing and classification' for the LDLS and 'Information Science' for the HDLS and the B.Bibl.

Questions 5, 6 and 7

7.2.5 Question 5: 'Please indicate whether subcourses specified in 4.1 - 4.53 contain each of [cataloguing, classification, and verbal indexing] in its entirety.'

Responses: 14

Table 5

<u>Answer</u>	<u>Number of universities</u>
YES	11
NO	3
	—
	14

7.2.6 Question 6: 'If NO, please state which of [cataloguing, classification and verbal indexing] are accommodated as subcourse units

7.2.7 Question 7: '.... please give a short syllabus description or outline.'

Three departments of library science indicated that the subcourses specified in question 4 did not include cataloguing, classification and verbal indexing in their entirety.

Of these three:

No. 1 indicated that verbal indexing is not included in the same subcourse as cataloguing and classification, but is accommodated as a separate subcourse unit. No further information concerning this subcourse unit was given.

No. 2 indicated that the various comprehensive courses differ in terms of level of complexity and intensity of the subcourses, in that HDLS and B.Bibl. students do more and also more advanced work in cataloguing, classification and verbal indexing than LDLS and DSE students.

No. 3 indicated that the subcourse specified in question 4 comprises two subcourses, viz.: Information Science I and Information Science II, subcourse I being an introduction to cataloguing and classification, and subcourse II theory and practice of cataloguing, classification and verbal indexing.

7.2.8 Question 8: 'Are \surd cataloguing, classification and indexing \surd compulsory in the context of the comprehensive courses....?'

Responses: 14

Cataloguing, classification and verbal indexing are compulsory at all universities for all comprehensive courses, with the exception of:

- a) verbal indexing for the DLS at one university.
- b) verbal indexing for the DSE at one university.
- c) verbal indexing for the UEDRCM at one university.
- d) 'macrographic' verbal indexing (i.e. "describing the bibliographic unit as a whole") which is compulsory for B.Bibl. and B.Bibl.(Ed), whereas micrographic verbal indexing (i.e. "describing information units in the bibliographic units") is not, in the case of one university.

7.2.9 Question 9: 'If not compulsory, please specify optional alternative subcourse/subcourse unit.'

No optional alternatives were specified in the case of the three universities at which verbal indexing is not compulsory.

7.2.10 Question 10: 'Please indicate the stage (i.e. academic year) during the completion of comprehensive course when the content of the subcourse/subcourse unit is offered.'

IDLS

Of the eleven universities offering courses leading to this qualification, five offer the subcourse(s) containing cataloguing, classification and verbal indexing during the second year of study. At

two universities students are taught only theory during the first year of study, and theory and practice during the second year. At one university attention is given to theory and practice only during the first year of a two-year course. Two universities, although they had indicated in Question 2 that the LDLS was a one-year course, reported in response to this question that cataloguing, classification and indexing are studied during the second year.

HDLS

At the ten universities where this is a one-year course, the content of the subcourse is obviously studied during that year. At the three universities offering a two-year HDLS course:

No. 1: deals with theory and practice of cataloguing, classification and verbal indexing during the first year and continues with theoretical studies only during the second;

No. 2: attends to theoretical studies only during the first year, and to theory and practice during the second; and

No. 3: studies theory and practice during the first year only.

B.Bibl.

The stage in the academic years of study during which cataloguing, classification and verbal indexing are dealt with vary considerably among the nine universities offering a four-year integrated B.Bibl. course.

In the following table, each university is represented by a number. T denotes theory; P practicals; cat = cataloguing; class = classification; v/ind = verbal indexing.

TABLE 10

Universities	1st year						2nd year						3rd year						4th year					
	Cat		Class		V/Ind		Cat		Class		V/Ind		Cat		Class		V/Ind		Cat		Class		V/Ind	
	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P
No. 1	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓		✓		✓							
No. 2	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓		✓		✓							
No. 3	✓		✓				✓		✓				✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
No. 4	✓						✓	✓							✓	✓	✓	✓					✓	✓
No. 5							✓	✓	✓	✓			✓	✓	✓	✓	✓	✓					✓	✓
No. 6							✓	✓	✓	✓	✓	✓	✓	✓	✓									
No. 7							✓	✓							✓	✓	✓	✓			✓			
No. 8													✓	✓	✓	✓	✓	✓						
No. 9							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						

The table shows clearly that the subcourse comprising cataloguing, classification and verbal indexing receives the most intensive degree of interest during the second and third years of study, while two universities introduce the relevant subcourse unit in the first year, another two universities do so also in the first and fourth years of study, yet another two universities rounding off the relatively intensive exposure to the subcourse in the second and third years in their final degree year.

DSE

Five universities offer this course, at three it is a one-year course, at two a four-year course. One of the two four-year courses deals with the theory and practice of cataloguing, classification and verbal indexing during the second and fourth years of study. The other university offering a four-year course indicated that theory and practice of cataloguing and practical classification are being carried out during the fourth year of study.

UEDRCM

Practicals in cataloguing, classification and verbal indexing are conducted during the first year of study and theoretical studies of all three during the second year.

B.Bibl.(Ed)

Only two universities offer a course leading to this qualification. In both cases these are four-year courses. At one of them, theory and practicals in cataloguing, classification and verbal indexing are performed during the second and third years of study, whilst

the other institution reported that theoretical studies are dealt with during the first year of study, theory and practicals being offered during the second year.

7.2.11 Question 11: 'Please indicate the number of contact lecture periods per annum assigned to cataloguing, classification and verbal indexing.'

Responses: 12 Abstentions: 2

The following table shows the average, median and range of the number of contact lecture periods assigned to cataloguing, classification and verbal indexing. For courses of more than one year's duration, the total number of periods for the full duration of the course has been recorded in the table.

With regard to DSE, in only three replies were the number of periods assigned to cataloguing, classification and indexing specified, and of these three only one reported that contact lecture periods were assigned specifically to verbal indexing.

TABLE 11

	AVERAGE		MEDIAN		RANGE	
	Theory	Practice	Theory	Practice	Theory	Practice
a) <u>Cataloguing:</u>						
LDLS	47	73	44	60	10-75	55-152
HDLS	49	76	44	70	28-84	15-152
B.Bibl. & B.Bibl.(Ed)	69	91	70	108	38-153	50-153
DSE	36	51	38	63	7-63	14-63
b) <u>Classification:</u>						
LDLS	40	53	42	49	5-75	38-152
HDLS	45	67	44	49	15-76	15-152
B.Bibl.& B.Bibl.(Ed)	61	58	58	60	20-152	28-152
DSE	44	49	38	50	38-47	21-76
c) <u>Verbal indexing:</u>						
LDLS	24	31	14	28	4-76	6-114
HDLS	30	30	27	19	6-76	6-75
B.Bibl. & B.Bibl.(Ed)	36	31	34	27	10-76	10-78
DSE	16	16				

This table demonstrates that, on the whole, more contact lecture periods are being assigned to cataloguing than to classification. At two universities the identical number of periods is assigned to cataloguing, classification and indexing for the HDL and B.Bibl. courses. At six universities classification and indexing jointly are assigned more periods than cataloguing and at four, the periods are divided equally between cataloguing on the one hand and classification and verbal indexing on the other.

7.2.12 Question 12: 'Please enclose subcourse/subcourse unit outlines in regard to cataloguing, classification and verbal indexing.'

LDLS:

The syllabus outlines for the paraprofessional course as offered by eleven universities show great similarity. All the outlines for cataloguing include an introductory study of catalogues and cataloguing; of components of the book; of the bibliographic description of monographs, serials and non-book material. One university includes 'International co-operative cataloguing' in this course.

With regard to classification, all universities incorporate an introduction to the basic principles of classification and a study of DDC. In one instance a study of LC and UDC is included in the subcourse for the LDLS. All universities offer training in practical classification according to Dewey.

Only one university excludes verbal indexing for the LDLS. Other universities include theory and practice of subject headings

and chain indexing, and in two instances post-co-ordinate indexing systems are included in the subcourse for verbal indexing.

HDLS/B.Bibl./B.Bibl. (post-graduate):

One answer concerning syllabus outlines for the professional level was inadequate to determine the subject content of the subcourse. The outlines of the remaining syllabuses show great similarity. In all instances the syllabus for cataloguing includes the history and development of cataloguing, catalogues and cataloguing codes, and practical work in descriptive cataloguing. Only seven of the thirteen universities indicated that selective and limited cataloguing, co-operative and centralised cataloguing and machine-readable cataloguing are included in the syllabus. Three universities conduct a study of machine-readable data bases.

The history and principles of book classification and the evaluation of different classification schemes, such as DDC, UDC, LC, CC, Bliss' BC, are represented in all classification syllabuses. Practical classification forms part of the study in all cases. Eight universities specifically identified facet analysis as a core element of the syllabus.

Verbal indexing is taught by all respondents, in the form of chain indexing and subject headings. In eight cases, index-language construction is listed as a component, designated variously as "vocabulary control" or "thesaurus construction". Nine universities specifically listed co-ordinate indexing as a unit in the subcourse syllabus concerned, six of them in conjunction with computerised indexing.

DSE:

All universities offering courses in school library science include in the syllabus for cataloguing some theory, for example, the functions, aims and nature of school library catalogues; physical forms of catalogues; and types of catalogue. All universities train the students in practical bibliographic description. One respondent indicated that centralised co-operative and selective and limited cataloguing is included in the syllabus.

All universities train their students in the practical application of a classification scheme. Theory of classification, if covered at all, is limited to advantages of classification and some major principles of book classification.

Only three universities include verbal indexing, in the form of the construction of subject headings, in the syllabus. Only one respondent reported the inclusion of chain indexing.

7.2.13 Question 13: 'Have you effected significant changes in the syllabuses of the subcourses/ subcourse units identified in 4.1 - 4.53 in the last five years? If yes, please state reasons for introducing the changes.'

Responses: 12 Abstentions: 2

Table 13

<u>Answer</u>	<u>No. of universities</u>
YES	7
NO	5
	<hr/> 12

All seven universities who effected changes in their syllabuses cite the need to update course material to keep abreast of the latest developments in the field (cf. also par. 7.1.6). One university specified that the content or volume of cataloguing and classification was reduced as a means of accommodating material on new developments. Another indicated that more emphasis is being placed on cataloguing and machine-readable cataloguing to incorporate new developments.

The reason given for changes in the DSE syllabus for cataloguing at one university is to introduce changes in the form of the school catalogue, initiated by the provincial department of education concerned.

Two universities indicated that, in addition to updating their course material, another reason for change was the anticipation of the requirements laid down by SALLIS in its Standards for education for library and information service (1979) as prerequisite for accreditation of their courses (cf. also 7.1.6).

7.2.14 Question 14: 'Are changes in regard to content, structure and contact lecture periods pertaining to cataloguing, classification and verbal indexing being contemplated within the next three academic years? If yes, please give relevant particulars briefly.'

Responses: 12 Abstentions: 2

Table 14

<u>Answer</u>	<u>No. of universities</u>
YES	6
NO	6
	<hr/>
	12

Of the two universities who left this question unanswered, one will only be introducing its courses in 1981, and the other left this as well as the previous question and also all following questions unanswered with no indication as to the reason for abstention.

The six NO responses are from universities who had effected changes within the last five years. Of the six YES responses, one reported in Question 13 that modifications had been effected in the last five years, and that alterations being contemplated in the near future will be in the arrangement of subcourse units more than in content. This change will comprise the extension of the subcourse over three semesters instead of the present two, in order to incorporate new developments and greater specialization in cataloguing and classification.

Two of the other five respondents indicated that changes are being contemplated in order to update course content. One indicated its intention to extend the subcourse Information Science by one year. Of the remaining two universities, one intends to modulate the staff structure and to examine courses for possible changes, whilst the other envisages the reduction of emphasis on practical cataloguing and classification and intensification of emphasis on verbal indexing.

7.2.15 Question 15: 'Indicate approximate ratio between amount of contact lecture periods devoted at present to theoretical and practical components of subcourses/subcourse units concerned in each of the comprehensive courses.'

Responses: 12 Abstentions: 2

Table 15

Ratio	Number of universities								
	Para-professional			Professional			School Libr. Sc.		
Theory Prac.	Cat.	Classn.	V/Ind.	Cat.	Classn.	V/Ind.	Cat.	Classn.	V/Ind.
0 : 100		1						1	
10 : 90	1	1	1						
20 : 80							1		
25 : 75	1			2	1		1		
30 : 70	2	3		2	1		1	1	
40 : 60	3	3	2	2	1	2	2	2	1
42 : 58					1	1			
50 : 50	3	2	4	5	5	5	2	2	2
56 : 44								1	
60 : 40					2				
66 : 33				1	1	1			
70 : 30						1			
75 : 25						1			
80 : 20			1			1			

The table shows that the ratio between time devoted to theory and practicals varies. It is also clear that at the majority of the universities, either more time is devoted to practicals than to theory, or the time is divided equally between theory and practicals. With regard to cataloguing, more time is nearly always devoted to practicals, whilst in the case of classification and verbal indexing a greater emphasis on theoretical study is evident.

7.2.16 Question 16: 'What degree of importance do you attach to pre-course experience in cataloguing, classification and verbal indexing on the part of students registered for these subcourses/subcourse units?'

Responses: 13 Abstentions: 1

Table 16

<u>Answer</u>	<u>No. of universities</u>
Of no importance	8
1 on a scale of 5	3
3 on a scale of 5	2
	—
	13

The above figures indicate that in the opinion of most departments of library science it is of no importance whether or not students have pre-course library experience.

7.2.17 Question 17: 'Is it standard practice of your department to provide for "fieldwork" (see Standards 3.2, p.55-56) during training and/or education?'

Responses: 13 Abstentions: 1

Table 17

<u>Answer</u>	<u>No. of departments</u>
Provision made	12
No provision made	1
	<hr/>
	13

7.2.17.1 Question 17.1: 'If YES, is fieldwork specifically devoted to cataloguing, classification and verbal indexing, conducted under supervision, required of students?'

Responses: 12 Abstentions: 2

Table 17.1

<u>Answer</u>	<u>No. of departments</u>
Required	3
Not required	9
	<hr/>
	12

7.2.17.2 Question 17.2: 'If YES, do you prescribe a minimum period to be devoted to fieldwork in cataloguing, classification and verbal indexing?'

None of the three departments which requires its students to perform cataloguing, classification and verbal indexing under supervision during their fieldwork prescribe a minimum period for its performance.

7.2.18 Question 18: 'Please indicate whether the subject approach to information is effected essentially through the (a) classified or (b) dictionary form of catalogue or (c) both.'

Responses: 12 Abstentions: 2

Table 18

<u>Answer</u>	<u>No. of departments</u>
(a) Classified	0
(b) Dictionary	0
(c) Both	12
	—
	12

7.2.18.1 Question 18.1: 'If both, please indicate relative emphasis given to each form.'

Responses: 12 Abstentions: 2

Table 18.1

<u>Ratio</u>	<u>No. of departments</u>
Classified : Dictionary	
30 : 70	4
50 : 50	4
70 : 30	3
80 : 20	1
	—
	12

What is evident from this table is that at only four universities is more attention paid to the dictionary catalogue than to the classified catalogue. One of these four institutions indicated that this position is reversed in respect of DSE.

7.2.19 Question 19: 'Please indicate whether ... attention is given to the cataloguing of the ISBD categories ... covered in AACR2.'

Responses: 12 Abstentions: 2

Table 19

<u>Category</u>	No. of departments		
	Para-professional	Professional	School Libr.Sc.
1. Cartographic material	5	12	3
2. Manuscripts	3	7	1
3. Music	5	10	3
4. Sound recordings	5	9	2
5. Motion pictures and video recordings	4	10	3
6. Graphic material	4	9	4
7. Machine readable data files	0	3	1
8. Three-dimensional artefacts and realia	0	5	2
9. Microfilms	4	11	2
10. Serials	7	12	4

Of the two abstentions, one has been elucidated in Question 14, while the other institution indicated that it did not find the question 'clear'.

One university failed to answer the question regarding the LDLS, presumably because this university had indicated earlier in the questionnaire that it intends discontinuing this course in 1981. Yet another did not specify any of the categories as receiving attention in the courses for the LDLS and the DSE, both of which are offered at this university.

One university remarked that the categories are alternated every year, because all the categories cannot be fitted into the available time every year.

7.2.20 Question 20: 'What degree of importance is attached to the teaching of facet theory and analysis in the subcourse/subcourse unit concerned in the case of the comprehensive courses listed?'

Responses: 13 Abstentions: 1

Table 20

Comprehensive Course	Answer	No. of departments
LDLS	Of no importance	1
	1 on a scale of 5	4
	2 on a scale of 5	1
	Essential	3
		9

Comprehensive Course	Answer	No. of departments
HDLS/B.Bibl.	Of no importance	1
	2 on a scale of 5	1
	Essential	11
		<hr/> 13
DSE/B.Bibl.(Ed) UEDRCM	Of no importance	3
	1 on a scale of 5	3
	2 on a scale of 5	1
		<hr/> 7

For the para-professional course (offered at eleven universities) only three respondents regard facet theory and analysis essential. One university left the question in respect of the LDLS unanswered again; presumably, because of its intended discontinuation of the course in 1981.

The majority of universities offering courses leading to professional qualifications, regard facet theory and analysis as an essential part of the education of professional librarians.

7.2.21 Question 21: 'What degree of importance is attached to the teaching of the theory and practice of chain indexing in the production of subject-index entries for a classified catalogue ...?'

Responses: 13 Abstentions: 1

Table 21

Comprehensive Course	Answer	No. of departments
LDLS	Of no importance	1
	2 on a scale of 5	1
	3 on a scale of 5	2
	4 on a scale of 5	1
	Essential	4
		<hr/> 9
HDLS/B.Bibl.	2 on a scale of 5	1
	4 on a scale of 5	2
	Essential	10
		<hr/> 13
DSE/B.Bibl.(Ed)	Of no importance	3
UEDRCM	1 on a scale of 5	2
	2 on a scale of 5	1
	4 on a scale of 5	1
		<hr/> 7

Surprisingly, there is comparatively little agreement on the importance of chain indexing for para-professional qualifications. Only four out of nine departments regard chain indexing as an essential part of the subcourse, and one sees it as being important.

The table reflects a good deal of consensus regarding the importance of chain indexing in the courses leading to professional qualifications. For school library science, however, five out of seven departments regard chain indexing as being of either no or very

little importance.

7.2.22 Question 22: 'What degree of importance is attached to the teaching of post-co-ordinate indexing ... in the case of the comprehensive courses listed?'

Responses: 13 Abstentions: 1

Table 22

Comprehensive course	Answer	No. of departments
LDLS	Of no importance	5
	2 on a scale of 5	1
	4 on a scale of 5	1
	Essential	2
		9
HDLS/B.Bibl.	Of no importance	1
	4 on a scale of 5	1
	Essential	11
		13
DSE/B.Bibl(Ed)	Of no importance	6
UEDRCM	2 on a scale of 5	1
		7

In the majority of cases, post-co-ordinate indexing is not regarded as necessary or very important in courses leading to para-professional or school library science qualifications. The consensus, however, reflects an overwhelming support in favour of

the view that post-co-ordinate indexing should form an essential part of courses leading to professional qualifications. This is also reflected in the trend towards updating course content to accommodate new developments in the field of information retrieval.

7.2.23 Question 23: 'Please list recommended reading material, excluding classification schemes, cataloguing codes, filing rules, lists of subject headings.'

7.2.23.1 Prescribed books

7.2.23.2 Recommended reading

Not all departments of library science prescribe books for their students. In some instances this fact was reported and no list had been submitted, nor were any remarks suggested under Question 23.2 (recommended reading). One respondent stated that books were not prescribed, but rather merely recommended, and supplied a list of recommended books. The books on this list are included in the Bibliographical Amplification List (Annexure C) but they were not included in listing the prescribed books.

Table 23.1

Comprehensive Course	Publication	No. of listings
LDLS	BLOOMBERG	3
	FOSKETT (b)	3
	SCOTT	3
	KENNEDY	2

	MALTBY(b)	2
	COETZEE	1
	HORNER	1
	WYNAR	1
HDLS/B.Bibl.	FOSKETT (b)	8
	SCOTT	4
	KENNEDY	3
	MALTBY(b)	3
	BLOOMBERG	2
	COETZEE	2
	HORNER	2
	AITCHISON	1
	BAKEWELL(b)	1
	FOSKETT(a)	1
	GILCHRIST	1
	HUNTER & BAKEWELL	1
	KENT	1
	LANCASTER(a)	1
	LANCASTER(b)	1
	LANCASTER(c)	1
	MALTBY(a)	1
	MILLS	1
	SAYERS	1
	VICKERY	1
	WYNAR	1
DSE/B.Bibl.(Ed)	GROENEWALD	1
UEDRCM	HUNTER	1

KENNEDY	1
MALTBY(b)	1
MANN	1
SHERA	1

In many instances, the publication which was mentioned most, viz. A.C.Foskett's Subject approach to information, is prescribed for both classification and verbal indexing. Wynar is prescribed by the one department listing it, for cataloguing and classification.

Most respondents left question 23.2 (recommended reading) blank, while a few remarked that 'various' or 'numerous' books are recommended to the students. Any lists supplied under 23.2 are included in the bibliographical amplification list.

7.2.24 Question 24: 'For cataloguing code used in teaching the subcourse/subcourse unit concerned, please tick appropriate columns and specify the edition used.'

Responses: 13 Abstentions: 1

Table 24

Code	Comprehensive Course	No. of depts. using :		
		2nd ed.	1967 ed.	1967 + rev.ch.6
AACR	LDLS	9	1	1
	HDLS/B.Bibl.	12	1	
	DSE/B.Bibl.(Ed)	2	1	

Other:

Code	Comprehensive course	Edition	No. of depts.
McARDELL, A.M. Cataloguing for school librarianship	DSE	2nd	2

No comments were offered by departments who indicated that the 1967 edition of AACR is used in the context of future planning, a reaction which may be interpreted as an intention, at the time of the completion of the questionnaire, of continuing to employ the 1967 edition for an indefinite period.

One respondent indicated that, in addition to its adhering to AACR 2, ISBD rules are being applied in all the comprehensive courses.

7.2.25 Question 25: 'For classification schedules used in teaching the subcourse/subcourse unit concerned, please tick appropriate columns and specify edition used.'

Responses: 13 Abstentions: 1

Table 25

No. of depts. in
which students perform :

Schedule	Ed.	Comprehensive course	Theory	Practice
Dewey	18	IDLS	8	9
		HDLS/B.Bibl.	12	12
		DSE	1	1

Dewey	19	LDLS	1	2
		HDLS/B.Bibl.	2	2
Dewey	10th abridged	LDLS	1	1
		HDLS/B.Bibl.	2	2
		DSE	4	5
UDC		LDLS	3	1
		HDLS/B.Bibl.	10	5
LC		LDLS	3	1
		HDLS/B.Bibl.	9	3
CC		LDLS	2	2
		HDLS/B.Bibl.	7	2
Bliss' BC		LDLS	1	1
		HDLS/B.Bibl.	5	1
Brown's SC		HDLS/B.Bibl.	2	

As far as the application of the Dewey systems is concerned, one department indicated that both the 18th and the 19th editions are being used, while two universities specified that the standard version as well as the abridged version is being used for theory and practicals. One department remarked that, though the 18th edition is used at present, a conversion to the 19th edition is planned for August 1980.

With regard to all the other schedules mentioned, the editions specified by the respondents varied markedly. In most cases, no edition was specified, while the following editions were cited:

a) UDC : 'various'; 'abridged'; 11th; 3rd

LC : 'various'; 'latest'; 1974

CC: 1969; 6th

Bliss: 2nd

Only one respondent indicated (by leaving the spaces blank) that no other schedule than DDC is being applied in the teaching programme in regard to both theory and practicals.

Of the number of departments which specified that the CC is used for the LDLS, one university indicated that both theory and practicals are conducted, while at one university, the Colon is used only in the context of theoretical study; at another institution this applied only to practicals. In the case of Bliss' BC, two departments indicated that this scheme is being used in the LDLS course, one of which, however, is applying it only in theoretical study and the other only for practicals.

7.2.26 Question 26: 'For subject heading list used in teaching the subcourse/subcourse unit concerned, please tick appropriate columns and specify edition used.'

Responses: 13 Abstentions: 1

Table 26

LIST	Ed.	Comprehensive course	No. of depts. where students do:	
			Theory	Practice
LCSH	'various' or 'newest'	HDLs/BiBibl.	3	2

SEARS	9, 10 and/or 11	IDLs	10	10
		HDLS/B.Bibl.	12	12
		DSE	2	2
COETZEE		HDLS/B.Bibl.	1	1

The two DSE courses in which Sears was specified as being used for teaching the construction of subject headings are both four-year courses. The 11th edition is being used in both instances.

One university specified that the 9th, 10th and 11th editions of Sears are being used in teaching. All the others confined their programme to the use of one only of these three editions. The 11th edition is being used in seven cases, the 10th in three, and the 9th in one, for the HDLS and B.Bibl. students. For the IDLS course, six specified the 11th edition, two the 10th and one the 9th.

7.2.27 Question 27: For verbal indexing, please indicate to what extent the following system(s) are used for teaching.'

Responses: 13 Abstentions: 1

Table 27

System	Extent to which systems are taught	No. of depts.:	
		Theory	Practice
a) PRECIS	not at all		4
	1 on a scale of 5	1	3
	2 on a scale of 5	1	
	3 on a scale of 5	3	2

	4 on a scale of 5 fully	2 6	2 2
b) KWIC/KWOC	3 on a scale of 5 fully	1 1	1
c) UNITERM	fully	2	2
d) TEST	3 on a scale of 5 fully	1	1
e) ERIC THESAURUS	3 on a scale of 5 fully	1	1
f) <u>MEDICAL SUBJECT</u> <u>HEADINGS (MESH)</u>	3 on a scale of 5 fully	1	1
g) THESAUROFACET	3 on a scale of 5 fully	1	1

Only one university indicated that systems (d) - (g) are all being taught in its relevant subcourses.

CHAPTER 8

CONCLUSIONS

The pattern of education for librarianship in the countries investigated generally reflects developments in the field of library and information science as well as requirements for employment. At the time of initiation of formal education of librarians, cataloguing and classification were the main tools of information retrieval. Consequently, these activities constituted the major part of study programmes. The development of new methods, however, created a need for librarians capable of handling them. Furthermore, the evolution of libraries from being collections of books into institutions serving a wide community, and the emergence of librarianship as an academic discipline, required professional librarians with a comprehensive academic and professional background.

8.1 Education for librarianship in general

From the investigation of the literature (Chapters 5 & 6) emerged a similar pattern of development in education for librarianship in Great Britain (cf. Chapter 5.3); the United States of America (cf. Chapter 5.4); and South Africa (cf. Chapter 6), viz. a progression from highly technically inclined courses aimed at training to the education (cf. chapter 5) of librarians. This was the outcome of a desire to improve the quality and status of librarianship, as well as to keep pace with developments in library and information science. This evolution inevitably entailed a reduction in the status of technical skills in the education programme, as was

suggested in Chapter 1.

The review of education and training of librarians in the two European countries investigated however suggests a different pattern from that of the English speaking countries. In the Netherlands (cf. Chapter 5.2.1) the courses are offered at two levels: one is a practical course for the training of library assistants, while the other is for the education of executive librarians (director's course). Each course developed on its own level, with the assistant's course never showing any inclination to provide for the education of executives.

In West Germany, education for librarianship did not advance from practical training to an academic education (cf. Chapter 5.2.2); neither has librarianship as a profession acquired the status it has in most other countries.

8.2 Education for librarianship in South Africa and the place of cataloguing and classification in the curricula of the universities

The courses leading to qualifications in library science offered by South African universities gradually began to replace those offered by the SALA, which based its initial courses on the teaching programmes of the Library Association of Great Britain. The SALA courses emphasised the teaching of the technical skills of cataloguing and classification (c.f. Chapter 6.2.1).

When universities began to offer courses, they had to comply with the guidelines laid down by the SALA in order to obtain recognition (i.e. equation to two of its three levels of qualifications) for

their courses by the Association. Consequently, the first courses offered by the universities followed the pattern of the SALA courses in emphasising cataloguing and classification. In time, however, they were able to familiarise their students with a greater range of procedures, thereby alerting them to the needs of different sizes and types of libraries.

Courses leading to paraprofessional qualifications offered at most universities today still tend to be technically inclined, excluding much of the historical and theoretical principles of cataloguing and classification, and concentrating rather on practical skills. The students following this programme are usually not being familiarised with the newest methods of information retrieval. This situation supports the hypothesis put forward in Chapter 1, viz. that provision should be made for different levels of education to provide for different levels of employment in libraries.

The aim of the paraprofessional course, being to prepare students for routine technical work in libraries, justifies this attitude. The guidelines laid down by SAILIS in its Standards for education for library and information service (1979: 23) state, inter alia:

"Training programmes shall be so devised that students, having completed their training, should be competent to apply standard techniques, methods and procedures in operational environments, and to handle standard systems and apparatus."

Information elicited by the questionnaires indicates that courses for the IDLS generally comply with the guidelines.

With regard to professional qualifications, the tendency at present

is to devote much more attention to underlying principles and history of cataloguing and classification than was the case in earlier courses. Technical skills are still being taught, but not as intensively as before. According to the Standards (1979: 9), the aim of these courses should be, inter alia:

"... to equip students with a fundamental store of knowledge and the keys to competence considered essential for practising their future profession."

Although all universities apparently do not pay comparable attention to the latest methods and systems of information storage and retrieval, all include it to some extent in their curricula, while the history and major principles of cataloguing and classification receive attention by all.

The subcourses comprising cataloguing, classification and verbal indexing have divergent designations at the different universities. A designation such as Information Storage and Retrieval seems to include all the activities concerned, viz. cataloguing, classification and verbal indexing.

There is considerable dissimilarity in the number of contact lecture periods devoted to cataloguing, classification and verbal indexing, displaying ranges as wide as 5 - 75 for time devoted to theoretical studies and 55 - 152 in the case of practicals. Perhaps more guidance in determining the appropriate number of lecture periods to be assigned to these subcourses is suggested by the divergent ranges, which may be presumed to have been determined with a measure of inadvertent lack of rational comparison.

The syllabuses for cataloguing and classification reflect a significant degree of similarity at South African universities, whilst those for verbal indexing differ more in regard to content. In some instances, increased attention being paid to modern indexing systems and practices appears to be desirable, if not imperative. Many of the latest retrieval systems involve verbal indexing, therefore education programmes should anticipate the needs of libraries by equipping prospective librarians with the necessary knowledge of and competence in handling these systems (cf. Chapter 1.1.1.2).

Facet theory and analysis on the whole is regarded as an essential part of the syllabus for professional qualifications, but not for paraprofessional qualifications. As the ability to analyse a compound subject into its constituent concepts is a basic requirement for classification, facet analysis should clearly be included in the syllabus for the LDLS, because LDLS students are expected to be able to apply the skills associated with this ability when they enter a career.

Although chain indexing is regarded as being more important for the LDLS course than facet analysis, only four out of nine universities recognise it as being essential in the paraprofessional context. Considering the importance of chain indexing in the building of classified catalogues, and in view of the aim of the LDLS to prepare students to perform routine duties in libraries, it is surprising that chain indexing can be regarded as of no or little importance by any institution offering such a course. It should form an essential part of the training.

With regard to facet analysis and, to a lesser degree, chain indexing,

the education and training of library assistants does not support the hypothesis (cf. Chapter 1.1.1.1) that prospective staff should be prepared to cope with all challenges of their work.

Post-co-ordinate indexing is generally recognised as being essential or very important for the attainment of professional qualifications. In view of this principle requiring practical illustration to be adequately understood, it is not sufficient to conduct only a theoretical study of it, but a certain number of systems based on the principle should be treated intensively. The number of systems dealt with should be decided by each individual institution. Only one university reported that its students are being familiarised fully, i.e. in theory and practice, with systems such as KWIC/KWOC, Uniterm, TEST, ERIC thesaurus and Thesaurofacet. Some of the others specified that these systems, or some of them, are studied in theory only. In this area there seems to be room for improvement, in so far as it seems desirable for different systems to receive more attention, even at the expense of traditional cataloguing and classification (cf. Chapter 1.1.1.3). The SAILIS Standards, however, do not dictate the content of the subcourses for library and information science, but only indicate study elements in general, for example, that the section comprising 'Information as content of the record' should include, inter alia:

"assembling, storing, organising and retrieving information - a study which may extend to information systems and services"

(Standards 1979: 51).

Of all the universities, only one still uses the AACR 1967 cataloguing code. Bearing in mind the rapid emergence of co-operative

cataloguing and the participation in SAMARC services (cf. Chapter 4.2.3), it seems essential that libraries should employ the latest (or at least identical) codes and, consequently, that students should be taught how to use them. In the case of classification, it would appear not of the utmost importance that students be taught to apply the latest edition of a classification scheme. The DDC is being taught intensively at all universities, most of them using the 18th edition at the time of the survey (i.e. mid-1980). Many libraries use earlier editions to classify their collections, and no library can be reasonably expected to reclassify its entire collection after the release of every edition. It is suggested, however, that once students have mastered the art of classification, they will be able to classify according to any classification schedule, and, in particular, later editions of the system used as a prototype in their teaching programme.

In the theoretical study of classification, it appears desirable that various schemes should be used to illustrate principles. Students should be familiarised with at least the underlying principles of the schemes which exercised a significant influence on the theory of classification. It is evident from the survey that most universities are indeed employing the UDC, LC and, to a lesser degree, CC and Bliss' BC in their teaching programmes. The Colon Classification seems eminently useful for illustrating facet analysis.

Students are being taught to use Sears' List of subject headings at all universities except one, which uses Coetzee's Notasies en trefwoorde instead. To preclude the possibility of students gaining

the impression that using Sears' is the only viable means of assigning subject headings, it seems desirable that more use be made of Coetzee's system, which requires more intellectual effort than Sears' and offers more opportunity for development and adaptation. It can also be used to demonstrate the principles of facet analysis, and to facilitate its implementation.

On the whole, cataloguing and classification occupy a far less prominent place in the library and information science curricula at South African universities today than they did in the past. Practical training in the use of schemes and systems does not predominate in the curricula as it used to, especially during the early years of education for librarianship (cf. Chapter 6.2.1). Today such schemes and systems are employed more to illustrate principles and to give students a measure of proficiency in applying them in the realities of the profession. Theoretical studies occupy a more important place within the confines of the syllabus for cataloguing, classification and verbal indexing, emphasising the why rather than the how (cf. Chapter 6.1).

The place occupied at present by cataloguing and classification in the curricula of South African universities is generally sufficient to equip future library workers with adequate knowledge of and skill in these activities to enable them to make sound decisions in organising a library collection for the optimal retrieval of its content.

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CATALOGUING AND CLASSIFICATION IN THE CURRICULA OF
SOUTH AFRICAN UNIVERSITIES

This survey is being done as part of the work toward an
M.A. degree in Librarianship at the University of Cape Town.

I would be most grateful for the help of your department
without which the survey would be useless.

Abbreviations:

- AACR - Anglo American Cataloguing Rules
- B.Bibl. - Baccalaureus Bibliothecologiae
- BC - Bibliographic Classification
- CC - Colon Classification
- DDC - Dewey Decimal Classification
- DSE - Diploma in Specialised Education
- LC - Library of Congress Classification
- LCSH - Library of Congress Subject Heading
- SC - Subject Classification
- UDC - Universal Decimal Classification

Scope Notes and key terms:

Course/comprehensive course refers to a unit of study culminating in a full professional or paraprofessional qualification, such as Lower Diploma or Higher Diploma in Librarianship, B.Bibl. degree, etc. A course description/outline is a curriculum.

Subcourse refers to a logically structured part of the comprehensive course, such as Information science, Library management, User studies, etc. A subcourse description/outline is a syllabus.

Subcourse units are constituent parts of a subcourse, eg. Information science may comprise the subcourse units cataloguing, classification, verbal indexing, etc. For the purpose of this questionnaire subcourse(s)/subcourse unit(s) refer to cataloguing, classification and verbal indexing.

Classification is the assignment of books to their proper places in a scheme of book classification.

Cataloguing is the process of determining the forms of entry and preparing the bibliographical descriptions for a catalogue.

A Catalogue is a list of books, maps, or other items, arranged in some definite order.

Verbal indexing is the process of determining the word or group of words under which books and other material on a subject are entered in a catalogue in which the entries are arranged in alphabetical order.

Prescribed textbooks are compulsory textbooks to be purchased by students. A prescribed textbook covers a substantial part of the syllabus and is referred to and used frequently during studies.

Recommended textbooks cover about half of a subcourse or a special angle of it, are being referred to and used intermittently, and possession of them by students should be optional.

1. Does your department offer courses leading to any of the following qualifications:

1.1 Lower diploma in Librarianship/
Library Science/Library and
Information science (LDL)

YES	NO
-----	----

1.2 Higher diploma in Librarianship/
Library Science/Library and
Information Science (HDL)

YES	NO
-----	----

1.3 Baccalaureus Bibliothecologiae
(B.Bibl.)

YES	NO
-----	----

1.4 Diploma in Specialised Education
(School library science) (DSE)

YES	NO
-----	----

1.5 Other (please specify):

YES	NO

1.5.1

1.5.2

1.5.3

2. Minimum and maximum duration of
the courses designated in
1.1 - 1.53

2.1 LDL

2.2 HDL

2.3 B.Bibl.

2.4 DSE

Minimum	Maximum

- 2.5 Other
- 2.5.1
- 2.5.2
- 2.5.3

Minimum	Maximum

3. Is provision made for a natural progression from attainment of the paraprofessional qualification (i.e. Lower diploma) to its professional level (i.e. Higher diploma or B.Bibl.)

YES	NO
-----	----

4. Designation of subcourses in which cataloguing, classification and verbal indexing are included

- 4.1 LDL
- 4.2 HDL
- 4.3 B.Bibl.
- 4.4 DSE
- 4.5 Other (please specify):
- 4.5.1
- 4.5.2
- 4.5.3

5. Please indicate whether the sub-course(s) specified in 4.1 - 4.53 contain each of the following units in its entirety:

5.1 Cataloguing

5.1.1 Theory

YES	NO
YES	NO

5.1.2 Practice

5.2 Classification

5.2.1 Theory

YES	NO
YES	NO

5.2.2 Practice

5.3 Verbalised indexing

5.3.1 Theory

YES	NO
YES	NO

5.3.2 Practice

6. If NO has been ticked in the boxes 5.1 - 5.3, please state which of 5.1 - 5.3 are accommodated as subcourse units:

6.1 Cataloguing

YES	NO
YES	NO

6.2 Classification

6.3 Verbal indexing

YES	NO
-----	----

7. If YES has been ticked in the boxes 6.1 - 6.3, please give a short syllabus description or outline

8. Are the subcourses/subcourse units identified in 4.1 - 4.53 or 7 compulsory in the context of the comprehensive courses

8.1 LDL

- 8.1.1 Cataloguing
- 8.1.2 Classification
- 8.1.3 Verbal indexing

YES	NO

8.2 HDL and/or B.Bibl.

- 8.2.1 Cataloguing
- 8.2.2 Classification
- 8.2.3 Verbal indexing

YES	NO

8.3 DSE

- 8.3.1 Cataloguing
- 8.3.2 Classification
- 8.3.3 Verbal indexing

YES	NO

8.4 Other (please specify)

- 8.4.1
- 8.4.1.1 Cataloguing
- 8.4.1.2 Classification
- 8.4.1.3 Verbal indexing

YES	NO

8.4.2	YES	NO
8.4.2.1	Cataloguing		
8.4.2.2	Classification		
8.4.2.3	Verbal indexing		

8.4.3	YES	NO
8.4.3.1	Cataloguing		
8.4.3.2	Classification		
8.4.3.3	Verbal indexing		

9. If NO, please specify designation of optional alternative subcourse/ subcourse unit:

9.1	IDL	Optional alternative	
9.1.1	Cataloguing		
9.1.2	Classification		
9.1.3	Verbal indexing		

9.2	<u>HDL and/or B.Bibl.</u>	Optional alternative	
9.2.1	Cataloguing		
9.2.2	Classification		
9.2.3	Verbal indexing		

- 9.3 DSE
- 9.3.1 Cataloguing
- 9.3.2 Classification
- 9.3.3 Verbal indexing

Optional alternative

- 9.4 Other (please specify)
- 9.4.1
- 9.4.1.1 Cataloguing
- 9.4.1.2 Classification
- 9.4.1.3 Verbal indexing

Optional alternative

- 9.4.2
- 9.4.2.1 Cataloguing
- 9.4.2.2 Classification
- 9.4.2.3 Verbal indexing

Optional alternative

- 9.4.3
- 9.4.3.1 Cataloguing
- 9.4.3.2 Classification
- 9.4.3.3 Verbal indexing

Optional alternative

10. Please indicate stage (i.e. academic year) during completion of comprehensive course when content of subcourses/subcourse units is offered:

10.3 Third academic year of study:
(where applicable)

	LDL	HDL	B.Bibl	DSE			
10.3.1 Cataloguing:							
10.3.1.1 Theory							
10.3.1.2 Practice							
10.3.2 Classification:							
10.3.2.1 Theory							
10.3.2.2 Practice							
10.3.3 Verbal indexing:							
10.3.3.1 Theory							
10.3.3.2 Practice							

10.4 Fourth academic year of study:
(where applicable)

	LDL	HDL	B.Bibl	DSE			
10.4.1 Cataloguing							
10.4.1.1 Theory							
10.4.1.2 Practice							
10.4.2 Classification:							
10.4.2.1 Theory							
10.4.2.2 Practice							
10.4.3 Verbal indexing:							
10.4.3.1 Theory							
10.4.3.2 Practice							

11. Please indicate number of contact lecture hours/periods per annum assigned to:

11.3 Third academic
year of study:
(where applicable)

11.3.1 Cataloguing:	LDL	HDL	B.Bibl	DSE			
11.3.1.1 Theory							
11.3.1.2 Practice							
11.3.2 Classification:							
11.3.2.1 Theory							
11.3.2.2 Practice							
11.3.3 Verbal indexing:							
11.3.3.1 Theory							
11.3.3.2 Practice							

11.4 Fourth academic
year of study:
(where applicable)

11.4.1 Cataloguing:	LDL	HDL	B.Bibl	DSE			
11.4.1.1 Theory							
11.4.1.2 Practice							
11.4.2 Classification:							
11.4.2.1 Theory							
11.4.2.2 Practice							
11.4.3 Verbal indexing:							
11.4.3.1 Theory							
11.4.3.2 Practice							

12. Please enclose subcourse/subcourse unit syllabus outlines in regard to those identified in 4.1 - 4.5.3 for:

12.1 Paraprofessional level (IDL):

12.1.1 Cataloguing:

12.1.2 Classification:

12.1.3 Verbal indexing:

12.2 Professional level (HDL and B.Bibl.)

12.2.1 Cataloguing:

12.2.2 Classification:

12.2.3 Verbal indexing:

12.3 Specialised Education (DSE)

12.3.1 Cataloguing:

12.3.2 Classification:

12.3.3 Verbal indexing:

12.4 Other: (please specify)

12.4.1

12.4.1.1 Cataloguing:

12.4.1.2 Classification:

12.4.1.3 Verbal indexing:

12.4.2

12.4.2.2 Classification:

12.4.2.3 Verbal indexing:

12.4.3

12.4.3.1 Cataloguing:

12.4.3.2 Classification:

12.4.3.3 Verbal indexing:

13. Have you effected significant changes in the syllabuses of subcourses/subcourse units identified in 4.1 - 4.53 in the last five years?

YES	NO
-----	----

13.1 If YES, please state the reasons for introducing the changes:

14. Are changes in regard to content, structure and contact lecture periods pertaining to subcourses/ subcourse units outlined in 4.1 - 4.53 being contemplated within the next three academic years?

YES	NO
-----	----

14.1 If YES, please give relevant particulars briefly:

15. Indicate approximate ratio (e.g. 50:50; 30:70; 20:80) between amount of contact lecture hours/periods devoted at present to theoretical and practical components of subcourses/ subcourse units concerned in the case of each of the comprehensive courses specified below:

- 15.1 LDL
- 15.1.1 Cataloguing
- 15.1.2 Classification
- 15.1.3 Verbal indexing

Theory	Practice

- 15.2 HDL and/or B.Bibl.
- 15.2.1 Cataloguing
- 15.2.2 Classification
- 15.2.3 Verbal indexing

Theory	Practice

- 15.3 DSE
- 15.3.1 Cataloguing
- 15.3.2 Classification
- 15.3.3 Verbal indexing

Theory	Practice

15.4 Other (please specify)

- 15.4.1
- 15.4.1.1 Cataloguing
- 15.4.1.2 Classification
- 15.4.1.3 Verbal indexing

Theory	Practice

- 15.4.2
- 15.4.2.1 Cataloguing
- 15.4.2.2 Classification
- 15.4.2.3 Verbal indexing

Theory	Practice

- 15.4.3
- 15.4.3.1 Cataloguing
- 15.4.3.2 Classification
- 15.4.3.3 Verbal indexing

Theory	Practice

16. What degree of importance do you attach to pre-course experience in cataloguing classification and/or verbal indexing on the part of students registered for these subcourse/subcourse units:

of no importance						essential
	0	1	2	3	4	5

17. Is it standard practice of your department to provide for 'fieldwork' (see Standards 3.2, p.55-56) during training and/or education.

YES	NO
-----	----

17.1 If YES

17.1.1 is fieldwork specifically devoted to cataloguing, classification and verbal indexing activities conducted under supervision, required of students registered for these subcourses,

YES	NO
-----	----

17.1.2 do you prescribe a minimum period to be devoted to fieldwork in cataloguing, classification and verbal indexing,

YES	NO
-----	----

17.1.2.1 If YES, please indicate approximate total amount of time prescribed.

Weeks	Days	Hours

17.1.2.2 If YES, please indicate approximate percentage of fieldwork prescribed specifically for these activities.

10	25	33	50	75	100

18. Please indicate whether the subject approach to information is effected through the classified or dictionary form of catalogue, or both.

Class.	Dict.	Both

18.1 If both, please indicate relative emphasis given to each form:

18.1.1 Classified catalogue

18.1.2 Dictionary catalogue

10%	30%	50%	70%	80%	100%
10%	30%	50%	70%	80%	100%

19. Please indicate whether, in the case of the comprehensive courses specified below, attention is given to the cataloguing of the ISBD categories of serials, maps and non-book materials covered in AACR2

		LDL	HDL	B.Bibl.	DSE			
19.1	Cartographic materials							
19.2	Manuscripts							
19.3	Music							
19.4	Sound recordings							
19.5	Motion pictures & video recordings							
19.6	Graphic materials							
19.7	Machine-readable data files							
19.8	Three-dimensional artefacts and Realia							
19.9	Microfilms							
19.10	Serials							

20. What degree of importance is attached to the teaching of facet theory and analysis in the subcourse/subcourse unit concerned in the case of the comprehensive courses listed below:

	of no importance					essential
	0	1	2	3	4	5
20.1	LDL					
20.2	HDL and/or B.Bibl.					
20.3	DSE					
20.4	Other (please specify)					
20.4.1					
20.4.2					
20.4.3					

21. What degree of importance is attached to the teaching of the theory and practice of chain indexing in the production of subject-index entries for a classified catalogue in the subcourse/subcourse unit concerned in the case of the comprehensive courses listed below:

- 21.1 LDL
- 21.2 HDL and/or B.Bibl.
- 21.3 DSE
- 21.4 Other (please specify)
 - 21.4.1
 - 21.4.2
 - 21.4.3

	of no importance					essential
	0	1	2	3	4	5
21.1						
21.2						
21.3						
21.4						
21.4.1						
21.4.2						
21.4.3						

22. What degree of importance is attached to the teaching of post-coordinate indexing in the subcourse/subcourse unit concerned in the case of the comprehensive courses listed below:

- 22.1 LDL
- 22.2 HDL and/or B.Bibl.
- 22.3 DSE
- 22.4 Other (please specify)
 - 22.4.1
 - 22.4.2
 - 22.4.3

	of no importance					essential
	0	1	2	3	4	5
22.1						
22.2						
22.3						
22.4						
22.4.1						
22.4.2						
22.4.3						

23. Please list recommended reading material, excluding classification schedules, cataloguing codes, filing rules, lists of subject headings:

23.1 Prescribed textbooks:

23.1.1 IDL

23.1.1.1 Cataloguing

23.1.1.2 Classification

23.1.1.3 Verbal indexing

23.1.2 HDL and/or B.Bibl.

23.1.2.1 Cataloguing

23.1.2.2 Classification

23.1.2.3 Verbal indexing

23.1.3 DSE

23.1.3.1 Cataloguing

23.1.3.2 Classification

23.1.3.3 Verbal indexing

23.1.4 Other (please specify)

23.1.4.1

23.1.4.1.1 Cataloguing

23.1.4.1.2 Classification

23.1.4.1.3 Verbal indexing

23.1.4.2

23.1.4.2.1 Cataloguing

23.1.4.2.2 Classification

23.1.4.2.3 Verbal indexing

23.1.4.3

23.1.4.3.1 Cataloguing

23.1.4.3.2 Classification

23.1.4.3.2 Verbal indexing

23.2 Recommended reading:

23.2.1 Cataloguing

23.2.2 Classification

23.2.3 Verbal indexing

24. For cataloguing code used in teaching the subcourse/ subcourse unit concerned, please tick appropriate columns and specify the edition used:

- 24.1 AACR
- 24.1.1 LDL
- 24.1.2 HDL and/or B.Bibl.
- 24.1.3 DSE
- 24.1.4 Other (please specify)
- 24.1.4.1
- 24.1.4.2
- 24.1.4.3

Theory	Ed.	Practice	Ed.

24.2 Other (please specify)

Code	Compr. course	Theory	Ed.	Practice	Ed.
24.2.1					
24.2.2					
24.2.3					

- 25.6 Bliss' BC
- 25.6.1 LDL
- 25.6.2 HDL and/or B.Bibl.
- 25.6.3 DSE
- 25.6.4 Other (please specify)
- 25.6.4.1
- 25.6.4.2
- 25.6.4.3

Theory	Ed.	Practice	Ed.

- 25.7 Brown SC
- 25.7.1 LDL
- 25.7.2 HDL and/or B.Bibl.
- 25.7.3 DSE
- 25.7.4 Other (please specify)
- 25.7.4.1
- 25.7.4.2
- 25.7.4.3

Theory	Ed.	Practice	Ed.

25.8 Other (please specify)

	Schedule	Compr.course	Theory	Ed.	Practice	Ed.
25.8.1						
25.8.2						
25.8.3						

25.9 Comments on future planning
if necessary:

26. For subject heading list used in teaching the sub-course/subcourse unit concerned, please tick appropriate columns and specify the edition used:

- 26.1 LCSH
- 26.1.1 LDL
- 26.1.2 HDL and/or B.Bibl.
- 26.1.3 DSE
- 26.1.4 Other (please specify)
- 26.1.4.1
- 26.1.4.2
- 26.1.4.3

Theory	Ed.	Practice	Ed.

- 26.2 Sears list of subject headings
- 26.2.1 LDL
- 26.2.2 HDL and/or B.Bibl.
- 26.2.3 DSE
- 26.2.4 Other (please specify)
- 26.2.4.1
- 26.2.4.2
- 26.2.4.3

Theory	Ed.	Practice	Ed.

26.3 Other (please specify)

- 26.3.1
- 26.3.2
- 26.3.3

List	Compr. course	Theory	Ed.	Practice	Ed.

27. For verbal indexing, please indicate to what extent the following system(s) are used for teaching:

- 27.1 PRECIS (theory)
- 27.1.1 PRECIS (practice)
- 27.2 Other (please specify)
- 27.2.1 (theory)
- 27.2.1.1 (practice)
- 27.2.2 (theory)
- 27.2.2.1 (practice)
- 27.2.3 (theory)
- 27.2.3.1 (practice)

none at all					fully
0	1	2	3	4	5

28. Please feel free to add comments of a general or specific nature relating to any question in the questionnaire:

THANK YOU

ANNEXURE B

Departments of library science which participated in the survey of the contemporary syllabus for cataloguing, classification and verbal indexing:

Potchefstroom University for C.H.E.
Rand Afrikaans University
Rhodes University
University of Cape Town
University of Durban-Westville
University of Fort Hare
University of Natal (Pietermaritzburg)
University of Pretoria
University of South Africa
University of Stellenbosch
University of the North
University of the Orange Free State
University of the Western Cape

ANNEXURE C

Bibliographical Amplification List

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