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ADVANCED STUDY
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DATA ENTERED

CATALOGUED

SUBJECT CLASSIFYING AND INDEXING OF LIBRARIES AND LITERATURE

SUBJECT CLASSIFYING AND INDEXING OF LIBRARIES AND LITERATURE

by

JOHN METCALFE

ANGUS AND ROBERTSON

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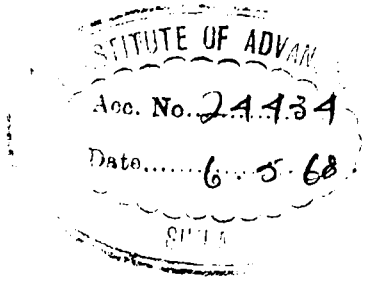

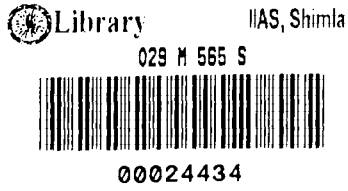

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PREFACE

This book is based on about twenty years' learning, teaching, and examining in its subject. It is intended to provide more than enough material for a year's course in library subject cataloguing and classifying, information indexing, and subject bibliography for library school students—either graduate full-time students or part-time students with some teaching and experience already. It is also a comparative study of methods and of actual catalogues, indexes, and bibliographies available in print.

The author has been Chairman of the Board of Examination and Certification of the Library Association of Australia since 1944; he was Principal Librarian of the Public Library of New South Wales from 1942 to 1959, and is now Librarian of the University of New South Wales; he is a bachelor of arts of the University of Sydney and a fellow of the Library Association in Great Britain, and has twice been enabled, by grants from the Carnegie Corporation of New York, to look over libraries and library schools in Great Britain and North America. In 1957 the Scarecrow Press of New York published a more advanced book by him, *Information Indexing and Subject Cataloging, Alphabetical, Classified, Co-ordinate, Mechanical.*

The scope of this book is discussed in its first chapter and detailed in its list of contents. It includes some rules for classifying and a tentative code of rules for alphabetico-specific entry in the dictionary catalogue, based on Cutter's subject entry rules; and there are exercises with answers.

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Chapter 1

Ends and Means

Literature is classified and indexed by subject in bibliographies, indexes and abstracts of periodicals, and in library catalogues and on their shelves. The subject of this book is the subject classifying and indexing of literature and related means of record and communication. In this subject the book is a critical and comparative study of examples and the methods they illustrate, and a student's textbook.

Some students may never use some still contemporary and some lately invented methods; it may even be hoped that they will never use some of them, but they are in use in bibliographies and indexes which all should know as reference books, even if they do not accept them as models.

Most students will begin with some idea of the subject, if only as consumers of cataloguing; some will think, perhaps rightly, that they already know what such terms as classification mean, or should mean, why a dictionary or a classified catalogue is better, and so on. Preliminary knowledge will help, if the student's mind has not become closed to any further knowledge or consideration; none has been assumed, but the style and purpose of this book are not those of a junior assistant's or junior reader's simplified library manual.

If all methods are dealt with fundamentally and comparatively the subject is not easy, and cannot be made so. Experience shows that it is not as readily taught and learnt as the descriptive and author and title branches of cataloguing and bibliography, even to university graduates. At its simplest, in its least obscured and pretentious treatments, the subject still has the difficulty of at least a first-year university course in a philosophical or scientific subject, and in the last fifty years, from about 1907 to 1957, some supposed authorities have left it far more confused than it was originally, without their competing metaphysical theories and jargons, their evolutionary orders, their consensuses, their facets, phases and foci. Their bibliosophy may be excluded as much as possible, or left to appendices, but even so, and however explanation may be simplified, the student cannot expect without thought and exercise to understand even such orthodox and long-established practices as specific entry and relative indexing.

As a textbook this book and its exercises are intended to be for at least a full year's course; it could be perused, that is read carefully and thoroughly for information, in much less time, especially by already working librarians or library assistants with capacity to take a university degree, if they have not already taken one. Basic matters are introduced as soon and as simply as possible and then returned to later on in

more difficulty and detail, and in different relations, but it may be read in any order of chapters, and with omissions as an examination syllabus or a teacher, or interest, may suggest. The chapters are not self-contained, but there is cross reference between chapter subsections, numbered 1·1 and so on, 2·1 and so on, by chapters; there is also an alphabetical index, and students of the book's subject should certainly know, or learn how to use both to suit their needs.

Practical students, and especially examination candidates, should read the last chapter on practical work and subject determination not later than after Chapter 2, and begin to attempt the exercises. These are roughly in the order of the book, but many of them should be possible with a little preliminary knowledge or after a reading of the first two chapters and the last. The only essential equipment for them is Dewey's Decimal Classification. Preliminary knowledge may have come from experience, and/or studies for a first professional examination; with some work by way of revision this book and its exercises are aimed at the Registration or Chartered Librarian level in Great Britain and Australia. Students with a teacher will of course work under his or her direction and, if they possibly can, examination students should attend an accredited school or class, for which no textbook with or without exercises is a sufficient substitute.

1·1 The Subject and its Importance.

The subject of this book most broadly stated is the indication of literature on subjects, and in forms, such as the dictionary form, in whole books and sets of periodicals, in chapters in books and articles in periodicals; more particularly it is this indication by the display of actual books on shelves, of pamphlets in drawers and so on; and by the cataloguing or indexing of literature in library catalogues, and in indexes, bibliographies and abstracts or digests of literature, which are not indexes to the shelves of particular libraries.

The subject is important because without adequate indication books are lost or wasted. As shown in 3·2 there has been opposition to subject cataloguing and indexing, on the ground that the student or scholar should know his literature; there can hardly be finally satisfactory or fundamental scholarship and research based entirely on indexing by others, usually not masters of the literature they index; but if the results of research are to be applied effectively they have to be consulted by persons who are themselves not workers in the field of research; they are simply consumers, and even the original workers in their first gropings can be greatly helped by good subject classifying and indexing, used directly by them or by librarians or bibliographical researchers on their behalf.

The basic economic units for most libraries are not books, but the uses which can be made of them, by as many people as possible, and saving money on cataloguing to buy more books is indeed penny wise

pound foolish if information in them is hidden, if they are not used, if wanted information is not retrieved from them because it is not indicated. A current term for catalogue or index compilation and consultation suggests more novelty than its users show, but it does make the purpose explicit; it is information retrieval.

1·2 Difficulties and Uncertainties.

It may seem easy, to arrange books so as to display or distinguish and make findable those on cadastral surveying amongst those on about fifty thousand other subjects, including geodetic and quantity surveying, social surveys and traffic surveys, easy to index the literature on the science of history, the history of science, and science and history, easy to distinguish the literature of atomic fission from that of atomic fusion, that of digital from that of analogue computers. Some consumers are far more learned in one or even half a dozen subjects than the librarian or indexer or bibliographer and they say: Why, you just do this, or do that; usually you just make out a card and put it in the catalogue, without any difficulty of decision about a heading or class number, or any of arrangement, or cross reference or extra indexing, to ensure that it will be found when the information it is supposed to indicate is wanted. When found make a note of, is sound advice, but neither Dickens nor his character told us how to index our notes.

In an old enquiry into the cataloguing of the British Museum Library many scholarly gentlemen were convinced that clerks could do the job; half a dozen of the former were persuaded to take home a copy of the same book, and bring back their catalogue entries for it next day. Each brought back different headings and entries, each broke in a different way rules or principles which librarians had already found to be essential, rules which could be applied by clerks, but not without training, and not without judgment requiring more ability and education than mere clerks are supposed to need. That is the century-old story. Certainly today there is a lot of poor indexing done by engineers, chemists and other amateurs, who may not have realized that thinking for one's self can be as much a vice as a virtue, that what can be learnt by, and taught to, persons of not much above average education and intelligence in about a year, may not be thought out to its fundamentals in ten years, even by very gifted amateurs. This is their own experience in their own subjects.

A book may be a short or a long one, an easy or a hard one; the subject itself may be easy or hard, for example, elections or electrons, but if the book as a whole is on a well-known subject with a simple well-known name it is easily catalogued as a whole, so as to have maximum use. But take a book called Power production: the practical application of world energy, by H. H. Thirring; one cataloguing service suggested its subject indexing under Fuels, under Power, Mechanical, and under Atomic energy. Take another book called Zoo

quest for a dragon, by D. Attenborough; the same service suggested its indexing under Indonesia—Description and travel, Animals—Indonesia, and Dragons. Both books could have more or less subject indexing with alternative subject names, both show that even in books which might be described as popular or for the general reader or the beginner there can be multiplicity and interrelation of subject matter, so that their cataloguing involves judgment and opinion, and can only be approximate and imperfect. But more has to be attempted rather than less if the use of books is to be more rather than less, and it has to be attempted in library catalogues and in bibliographies at large.

1·3 Shelf Arrangement.

Books are likely to be found on the shelves of a library in subject classes and subclasses indicated by labels and numbers somewhat as follows:

300 SOCIAL SCIENCES

300	310	320	330	340	350
Sociology	Statistics	Politics	Economics	Law	Administration

620 ENGINEERING

621	621·3	621·38	622	623	624
Mechanical Engineering	Electrical Engineering	Wireless Television	Mining Engineering	Military Engineering	Structural Engineering

Each book then has on its back or spine a corresponding number, extended if necessary to distinguish an even more specific subject; for example, a book which would go under the number and label 621·3 Electrical engineering would be Switchgear principles, by P. M. G. Crane, which could have the specific number for switches, 621·3173. The subject class order and the class numbers illustrated are those of the most used library and library catalogue subject classification, Melvil Dewey's Decimal Classification, first published in 1876. Notice that although an actual book can be on two or more subjects, such as Politics and Television, one copy can only go in one place on the shelf, and that it is usual to keep multiple copies together.

1·4 Relative and Fixed Location.

Book presses may be numbered first, and the shelves in them subnumbered, and subjects then distributed over them; books put into them by subject then have press marks, that is the number of the presses and their shelves. But this means fixed location for books, and a final insuperable difficulty in the insertion of new books on new subjects in the classified order without a redistribution of subjects over the presses and a new press marking of all the books. In relative as opposed to fixed location room is left on shelves so that books can be moved right and left, up and down, and the books themselves are

given subject class numbers by which they are kept in subject order relative to each other. The shelves are then labelled to show the subject order, but the labels are movable according to any shifts of the books. This relative location is now so common that students take it for granted; they do not realize that it was an innovation mainly by Dewey in 1876, and was one of the essentials of his Dewey system, which is now used with most classifications; on this see also 2·1-3.

1·5 Classified and Alphabetical Cataloguing.

If a library has both shelves and catalogue classified by DC, then subject entries in the catalogue and books on the shelves will be in the same order with the same numbers. But in most English-speaking countries at least the catalogue is far more likely to be the dictionary catalogue; in this the subject entries are alphabetical, and arranged with author and title entries in one sequence or file, much like articles in most present-day encyclopaedias on, for example, Marseillaise, a song, Marseilles, a place, Marsh gas, a subject, Marston, John, a person, Marston Moor, Battle of, a subject, and so on. In studying the following comparison of the classified and the dictionary catalogue the student should note:

1. None of the entries is given in full, that is with full title, place and date of publication, and so on; in an actual catalogue at least one entry for each book could be full.

2. Not all the entries for each book, or all the cross references to each heading, or all the indexing of each class number is given as in an actual catalogue in which there could be dozens more headings and thousands more entries, even within the range shown.

3. There are the same number of entries for the same books in each catalogue, and one book has two subject entries in each. Later it will be shown that there is a common form of classified catalogue in which there are only single entries for multiple subject books with alphabetical indexing of extra subjects; but the multiple subject entry form is the ideal form of both the alphabetical and the classified subject catalogue.

4. The dictionary catalogue has only one arrangement and is self-indexing; the classified catalogue has a classified subject arrangement and an alphabetical author and title arrangement and an alphabetical index to the classified subject arrangement; in the alphabetical subject catalogue cross references have some of the functions of the alphabetical index to the classified catalogue, but there is usually some cross reference in the classified catalogue, as well as an index to it.

5. The dictionary catalogue gives only one number, the shelf number, in all entries for the same book; in a classified catalogue an added subject entry gives the shelf number as well as the class number of the added entry.

DICTIONARY

ART—Essays
Fry, R. E. 704
Transformations: critical and speculative essays on art

ART—History
Craven, T. 709
The rainbow book of art

ART—Study and teaching
see also ART IN EDUCATION

ART, Primitive
Boas, F. 709·01
Primitive art

ART IN EDUCATION
Gaitskell, Charles D. 375·7
Art education during adolescence

ARTERIES—Diseases
Allen, E. V. 616·13
Diseases of the principal arteries

ARTERIES—Embryology
Bruner, J. L. 611·01368
On the varieties of wall thickness in embryonic arteries

ARTERIES—Physiology
Camadias, A. P. 612·133
The oscillometric examination of arterial permeability

ARTHUR, Sir George 365·36
Defence of transportation

ARTHUR, Sir George
Levy, M. C. I. 920
Governor George Arthur

ARTS AND CRAFTS
Black, E. T. 745·5
Decorative arts

ARTS AND CRAFTS see also LEATHER WORK
LEATHER WORK
Aller, D. 745·53
Summit leather craft book

PENAL COLONIES
Arthur, Sir George 365·36
Defence of transportation

TASMANIA—History
Arthur, Sir George 365·36
Defence of transportation

TRANSFORMATIONS . . . ESSAYS
Fry, R. E. 704
Transformations: critical and speculative essays on art

TRANSPORTATION OF CRIMINALS see PENAL COLONIES

CLASSIFIED

365·36 PENAL COLONIES
Arthur, Sir George
Defence of transportation

375·7 CURRICULUM—ART
Gaitskell, Charles D.
Art education during adolescence

611·01368 EMBRYOLOGY—Arteries
Bruner, J. L.
On the varieties of wall thickness in embryonic arteries

612·133 PHYSIOLOGY—Arteries
Camadias, A. P.
The oscillometric examination of arterial permeability

616·13 DISEASES—Arteries
Allen, E. V.
Diseases of the principal arteries

704 ART—Essays
Fry, R. E.
Transformations: critical and speculative essays on art

707 ART—Study and teaching
see also 375·7 CURRICULUM—ART

709 ART—History
Craven, T.
The rainbow book of art

709·01 ART, PRIMITIVE
Boas, F.
Primitive art

745·5 ARTS AND CRAFTS
Black, E. T.
Decorative arts

745·53 LEATHER WORK
Aller, D.
Summit leather craft book

920 BIOGRAPHY
ARTHUR, Sir George
Levy, M. C. I.
Governor George Arthur

994·6 TASMANIA
(365·36) ARTHUR, Sir George
Defence of transportation

CLASSIFIED CATALOGUE AUTHOR AND TITLE FILE

ARTHUR, Sir George 365·36
Defence of transportation

.....

TRANSFORMATIONS . . . ESSAYS
Fry, R. E. 704
Transformations: critical and speculative essays on art

CLASSIFIED CATALOGUE SUBJECT INDEX

ART	700
—Essays	704
—History	709
, Primitive	709·01
in Education	375·7
ARTERIES—Diseases	616·13
—Embryology	611·01368
—Physiology	612·133
ARTHUR, Sir George	920
ARTS AND CRAFTS	745
BIOGRAPHY	920
LEATHER WORK	745·53
PENAL COLONIES	365·36
TASMANIA—History	994·6
TRANSPORTATION OF CRIMINALS	365·36

Here are other subjects, related and unrelated, in the orders in which they would be arranged, brought together and separated in the alphabetical and the classified subject catalogue respectively; only headings and numbers are given, without the entries, cross references and indexing which there would be in actual catalogues.

ALPHABETICAL

Coconut fibre—Growing
—Weaving
oil
Copenhagen
Copper—Chemistry
—Geology
—Metallurgy
—Mining
—Trade
Coppersmithing
Copra
Coptic church
Coptic language
Coptic literature
Copts
Copyright
.....
Publishing
.....
Tinsmithing

CLASSIFIED

Coptic church	281·7	Coconut oil	665·3
Copper—Trade	338·2743	Copra	665·3
Coptic language	493·2	Copper—Metallurgy	669·3
Copper—Chemistry		Tinsmithing	671

CLASSIFIED

Copper—Geology	553·43	Coppersmithing	673
Copper—Mining	622·343	Coconut fibre—Weaving	677·18
Coconut fibre—Growing	633·581	Coptic literature	893·2
Publishing	655·5	Copenhagen	914·8
Copyright	655·6	Copts	916·2

Two unqualified generalizations are commonly made; one is that readers want, for example, the metallurgy of copper, lead, zinc, tin together, at the same time, instead of, at a time, copper metallurgy to the exclusion of everything else, even other aspects of copper; the other is that the alphabetical catalogue scatters and the classified catalogue brings related subjects together. There is also an assumption that the subject relation or grouping given in a classification is the one wanted, if one is wanted. The student of information indexing should study the examples just given, and reconsider such unqualified generalizations and assumptions, if he has ever entertained them.

Our language is not classificatory in any systematic way, and it is affected by accidents. This is shown by unrelated names of related things such as lamb, mutton, sheep, wool, and bacon, ham, pig, pork. But headings and subheadings, and adjectival phrases, uninverted and inverted, ensure alphabetical subject and subject aspect grouping which can be more useful, and used, than the grouping of subjects by aspect of most classifications. The subheadings under copper show the aspect grouping which most classifications scatter, the adjectival phrases beginning with Coptic, followed by the noun Copts show the same thing, and both are well within established practice of the alphabetico-specific catalogue.

There has been an attempt at a thing-aspect kind of literature classification, by Brown in his Subject Classification of 1906, but this has had very little use. In it all the aspects of, for example, the rose are at its botanical number and only general books are at its gardening number. It does not have the ready reference or self-indexing value of alphabetical arrangement, nor the classificatory value of an order which allows all flower gardening to be together, all literature on the botany of the Rosaceae to be together and so on. On it further see Appendix B.

Another unqualified statement about alphabetical catalogues is that they always involve cross reference, but if an alphabetical catalogue is specific, and most now are, and once we know the specific entry rule, then we go straight to coconut or copper or Coptic, and we have an even chance with the small proportion of synonyms such as radio and wireless, corn and maize, heredity and inheritance. With the classified

catalogue there must be cross reference from an alphabetical index, until we know a subject's class number, and there is often cross reference in the classification, for example in the Abridged English Edition of UDC:

396 WOMEN AND SOCIETY. FEMINISM
Cf. 331·4; 342·83

·1 Emancipation. Anti-feminism. Cf. 342·83
·2 Women and the law: nationality (of wives), etc.
·5 Women and work. Cf. 331·4
·6 Family status. Woman and the home. Cf. 321·1; 392

On cross reference see later 4·7, 8·4, and 11·2-4.

Note that the same piece of literature can be put under two or more headings in either alphabetical or classified arrangement; but this is usually done for different subjects in the same piece. Repeating all the literature on a thing at more than one place in a classification would be quite uneconomic and a contradiction of a classification based primarily on common aspects of subjects, such as the economic and the engineering aspects of metals. What is sometimes done is to pick one number, for example the mining number for copper, and put everything on copper at it; but this is not using the classification as intended. These are the kinds of distinctions and points the student should carefully consider. Classified arrangement is still better for the shelf; it is not better in all circumstances and cases for the catalogue, index or bibliography.

In what may be termed disillusionment in some quarters about classification, there has been some reaction against the use of even broad classification on the shelf. But we may as well have some shelf classification, at least in open access, provided we make it clear to the reader that it does not bring all the relations and literature of his subject together. One thing it does is to enable him to browse over a wide subject field and perhaps to discover material useful to him which we do not indicate in our catalogues. He cannot do this if books are in order of accession or acquisition, or alphabetical by author, or even alphabetical by specific subjects. This may not matter if books are in closed access, though it will still matter to staff making searches; it does matter in open access which is little use to the student without subject classification. This is further discussed in 7·1.

Books are classified and displayed on shelves, but this does not index them; we can put up prominent shelf guides or labels or charts or outline schemes, but these hardly index. They do not show in which of several possible classes a particular subject is, and they do not show chapters in books and articles in periodicals, such as a chapter in a book on cats on the Egyptian religion, or one in a book on the Egyptian religion on cats. Cataloguing, indexing and bibliography do this; different lines of reasoning apply to them, and there is not the uniformity of practice in them that there is on shelves. A choice has to be made

and the student should keep an open mind, remembering only that on the whole the more sweeping and unqualified claims have been made in the past fifty years for classification for all purposes, and especially for those of scholars, students and research workers, although the British Museum Library, the Library of Congress, and large university libraries outside Great Britain all have alphabetical subject catalogues, and some of the most used bibliographical indexes are alphabetical.

1·6 Card and Volume Catalogues.

Note that entries under headings or class numbers can be on cards or in column on pages in bound or looseleaf volumes. Cards conforming to an international standard measure 12·5 × 7·5 centimetres, which is only approximately the 5″ × 3″ often stated as standard. The area of each is approximately fifteen square inches, but if cards are used to the only advantage they have, each will have only one entry on it, however little of the area of the card is used for the entry. The only advantage of the card catalogue is that it is indefinitely cumulative. There is the same advantage with the 'sheaf' catalogue, made up of loose leaf slips about the size of cards, one for each entry, and up to about two hundred and fifty in a binder; the sheaf catalogue is not now much used, because of the trouble of inserting entries, and the 'slip' catalogue is used still less; in this slips are pasted on looseleaf pages in columns, one full and the other being pasted up as new entries are made, until this column is full, when the slips are then shifted, or duplicates used to make one page or leaf into two, and so on.

These attempts at a solution show the inescapable weakness of the bound volume, printed page catalogue. This takes up less space, can be made available in copies by the ordinary methods of printing and duplicating, and is much more easily scanned than the card catalogue. But there cannot be satisfactory cumulation of bound-page catalogues without reprinting and rebinding, and cost and other factors mean that some catalogues, indexes, bibliographies, and abstracts cannot be indefinitely cumulative, and have to be different from card catalogues in other important respects, especially that of multiple entry for books on several subjects.

Study and teaching should always be related to practical considerations, including some which are economic and physical, rather than to abstract theory which in some directions has got right away from practical considerations, into questionable theory and downright pseudo-science.

1·7 Theory and Practice.

The student who is required to make a study of supposed logic, philosophy and science of classification and indexing must read as he is required and directed. The writer of this book has discussed this 'bibliosophy' in another book, Information indexing and subject cata-

loging: alphabetical, classified, coordinate, mechanical, Scarecrow Press, New York, 1957, and the interested student may turn to it, and especially to paras 117-152 of its Chapter 1, Introduction, and its Chapter 10, Bibliosophy, and logic. A good, independent, impartial course in logic and scientific method, at university level, is good for a student who has a mind for it; a smattering, or a tendentious study of logic either in books by logicians or books on classification by librarians is likely to be worse than useless.

Some of the logic, of logicians and librarians, is touched on in Appendix A of this book. But we should be able to get on almost without logic, and certainly without the very questionable metaphysics of some supposed authorities. Cutter and Dewey were able to do without them in establishing what is still in all essentials present-day classified and alphabetical practice. But any practice must have its theory, of what it does and how this may be done most economically and efficiently, and this theory will include an ideal, which may not be a reality because a method of realizing it economically and efficiently has not yet been discovered. The development of such things as motor cars and artificial satellites illustrate this relation of theory and practice, of the ideal and the possible.

1·8 Information Indexing and Subject Cataloguing.

The ultimate ideal in literature indexing has been called universal bibliography or indexing, and has not been realized; it means indexing everything in a piece of literature, intentional, incidental and accidental, that could possibly be of interest to anyone, anywhere, anytime. Another ideal is realized, or realizable in the cataloguing of books and periodicals, and of chapters and articles in them, by their general subjects; this ideal is the entry of all that is indicated on a subject at one point in the catalogue, so that whilst there is cross reference for related subjects such as soul and personality, or balloons and airships, all that is catalogued on a subject such as the soul or balloons, will be found under the subject name in alphabetical order or under a class number, without cross reference for entries for literature on exactly the same subject.

This requires multiple entry of a book on several subjects, whether these are related and have cross reference or not; it is quite possible in card catalogues and in some catalogues and indexes in printed volume form, such as the Wilson periodical indexes, even with some cumulation, that is with entries not only repeated under several subjects but also repeated from one issue to another which includes new and old, and so on for a year or more. But if abstracts of articles are given as in the abstracting journals then the cost of multiple entry and cumulation, or even of either, would usually be prohibitive, and the resulting bulk might even mean inefficiency, in physical handling and storage. So as shown in Chapter 6 these usually have single, uncumulated, classified

entry, with multiple alphabetical indexing, usually at the end of a volume.

This is all right, provided the method is not talked of, as in fact it is, as though it were purely classified indexing or cataloguing; with it more intensive indexing in serially published indexes is economically and efficiently possible, as in Chemical Abstracts, than with multiple entry and cumulation, alphabetical or classified. But the ideal of completely universal indexing is still not realized, and is not realized even in indexes to single books; the nearest approach to it is concordances, for example of the Bible, bigger than the work indexed. And as shown in Chapter 13, it has not been realized with mechanical and co-ordinate indexing methods, which are discussed more fully in the writer's other book, referred to just above, Chapter 7 on Mechanical selection and co-ordinate indexing. Even with these all that can be done is to index everything relating to some highly specialized subject, ignoring everything else in the literature indexed; it is still not certain that this can be done any better by these methods than by 'conventional', manual cataloguing, and either way it is not done with complete success outside very narrow limits. But the idea persists, and even some professional statements may give the student the idea that somewhere some mechanical brain is indexing everything on everything.

The next best thing is what is usually understood by subject cataloguing. Single volumes and sets of volumes constitute bibliographically complete works, such as Essential oils, by Ernest Guenther and others, in six volumes, 1948-1952, or John Gould's Birds of Australia, in eight volumes, 1840-1869, and a continuing periodical such as Nature; these are catalogued by their general subject or subjects, and in addition some parts are recognized as bibliographical units, such as chapters and essays in books and articles in periodicals, and these may be indexed for their general subjects, but not for incidental or accidental information in them. This indexing or analysis may be called subject analysis, and this is what is meant by subject analysis in Subject analysis of library material, Papers . . . ed . . . by M. F. Tauber . . . New York, 1953; but subject analysis also means sorting out the related subjects or terms in a complex subject, such as the spray painting of motor car bodies by electrodeposition, and bibliographical analysis or subject bibliographical analysis is best kept as the name of the former. It is fairly completely and systematically done for some subjects or some periodicals in periodical indexes and abstracting journals such as the British Library Association's Subject index to periodicals, the Wilson indexes, Plant Breeding Abstracts, Chemical Abstracts, and many others. On these see Chapter 6, and on subject analysis see also 4·6 and 14·5-6.

Chapter 2

Classifying, Class Numbering, and Indexing

A library consisting only of Fiction, Biography and Travel, might have its books so divided and labelled, and its Fiction subdivided as Crime, Romance, Cowboy and Scientific. This is classification, with or without the subdivision which becomes more elaborate in more general and larger libraries.

These are intended for education, science and culture, and for reference and research as well as or instead of merely recreational or even merely informative reading, and in them entirely general literature may be classified by forms such as encyclopaedias and newspapers; imaginative literature may be classified by country, subclassified by forms such as poetry, drama and the novel, subsubclassified by periods, and even subsubsubclassified for important writers, who, if they are 'voluminous', may be still further subdivided; and books and parts of books written and read for more or less particular subject interest may be classified as, for example, literature on Social sciences, Economics, Finance, Banking in successive subdivisions, which may be carried still further to central, trading and savings banks, and these even to school banks and piggy banks, with further subdivision by form, for example, a savings bank periodical. In libraries and bibliographies in which this happens, the major interest is likely to be applied rather than so-called pure literature, and it is with the classifying, cataloguing and indexing of the former, by subject and form, that we shall be almost exclusively concerned throughout this book.

The numbering of classes of literature with figures or letters or a mixture, is called notation, and must be distinguished from classification. Such labels as Biography; Fiction, Cowboy, Crime, Romance, Scientific; Travel, are classification, but to use even a simple classification some notation is necessary, and we might find on the labels and the books, B, FCo, FCr, FR, FS, T. This is mnemonic notation because the letters not only keep Biography, Fiction, Travel, in that order, they also remind us of what they stand for. Figures may also become mnemonic through constant use for the same thing, for example all numbers beginning with three for Social sciences, and two for England where it occurs, in Language, Literature, History and other classes such as Education. But with much classification there cannot be completely mnemonic notation, and although the classification now to be illustrated has some important constants or mnemonics, for example, 2 for England or Great Britain, there are none in the illustration about to be given. On mnemonics see further 9·1.

2·1 The Decimal Classifications and the Dewey System.

In general and special libraries in Great Britain, the United States of America, Canada, New Zealand, South Africa, Australia, in all countries in which English is a primary or a secondary language, and many others, books are arranged according to either Dewey's Decimal Classification (DC), or the more elaborate version of it, the Universal Decimal Classification (UDC), developed from Dewey's by a Belgian, Otlet, especially for libraries specializing in the sciences. Neither is the only classification, but either is used in more than a hundred times as many libraries as any other, and DC in a hundred or more times as many libraries as UDC, on the shelf, and in the catalogue if this is classified.

This widespread uniformity in classification is helpful in teaching and learning. We can note that there has been a swing away from detailed shelf classification, or in some older libraries never a swing to it, that only a minority of libraries in English speaking countries have classified catalogues, and that there are other classifications, the most used being that of the United States of America Library of Congress (LC); but at least until we have got our foundations well and truly laid we must still study the classification and notation which is most used and was the foundation and model for all later classifications in their essentials, and that is Dewey's Decimal Classification (DC).

Here are extracts from it:

600	Useful arts
620	Engineering
622	Mining engineering
622·8	Dangers and accidents in mines
622·81	Explosions and fire damp
622·82	Mine fires

These are from what are called the tables or schedules of the classification, and from this point on the student must be able to study at least DC, if possible in its 14th and 15th editions, but at least in the 15th or any later edition, or in the 14th or an earlier one. Illustrations given here are from the 14th, because this is the fullest or most detailed, and the latest with Dewey's own introduction.

There is an index to the tables by which we can find the subjects in their classified order, for example:

Engineering	620
Fires	
mining dangers	622·82
public health	614·84
Mining	
accidents	622·8

Turning back to the tables or schedules for Fires Public Health we find:

614 Public Health

.....

614·8 Protection of human life from accidents, casualties, etc.

.....

614·84 Fires

This turning back to the tables is most important. In this particular case we might otherwise think that the class numbered 614·84 was for fires in relation to personal or bodily health, but no clear provision has been made for this; it would probably go into 613 General and personal hygiene, 613·1 Air and light. . . . 613·18 Temperature, though there is no reference to this from Fire or Fires in the index. This alphabetically indexes the class numbers for specific subjects in one or more relations or classes; for example, the index gives Fires in the Mining dangers and the Public health or safety class or relation as shown above, and it gives Semantics 412, although at 412 the term Semantics, a new one, is not given. These examples show that the classification tables and the index to the numbers of the classes in the tables cannot be satisfactorily used apart.

Note now that the references from the alphabetical index are to subject class numbers, not to pages on which these happen to fall in the particular edition of the classification we are using, for example, Carpentry 694 in the index of any edition indexes carpentry in any edition although the pages of the first, including everything, were less than the pages of supplementary tables or of the introduction in the 14th edition; and Carpentry 694 indexes the subject on the shelves of any library or in any classified catalogue or bibliography in which DC is used. Notice that the tables of DC in the 14th and some earlier editions after the first and to the 14th have no page numbers.

The old fixed location shelving of books and the press marks discussed in 1·4 corresponded to fixed page location and page numbers in a book. By the Dewey system, with either DC or other later classifications, books are put in locations which are relative according to class numbers, and all indexing is by these numbers. This is what Dewey originally meant when he called his index relative; in his first edition, 1876, he said: "in arranging the books on the shelves, the absolute location by shelf and book number is wholly abandoned, the relative location by class and book number being one of the most valuable features of the plan," that is, the Dewey system which was then quite new in this, and in giving after each subject in the alphabetical subject index to a classification, not a page number, but as he said, "the number of the class to which it is assigned".

He did not use the title Decimal Classification and relative index until his second edition of 1885, and in this edition he began indexing

the class numbers of specific subjects and subindexing the classes in which they were put according to aspect, or relation, or, as he called it, standpoint. For example in the first edition index he had only Dogs 599, 636; in the second he had Dogs zoology 599·7; domestic animals 636·7. The classification is more specific, and the index names the including classes. It gives two class numbers for dogs, one "from the standpoint of" zoology, the other from that of domestic animals; this has been taken to be what he meant by relative indexing and is what relative indexing now means. But there was nothing new in this; book, and possibly classification indexes already distinguished subject relations or aspects, but they referred by fixed page numbers, not by relative class numbers, which was what he had already done in his first edition of 1876 and meant by relative indexing in his second edition of 1885. And whatever might have gone before, he was the first to combine relative indexing in both senses in a classification intended, as he said on the title page of the second edition, "for arranging, CATALOGUING AND INDEXING public and private libraries". Note the capitals for cataloguing and indexing, and his statement in the preface and introduction to both editions that "the system was devised for cataloguing and indexing purposes, but it was found on trial to be equally valuable for . . . the shelves". It is often said now to have been meant only for the shelves, but this did not happen until the 15th edition; on this see also 4·4.

The numbers given in the index take us where we want to go, as they do in other indexes or directories. On one of these at the entrance to a building we might see Smith and Co., Mining engineers, 622, and this would guide us to room 22 on the sixth floor; of course it would be accidental if such a company had such a room number, agreeing with a library classification number, and we should avoid loose talk about 622 being a code number meaning mining, which would have quite a different number in another classification, for example TN in LC; 622 and TN are simply numbers of classes in an order which is not determined in any way by the numbers but by subject relations or associations. There must first be classes, second these must be put in an order, third they must be numbered in some way to keep them in order, and to find them in order through an alphabetical index. Do not confuse classification and notation.

2·2 Classification and Specific Reference.

If we wanted Smith and Co. we would go to their office without worrying or caring who was in rooms 621 and 623, and on library shelves or in a classified library catalogue or bibliography, readers would be most likely to go to 622 Mining without caring or even noticing that 621 was Mechanical and electrical engineering and 623 Military and naval engineering. On the other hand, if we went to 622·82 for Mine fires we might be surprised and annoyed to find that we were in mining and cut off from other fires in Protection of human life from

accidents, 614·8. We may not want the classification we get, or we may not want any classification. We commonly want information on a subject, however general or however special, without wanting at the same time information on other subjects in some embracing class, or on specialized branches of our subject; for example, in wanting information on economics we may not want information on politics, or specialized information on banking, and the change-over of the arrangement of encyclopaedias of all kinds in the 18th and 19th centuries from classified to alphabetical suggests that this exclusive interest in one subject at a time, general or special, is the rule rather than the exception. And even if classification is wanted, be wary of suggestions that there are or can be classifications which will give everyone just what they want or even be much better in this respect than DC.

2·3 Notation Expansibility and Classification Hospitality.

We noticed just above that the index to the first edition of DC had only Dogs 599, 636 whilst the second had Dogs zoology 599·7 and Dogs domestic animals 636·7. The tables in the first edition had only 590 Zoology and 599 Mammals, and 630 Agriculture and 636 Domestic animals; all the numbers were made up to three figures by noughts or zeros, for example 500 Science and 590 Zoology, except that the first general class, now 000-099, had its first zero left out, and was considered as a preliminary to nine classes, 1-9, rather than the first of ten classes, 0-9. None of the subject classes was extended by more than a third figure; that is, there was division, subdivision and subsubdivision, but not subsubsubdivision and so on.

In the second edition division and subdivision went to four or even five places or steps, so that there was 599·7 Ungulata. Carnivora. Domestic mammals; and 636·7 Dogs. The decimal point is just a way round what Dewey called a 'mental hitch'. Essentially a number is provided for a further subdivision by extending an existing number to the right, on the understanding that the figures indicate subdivision, not quantity, and all numbers beginning with a figure go before all numbers beginning with the next figure in the order 0 to 9. Because we are very much in the habit of using figures for quantities there is a mental hitch in thinking of 16 coming before 6 and of 61 as coming before 7. Up to three figures in his classes 1-9 in the first edition Dewey got over this mental hitch by using nought to make up numbers of less than three figures to this as in 500 and 590. He also tried to get over the mental hitch of regarding nothing as standing for something in his first or preliminary general class by leaving off the first nought, but this led to confusion, for example of 52 English periodicals with 520 Astronomy, so in the second edition he used 000-099, and now that we are used to such numbers as OOO 000 for motor cars we do not find this use of nought for something the mental hitch it was for our great-grandfathers.

In going beyond three figures in the second edition he got over the mental hitch of reading 5997 before 600 and 6367 before 637 by writing

and arranging all figures after three in any number as decimal fractions according to the established rules of arithmetic. In UDC later on, neither DC's three figure minimum nor its decimal fraction device were used; instead all numbers, however long and however punctuated for other reasons, are regarded as decimal fractions with the decimal point in front understood. This allows 5, for example, to be used for General science, and leaves 50 and 500 free for other uses, but doesn't get over the mental hitches as well as Dewey's device does. But what we are mainly concerned with here is the basic device of number extension to the right as a means of providing notation for subject or class subdivision, subsubdivision and so on, whether with letters as in T Technology and TN Mining in LC, or with figures as in DC and UDC, or with letters, and figures as in LC, after the second letter.

Relative location in place of fixed location has been discussed in 1·4 and 2·1 and the purpose shown to be the insertion of books on new subjects, really new or only new to the classification, at an appropriate point in classified shelf or catalogue arrangement. A first requirement is that the things actually arranged must be in separable, movable units; any book which is a whole and not part of a bound volume always has been such a unit, and catalogue entries on cards are as shown in 1·6 as long as there is not more than one entry to a card. A second requirement is an expansible notation. Leaving blank numbers had been tried, but new subjects do not come where the blanks are, except by lucky anticipation, so the third essential element in the system introduced by Dewey was expansible notation by the method described just above.

None of the classifications have been thoroughly or evenly expanded for existing subjects, but the chief use and justification of expansible notation is the accommodation of new subjects at appropriate points. For example, about 1920 psychoanalysis burst on an astonished world; in DC 131·3 Mental hygiene seemed an appropriate point for it and the editors finally expanded the classification and the notation at this point, providing 131·34 for psychoanalysis, 131·346 for systems of psychoanalysis and 131·3462 for the Freudian system.

Ideally subjects with a future and an increasingly specialized literature should have the shorter numbers, and about 1876 phrenology seemed such a subject, more so than applications of electricity. Phrenology had and still has a three-figure 'whole' number whilst electrical engineering is a decimal fraction of 621. But despite illusions it is the nature of the future that it cannot be anticipated; new subjects can be fitted in, but they cannot be given numbers of their own without either renumbering books on the shelves and entries for them in catalogues and bibliographies, or using the method of number extension. The former is hardly practicable, which is one reason why very large libraries are now reconsidering at least close or minute classification on the shelves, and classification theorists are playing with ideas of perpetual classifications as physical theorists once played, and some

still do, with ideas of perpetual motion. One practical solution for the shelves is to leave in a large, ever-increasing library a large part of it which has only historical interest classified as it is, and to start with another classification for current and future literature. A practical solution for the catalogue is the alphabetical catalogue, complementing and supplementing broad classification on the shelves; this is the solution implied in the 15th edition of DC, which is only an abridgment of the 14th, and too broad even for the shelves of medium-sized reference libraries.

If classification numbers on books on shelves and entries in catalogues could be readily altered opportunity would undoubtedly be taken to revise the classification at the same time, but as numbers on thousands of books and cards cannot be readily altered the classifications and their notations remain largely unaltered and statements are made that both must be discarded because the classification is no longer hospitable, not suited to an atomic age, and so on. This is said particularly of DC, with the implication that there is as much difference in knowledge, and in ideas of its organization for teaching and learning, and therefore in the classification needed for the literature of knowledge, between 1876 and a rapidly approaching 1976, as between 1876 and 1776, 1676, 1576, 1476. But this isn't true. If we look at an earlier classification, at Brunet's in his bibliography called a Manuel du libraire et de l'amateur de livres, of 1810, and further discussed in 3·1, we can see that it is much closer to 1710 and 1610 and more out of touch with 1876 than DC in its 1876 outline is with the present; for example, between fine arts and sport it has, in the 3rd edition of 1820, a class of mechanical arts and trades, with only thirty entries, including entries for books on fireworks, metallurgy, glass making, fountains, paper making, gilding and varnishing, baking, in that order. It lacks an index and an expansible notation, because it is before Dewey, but for its period it is perhaps a better classification than his; yet it was far, far more out of date by 1876 than his is now, with a Useful arts class in which it has been found possible to accommodate both atomic energy and artificial satellites quite reasonably. UDC is sometimes thought to be a new decimal classification, but as will appear from later examples, it is the same as DC in broad outline and much of its detail, and despite attempts at other classifications, each with some following, DC and UDC still hold the field, partly because each of these has an organization to maintain it, the only other classification having this being LC. This is another practical consideration of great importance often overlooked by theorists; the day of the classification without a large, non-profit making, wealthy society or institution behind it is over, just because there is this business of keeping up-to-date, of issuing amendments, extensions and new editions, in which, as shown in Chapter 10, even UDC published in Great Britain by the British Standards Institution, and with an international organization supporting it, has not been very successful.

2·4 Alphabetical Notation and Indexing.

Alphabetical or literal notation has two advantages over numerical; it is not used to indicate quantities, and therefore doesn't present the same mental hitches in its use for indicating subdivision as well as order, and it has a longer base. The number of symbols in a notation is called its base, so that A-Z means a base of twenty-six against 0-9 with a base of ten, which is what is meant by decimal, and the longer the base the shorter class numbers may be on the average. But the order of the base may not be as well known, so that letters may not be put and found in order as easily as figures, just because they are not used as much for counting and indicating order.

However, we do learn the order of the alphabet even though we may not become as familiar with it as with that of our arabic or decimal figures, and without much thought the letters with which words are written were used to put old and new words in one alphabetical order in which they can be found, long before Dewey thought of using figures or letters, pure or mixed, for an expansible notation for an hospitable classification. There is the same physical problem as with an extra notation for a classification; the things on which the symbols are written must themselves be separable and movable if there is to be intercalation and cumulation, or there has to be revision and reissue, as there is of dictionaries. But this is the common problem, and assuming some solution, such as that of the card catalogue, groups of letters which are words, such as BEACH, BEAD, BEADING, BEE, BEEHIVE, BEESWAX, BEETLE, are put in order as words or headings on the same principle as that of the expansible classification notations, except that instead of BOY, for example, being a number or notation as it is in Bliss's Bibliographic Classification, for television, it is the word boy meaning a male child; and a later, longer word, such as boycott, fits in order, just as it would if it were an extension of BOY as a class number in BC.

This method of arrangement used with words is an accidental by-product of phonetic writing rather than a deliberate invention for the purpose it serves, which is indexing, but in effect it is the most important high precision instrument ever invented by man, and familiarity with it should not be allowed to breed contempt. It allows us to put subject names and phrases in exact order, for example in the index to DC, Apothegms folklore 398·4, between Apothecary pharmacy 615·4 and Apotheosis comp. relig. 291·213, by the seventh letter in each phrase after Apothe-. Without it we could not have indexes to stores, to telephone numbers, to office files, to codes, to classifications such as DC, and without these indexes we could not find, or at least not have direct, quick, efficient, economic access to the things indexed, which are vital in peace and war; with it we can have direct indexing of information, specific reference to it as in most encyclopaedias, and direct cataloguing of books by subject.

There are only two starting points from which to get at information

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...No. 24434
6·5·68

on subjects, and both are names in alphabetical order; one is the particular or specific name of a subject and the other the name of an including class or genus. Suppose we know there is something called calculus; we may find this name in alphabetical order in either a classified catalogue index, with a class number, in DC 517, or in an alphabetical catalogue with entries directly under it. Suppose we are vague about the name, but know the thing has something to do with mathematics; the classified catalogue index then gives us Mathematics 510, and under this we find 517 Calculus, whilst the alphabetical catalogue has the 'downward' cross reference, Mathematics see also Calculus. On this see also 4·7. Any form of mechanical indexing requires the code dictionary, discussed in 13·83, to give the coding of a subject.

A particular name of known or unknown meaning is a better starting point than a supposed class name. We do not need to know what the name cybernetics means to find it between cyanide and cycles, and even with a lot of knowledge of what the subject named is, it has not yet been classified satisfactorily or obviously. On names and indexing and classification see also 4·3-4 and 4·7. Some supposed authorities dismiss the alphabetico-specific arrangement of the dictionary catalogue, and of most encyclopaedias, with amused contempt, because such name sequences as cyanide, cybernetics and cycles do not constitute subject classes; they forget that classification is only a means to an end, not one in itself, and that even as a means it is dependent on such indexing sequences; or familiarity breeds contempt.

The student must carefully study and avoid confusion between alphabetical indexing, alphabetical or literal notation for subject classifications, and alphabetico-numerical or Cutter type notations used in place of names in alphabetical order, as discussed in 7·25 and 7·5(6)-(7). He should also note that all notations extended to the right for subdivision have been called decimal, apparently because Dewey established the method with his decimal notation, but only a notation on a base of ten symbols can properly be called decimal.

2·5 Class Numbers, Code Numbers, and Synthetic Classification.

It is often said by students that LC was made "as they went along"; Congress librarians worked it out for actual books rather than subjects in the abstract, but they had to begin with an outline of order and subdivision, which was based on Cutter's Expansive Classification (EC), discussed in relation to LC in 7·4-5. New numbers go into a classification notation, just as new words go into alphabetical order, but there has to be a classification before it can be numbered, and there have to be classes before there can be subclasses; a new religion must go in religion, and religion must already have its place in the order of classes, and its number, before this can be extended for the new religion. But then, with this fixing, the numbers may become to some extent a language or code, for those familiar with them, and librarians often speak of the three hundreds and the three thirties, using these DC

numbers instead of the names Social science and Economics. But a somewhat different idea was developed by Otlet in what became UDC and in what is called synthetic classification.

DC always had constant or mnemonic form numbers, as discussed in 9·2. These were another of Dewey's innovations. The number 505 means Science in the form of a periodical, and in this 05 is the mnemonic or constant, so that 705 is Art in the form of a periodical, 510·5 is Mathematics in the same form, and 511·05 Arithmetic in the same form. The figures 01-09 are used constantly in this way, though not completely so. The point comes as always after the third figure, even if this is the nought or the next figure of the form number, or not a figure of the form number at all, as in 621·38409 which could be used for a wireless history. Students often say the form numbers of DC are ·01-·09. As shown in Chapter 10 in more detail, Otlet elaborated these not only as means of subdividing literature by form, and according to subject aspects and processes to which 'documents' might be confined, but as a means of writing in code numbers a detailed description or specification of a document; for example, where Dewey went no further than 332·09 for any history of money, with extensions for place such as 332·0942 for a history of money in England, Otlet made possible 332·001 (38) (091) = 20 for a document on money theory in Ancient Greece historically considered in English. After about fifty years, about 1948 in Great Britain, this idea was rejected by UDC authorities, as a confusion of document specification, as given in the entry, with document classification. But there is now a general analytico-synthetic classification theory in which it is still dominant, and class numbers may be called code numbers, as in the preface to BNB, discussed in Appendix G.

In UDC practice almost all that now remains are the elaborations of DC's form and place numbers, which have their uses, and what is called 'coloning'. Otlet thought of compounding or synthesizing class numbers not only to describe documents in code with what he called all the nuances of an ideological-bibliographical analysis, but also as a means of multiple entry of a document, so, for example, one on seeing dogs for the blind could have the number 636·7:362·41, and be entered under this and under its permutation or 'reversal' 362·41:636·7. It may be noted that the document could be entered under both 636·7 Dogs and 362·41 the Blind without combining the two numbers, and whilst a combination of two numbers may subclassify a subject, as in this example, combinations of two or more do not do so in a satisfactory way and often complicate subarrangement without any classifying or indexing advantage. However, this is further discussed in Chapter 10.

2·6 Hierarchical Classification and Notation, and Linearity.

A series of undivided classes such as those of Chemical Abstracts discussed in Chapter 6 is a classification, but we may have progressive subdivision as in DC, called hierarchical classification, and a hierarchi-

cal notation may be applied to it, more or less. In DC the application is more rather than less, and whilst it, and even UDC, are somewhat scornfully dismissed by some writers their thinking is still strongly, though perhaps unconsciously, influenced by them.

In DC and UDC, 5 is Science, 52 Astronomy, 523 Descriptive astronomy, 523·1 the Universe, 523·11 Structure of the universe, so that there is a matched hierarchy of classification and notation from 5 to 523·11. In LC there is this matching with a literal notation; for example, Q Science, QA Mathematics, but further subdivisions are simply numbered serially QA1-935, in which for example QA304-6 is differential calculus, without any hierarchy of the figures.

Even where there is systematic matching of hierarchical classification and notation there are often inconsistencies, because whilst figures go by tens and letters by twenty-sixes subjects do not subdivide regularly. In DC Chemistry and Mineralogy are shown by size of print to be collateral or co-ordinate classes, but by its number Mineralogy 549 appears to be a subdivision of Chemistry 540; Scotland and Ireland are shown by size of type as co-ordinate subdivisions of Europe, but numerically Ireland 941·5 appears to be a part of Scotland 941. Biology 570, Botany 580, and Zoology 590, appear to be co-ordinate, both by typography and numbers, though Botany and Zoology are branches or species of Biology. This business of hierarchy in notation could be regarded as of little practical importance had not the idea of chain procedure discussed in Appendices E-G been made out of it, and if it had not also given rise to some confusion of thought about what is now called linearity.

Simple class relations can be shown in family tree style, or by circles including circles, or umbrella ribs pointing downwards for special subjects divided out of general, where the ribs come together, or the other way up for special subjects made into a general class, but this is only by way of illustration; classes, genera and species do not exist in any of these ways, and if a lot of classes have to be shown, with a lot of subclasses and subsubclasses, and so on, all of them have to be shown in line, vertically as in the tables or schedules of DC and other classifications; and actual classes and subclasses of books or catalogue entries have to be shown in line, vertically or horizontally. This is now called linearity, and has been used as an argument against classification, for example in the disillusionment about shelf classification touched on in 1·5. So-called synthetic classification gave rise to ideas that classification should show all class relations of a subject at once, but this is stretching the meaning of classification. Obviously rabbits in the agricultural pests class cannot be at the same place in the hunting, fishing and shooting, and the domestic animal or pets class. But when classes are in line a subject can be shown in two class relations, by what has been called modulation, for example, mineralogy at the end of chemistry modulates into the next class in DC, which is geology, and by being between this and biology palaeontology is shown in relation to both. The limits

to this become obvious when we realize that only one subject can be at the end of one including class or the beginning of the next, and only one class between two classes. When subjects, or the same subject in different aspects, are separated we can only link them by cross reference, or by temporary reclassification, and we should not confuse cross reference and alternative places with classification.

2·61 Cross Division in Classification.

If we classify dresses first by material and then by colour we cannot at the same time classify any of them first by colour and then by material, or have another classification of the same dresses by purpose, and mixing our classes would be what is called cross division in logic. Bibliographical classifications have been said to be illogical on the score of cross division, because the same thing or kind of thing is a subject in more than one class. But different aspects of the same thing in different classes are different subjects, often with different literature and a different interest, for example the rabbit in sport, in agriculture, and in animal husbandry; marriage in religion, a sacrament; in law, a contract or branch of family law; in customs or anthropology, a custom. We should use only one place for all the general books, but we still need the others for specialized literature, because, for example, the sacraments are a subclass in religion, even though one is an aspect of marriage which has other aspects. It would be cross division if a classification had species of the same genus of animals, or of ball games, in different classes, but except possibly by error this doesn't happen in the bibliographical classifications, and we must be wary of talk about cross division which arises out of a confusion of things as objects and things as subjects with different aspects and relations. It is because there are different aspects of subjects that the classifications have relative indexes, as shown in 2·1.

What we have to be careful of is cross division in classifying, that is, putting books on the same subject in the same aspect in different classes. But as shown in 1·5, the intended classification is denied if all aspects of such things as marriage and manganese are brought together. We can by the 'coloning' kind of synthetic classification illustrated in 2·5 represent the relation of two or more subjects at each place at which the document on them is entered, and under each subject subdivide by its relations, though in practice much of this leads to hopeless confusion of arrangement. If we use coloning such as 636·7:362·41 only to subdivide single entry of all literature on dogs at the domestic animal number, then we are defeating both the classification and Otlet's intended use of this coloning as a means of 'ensuring' multiple entry.

2·7 Headings, Numbers, and Entries.

We speak of entering books under numbers in a classified catalogue; this is convenient, but strictly all entries are under names as headings,

with different arrangement in different types of catalogue, or in different parts of the same catalogue; the class numbers are only to keep and find the headings in a subject class order, which is not self-indexing as alphabetical order is. In a subject bibliography arranged alphabetically class numbers are not needed; in a library catalogue arranged alphabetically they are, if the shelves are classified, because the catalogue is then an index to the subject classification of the shelves. In a classified bibliography class numbers are not needed if index reference is by some system of entry numbers independent of the classes, as in most of the abstracting journals. This is illustrated in Chapter 6 by Plant Breeding Abstracts in which abstracts are classified according to UDC, without any use of UDC numbers. Insofar as there may be author, title and perhaps other entries as well as subject entries in a library catalogue, all of them, however they are arranged, must give the shelf numbers of the books entered.

Here is a book entered by or under its author's name:

BUXTON, Angela 796·342
Tackle lawn tennis this way. London, S. Paul, 1958. 132p. illus., 12 plates, diags. 19 cm.

In strict bibliographical practice the description of the book which is the entry should include the author's name as given on the title page, but whenever this is heading or subheading in an entry it is now usually omitted from the 'body' of the entry. Here is a subject entry for the same book:

TENNIS, LAWN 796·342
BUXTON, Angela
Tackle lawn tennis this way. London, S. Paul, 1958. 132p. illus., 12 plates, diags. 19 cm.

This would be its subject entry in either an alphabetical or a classified library catalogue, being filed alphabetically by or under TENNIS, LAWN in the former, and numerically in the latter, usually with alphabetical suborder by author in both. The number is from UDC, because DC 796·34 does not distinguish tennis specifically. The alphabetical subject catalogue does not require an extra index, but needs class numbers so that books can be found on the shelves, and a subject heading may be looked up, not for the books under it, but simply to get the shelf number of the subject. The classified catalogue has to have an extra index; this indexes the catalogue, and is a guide directly to the shelves. But in both cases the guidance is not always reliable, for example a book on croquet and Wimbledon entered under tennis because of a chapter on tennis would have on this entry in an alphabetical catalogue the croquet number, and as shown in Chapter 5 there is still a common type of single-entry classified catalogue which would

refer from tennis in its index to the croquet number as a means of indexing this book, as having something in it on tennis. In both cases the reader is led away from the lawn tennis shelf number.

In all kinds of catalogues author entries, or index references from authors' names to subject entries, are arranged alphabetically, and therefore in classified catalogues must be in a separate file, whereas they can be filed in with alphabetical subject entries, as in the 'dictionary' catalogue, much as personal names and impersonal subject names are given in one order in alphabetical encyclopaedias. We are not concerned in this book with book description for entry purposes, or with the choice and form of author, title and series headings. These are covered by their own rules and codes such as the 'Joint Rules' of the British and American Library Associations of 1908, the ALA Cataloguing rules for author and title entries, 1949, the British Museum and Library of Congress rules for description, and Cutter's Rules for a dictionary catalog, 4th edition, 1904, which are for alphabetical subject as well as author and title entry. We are concerned with relations which there are between different kinds of entries in the organization and control of catalogues, especially card catalogues, both alphabetical and classified, as shown in Chapters 8 and 11.

2·8 Catalogues, Indexes and Bibliographies.

As shown in the next chapter, the word catalogue in library use has taken on some of the sense of index, and index has taken on some of the sense of catalogue. So we have index in the sense of an extra index to a catalogue, in the sense of catalogue, which may then have an extra index called a key, and in the sense of a bibliography when this is one of chapters, essays or articles in books and periodicals, because these are thought of as being indexed. If the main purpose is presenting abstracts of articles or papers then the term abstracts is used, or digests in law. Abstracts and digests are usually published periodically, and at least apart from law they are classified for current generic survey of the literature, with indexes to annual volumes through which they are probably more used for specific reference. Their problems of economy and efficiency have been touched on in 1·8 and are further illustrated in Chapter 6.

Strictly, the dictionary catalogue is one with all its headings, author, title, subject and any other in one alphabetical arrangement or file, but the same rules of subject headings and entries apply to both a divided and an undivided file, and the interest here is the subject headings and entries. The term dictionary catalogue may also be taken to imply Cutter's specific entry, that is the alphabetico-specific as opposed to the alphabetico-classed catalogue, which rarely includes author and title entry in the same arrangement.

In British countries other than Great Britain the dictionary catalogue is as widespread in public and university libraries as in the United States of America, with DC for shelf classification; in some

special libraries in these countries as in Great Britain, UDC has been used for the shelf and the catalogue. The only deviation is the use for the shelf in two Australian university libraries of Bliss's Bibliographic Classification, used only by one major library in America, Bliss's own, but by several minor libraries in British countries, including Great Britain, New Zealand and Ghana. But there is no sign that this classification will have much, if any, further following. It is discussed in Appendix C.

A choice between classified and alphabetical should not be based on a national preference; as shown in 3·7, present national preferences may be the result of historical circumstances and established habit rather than fully informed and quite free choice. In making a choice one type or example should not be assumed to be either at its best; there are makeshift and hybrid or adulterated versions of both, and in advocacy or propaganda supposed inherent defects of one have often been made a ground of preference for the other, rather than its own clearly stated and exemplified qualities. And differences in purpose may be left too much out of account.

Informed choice can only be based on a study of several examples of each, as far as possible from different countries, and with different purposes and different economic and physical conditions to meet. An attempt is made in Chapter 3 to show historical circumstances which still influence the choice of cataloguing methods, in Chapter 4 to give further grounds for comparison, and in Chapters 5 and 6 to present a wide range of present-day examples.

Chapter 3

Catalogues and Indexes from Past to Present

The word catalogue has taken on a meaning in librarianship different from its common meaning, and that which it formerly had for librarians. Originally a catalogue of books was simply a list, with a single entry for each book; there might then be an index to it, and even cross references in it, and it could be arranged in different ways, but what was meant by catalogue was a list or inventory, and we are at cross purposes with scholars and librarians at least up to 1876 if we use the word catalogue differently in arguing with them about the cataloguing and indexing of libraries.

3·1 Author, Classed and Classified Catalogues.

If a catalogue consisted of entries under or beginning with authors' names, and this is what most of them thought a catalogue should consist of, then it was an author catalogue, however the entries were arranged. The advantage was seen of arranging entries alphabetically by authors' names; the catalogue was then an author index as well; but catalogues and indexes were physically in page form, a catalogue in accession order allowed of additions at the end, and it could have author, and other indexes renewed from time to time at little cost, whereas an alphabetical catalogue made up of full entries was costly to renew and cumulate, and soon became a catalogue with supplements, and not one but several alphabetical arrangements. So there was some support for accession order catalogues, printed or in manuscript, with indexes.

There were some doubts that entries could be classed by subject and still constitute a catalogue in the strict sense, but the possibility of classed catalogues was generally conceded. Any use of headings which were independent of book titles was thought to make a classed catalogue, whether the headings were arranged alphabetically, or in the kind of subject order we now mean by classified. As late as 1881 the British Museum Library Subject Index then established was looked on as an index to the older author catalogue and regarded as a classed catalogue or index. Its headings were independent of book titles, but were not directly specific in relation to the books entered under them, though in some cases subheadings made them specific. It was, and is, what is now called an alphabetico-classed, as opposed to an alphabetico-specific catalogue, but up to about 1876 there was little recognition of the distinction between alphabetico-classed and alphabetico-specific catalogues, because the latter were confused with title word indexes.

The nearest thing to what would now be called a classified catalogue was what we would now call a shelf list.

The earliest libraries had some shelf classification, with fixed location, and they had shelf lists, which served as indexes by working from a synopsis to a likely class and running through it, which was not difficult or tedious until volumes got out of the hundreds into the thousands, the tens and hundreds of thousands, and approached millions. Then there was increasing concern about cataloguing and indexing, not of small, local libraries, which scarcely existed, but of the increasing university libraries, especially the Bodleian at Oxford, and the emerging national, copyright deposit library which was a department of the British Museum, which was originally established as what we would now call a scientific research organization, a function from which it was steadily diverted by its staff and trustees. The early shelf list catalogues were obviously classified, but unqualified assumptions that in them the classified catalogue came before the alphabetical are misleading, because without the detailed subdivision, the notation and the indexes of present-day classified catalogues, the former were not the literature subject indexes the latter are supposed, and designed to be.

The classified bibliography, or 'catalogue raisonné', was developed in France for book collectors and booksellers by Jacques-Charles Brunet, the son of a bookseller, in his Manuel du libraire et de l'amateur de livres, first published in 1810; in this an author alphabetical catalogue or 'dictionnaire bibliographique', with very full entries with notes is the important part, corresponding to the British Museum Catalogue; the classified short entry catalogue, or 'table en forme de catalogue raisonné', is by way of appendix or supplement, corresponding to the British Museum Subject Index, except that instead of being alphabetico-classed it is classified in the present sense.

In the second edition of this, published in 1820, we find in the author alphabetical part a seven-line entry, exclusive of a four-line note, for Anderson's (James) letters (14) to Sir Jos. Banks on the subject of cochineal insects, and ending with the number 4197 in square brackets. Turning to this entry serial number in the classified part we find under SCIENCES ET ARTS. . . . Histoire naturelle . . . 8 Zoologie, ou Histoire naturelle des animaux . . . Insectes . . . Histoire particulière de quelques insectes . . . 4197 J. Anderson's letters on the subject of cochineal insects. Madras, 1788-90, in -4. Brunet's classification for Zoologie is more up-to-date than that for other subjects, already shown in 2·3.

3·2 INDEX LEARNING.

In 1824 in Edinburgh there was published the late Robert Watt's Bibliotheca Britannica; or general index to British and foreign literature. In part one of this, Authors, we find ANDERSON, James, M.D. —Letters to Joseph Banks, Bart. on the subject of the Cochineal Insects, discovered at Madras, with plates. Lond.—1789. Obviously biblio-

graphical detail was not Watt's principal interest as it was Brunet's. In part two, Subjects, arranged alphabetically, we find COCHINEAL, a Dye of a Scarlet Colour, but Anderson's letters aren't under this heading. They are under SHELL insect. . . . On the subject of the Cochineal I.s discovered at Madras, with plates. 29u.—1789. The notation 29u is a reference to the author entry, the figures 29 indicating a column or page, and the letter a part of it, as in Chemical Abstracts today. Shell insect meant what is now called Scale insect.

Watt's Bibliotheca Britannica was greatly appreciated as an index and had influence on indexing methods, but still seems to have been before its time in method, the significance and peculiarity of which does not seem to have been fully appreciated then, or since. In his Memoirs of libraries, vol. 2, pp. 155-6, 1859, Edward Edwards said of it that "of necessity such catalogues must deal rather with the phraseology of title pages than with the subject matter of books"; as subject headings must always do, many of Watt's coincide with title words, but many don't, as this example of Cochineal insects under Shell insect shows, and we have also the careful distinction of Cochineal meaning a dye from the insect producing it. There isn't a cross reference from cochineal to shell insect and the reverse, as perfection requires, but in the history of cataloguing there is still the significance in Watt's general index that it is superior as a subject index to Brunet's 'catalogue raisonné', that despite the already great reputation of this by 1820, Watt preferred alphabetical subject indexing, did not stick to the phraseology of the title page in doing so as was the custom and almost the law for another fifty years, and did in essence anticipate Cutter's specific entry.

William Thomas Lowndes was much more a bibliographer than Watt in the narrow sense of book description according to the rules, and in the preface to his author alphabetical Bibliographer's manual of English literature of 1834 he said that Brunet's Manuel had served as his model, yet he did not follow its classified arrangement but did praise Watt's work for its "great assistance to persons desirous of ascertaining what works have been written on a particular subject". But however this assistance was given, learning through indexes or catalogues was not thought much of by scholarly gentlemen and men of letters.

Something might be done for the 'amateur de livres' or for amateurs of science, such as Sloane who was one of the founders of the British Museum, and Watt. But it was not considered to be the business of libraries to encourage that index learning which,

> turns no student pale,
> Yet holds the eel of science by the tail.

This was written sarcastically by Pope in his Dunciad in 1728. Even today there is European feeling against detailed subject indexing of scholarly and research libraries, and towards the end of the nineteenth

century the documentation movement and UDC were established in Europe, and documentation distinguished from librarianship on the ground that this did not include information indexing. This European documentation movement was all for Dewey's, decimal, or metric system of classifying and numbering knowledge, but at least in Great Britain the classified catalogue was still opposed by scholars, logicians and librarians.

3·3 Opposition to Classification.

The earlier logician de Morgan was supported by the later logician and economist Jevons in rejecting the classed or classified catalogue, the latter publishing his famous remark in 1874 that the classification of books is a logical absurdity. Chandler writing about 1888, and quoted by Norris in her History of cataloguing, 1939, said: "who tied the millstone of a classed catalogue round the Librarian's neck . . . I do not know . . . no real scholar, no man who is capable of literary research wants a classed catalogue . . . men of real knowledge . . . infinitely prefer the alphabetical arrangement under authors' names, to the best classed catalogue that could be devised." There is something here of the scholar's objection to index learning. But although Chandler was a professor of philosophy and a Greek scholar who was made curator of the Bodleian, he made himself a librarian who advocated photographic copying as a substitute for the lending of rare books, and certainly made a study of cataloguing methods.

Fortescue of the British Museum was a sailor before he became a library assistant, and writing to Anderson of the Public Library of New South Wales in 1899 he still spoke for many librarians who did not profess to be scholars when he said: "we shall not stray into the quagmires of a class catalogue . . . a pretentious attempt to classify human knowledge . . . it cannot be done without innumerable inconsistencies and failures . . . when done it is of no use to any human being." These were strong words written in a private letter.

Jevons on index classifications in his Principles of science, vol. 2, ch. 30 is still worthwhile reading, more so than most of the librarians who have tried hard to explain or disprove what he meant by logical absurdity in the classification of books. It must be understood that the premise was only one catalogue in the then accepted sense, with one entry for each book, though possibly with an index. Note that Chandler did not oppose two kinds of subject catalogue, but a subject and an author catalogue. There was no clearly realized possibility of what Watt had in fact achieved, an alphabetico-specific catalogue or index; the alternatives on the subject side were the classed catalogue, alphabetico-classed or classified in the present sense, and indexing of catalogue entries by title words. Watt's Bibliotheca Britannica, besides not being clearly understood in its method, was regarded as a useful aid to index learning rather than as a catalogue or bibliography.

Books were obviously of author and form as well as subject interest, and they were polytopical; then assuming single entry, this seems to be the ground of Jevons's charge of logical absurdity in classification by subject, though it should still be possible without logical absurdity to classify a book by its general or leading subject as is done for the shelf, and in other books and contexts Jevons himself used book classification as an example of logical classification.

3·4 Concordance of Titles Indexing.

A catalogue could have an index, but this was an index to the catalogue, not a companion catalogue, and strictly a word index of the book descriptions or titles constituting the catalogue. Part of the objection to the classed catalogue was that, however specific or general the headings were in relation to the books, and however they were arranged, they were subject classes and headings independent of, not necessarily taken from, the titles of the books under them. In the enquiry of 1846 into the British Museum and its library catalogue the Italian refugee, Panizzi, who became Principal Librarian, was then Keeper of Printed Books; he said that an index to a catalogue would give information on the books in a library on a particular subject, "as far as it can be obtained from a title page, which is all that can be expected in a catalogue", that is, a catalogue of a library, and not an information index. Despite his reputation and achievement in some directions Panizzi may yet be considered one of the worst of many bad influences on the development of the British Museum Library; his praises have been sung mainly by those who took their direction from his. Another Italian, Crestadoro, may prove a more important link in the development of subject indexing, although he too accepted the idea of catalogue indexing by title words, carrying it to what seemed to him a logical conclusion. Crestadoro was a professor of natural philosophy who came to England with inventions, but turned to indexing for the booksellers to make a living.

He rejected the classed catalogue in any order because its classes were artificial, limited, and only one set of many possible sets of classes for the same books, and because it went beyond the cataloguing of the book by its own, that is, its author's or publisher's description. He had the idea expressed later, but without quite the same conclusions, by Hulme, who said in his Principles of book classification (Library Association Record, 1911, vol. 13, p. 447): "the real classifier of literature is the bookwright, the so-called classifier merely the recorder." Hulme was thinking of making classes for books rather than for subjects in the abstract, as discussed in 2·5 with reference to LC; he was not thinking, as Crestadoro was, of the author as determining subject headings.

Crestadoro preferred a catalogue in accession or author alphabetical order, with an index which he described as a concordance of titles. Here are entries from his Manchester Central Reference Department Catalogue of 1864:

BROWN (Capt. T.) The elements of Conchology; or, Natural history of Shells, according to the Linnean system. With observations on Modern Arrangements. By Thomas Brown . . . with . . . Engravings, pp. 168. Lond. 1816. 8vo. 3035

DONOVAN (E.)

—The Natural History of British Shells, including Figures and Descriptions of all the species hitherto discovered in Great Britain. Systematically arranged in the Linnean Manner, with scientific and general Observations on each. By E. Donovan . . . 5 vols. Lond. 1803-4. 8vo. 7130

MILLER (Lieut. Col.) Description of a Percussion Shell to be fired horizontally from a Common Gun. By Lieut.-Colonel Miller . . . pp. 17. Lond. 1827. 4to. With plates. 15909

Here is their subject indexing by his concordance of titles method:

Conchology, Elements. Brown. Lond. 1816. 8vo. . . . 3035

Shells, British. Donovan. 5 vols. Lond. 1803-4. 8vo. 7130
—Percussion. Miller. Lond. 1827. 4to. 15909

The weakness which he had to admit was that, with no other advantage than that of sticking to the title page as the source of all cataloguing and indexing data, books on the same subject are not all catalogued or indexed together, when there are different names for the same subject in different titles, as in the case of conchology and shells, and when a known subject name is not used in a title.

The student should note that there is nothing wrong with the sequence of Shells and Shells, Percussion, though the shells meant are very different. In his Documentation of 1948 Bradford referred to the 'classical error' of the librarian who put Lead pipes just after Lead kindly light, and there is an old joke about Mill, On liberty and Mill on the Floss, the former being an abbreviated author entry for Liberty by John Stuart Mill and the latter really a title entry for a novel by George Eliot. Unrelated sense sequences, sometimes misunderstood, are in the nature of alphabetical indexing, and are no more errors, than hunting, fishing and shooting coming at the end of DC's amusements class, and aesthetics coming immediately after them at the beginning of its literature class.

3·5 The Index-catalogue.

Demand required that lending departments and branch libraries have printed catalogues, economy required that they have 'title-a-line' entries of the Mill, On liberty and Mill on the Floss kind. Crestadoro's concordance of titles method of indexing fitted in with this, and he produced what he called an index-catalogue, meaning a combination

of catalogue and index. In a preface to the Index-Catalogue of the Chorlton & Ardwick Branch of the Manchester Public Free Libraries in 1872 he said this was on "the principle of a Dictionary, in a single alphabet, as most convenient and useful to the wants of the largest number of Readers, for referring with the least trouble and greatest economy of time to the authors' names, titles, and subject-matter of the books". The method allows author, title and subject entries in one file, as in the dictionary catalogue but not subject headings independent of titles, though they may be and usually are specific.

In Crestadoro's index-catalogue we find:

Brown (Capt. T.) Conchologist's Text-book	6150
—Elements of conchology	6313
.....	
Conchologist's Text-book. By Brown	6150
Conchology. Elements. By Brown	6313
.....	
Mayo (C.) Lessons on Shells	6450
.....	
Shells, Lessons on. By Mayo	6450

The numbers are accession numbers or serial numbers of catalogue entries, not class numbers.

About the same time the name index-catalogue was used somewhat differently for Billings' catalogue of the U.S. Surgeon-General's Library; here are examples of its headings and entries:

Brain and mind.

See, also, PSYCHOLOGY (Physiological). MAYR (J.) *De alimentis animi humani. 8°. Manachii, 1838.

.....

Broadbent (W. H.) On the cerebral mechanism of thought and speech. Proc. Roy. M. & Chir. Soc. Lond., 1872, vii, 24-29.

.....

Brain: A journal of neurology.

Edited by J. C. Bucknill, J. Crichton-Browne, D. Ferrier, and J. Hughlings-Jackson. [Quarterly.] v. 1-3, April, 1878-81. 3 v. 8°. London, Macmillan & Co. Current.

.....

Brainerd (Jehu). . . . —. A lecture upon narcotic stimulants. 18 pp. 8°. Cleveland, O., Fairbanks, Benedict & Co., 1858.

.....

Brain-Sand. See Brain (Concretions in); Psammoma.

These are from the first published catalogue, vol. 2, 1881. There are eighty-two columns of entries under Brain; these with others under

headings beginning with the same letters show that the catalogue is on "the principle of a Dictionary" like Crestadoro's, but it was called an index-catalogue for a different reason, and its subject headings are independent of titles.

The entry of the article by Broadbent is one of fifteen analytical or index entries under Brain and mind, following only one entry for a whole book on the subject. Billings found that users thought of the catalogue as an index in this respect, and called it an index-catalogue; so on first proposing publication and on publication he called it by this name.

The subject headings are mainly specific, and independent of titles which are in several languages, but there is some upward reference from specific to general; for example, whilst there are entries under Arrow—poison and Arrow—wounds there is under Arrow—heads a see reference to Archaeology. But this seems uncommon when the subject matter is medical.

There are no subheadings in form, but parenthetical qualifications such as Brain (Diseases of) and Brain (Softening of) are the same in effect; under Brain there are about fifty of these, with cross references; and these are followed by Brain and heart and Brain and mind. Even under Bread there are four subdivisions and a see also reference to Bakers.

In its range and detail in a special field no cataloguing or indexing has ever surpassed this, which was made possible by Billings' genius, though of course he was assisted, for example by the Englishman Fletcher who with Billings was a doctor in the Civil War. It shows the way in which the alphabetico-specific catalogue was clear and effective in its methods right at the start, whereas the purely classified catalogue has not yet clearly established its methods, or shown itself to be as effective in practice, despite constant theorizing.

The word dictionary was useful to show the method of the single-file index-catalogue, and finally took the place of the word index in the name. It might have been better if catalogue had been dropped instead of index, because the word catalogue was, and has remained a source of confused thinking about what is an index rather than a catalogue in the sense of a descriptive inventory. But Cutter who laid down the rules of the index-catalogue, as already exemplified by Watt in Scotland and Billings in America, established the name dictionary catalogue.

3·6 Cutter's Dictionary Catalogue.

In 1876 Cutter used the name dictionary catalogue for what is an index-catalogue in both Crestadoro's and Billings' sense. He published Rules for a printed dictionary catalogue in that year. These rules were for a combination of alphabetical index and catalogue and for a catalogue including analytical or index entries, but they were not rules for cataloguing or indexing by the concordance of titles method.

The rules were published as Part II of Public Libraries of the United States of America, in which Chapter 27, Part I was by Cutter, on library catalogues, and probably the best survey of library cataloguing methods ever written. In the rules and notes to them he showed that he had read Crestadoro, but in a note to the rule which is 172 in the 4th and latest edition, reprinted by the Library Association in London in 1935, he said it was strange that the delusion ever should have arisen that "a catalog must of necessity confine itself to the titles only of books".

Rule 172 is to "Enter books under the word which best expresses their subject, whether it occurs in the title or not." He did not say that title words are to be avoided at all costs, though as noted in 11·13 some cataloguers seem to read the rule that way; on the other hand he did not say as Crestadoro did, that books are to be subject catalogued or indexed by title words at all costs.

Yet as shown just above in 3·2, Edwards had said in 1859 of such catalogues as Watt's that they "must of necessity deal rather with the phraseology of title pages than with the subject matter of books", and the fact that he used Watt's index as an example shows how much it was assumed, without check, that catalogues with supplementary or complementary subject indexes, must index by means of the "phraseology of title pages". As late as 1948 Bradford quoted Edwards on this in support of his assumption that all alphabetical subject cataloguing or indexing fails through necessary dependence on title words for subject indexing, and apart from Bradford, who was making a case for the classified catalogue by making one against the alphabetical, there are still signs of a sheep and goat distinction between information indexing and the subject cataloguing of books, on the ground that the latter can cover only books as wholes, and/or can only catalogue them by title words.

Cutter's own catalogue of his own Boston Athenaeum Library, 1807-1871, published in five volumes, 1874-1882, illustrates alphabetico-specific entry and the dictionary catalogue, and like Billings' Index-catalogue it shows how immediately true to their own theory they were. Here are entries:

Cattle

.....

—Diseases

—Bigelow, J. Testimony on the cattle diseases in Mass. (In his Modern enquiries, 1867.)

.....

Flax

—Wily, J. Treatise on the propagation of sheep, the manufacture of wool, and the cultivation of flax. Williamsburg, 1765. 12°. (W 46)

.....

Sheep. Wily, J. Treatise on the propagation of sheep, etc. Williamsburg, 1765, 12°. (W 46)

.....

Wily, John. Treatise on the propagation of sheep, the Manufacture of wool, and the cultivation of flax. Williamsburg, 1765, 12°. (W 46)

.....

Wool

.....

—**Wily, J.** Treatise on the propagation of sheep, the manufacture of wool, etc. Williamsburg, 1765. 12°. (W 46)

Note the use of the qualification subheading under cattle, although as discussed in 4·5, Cutter was uncertain in his subheadings practice, and thought mainly in phrases, such as Agricultural chemistry, not Agriculture—Chemistry; there is analytical or index entry for a chapter on cattle diseases in a more general book; there is multiple and specific entry, a book on wool and flax being entered under both, not under textiles, divided or undivided; some entries are abbreviated because the catalogue is in printed volume form and space has to be saved, as in the present-day CBI, but none of the entries are cut to 'title a line' and all of them are in essence those of the present-day dictionary card catalogue.

The catalogue has cross references such as Wool see also Sheep, and headings as specific as Merino sheep and Shetland wool, with references from Wool and Sheep. Such adjectival phrases are not inverted as they might be today, because Cutter rejected inversion as logically a form of subdivided class entry. The catalogue is one of a library and therefore gives shelf numbers, but at the same time like Billings' Index-catalogue it is large enough and detailed enough to be a valuable bibliography.

3·7 Alphabetical or Classified?

Dewey's Decimal Classification had its first edition in 1876, the great centenary year of the American republic, along with Cutter's rules; the former had its second edition in 1885 and the latter in 1889. We would expect examples of the classified catalogue by 1880 as clear cut in theory and practice as Billings' Index-catalogue and Cutter's dictionary catalogue, but as shown in Chapters 5 and 6 we haven't got them even today, for good and bad reasons; yet a form of classified catalogue, an alphabetically indexed shelf list, almost entirely superseded Crestadoro's alphabetical catalogues in British public libraries, and it is relevant to ask why.

With Watt's Bibliotheca Britannica, Crestadoro's and Billings' Index catalogues, Fortescue's alphabetico-classed British Museum's Subject Index, and Cutter's Rules and his Boston Athenaeum Catalogue, with the opposition of scholars, logicians, and reference and research librarians to classified cataloguing, alphabetical subject cataloguing in one

form or another seemed to be emerging triumphantly on both sides of the Atlantic, as the more scientific and logical. But whilst Cutter's Rules were published in Washington in 1876 the first edition of Dewey's Decimal Classification with relative index was published in Amherst in 1876, and a second edition in Cutter's own Boston in 1885.

The Dewey system, mainly in his decimal version, was adopted on both sides of the Atlantic for the shelf, but on its adoption for the catalogue, for which he primarily intended it, there was a split, and to understand the present preference for alphabetical or classified cataloguing more or less according to nationality, it is worthwhile examining possible causes for this split at the time it occurred.

In America libraries of all kinds were new; there was not the same division of libraries for rich and poor, students and general public, as in Great Britain, or the same division of reference and lending libraries and departments. In public libraries, free and subscription, shelves and catalogues were earlier more open to the public, so that an alphabetical catalogue, on cards in the library, could be taken as complementary to the classified shelves, and typed catalogues on cards came earlier into use in America, where too the classified catalogue had not only to demonstrate superiority over title word indexing, but also over the much superior specific entry with independent subject headings of Cutter and Billings, who were older and more influential men than young Dewey. There are not even now good examples of the good dictionary catalogue or clear understanding of its theory and practice in Great Britain, where its textbook treatment is still inadequate and prejudiced. Edwards, Crestadoro, Hulme and Kaiser are still the four greatest British or naturalized British authorities on subject classifying and indexing; they were certainly not against alphabetical indexing, but as shown, Crestadoro favoured title word indexing and Edwards did not clearly distinguish this from independent alphabetico-specific indexing, whereas the contemporary American authorities made an explicit case not only for the latter as the best means of serving specific reference, but for this as the major use of catalogues, as against the still prevailing British assumption, made in such textbooks as Sharp's Cataloguing, that vaguely defined 'students', as opposed to men in the street or casual enquirers, make a systematic study of a wide field, as wide even as the whole of science, through the classification and entries of a catalogue classified according to DC.

In Great Britain the national library, that of the British Museum, began its Subject Index in 1881; in its alphabetico-classed form this was apparently a compromise forced on Fortescue, and it was not in any form wholeheartedly supported by many of the staff and trustees, who kept their scholarly or literary opposition or indifference to index learning. The Subject Index has been continued much as it began, but generally the Museum, getting further and further away from its origins as a science museum, and declining to become a national central library, has become more absorbed in bibliography than in library cataloguing.

Its catalogue of fifteenth century books, for example, is really a bibliography of typography extra to its cataloguing of the books as pieces of literature; and gradually the initiative and impetus which produced its great author catalogue, which was only incidentally bibliography, was lost, until in 1957, an American foundation and subscribers had to be informed that the latest edition of this catalogue, in progress, would not be completed, and that one of the methods of bringing out an up-to-date catalogue of the library which had earlier been rejected would now be tried, again with American and subscribers' support. Whilst new editions of the B.M. Catalogue were in slow and slower progress the catalogue of the Library of Congress was reproduced from its cards, and current supplements, author and subject begun, with annual cumulations. It had begun issuing copies of its cards with notes of headings for all its entries about fifty years earlier, when it decided on a dictionary catalogue according to Cutter's Rules. What Cooley of the British Museum in London, and Jewett of the Smithsonian Institution in Washington had proposed about fifty years earlier still, was established in and from Congress in Washington: a central cataloguing system with cards provided. It was a dictionary catalogue system which gave satisfaction in both popular and scholarly libraries; in America it was probably the deciding influence in favour of the dictionary catalogue, and one which ensured its 99 per cent or more adoption and did much to ensure a high average of quality in cataloguing.

As shown, the scholarly libraries of Great Britain were not greatly interested in subject cataloguing, the older and major universities even now being still without it, and even the national libraries were not joined to the emerging public libraries of the municipalities or boroughs, and later the counties, by any more than occasional condescension, from the libraries and librarians of the classes to the libraries and librarians of the masses. After elementary schooling the masses could hardly be informed except in the 'people's university', and by index learning, and so the public libraries had a need for subject classification and cataloguing. But if we turn to their present textbooks we do not find much light on the divergence of British from American practice.

Sharp's Cataloguing, a textbook for use in libraries, is by far the best, because he does cover cataloguing instead of confining himself to classification almost entirely in a questionably abstracted form, as most of the other textbook writers do. His comparisons and illustrations are discussed in 5·4-41. Whilst hardly approaching the question historically, he does remark in passing that he thinks "it is fair comment to say that the dictionary catalogue reached the height of its popularity", in Great Britain, "in pre-open-access days, but with the coming of shelf classification came the classified catalogue" (4th ed., p. 22). This seems to imply that the dictionary catalogue was good enough for the old days, but with open access and the Dewey system for the shelves

only the unenlightened persist in it. But open access and the Dewey system for the shelf are a common factor with both catalogues, and anyone who will read the Library Journal at the time can hardly support the comforting view that American librarians were unenlightened or unscholarly compared with British. There are other factors to be considered.

As noted above, the library card catalogue came into use earlier in America, and this is perforce used in the library. But some people only want to find something interesting to read in some favoured category, and these are a large proportion of even non-fiction readers amongst public lending department borrowers and reference department loungers; once in a library they tend to bypass the catalogue, going straight to the broadly labelled shelves. But in Great Britain there were people of some influence who preferred to get books from their public library without the necessity of visiting such a public institution; they wanted to get them as it were anonymously or pseudonymously, by messenger, or at any rate to have a catalogue, such as the subscription libraries provided, from which they could pick books at leisure much as they would pick them in the library, and the idea that there should be a printed catalogue at a cheap price as a substitute for browsing over even classified, and labelled open access shelves continued well into the twentieth century. Such a catalogue fitted in with one traditional idea of what a catalogue could be, a mere shelf list; it provided all that most registered borrowers expected or needed from a catalogue, and what was provided fitted in with a desperate economy of money and staff.

In the same circumstances there was a need and a demand for the annotated catalogue, to know what a book really was about, and since as much as possible had to be cut reduction in bibliographical description, down to a 'title a line', and reduction in added entry were preferable to reduction in annotation, which was carried over in card catalogues for some time before it was generally realized it no longer served the purpose it had in the printed, take-home catalogue.

As far as economy in printing costs was a consideration, Crestadoro's title-a-line lending branch index-catalogue on the principle of a dictionary was an answer; it was not one to the demand for a catalogue according to the shelves, nor was his author catalogue with a concordance of titles index. But substitute for this catalogue a shelf list according to the Dewey system, with rarely more than one entry for a book, and add what appears to be an index to the classification, but is his author, title, title word index to entries, and there is an answer to the demand, and the kind of classified catalogue and index which has persisted in Great Britain right up to the present.

The dictionary catalogue which emerged in America between 1870 and 1900 was a good catalogue of its kind, with some adulteration of title word entry and class entry which still persists, but no hybridization or compromise with another principle of cataloguing. It had from

the start author, and for some books proper title entry, as well as subject entry, and it had multiple subject entry, often with analysis. The so-called classified catalogue which emerged in Great Britain in the same period was the old shelf list, certainly with much improved classification, but not with improved cataloguing or indexing; single entries were and are alphabetically indexed by title words, as a substitute for added subject entry, for which titles have to be sorted out under class numbers by words in their titles; whereas, whilst Crestadoro indexed by title words he referred to an entry number which identified the entry referred to immediately and exactly. The sorting through that has to be done is shown in 5·41.

The method may have been justified by circumstances, such as customer demand and a desperate economy. Instead of shelf class numbers and subject headings, with cross references as required, as in the dictionary catalogue, instead of multiple classifying and careful relative indexing as in the pure classified catalogue, all that was required was shelf classification and indexing of entries by shelf numbers and title words, without any regard for consistency in subject terminology; and the classification itself was obviously done from titles with little check of the actual subject matter of the books classified; not much of time, or training, or skill, or even education was wanted in the cataloguer, and obviously from the results he often lacked one or another, or all four. Besides being justified by circumstances the method might well produce a sufficient result for popular, small to medium-sized lending libraries, and even their reference departments; it has been well said that both need good catalogues of what they haven't got, far more than good catalogues of what they have got.

The point here, however, is that the student of cataloguing is hardly helped by toplofty comparisons of general types of catalogue and index, without clear indication, by exact description, example and illustration, of which special type is meant, in discussion of past, present, and future. And in talk about the classified catalogue there is most need of definition of what is being talked about.

The explanation given may not be a complete or balanced one, of the divergence in method between Great Britain and its colonies, of the prevalence by about 1900 of the alphabetical index or dictionary catalogue in America, despite Dewey, and of a form of classified catalogue in Great Britain, despite Crestadoro; but the emergence and persistence of the types of catalogue just discussed is a fact, and types, and subtypes, have to be further discussed in succeeding chapters, as possible solutions of indexing problems.

The comparison is mainly between Great Britain and America because they have been and still are the main sources of theory and practice for English-speaking countries, but influences affecting development in other English-speaking countries are of some interest, at least to those living in them, in view of opinions that Australia, for example, must be Americanized if it follows Cutter, or does so because

it is Americanized, whereas there is no suggestion that Great Britain is Americanized because it follows Dewey, Richardson, and Bliss, or Indianized because it follows Ranganathan.

Canada is North American, next door to the United States, and has shared the same North American Library Association. In Australia in the critical period local lending libraries were those of schools of arts or literary institutes, which generally had little better, or even something worse than no classification or cataloguing at all. But there were comparatively large public and university reference libraries in the colonial capitals, that is in the capitals of the Australian colonies before they became the capitals of the States of the federated Australian Commonwealth. These university and state or local national libraries, comparable to those of Scotland, Wales, and Ireland, settled on the dictionary catalogue, undoubtedly under the influence of Cutter, but also perhaps because there was a temporarily flourishing library association, with intercolonial conferences, published proceedings and a journal called the Record, and because Anderson of the Public Library of New South Wales issued a printed Guide to the system of cataloguing of that Library, with a subject headings list only a few months later than the first, published by the ALA, and compiled independently. The system and the list produced good subject catalogues or indexes, not combined with the author catalogue; they were praiseed by Fortescue at the British Museum, who disliked the combined catalogue and subject index, and the Guide and the list, and Anderson's 101 rules, became for a time an authority in America, and even in Congress itself, although the conclusion may be jumped to that an Americanized Australia blindly followed America, which also grows gum trees and has shower baths. Americanization in British countries, to whatever degree, was well in the future when the dictionary catalogue became well, perhaps too well established in some of them, and it was about fifty years later, when Americanization could have been suspected, that British influence and example led to the adoption of the UDC classified catalogue in many Australian special libraries. And later again it was British, rather than American influence, which led to the adoption of Bliss's Bibliographic classification, for the shelf, in two Australian university libraries.

Chapter 4

Ideal and Makeshift in Cataloguing Method

Current examples of the subject cataloguing and indexing of books and periodicals are examined in the next two chapters. As well as being current examples of current methods they are also examples which are widely available for study, being issued in printed volume and/or printed central cataloguing card form. Without any collection for the special purpose of writing this book all of them are in the State reference library in Sydney, Australia, so that at least some are likely to be in libraries within reach of most students in English-speaking countries. A study disadvantage of the unduplicated card catalogue is that a sufficiently wide range of examples of it cannot be examined and compared, even in one country. Some of the examples given are also of use to the student insofar as he may have need to study them in other connections, as reference tools and aids in book selection and acquisition. Many students, and teachers, make the mistake of working in compartments, and not realizing that, for example, the English Catalogue and the Cumulative Book Index of the H. W. Wilson Company in America can be studied both as examples of cataloguing and indexing and as book selection and acquisition aids, and can be more thoroughly and economically studied with an eye to both at once.

These examples show that all the methods which emerged between 1850 and 1900 have survived. The only one that hasn't even clearly emerged, let alone survived, in any well-known or authoritative examples is the one most talked about and praised in theory, the pure or ideal classified catalogue, with a relative index to its subject classes, not to particular entries in them, and multiple entry for multiple subject books. This is the one which must still be studied mainly in theory, in the chapters on the classified catalogue, pure and simple, and on UDC and synthetic classification.

All the surviving methods are found useful in both the compilation and the consultation of the catalogues in which they are used. They all work, but not equally well, either for the purposes for which they were designed or for other purposes for which we may think they should have been designed. Some are classified for the generic survey of literature, some are alphabetically arranged for specific reference, but we may find that they are not ideal, even for their stated purpose; we must attempt comparison and evaluation, and to do so we must revise and extend the bases of comparison and evaluation which have already been suggested.

We must study indexing largely by studying entries and their headings which are not the beginning but the end of a catalogue

consultation or information retrieval process and we may find ourselves marvelling at something like this:

> 621·34:621·311·21:627·88
>
> 215. An investigation into the design and performance of electric fish screens and an electric fish counter. N. G. Lethlean. Trans. Roy. Soc. Edinburgh, 62, Pt II, 479-526 (1951-53)

But as shown in 6·6, if we were looking for something on fish screens in dams, in the abstracts in which this class number and entry appear, we would be lucky if we ever found the entry through the classifying and indexing of the abstracts. Many students, and some teachers, seem to forget that in studying entries and headings or numbers for them we are studying the end of a trail or line of clues and that insofar as we are studying indexing methods our interest is not the end, but what lies between some such subject name as 'fish screen', and entries for books on the subject. Even long experienced cataloguers fail to realize that their cataloguing is useless if it fails as information retrieval. Examples are given in 11·13.

A minor but important point in this distinction between the end and the way to it is that whilst subject indexing may be used to find literature already known, this is not its important purpose, because literature already known, through previous use or by a 'reference' to it, is usually known by author and title and/or in the case of articles in journals by volume numbers and/or dates, and by page numbers. And these are quicker means of finding particular pieces of literature than subject entry. But the student looking at an entry for a particular book or periodical article is apt to think of it as illustrating the problem, and a solution of the problem, of finding that particular document, already in some way known. Taking the example just given, what it is intended to illustrate is the problem of the indexing and retrieval of any information on fish screens and fish counters, electric, in dams and reservoirs, any information by anyone in any book or periodical, and until an entry for or 'reference to' a particular document is found the great likelihood is that the enquirer has no knowledge of its authorship or title or source; if he had, in other words if he already had some reference to it, then he wouldn't be in need of subject indexing. And however much documents are given multiple entry, and they and their subjects are specified, a point is reached in all indexing at which the reader must sort out from entries or from books themselves the information he wants in the form he wants it, or by his own sorting or searching find that all that indexing has brought to his notice does not give him the information he wants in the form in which he wants it.

4·1 Multiple Entry and Multiple Indexing.

One ideal is universal indexing, discussed in 1·8 with the conclusion that it is unattainable except within very narrow limits. In Chapter 5 we confine ourselves mainly to the indexing of books as wholes, by

their general subjects; in Chapter 6 we get down to bibliographical analysis, the separate indexing of chapters in books and articles in periodicals, but even this treats chapters and articles as wholes, without getting down to incidental, let alone accidental subjects. Another ideal discussed in 1·8 is that of entering all that is intended to be entered on a subject at one point, to avoid cross reference, not for documents on related subjects, but for documents on exactly the same subject.

This requires multiple entry for books on multiple subjects, because extra indexing of, and even cross reference to single entries for multiple subjects, are not the same thing as multiple entry. For example, there are books on ballet, pantomime and other forms of dancing separately and together, and a cataloguer may quite properly intend to indicate the same book as being on each of these subjects separately considered, along with other books on each of them separately; but if the catalogue user interested for the moment only in ballet finds some books on it under Ballet or 792·8, others on it only by indexing of, or cross reference to Pantomime or 792·3, and still others only by indexing of or cross reference to Dancing or 793·3, then he does not find entries for all the books on the ballet together, in either an alphabetical or a classified catalogue. They may be closer together in the latter, and under a general heading and number, but in DC and UDC 792 is Theatre, not Dancing, and 793 is Indoor or Social entertainment, and parties; and in a classified catalogue of much size 792 and 793 could be many pages or a drawer apart. The student must always keep in mind that even in the smallest catalogue subjects with entries are much farther apart than the same subjects without entries in the tables of a classification.

In mechanized indexing or selection there may be only single entry for books or documents, but single entries are then 'coded' for multiple subjects, and the machine may be set so that, for example, all entries coded for ballet, whatever else they are coded for, can be sorted out, and some of the same cards could be sorted out again for pantomime; the intention and result are then the same as those of multiple entry in entirely manual cataloguing; in some physical forms this multiple entry is limited by economic and physical factors as shown in 1·8, 3·7 and the next two chapters; but we must keep it in mind as a realizable ideal in other forms, and be critical if it is not realized in them.

4·2 Subject Specification.

Another ideal is that of subject specification in indexing in relation to the subject specialization of the books indexed, for example a book on stained glass in some way distinguished as one on stained glass, and not merely listed alphabetically by author with hundreds of others as one on Art and architecture. But we must be careful of assuming a theoretical extreme in which the specification of subjects for the entry of documents is confused with a specification of the documents themselves, in the sense of a detailed codification of the subject matter, the form, and even the language of a document in the very number under

which it is entered. This has already been touched on in 2·5 and is further discussed in Chapter 10.

We may extend specification even beyond what are strictly species to the members of species or classes, the individuals, or indivisibles, such as individual philosophers, poets, musicians, and even individual dogs which have become individually famous; but what we are classifying and specifying is pieces of literature by subject and form; the dog is already classified and specified for us, as a kind of domestic animal, or zoologically as a species in a wider class known as canines, and we then classify and specify a book as being on dogs, and possibly, in addition, as being in the form of a dictionary or some other form. Subject and form are the characteristics by which we classify books; we might also classify by the characteristic of size and that of access, open or closed, as we do with actual books on library shelves, as discussed in Chapter 7. This is basically important and clears up confusion which has arisen over subject classification and the classification of books by subject. But if we go too far in specifying each book by its own peculiar subject and form then we may get into such a tangle of arrangement, subarrangement and so on, and into such a tangle of extra indexing that we defeat the very purpose of indexing. We may then deceive ourselves with an illusion that merely by specifying by some combination of numbers all of several subjects of a book we have in some way indexed it as one on all the subjects in our specification; for a time this illusion was encouraged by UDC, which introduced it into indexing theory, but later its editors and supporters realized that far from being revealed or retrieved information was, as they put it, "hidden" by some of their numbers, and about 1948 its theory and practice were radically revised, at least for British use.

There is an ideal of subject specification, though it is not the mistaken one of expressing all at once all the subject matter of a particular document, its relations and its form. The ideal is specification or particularization of the subjects under which documents are entered as far as the treatment of the subject is specialized in the documents entered. A document specialized as far in subject matter as to be on the physical sciences goes under Science or 500, one specialized as far as to be only on mathematics goes under Mathematics or 510, one specialized as far as to be only on arithmetic goes under Arithmetic or 511, and so on. A book which is on, and called Rats, lice and history, may go, as far as it is on history, not just under History, but under History—Causes, and even under History—Causes, Biological as distinct from History—Causes, Ideological. These would be difficult if not impossible to express satisfactorily in the notations of any of the classifications, they are certainly not easy to express satisfactorily in words, and also we may be reaching limits of practicability and use, even with obvious and fairly easily expressed specification such as that of Motor car, Ford, Model T. But the ideal is different from that of expressing rats, lice and history all at once, and far more realizable.

4·3 SUBJECT SPECIFICATION AND SUBJECT NAMES.

The importance and necessity of alphabetical indexing in all forms of information retrieval has been discussed in 2·4. A first necessity is of course names. Subjects are distinguished by names, but there can be specification or particularization of subjects before a distinctive name is established. A notable example of this in recent years was what is now called co-ordinate indexing; this was first known in English loosely and misleadingly as a form of punched card indexing, which it need not be, or as Batten's method. Without the now established name co-ordinate indexing some extension of UDC 025·343 or 025·49 might classify and lead to the retrieval of information on it, but in this case the classification is obvious; it is not so obvious with what is now called cybernetics, or even with semantics. Without these names and alphabetical indexing classification would not lead readily to retrieval. However, in actual practice distinctive names do emerge long before new subjects are given places in published classification tables, and what is of much more practical importance for all forms of indexing is the way in which names are used, in ordinary communication and in indexing. On this see also 8·2.

A farmer does not talk about Agriculture—Crops—Wheat, or even a botanist about Graminales—Graminae—Triticeae—Triticum aestivum, and if we are indexing by the title word method we find that book titles usually give subjects their particular or specific names, such as Wheat. The method therefore tends to result in what is called specific entry, by which is meant entry directly under the specific names of subjects in alphabetical order; but title word entry cannot do so consistently because what is called maize in one title is called corn in another, and so on, and because some titles are ambiguous because they are metaphorical, so that a book called Water into gold, by Ernestine Hill, is not about the extraction of gold from seawater, but about irrigagated farmlands in Australia. The difficulty is only got over with independent subject headings, and of course not even then if the cataloguer does not check beyond the title.

Inconsistency and metaphor in book titles means that the title word method defeats the ideal of all entries for books on the same subject together, even for books with only one subject and therefore needing only one subject entry each, and with this method in actual practice even the remedy of cross references has not always been used, for example, Maize see also Corn, and the reverse.

The fatal weakness of title word indexing is overcome by independent subject names, independent that is of titles, so that Maize is used for all books on it, without regard for title, and with the single, one-way cross reference Corn see Maize; and so on with many subjects, though not anything like the proportion sometimes suggested. If the student, or his teacher, tries now he may find it hard to write down ten synonyms such as maize for corn, radio for wireless, apiculture

for beekeeping, in five minutes. The proportion of cross reference to entry is further discussed in 11·26.

Given a subject name independent of titles it may be used directly in an arrangement or classification, or in subordination, for example in an alphabetico-classed catalogue we may find entries under Cereals or Crops for books on all or several cereals or crops, and then entries for barley under Cereals—Barley, for maize under Cereals—Maize, and so on to Cereals—Wheat and even Cereals—Wheat—Hard wheat. If there is this subordination then only comparatively general headings can be given directly as headings, but in what we now call classification, there may be no more than ten very general names as unsubordinated headings, as in DC, and several degrees of subordination, as in:

6 Useful arts
3 Agriculture
3 Crops
1 Cereals
1 Wheat

Such a hierarchy may then have a numerical or notational representation such as that given, which results in the number 633·11 for wheat, in the necessarily linear arrangement, already discussed in 2·6. The interest here is that specification may be ended with wheat numbered 633·11, or in alphabetical order, even though there are books under the heading limited to special kinds of wheat, because there is a practical, if not a theoretical problem of degree of specification.

4·4 Degree of Specification.

In title word indexing titles determine degree of subject specification, for example a book on Rugby Union Football may be called Rugby football, or just Football, so that in its indexing the specific form of football to which it is limited will not be distinguished, unless the method is varied. And in all other methods there must be judgment, which may be based on something between rule of thumb and principle.

In a classified catalogue there may be a decision to be no more specific than the classification tables used, which with DC even in its detailed 14th edition means not distinguishing rabbits and guinea pigs as domestic animals or pets, not distinguishing utilitarianism and pragmatism as philosophies, and so on. There has been an idea of not going beyond a fixed step in subdivision as measured by the notation, usually in DC the third figure, but this means that whilst After life 237 and Salvation 234 will be distinguished, Investment 332·6 and Credit 332·7 will not, and so on, because as shown in 2·3 there is not and cannot be a true reflection of subject importance and specification in notation. Such broad classification might be used on the shelf and followed in an alphabetical catalogue, but the prescription of the 15th edition of DC which is hardly more than an abridgment of the 14th, is broad classification on the shelf and detailed alphabetical cata-

loguing. Another idea is to be guided partly by subject importance and partly by number of entries under a heading so that, for example, in either a classified or an alphabetical catalogue, all books on football would be put under Football until there were fifty entries, and then football would be further specified. A verbal limitation may be used with adjectival phrases and a decision made not to go further in specification than the noun, so Card games generally and Bridge specifically, but not Auction bridge, or Bridge, Auction more specifically. This can be translated back into the classified catalogue, so that 636·3 would be used for merino sheep, not 636·36. With card games even bridge is more specific than DC, which does not distinguish bridge, poker and whist, amongst several other card games.

It is important to note that this is not a problem peculiar to alphabetico-specific entry, or one which it escapes. By the degree of specification usually practised in it a book on chairs would have in it the heading Chairs, and not Furniture or Furniture—Chairs, both of which are correct in the alphabetico-classed catalogue, which can be undivided or divided in its classes, but does not have hierarchies like any of the following from DC, none of which gets down to chairs:

6 Useful arts	6 Useful arts	7 Fine arts recreation
64 Home economics	68 Mechanic trades	74 Drawing Decoration Design
645 Furniture, etc.	684 Furniture, etc.	749 Artistic furniture, etc.
645·4 General furniture	(Not further extended)	749·3 Special articles of furniture
645·41 Chairs, Footstools		749·31 Chairs Footstools
(Not further extended)		(Not further extended)

But with Easy chairs, or Chairs, Easy, doubt would begin and decision be required even with alphabetico-specific; this could be made as specific, because it is not tied to any classification, or even to any list of subject headings, though one, such as Sears' abridgment of the Congress list or this list may be used with it. Sears goes no further than Chairs; Congress distinguishes Chairs (Cathedra) and Chairs (Sella), but not any of the common or garden chairs of today. And whether blindly following one of these lists or not, most dictionary cataloguers in general libraries would not go beyond chairs.

So the basic rule of specific entry emerges not as an absolute rule for specification in the same degree as the book entered, but as an absolute rule that there cannot be specification of things in subordination, except by the established usage in indexing of the inversion of adjectival phrases as in Chairs, Easy; and even this was not acceptable to the original rule maker, Cutter. Despite his authority there can be as an alternative to Easy chairs, the inverted Chairs, Easy, which is logically divided class entry, and there is obviously undivided class entry in relation to the special subject of the document if Chairs is used

as the heading for one on Easy chairs; but there cannot be Furniture—Chairs, or Chairs—Thrones, and the heading, whatever its degree of specification of a thing, must be a name of the thing in common use. This reaches down to the basic reason for Cutter's alphabetico-specific entry; the catalogue user must get to what he wants by a name of his subject which he knows, in an order which he knows, without any guesswork classification on his part, without any guessing that 'they' will have put chairs under Home economics, or under Mechanic trades, or under Interior decoration, which are only three of at least five possibilities in DC, others being Business, for office chairs, and Education for school chairs. If he knows no name for his subject, then he may, and should get a reference from an including or related class, for example in Congress headings from Biography, Burial, Cemeteries, Inscriptions, Tombs, to Epitaphs; if he does not know the name of a subject or some including class then he can hardly be seeking information on it. In DC the classification of epitaphs is 920 Biography . . . 929 Genealogy and heraldry . . . 929·5 Epitaphs, and in the relative index, apart from the specific name, only Biography 920, Genealogy 929·1, Family 929·2 seem to get within reach, so the reader who had forgotten the specific name, or never learnt it, might be guessing without much result. A name must be known, and the index to the classified catalogue must work indirectly as that to the alphabetical works directly.

4·5 Specification and Qualification.

Alphabetico-specific entry does not allow the subordination of a species or subclass of things to a class or genus of things, and a confusion of things, or objects, with subjects has given rise to a persistent idea that any subordination of one name to another is a breach of specific entry, avoidable or unavoidable. At first sight a distinction between something as a thing or object and this as a subject of literature or information may seem an unnecessary logical or metaphysical subtlety. But if we take the name sheep as referring to sheep we can divide it further into merino sheep, southdowns, crossbreds and so on, which are species of sheep, which can be physically divided or separated; if we take the name as referring to the subject sheep in information and literature then obviously it is also divisible, as the sheep themselves cannot be, into aspects of the subject such as the history of sheep, processes of the thing, such as shearing, and forms of the literature such as the periodical or the dictionary form. The words aspect, process and form may help understanding, but they are not easily distinguished; for example, history of a subject has commonly been treated as a form of the literature though it is obviously different from the periodical form which could also be historical; and it is convenient to use an embracing term, qualification, and qualifications.

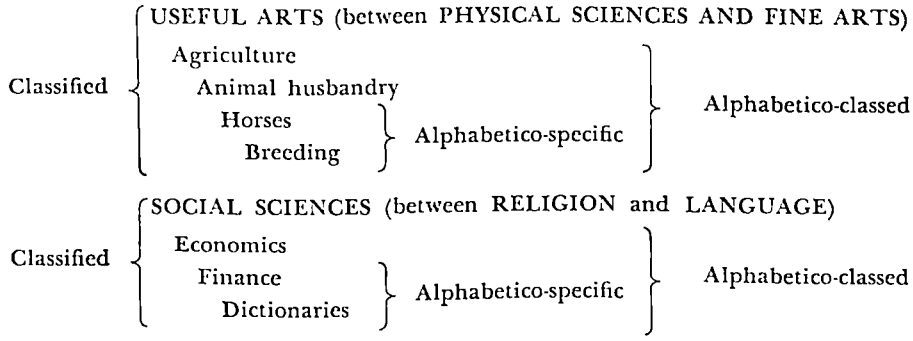
Now, in considering this further we must avoid thinking only of mere punctuation or in purely verbal terms; for example, we might think

Sheep—Shearing wrong because of its heading and subheading form, and think Sheep shearing as a phrase all right; we might think Agricultural exhibitions all right because it is a phrase and Agriculture—Exhibitions wrong because it is heading and subheading. Sometimes it is said, wrongly, that we may use some subheadings, but never subsubheadings without risk of alphabetico-classed entry, and Coal mining —Safety measures, instead of Coal—Mining—Safety measures might look like mere avoidance of subsubheading. But many subjects are a combination of a thing and a process, for example bookbinding, paperhanging, agriculture, bibliography, and a phrase may express a subject we think of as 'on its own'. We don't want to classify coal mining as a species of mining by the inversion Mining, Coal, and we don't want to group its mining with other processes such as its analysis, its testing and so on; it just happens then that we don't get subsubheading, but we could have it, for example in Coal—Testing—Laws, without any breach of specific entry.

On examination, all that specific entry does and could require in this respect is that we don't subordinate species or subclasses of things to genera or classes of things; we must subordinate qualifications of things, whether we use the heading-subheading form or not, or not distinguish them. Packing is a general subject, and it may be useful in some indexing to specify it as Packing, Hard, Packing, Soft and so on, but it may not be useful to have Packing of cigarettes, Packing of eggs, and so on together; we may want Cigarettes—Packing, Cigarettes —Rolling, and so on together; packing is then a subject qualification. We can do this without breach of specific entry, even as defined by Cutter, because, whilst he never quite freed his mind and his rules from some confusion, he did admit what he called topical subdivision, and did have in his own Boston Athenaeum Catalogue such a heading and subheading as Cattle—Diseases. One object of punctuation is to secure some grouping in alphabetical arrangement which cannot be secured by either what is called letter by letter or what is called word by word arrangement, but can be secured by what is called logical arrangement if this is indicated by punctuation. This is discussed in Chapter 12.

The subordination of subject qualification, or limitation, in literature indexing has not raised the same doubts in alphabetico-classed and classified as in alphabetico-specific, because there is already subordination of specification in the former, and specification and qualification have not been explicitly distinguished. But there is some distinction of the two in the classifications, especially in the tables of constant or mnemonic form numbers, the auxiliary tables, categorical numbers, systematic schedules, and so on, which all of them have had since DC, although in all of them there is a mixture of qualification in the main classification and by auxiliary tables, for example in UDC safety measures in mines are 622·86, in electrical engineering they are 621·3-78, the -78 being from an auxiliary table applicable right through 621, and so to steam as well as to electrical engineering.

The student may be helped by the following illustrations of subordination in the classified, the alphabetico-classed and alphabetico-specific type of catalogue:



But he should note also that as discussed in 2·2 and Chapter 2 generally, the reader finds Horses or Horses breeding in the index to a classified catalogue as he would in the alphabetico-specific catalogue and, given a number such as 636·1, may go to the subject specifically without realizing its hierarchical subordination and the representation of this in the number 636·1.

4·6 Specification, Multiple Entry and Subject Analysis.

A book on anatomy and physiology is on two subjects which are related by being in the class medicine; one is on the structure of the body, the other on how it works, but one is not a function of the other; it would be absurd to speak of the anatomy of physiology or the physiology of anatomy, and we can and should enter the book under each quite separately. The relation of horses and breeding is quite different, and a book on the breeding of horses is not fully specified as one on horse breeding if it is only put under horses and/or breeding, in any type of catalogue. It has to be entered under Horse breeding with the alternative form Breeding, Horse in an alphabetical catalogue, and/or under Horses—Breeding, in a UDC classified catalogue under 636·082:636·1 and/or under 636·1·082. We can enter it under both, but there is a great and legitimate saving in entry if we make a cross reference, Breeding see also the subheading Breeding under the names of animals, or 636·082 see also ·082 as an extension of class numbers for particular animals, for example 636·1·082 for Horse breeding. We may then have eventually a hundred entries under Horses—Breeding or 636·1·082, but only one cross reference, that is a hundred and one cards in a card catalogue against two hundred for double entry. And this does not make the indexing less efficient, because the enquirer will usually be interested at the time of his enquiry in either breeding generally, or in the breeding, and perhaps other aspects or processes of the specific animal, and the cat breeder for example is not greatly helped by entries under breeding for the cat, followed by those for

cattle, whether the catalogue is alphabetical or classified. On this see also 11·25 and 14·6.

It is, however, not always easy to say when we have two or more subjects in a document so related or unrelated as to require multiple entry of the document, and when we have one subject with more than one aspect; there is the book on two subjects such as anatomy and physiology or electricity and magnetism, related only by being things in the same class or different ways of looking at or manifestations of the same thing, and there is the book on the history of the horse or the feeding of cats, in which there is a relation of a thing and a qualification or limitation of information on it in a particular book; there is the book on the influence of one thing on another, for example the influence of science on history, which is different from the history 'of' science, and the science 'of' history. The subject is then the relation or interaction of two things expressed in alphabetical indexing by conjunction, as in Religion and science, or possibly by a subheading with a further qualification as in History—Influences, Science; in classified cataloguing such compound numbers as UDC 5:93 and 93:5 may be used.

In co-ordinate indexing theory there are suggestions that it is good enough to co-ordinate or intersect 'terms' in any order without much regard for differences in meaning and in relation, but the example of history and science shows that everything lumped together arising out of different relations of the same terms or words, but in differing senses or relations, can result in very rough indexing, and that examples such as Blind Venetians and Venetian blinds are not sufficiently representative.

We can be helped in making distinctions by common usage. As noted in 4·3, we do not say Crops—Wheat or Graminae—Triticeae—Triticum aestivum in talking about wheat, but we can't talk about the harvesting of wheat without using both words, either in an adjectival phrase, wheat harvesting or a prepositional phrase, harvesting of wheat, and if we want to talk about the influence of wheat on history we have to say wheat and history. When we have to use terms together, because our meaning is not conveyed by one of them by itself, then we can subordinate one to the other in some way; we have to do so, in any type of catalogue, and we may save entries legitimately by properly controlled cross reference. The student will usually be helped better by taking language as a guide rather than logical rationalizations of some subtlety, with some of which the co-ordinate indexers try to dazzle us, and end by blinding themselves, especially when they drag in the class calculus or algebra of symbolic logic. Subject analysis is incidentally exemplified in 5·32 and further discussed in 14·6.

4·7 Cross References and Extra Indexing.

It should be apparent now that cross reference in both the alphabetical and the classified catalogue, and the extra indexing of the latter

which is really cross reference to it, are very important, and with these as with entries we must distinguish ideal from makeshift uses.

In the alphabetical catalogue cross reference is a means of getting the user down to the subject specification and specific entry he doesn't understand or expect in the first place, or of which he doesn't know the terminology. Library users without the training they are now beginning to get in school are apt to think of what they want as being under or in something else; like librarians and scholars of the nineteenth century, as shown in Chapter 3, their only alternatives are title word entry or some kind of class entry, so they may look under Mathematics when they want Algebra; and in some cases in which men use libraries and their catalogues as a way of self-education a man may not know until he sees the reference, Mathematics see also Algebra that Algebra is not a famous Arab, or until he sees Mathematics see also Calculus, that calculus is not a disease. These are not jokes; in medicine calculus is a stone in the body. On this see also 2·4. But in some libraries, in the users of which some general knowledge and some idea of cataloguing method may be expected, cross reference of the Science see also Physics kind can be overdone.

Cross reference in the alphabetico-specific catalogue is also indirect classification, just as the extra indexing of the classified catalogue is indirect specification. On this ground the alphabetico-specific catalogue used to be called syndetic, a word meaning joining together, as by cross reference; Cutter, in his rules, and Sharp in his textbook, give the word in their definition of terms. We may refer generally, as in what is sometimes called a 'blanket' reference, for example, Mineralogy see also under the names of minerals, or we may refer specifically, as in Socialism see also Communism. We may also refer between related subjects, neither being subordinate to the other, as in Children's libraries see also School libraries and the reverse. In the classified catalogue index reference is from included class name to including class, but with the specific class number given so that, as shown in 2·2, the user need not become aware of the including class; what is as important as indicating an including class by number is the indication of the nature of this class, as in Horses domestic animals 636·1 and Horses, hunting with, sports 799·25, which we call relative indexing; including class name has to be indicated when there is more than one for the same thing in different aspects or relations. In the alphabetical catalogue these aspects and relations are generally subordinated qualifications, which may or not be distinguished, and it is sufficient to refer from Domestic animals to Horses, where there may be such subdivision as racing, or there may be further reference, as to horse racing regarded as a subject 'on its own'. There has to be cross reference in the classified catalogue itself, because of the different including classes for the same thing in different aspects. For this see further 8·42.

Taking cross reference to the classified catalogue from its index, and cross reference in it, there is in actual use far more cross reference with

the classified than with the alphabetico-specific catalogue. The former may be used for generic survey, for going through all the literature on a subject such as astronomy, in "all its ramifications", as Sharp suggests (4th ed., p. 20), but it is certainly used in some proportion, and probably a very much higher one, for specific reference, that is in looking for a book on astronomy generally, or for one on the sun specifically, and not in checking all the library's holdings on the sun, the moon and all the stars; and the index has to be used. On the other hand there is cross reference from one synonym to another, as from Radio to Wireless, or the reverse, in the alphabetical catalogue, which may be as much a nuisance as Radio (see) 621·384; but there is not cross reference by the reader every time, once the idea of specific entry is grasped, for example that banks are under Banks or Banking, dogs under Dogs, and so on; the proportion of synonyms is low and there should not be cross reference instead of entry. On synonyms see 4·3 and on entries and cross references in proportion see 11·26.

Single entry was attempted with the alphabetical catalogue, as it still is with the classified, as shown in the next chapter. Even Cutter thought of cross reference as a substitute for entering "a polytopical book under each distinct subject", as his rule 176 requires, and suggested that Gothic architecture see also Spanish architecture (Street) would do instead of entry of a book by Street, with something in it on Gothic as well as Spanish architecture, under Gothic as well as under Spanish architecture; he saw that this, "for economy" in the printed volume catalogue, "put the reader to some trouble", even when the particular book intended was identified under the heading referred to by its author. Under his rule 148 he said "of course entries are better than references for the reader", and in his rule 113 he said "in the title-a-liners references are not an economy; they occupy as much room as an entry". This is all with the printed volume catalogue in mind, but in his 4th, 1904 edition he noted in his rule 114 that "in printed card catalogues a reference for a particular book is made by inserting the whole card", what is now called a unit card, "with suitable heading...", which means that an entry takes the place of the cross reference for which economy in the printed volume catalogue was the only excuse, but reference forms of added entry still persist in card catalogues through lack of realization that they only had excuse in the printed volume catalogue, and also on the argument that a reader should not find a book under a heading referred to which he has already seen under the heading referred from, and therefore that either there should not be cross reference or the book should only be under the heading referred to. This is further discussed in 11·21, and only applies, if at all, when the subjects are related.

In American theory and practice now there is no thought of cross reference between unrelated subjects, and it is not clear that Cutter ever thought of this as a substitute for added entry. It seems to have been common in British dictionary cataloguing; there used to be such

cross reference as Dickens see Tennyson in the Library Association's Subject index to periodicals, to avoid repeating an entry under the one referred from; and in the annual volume for 1956 there is Beauty, Personal see also Tiv tribe, under which an article deals with the tribe's ideas of personal beauty, and Beauty—Contests see also Mumbles, The, the entry under this being Amis, Kingsley. Age-old ceremony at the Mumbles: [a beauty contest].

Assumption that this kind of single entry with cross reference is still the rule and not very much the exception in the alphabetical catalogue seems to be the basis of still common assertions that there is far more cross reference in it than in the classified catalogue, and that it involves more cross reference than entry. This argument against alphabetical cataloguing has been one of the strongest in favour of classified, and yet the common classified catalogue is still one in which, in Sharp's words, the index is made to "serve to some extent the functions of added entries", as shown in 5·4 and 5·41. The reader has then not only to refer from the index to one number for books on, for example, the theory of biological evolution, he has also to refer to other numbers, for other subjects, at which there are books with something in them on evolution, and sort these out. Emphasizing minor and ancient blemishes in alphabetical cataloguing whilst ignoring, or being unaware of, major unremoved blemishes in the classified catalogue has long been a characteristic of its advocates. But the point here is that the student should note that there is ideal and makeshift use of cross reference, within an arrangement, and from an extra index, that ideal and makeshift are still confused, and that cross reference from an extra index is not thought of as cross reference, not compared, as it should be, with cross reference within a single alphabetical arrangement, merely because it does not go by the name of cross reference.

The student should also keep in mind differences between the functions of see and see also references; in particular he should note that whilst see also reference 'upward', that is from specific to general, is not recommended in alphabetico-specific entry it is not a breach of it, but upwards see reference is, because it means that although the specific subject of some literature has been recognized this has nevertheless been given class entry. For examples of this see 5·32, and see also 11·23. The alphabetico-classed catalogue has to have upward see reference, for the same reason that a classified catalogue has to have an index of specific subjects; for examples see 5·21.

4·8 Specification, Classification and Indication.

The alphabetico-specific cataloguer doesn't or shouldn't use cross reference in the place of specific entry, as in Dry cleaning see Cleaning or Ponies see Horses; he should limit his specification and say no more, as he often does without even thinking, for example, that caps is more specific than hats, or he should use a specification, such as dry

cleaning; if he uses 'see' cross reference instead then he has explicitly admitted the adulteration of alphabetico-classed entry.

Theoretically the classified catalogue might be as specific in its classification and notation as it is in its indication or indexing. But in practice it is not; the classification tables it uses are not as specific in classification or notation as the index to them. This means that the catalogue user must do his own sorting when, for example, he is referred by an index to 144, in DC, for Empiricism, because the class numbered 144 also includes Pragmatism, Humanism and Utilitarianism; he must sort out the titles under 144, or in the last resort the books themselves.

This is not so bad because the subjects are related, and as far as they are on empiricism, pragmatism, humanism, utilitarianism all the books at 144 belong there. What is not so good is to have to sort out a book on the Lamarckian theory of evolution, at 131 Mental physiology and hygiene, by the words Lamarckian theory of evolution in the fourth line of the third title under 131, because the book is only given a single entry though it is on more than one subject, and the subject by which it is not entered is indexed as being in the unrelated class where the book is classified. There should be added entry at 575·0166.

The difference between indexing a subject and therefore books on it in an appropriate including class, even without specification, and indexing a subject and therefore a book on it in a class to which the subject does not belong should be noted, and studied in its exemplification in 5·41-5.

With some idea of ideal and makeshift, good and bad in subject cataloguing method the student can and must ask of any catalogue: what does it pretend to do, and how; what does it really do, in what way; how effective are both what it pretends to do, and what it really does; if it works, and of course it works somehow, does it work like a museum piece or a late model, and how efficiently and economically, in consultation as well as compilation. There are compromises justified by economy and efficiency, and mere carry-overs of traditional methods, sometimes complicated and theoretically justified by pseudoscientific ideas. Questions are asked in the next two chapters of methods which are current, and accepted, even eulogized by experts, and some answers are given.

Chapter 5

Current Catalogues, Indexes and Bibliographies

Reasons for using the examples of this and the next chapter, and bases for their comparison and evaluation have been given in Chapter 4. As stated there, all the methods shown in Chapter 3 as emerging in both theory and practice between 1850 and 1900 are still current, though the alphabetico-classed catalogue is almost extinct as an avowed and moderately unmixed form, in both theory and practice, and the pure classified catalogue is the least evident in practice whilst being the most talked about in theory. The examples now examined are examples of the title word catalogue, the more or less alphabetico-classed, the alphabetico-specific or dictionary, the title word indexed shelf list and other compromises of the pure classified catalogue, in that order and in this chapter which is confined mainly to catalogues and bibliographies of whole books. Indexes to periodicals and abstracts are dealt with in the next chapter.

5·1 Title Word Subject Indexing.

The English Catalogue of books is a general publishers' catalogue or trade bibliography in direct descent from the booksellers' and publishers' catalogues in which Crestadoro first developed his concordance of titles method on the "principle of a dictionary", already exemplified in 3·5. The title page of the current English Catalogue says it gives British books "in one alphabet, under authors, titles and subjects". The Prefatory note describes its 'main' entries under author and then says that as "an index to these . . . entries are also made under titles, commencing with their most important words (which usually indicate the subjects with which the books deal), or with the first words. Many other index entries are also provided under subjects in order to make the Catalogue of use to persons in search of the literature of a particular topic, as well as to those requiring a particular book."

The "many other index entries" are in fact few and far between. There are some for books with entirely metaphorical titles, for example we find Economics: Getting and spending, Fisher (L.), in which Economics is an 'independent' subject heading, and sometimes a book is brought under a general heading, for example Norton (J. W.)—Strawberry, bush and stone fruit growing for profit, is under Strawberry, bush and stone fruit growing, and Fruit growing: Strawberry, bush and stone fruit, but not under Bush fruit or Stone fruit. There appears to have been more of this independent subject entry in it at some times than others, but never enough to make it a satisfactory subject index. The fatal weaknesses of the title word method appear in sequences

of Dog . . . and Dogs with Dogmatics in between, and nowhere under Dog a book which has the title entry Canine distemper and hard pad, The cure of, Levy (J. de B.).

What can be and should be even in trade bibliography is exemplified in the Cumulative Book Index, world list of books in the English language, author, title and subject catalogue in one alphabet of books . . . New York, the H. W. Wilson Company. In this we find DOGS clearly given as a heading independent of title, then, in one issue August-December 1957, nine entries for general books on dogs, some British books, some American, then See also Boxers (dogs) down through nine references to Whippets, then the subheading Diseases, and under it Hoskins, H. P. Canine surgery . . . which also has a title entry under Canine; then the subheading Legends and stories with seventeen entries, then the subheading Training, with one entry. But in fairness to the English catalogue we should note that in its purposes "persons in search of the literature of a particular topic" are secondary to "those requiring a particular book", and that it will serve at least some of the needs of booksellers who are asked to find a book already known, if only vaguely, as something to do with canines, or with strawberries and other fruits. And of course when all is said and done title words do in most cases "indicate the subjects with which books deal" as shown in 11·13. Cataloguers often forget this when they try at all costs to put books under words not in their titles, and in some dictionary catalogues there are perhaps as many books lost through title word aversion as are lost in the English Catalogue through title word indexing. Nevertheless this is not as good as the independent subject cataloguing exemplified from CBI, and not good enough as indexing for "persons in search of the literature of a particular topic".

The English Catalogue is published by the Publishers' Circular Ltd., London, the Reference Catalogue of current literature is published by J. Whitaker & Sons, Ltd., London, in two parts, Author index and Title index. No claims are made in it for subject indexing and we find Canine hysteria under that and Diseases of dogs under Dogs, Diseases of. But there is also Whitaker's Cumulative Book List . . . giving in one alphabetical list details as to author, title . . . classification . . . as well as a special classified list giving details . . . in each separate classification. The Alphabetical list is described as under author and title, and, in many cases, under subject. But the "many" seem even fewer and farther between than in the English catalogue; books called soccer are not under football and those on soccer or association football but not so-called, are not under soccer, a book called putting is not under golf, books on anthroposophy which don't happen to have this word in their title are not under anthroposophy, and so on.

5·2 The Alphabetico-classed Catalogue.

Whitaker's Classified List has 49 classes, in alphabetical order from Aeronautics to Wireless and television; most are subject classes, but

some are form classes, for example, Annuals and serials, Children's books, Classics and translations. Such a book as Andrews, A., The Greek tyrants, is not in any of the classes History, Law and parliamentary, Politics, etc.; Barker, Sir Ernest (ed.), From Alexander to Constantine: passages and documents illustrating the history of social and political ideas, is not in any of these classes, or in Sociology, and so on; neither book is under headings beginning with social or political in the alphabetical section. The classes are not subdivided by subject, the subarrangement being alphabetical by author so that, for example, several books on ballet, under Art and architecture, are widely separated. Entries in the alphabetical section are related to the classified section, for example, in Ballet (Lido) v.5 D4·110 111 . . . sd. 35/- Black Art., Black is the publisher, Art refers to the class Art and architecture. But it is difficult to see what use this relation of the two sections is, and what use the Classified list is, with its very general, unsubdivided, cross divided classes. It appears to be an historical survival of the Classified Index to the London Catalogue of about 1850, Hodgson's London Catalogue being then a rival of Low's British Catalogue on which Crestadoro was employed, with far less use than Crestadoro's cataloguing in the present English Catalogue; if anything there has been a decline, because whereas the old classified index had an Agriculture and a Botany class, the present classified list has Botany, Horticulture and Agriculture in one. However, a bookseller, in a last desperate search for a book he could not pick up by any title word in the alphabetical section, might comb through one or more of the classes, if he thought of looking under Classics and translations for a contemporary book by an English author on Art and literature in fourth century Athens. Besides being much worse than it need be, this classified list exemplifies the weaknesses of the alphabetico-classed catalogue, especially when this is undivided and without cross reference or multiple entry. Only the alphabetical section, also worse than it need be, saves the classified section.

5·21 British Museum Subject Index.

The British Museum Subject Index is the only example of the more or less alphabetico-classed catalogue, with subheadings, which is commonly available for examination; it comes out in quinquennial cumulations, increasingly lagging in publication, but apparently not yet given up as the latest edition of its author catalogue has been, whilst still in progress. As an example of its method, and lack of it, a search for information on cereals may be taken. In the 1931-1935 Cumulation there is a cross reference BARLEY. See Corn. CORN then seems to be a generic heading for all kinds of cereals, subdivided by Bibliography, History, General Works, Diseases, Trade:Production:Supply, with other subdivisions not listed and without headings, for example under Trade:Production:Supply there is an unheaded group of four entries

for books on Grain silos and bulk handling of grain. There is no subdivision by specific cereals, and directly under Maize in the general alphabet there are two entries without any cross reference from Corn which covers Barley, oats, wheat, but not maize, though this is what is now usually meant by corn as distinct from other cereals; rice is also given separately.

There is some multiple entry; a book on optimism in Indian thought is under Optimism directly, as well as under India—Religion and philosophy—General works, which appears to cover specialized works other than those on Hinduism, as well as general works, and has two unheaded subsections. A book called The Tank-mixture method of using oil spray is under Gardening—Fruit and vegetable culture, which has a further unheaded subsection in which fruit seems to be separated from vegetables. This book is also under Paraffin, apparently as a synonym for kerosene, mentioned in the book as only one kind of oil used in orchard spraying. There is a reference from Fats and oils—Mineral oils to Paraffin. These examples illustrate the mixture of specific with classed entry, and the casualness of some of the entries and references. Philosophy is divided by period and country for European philosophy, with no reference to the subordination of Indian philosophy to the country. A book by George Beet called The Grand old days of the diamond fields is entered under Diamonds and under Africa, South—Topography:Travels:Social life; one by William Peter Taylor called African treasures; sixty years among diamonds and gold, is entered under Diamonds and under Gold, but not under Africa. Congress enters the first only under Diamond mines and mining—Africa, South; it enters the second under Mines and mineral resources—Africa, South; Diamond mines and mining—Africa, South; Gold mines and mining—Africa, South; Frontier and pioneer life—Africa, South; Africa, South—Native races. On a fairly random though limited sampling multiple entry seems fairly consistent; two books on concrete silos under Corn—Trade:Production:Supply are also under Building—Iron, Steel and Reinforced concrete structures: Structural engineering, but there is no reference from silos to either. A book on criminology and penology is under Crime and under Prisons:Penology, with a reference from Penology to Prisons; a book on marriage and the family is under both. A book on massage and medical gymnastics is under Massage and under Gymnastics—Medical gymnastics. This is five out of five in succession. But in every case two subjects are clearly stated in the title, and the cataloguing seems a good deal from titles, although the headings are independent of titles.

Books called Games coaching for schools and colleges, Games and games leadership, Games master's handbook, how and what to teach, are under Games in a unheaded subsection; a book called Physical training, games and athletics in schools is under Gymnastics—Physical culture for children, schools, etc., and there is no cross reference and no double entry. A Leaders' handbook of physical exercises and games

is under Gymnastics, with others in an unheaded group on physical education; it is not under Games.

These rather random, and perhaps insufficient examples show alphabetico-classed cataloguing in a different class from the primitive undivided form in Whitaker's Cumulative Book List; but there are weaknesses, some peculiar to the British Museum Subject Index, and others of the method generally. A subject is subordinated in a class, but which class? Military and naval hygiene are under Hygiene, but School hygiene is under Education. Some subjects are subordinated, some are made alphabetico-specific, for example Gliding is under Aeronautics but Tennis is not under Games or Sport, Athletics are covered under Gymnastics, with vaulting and tumbling and club swinging in a unheaded subsection of Gymnastics—General works, but vaulting for women is under Gymnastics—Physical culture for women, and running and tug o' war are under Gymnastics—Athletic sports. There is some confusion here, between gymnastics and athletics, as there is under corn, between older and newer uses of the words, and the confusion might be sorted out, but problems remain which are essentially those of classification, perhaps increased because there can be both classed and specific entry in one arrangement. And there is no determination of the number of classes as there is in a classified catalogue by the base or a notation. As shown, there are some cross references, from special to general and from general to special, and there must be both in an alphabetico-classed catalogue, if it is to work. But in this catalogue there is neither sufficient nor consistent nor correct cross reference. There is a reference from Tug o' war to Gymnastics—Athletic sports, but not from Tumbling to Gymnastics; there is a reference from Vaulting to Gymnastics—Athletic sports, but not to Gymnastics and Gymnastics—Physical culture for women, under which books on vaulting are entered. This may be because these upward references are made both to a special subject in a general class, and simply to the general class as including general books; there is nothing to show which way the reference is to be taken, but clearly in this case it does not lead to the specialized literature, and this is more important than leading to the generalized literature.

As shown in 4·4, the alphabetico-specific catalogue is not sure about its degree of specification, so that it has class entry where specific entry might be expected; in reverse the alphabetico-classed catalogue is not sure of its degree of generalization in its headings, because it is not tied down to the procrustean bed of a notation; and it is in greater difficulty than the other, which can, down to a fairly fine point, take the book itself as a guide, and has the other measures mentioned in 4·4, all of which limit specification in headings much more than they limit or determine generalization.

The alphabetico-classed catalogue is caught between the fully classified and the alphabetico-specific, and if it remains alphabetical it tends towards specific entry; in the British Museum Subject Index there is

from cumulation to cumulation what it calls decentralization, for example in the 1931-1935 volumes Crime was decentralized and "particular crimes . . . dispersed to their appropriate headings such as Arson, Blackmail, Fraud, Homicide, etc.". And perhaps the only remedy of the alphabetico-classed catalogue is the decentralization or dispersal of the alphabetico-specific.

5·3 Alphabetico-specific Entry.

Alphabetico-specific entry has already been compared with title word entry in 5·1 with an example from Wilson's CBI, and it and the dictionary catalogue may be further illustrated from this. Here is an author entry:

WARDLE, Cecil Francis

Of pups and pubs [with il. by the author] foreword by Jack Train. 0 204p 12s 6d. '50 Pop. dogs pub.

Here is a straight title entry for the same book not meant to serve in any way as a subject entry:

OF pups and pubs. Wardle, C. F. 12s 6d Pop. dogs pub.

Here are 'downward' cross references, ANIMALS . . . see also . . . Domestic animals, and DOMESTIC ANIMALS . . . see also . . . Dogs. Here is a subject entry:

DOGS

Wardle, C. F. Of pups and pubs. 12s 6d '50 pop. dogs pub.

Then follow 'downward' cross references: see also Airedale terriers, Beagles (dogs), Boston terriers . . . Welsh corgi. Here is a 'collateral' cross reference: RESTAURANTS, LUNCH ROOMS, etc. See also . . . Hotels, taverns, etc. Here is another subject entry:

HOTELS, TAVERNS, etc.

Great Britain

Wardle, C. F. Of pups and pubs. 12s 6d '50

There are no class numbers because this is not the cataloguing of a particular library which would require shelf numbers. It is alphabetical and dictionary cataloguing because all the headings and entries, author, title, subject, and cross references are in one alphabetical order or file: Animals . . . Dogs . . . Domestic animals . . . Hotels, taverns, etc. . . . Of pups and pubs . . . Restaurants, lunch rooms, etc. . . . Wardle, Cecil Francis. There is multiple subject entry, under subject names or headings which are independent of title words and are specific in rela-

tion to the subjects of the books entered under them. There are subheadings, such as Accounting, Directories, Employees, under Hotels, taverns, etc. as well as country subheadings. The book, known or unknown beforehand, is reached by anyone looking directly under Dogs, or under Hotels, taverns, etc.; the usage in this heading is American rather than British because the catalogue is American. The book is also reached indirectly by anyone looking first under Domestic animals, or Animals, which are specific for books on Domestic animals or Animals, but class or generic for books specifically on dogs. The book is reached by anyone looking under Restaurants, lunch rooms, etc., and then realizing that his interest is rather in the collaterally related Hotels, taverns, etc.

The corresponding British bibliographies are the title word and alphabetico-classed lists issued by the Publishers' Circular Ltd. and J. Whitaker & Sons Ltd., and examined in 5·1-2, and in some respects the classified British National Bibliography examined in Appendix G. A British attempt at dictionary cataloguing which is fairly readily available is the Library Association's Subject index to periodicals, examined in 6·2; another perhaps not so commonly available but printed and published in volume form is the City of Liverpool Public Libraries Catalogue of works of non-fiction . . . added from August 1952 to December 1955 and published 1957.

5·31 Liverpool Public Libraries Catalogue.

As Sharp says, as quoted in 3·7, in British public libraries, with open access, Dewey and shelf classification "came the classified catalogue", apparently like the dawn in early silent films, superseding the darkness of the dictionary catalogues of "pre-open-access days", which though dictionary, were on the plan of the title word indexing examined in 3·4 and 5·1 rather than according to Cutter's Rules. But as Sharp shows, something nearer to Cutter was developed for Liverpool in 1872, by Huggins who, he says, followed the rules of Jewett of the Smithsonian Institution, Washington, and the Boston Public Library, who was a forerunner of Cutter; and Sharp uses present-day Liverpool as a good example, comparing its dictionary with Glasgow's classified cataloguing (4th ed., pp. 312-13, 331). It looks as if Liverpool's can be taken as representative of better dictionary cataloguing in the comparatively few British libraries now using this form; with all faults its recently published catalogue is certainly better than some of the horrible examples that have fortunately remained in sheaf or card form in some libraries, and in its own way it is better than most if not all, the classified catalogues in theirs. Another fair example, is or was the card catalogue of the Kent County libraries, apparently founded by Miss Cooke.

In the Liverpool 1952-1955 catalogue in two volumes in one, with 1098 pages of single-column entries, there is a title page, with a blank verso on which there could have been but isn't any explanation of the

form and method of the catalogue. The following are the first eight entries at the top of the next page

A.J.S. Motor cycle	
Haycraft, W. C. The Book of the A.J.S.	629·227
Neill, F. W. A.J.S. Motor cycles	629·227
Aalto, Alvar, and Finnish architecture	
by E. Neuenschwander, etc.	q 720·948
Aarek, W. From loneliness to fellowship	301·15
Aaron, R. L. John Locke	192
Aaronovitch, S. Monopoly	338·82
Abadan, by N. Kemp	338·922
Abattoirs. The Slaughter of animals book. By R. James	636·809

From these and other examples the catalogue appears to be a dictionary catalogue, with title-a-line entries as far as possible, by omission even of date of publication, and with subject entry mainly under independent headings but with some title and inverted title entry serving as subject entry. It is to be praised as a gallant attempt in these days and for whatever reason, at a printed catalogue in volume form, and this may explain and justify the severe economy of entry. But the influence and tradition of Crestadoro's index-catalogues is also evident, rather than that of Huggins' earlier catalogue which was fuller in its entries, and had cross references.

Absence of cross reference, and absence of any explanation of its absence, is the most extraordinary or astonishing thing about this catalogue, the more so because there is the blank back of the title page right opposite the first page of entries.

If the reader were told the principles of the alphabetico-specific catalogue, that for example he would find entries for books on motor cycles under that, and entries for books on particular makes of motor cycles under their names, he might get on fairly well in this and any other dictionary catalogue without cross reference. But in this one there isn't any explanation and there isn't any general or particular reference from Motor cycles to A.J.S. Motor cycles, or from Dogs to the special breeds under which there are entries, or from Ships and Shipping to Sailing, or from Shooting to either Game or Guns and rifles, though Keith, E., Big game rifles and cartridges is under Game—Big game, and under Guns and rifles, but not under Shooting. O'Connor, J., The Big-game rifle is under all three. On the whole however, the multiple entry of books on more than one subject, is good, and the headings are usually specific. Football for example is better specified, by inverted headings, than it used to be by Library of Congress. And title word entry in place of true subject entry does not seem in greater proportion than in the Congress Catalogue. It seems to be used when there is only one entry for a subject, whereas in Congress it is used when a heading has not been established. And there is some divided and some undivided class entry; Congress has some undivided but little divided class entry.

Ships and shipping has the subheading Steamships, with an entry for a book on paddle steamers for which there is no entry under Paddle Steamers or Steamers, Paddle. Under Libraries and library service books on public libraries are under a subheading General, followed by subheadings for Children's libraries, Co-operation, Organization and administration, Profession and education, Reference libraries, Special collections, Special libraries, University libraries, Yearbooks and dictionaries. And under General there is a book on Libraries and archives in Sweden, with entry under Sweden, but none under Archives. The heading and subheading Motor cars and vehicles—Transport covers some entries for motor road transport, the general heading Transport covers others, and some are under both. Tramways is a separate heading. But in every case there is no cross reference.

As shown in 5·41 and App. G, prefatory explanations and claims are made for some British classified catalogues which are misleading to the point of being untrue; the Liverpool catalogue is refreshing in this respect, but especially as it has no cross references, which are almost as desirable in a dictionary catalogue as an index in a classified, the reticence of its obviously enterprising compilers, their willingness to be judged by their work, without any of the pretence and pretentiousness of the others, may have been carried a little too far.

5·32 The Library of Congress Dictionary Catalogue.

The definitive example of the dictionary catalogue, with alphabetico-specific entry, and on cards of the kind called 'unit', and with the piece of compilation apparatus known as a subjects headings list or file, is the catalogue of the United States Library of Congress which is in more than one sense the national library of the United States of America. There is now a copy of its author entries in printed volume form, in multiple copies, and supplementing this there is both the National Union Catalogue Author list and the Library of Congress Catalog.Books:Subject, in the same form, but these are done from the card entries, which have been available to other libraries as central cataloguing and still are, so the unit card is the basic cataloguing of the Library of Congress in its physical form.

Here is a Congress entry as it appears on a unit card, and in the author and subject catalogues done currently from the cards:

Campbell, Andrew, dramatic critic
The book of beer. London, D. Dobson 1956
304 p. 21 cm.
1. Beer
TP577·C3 663·4 56-41398‡

The card is called a unit card because the subject entry under Beer is another copy of the same card with Beer typed in as the heading for filing, above the author's name, and so on with other added entries under persons, title, or subject. There is no abbreviation of the 'main'

entry. This abbreviation was usual in catalogues in volume form, and still is, as shown from examples, and has been carried over into card catalogues, although in these every entry has the approximately fifteen square inches of the 12·5 × 7·5 centimetre standard size card, and in printed, and even in handwritten cards, it is cheaper and quicker to reproduce the whole of the main entry rather than to abbreviate it.

The first line of the unit card is the author heading, then follows the title and imprint, and on a separate line the collation, giving at least pages and page size. There may also be the name of a series in which the book is included on this line, and notes may follow. Finally there is catalogue compilation data intended only for cataloguers. In the example, 1. Beer indicates the one and only subject entry, by its heading, and this is called a tracing note, because by such notes, which serve also as a guide to cataloguing, entries may be traced in the catalogue from the main entry under author, or in some cases title. The last line gives a shelf number according to the library's own classification, LC, a shelf number according to DC, and the order number of the printed card. The double dagger following this is one of many special signs which appear on Congress cards; this one means "entries prepared under rules for limited cataloguing". For an actual card catalogue one of the class numbers would be put at the top of each card, and one card would probably be filed by class number in a shelf list. On the Congress classification see 7·5.

Note that cross references to the suggested headings are not given in the tracing notes on the unit card. As used by Congress itself these are recorded in its subject headings file, which is printed as a Subject heading list for general use. In this we find:

> **Beer.** (Industry, HD9397; Technology, TP569-587)
> sa Ale; Brewing; Malt; Malt-extracts; Porter; Rice beer.
> xx Ale; Brewing; Brewing industries; Malt liquors
> —Taxation see Liquor traffic—Taxation.

LC numbers are given as an aid to shelf classification immediately after the heading in round brackets, in this case for beer as an industry, and as a technology. The list is not intended as an index to the classification; sa Ale, etc., means see also these headings as possible alternatives for a book in hand; xx Ale, etc., means that if Beer is used as a heading for the first time then 'see also' cross references should be made to it from the headings given. In Bees . . . x Bee the single x means make a 'see' reference only from Bee to Bees, and there appears also in the list Bee see Bees. Beer—Taxation see Liquor traffic—Taxation is another example of this, and there appears also Liquor traffic—Taxation . . . x Beer—Taxation. The use of subject headings lists and files as compilation and catalogue control tools is discussed in Chapter 11 and the use of corresponding tools for the classified catalogue in 8·7. They are compilation tools and controls, not consultation aids.

Here is another Congress entry, used for comparison of classified methods and results in 8·1, and Appendix G:

Clarke, Arthur Charles, 1917–

The coast of coral. With photos, in color and black-and-white, by Mike Wilson and Arthur Clarke. [1st ed.] New York, Harper, [1956].

208 p. illus. 24 cm.

1. Great Barrier Reef, Australia. 2. Pearl-fisheries—Australia—Great Barrier Reef. 3. Photography, Submarine. I. Title.

QE566·G7C53 ○ *551·42 551·96 56-6911‡

In either a dictionary or a classified catalogue as an author entry this would have a shelf class number as in the following subject entry, which is the same 'unit' card with the subject heading added:

551·96 **Great Barrier Reef, Australia**
C597

Clarke, Arthur Charles, 1917–

The coast of coral. With photos, in colour and black-and-white, by Mike Wilson and Arthur Clarke. [1st ed.] New York, Harper, [1956].

208 p. illus. 24 cm.

1. Great Barrier Reef, Australia. 2. Pearl-fisheries—Australia—Great Barrier Reef. 3. Photography, Submarine. I. Title.

QE566·G7C53 ○ *551·42 551·96 56-6911‡

Note the multiple subject entry suggested by the tracing notes numbered 1-3. Note also that only one classification is given, though with three different numbers; the first of these is the LC number, as further explained at the end of Chapter 7; the second marked by an asterisk is DC 15th edition, and third DC 14th edition. All are numbers for Coral reefs in Geology, which is the suggested shelf classification.

The cataloguing of Congress for one year is more than that of most libraries for fifty years or more of existence; in its extent, in its quality, and in the way in which it has been made available to other libraries it is the greatest cataloguing achievement the world has ever known, not merely in the resources devoted to it, but in the intelligence and public service devoted to it. But as a whole it is cataloguing resulting from over fifty years of growth in one cumulation on cards, and this has meant that faults have been carried on by cumulation and consistency; other faults may be caused by the ever-increasing volume of cataloguing, and inability by the ordinary methods of supervision and revision to ensure a uniformly high standard, consistency, and freedom from error. Some comment on the form and arrangement of its headings is in 12·6. Faults in the cataloguing of particular books, and departures from specific entry and from subject headings independent of title words are illustrated by the following examples:

De Armond, Frederick Francis, 1893-

Let's talk dry cleaning. Springfield, Mo., Mycroft Press, 1956

64 p. 21 cm.

1. Cleaning. I. Title

TP932·D32 *667·12 56-28644‡

This shows that books on dry cleaning are put under cleaning generally, and as the library's subject headings list shows, there is an upward see reference in the catalogue, Dry cleaning see Cleaning, yet House cleaning, Street cleaning, Vacuum cleaning, Washing powders, are all made specific, with see also downward references from Cleaning. There is then inconsistency in degree of subject specification in the same general subject; there is deliberate, explicit class entry, made so by the upward see reference; it is as method the same as the entry of a book on dry cleaning in the British Museum Subject Index under Laundry work, without any subdivision. Other examples of this class entry and upward reference in Congress cataloguing are Beeswax see Waxes, Comic opera see Opera, Milk substitutes see Food substitutes, but a sampling of its subject headings list suggests that it is well under 1 per cent for all specific subjects numbering up to about fifty thousand or more.

The evasion of true specific entry illustrated by the following example is much commoner, and so much so that in 1941 it was called Titles: fifth column in the catalog, that is in the Congress and other American

dictionary catalogues, by Lubetsky in an article in the Library Quarterly for October 1941.

Campbell, Thomas T

Recovering lead and tin from wet solder drosses, by T. T. Campbell, F. E. Block and A. D. Fugate. [Washington] 1956.

16 p. Diagrs. tables. 27 cm. (U.S. Bureau of Mines. Report of investigation 5210)

1. Lead. 2. Tin. I. Title. II. Title: Solder drosses. Series.

The tracing notes indicate that an added entry is to be made under the series, U.S. Bureau of Mines, etc., and under the title, Recovering lead and tin etc., but neither of these are subject entries or substitutes for subject entries; added entries are also to be made under Lead, and Tin, and these are true subject entries, under headings independent of title, although the names chosen as headings happen to be used in the title, as is commonly the case. The second title, Solder drosses, is title word entry in place of independent subject entry, and takes us right back to the title word indexing exemplified in 5·1. Solder drosses could be an independent subject heading, but it is not; the subject headings list has Solder and Soldering, but not Solder drosses. In another example Smith, A. C., Theories of the nature and standard of taste in England, 1700-1790, the subject heading Esthetics—History is given, and in the subject headings list there is the upward see reference Taste (Esthetics) see Esthetics; but then to get the book under its more specific subject there is not only the straight title entry given, Theories of etc., but in addition, Taste in England, 1700-1790, Nature and standard of. Another example is Smith, A. G., Care and repair of fractional-horsepower motors, with Electric motors and Electric motors—Repairing given as subject headings, and Fractional-horsepower motors as a title entry.

It is difficult to estimate how much of this there has been or is in Congress subject cataloguing, but clearly it occurs, and a standard American textbook, Mann's Introduction to cataloging, 2nd edition, 1943, says title entries are made "when the subject heading is not as definite or specific as the title, e.g. Greek vases, when the subject heading is Vases; a reference may be used in such cases if preferred" (p. 129). That is, a title entry, Greek vases, may be used instead of a subject entry under Greek vases, or Vases, Greek, or Vases—Greece, Ancient; or an upward reference may be made, Greek vases see Vases. But she does not say what happens if the book is called Grecian urns, or why the subject heading is not to be made specific. She does point out that title entries are dangerous, when their wording differs from that of subject headings, because the reader, not perceiving the difference between a title and a subject entry, assumes that the title entry indexes all there is on a subject. In some ways related to making-out by title

word entry is unnecessary multiple entry through a failure of subject analysis, and failure to express the subject by a heading and subheading, as discussed in 4·6, 11·51 and 14·6. Sometimes the way out is by title word entry and sometimes by unnecessary multiple entry. An example is:

Smith, F L

The effect of various surface treatments using magnesium and zinc fluosilicate crystals on abrasion resistance of concrete surfaces. Denver, Commissioner's Off., 1956

This title is near enough to being an abstract of the book's subject matter and purpose; it is the sort that puts a student into a panic, and perhaps even a cataloguer who has only lately been a student, and has been taught little more than that a book on lighthouses goes under Lighthouses and not under Geography. The solution by both is apt to be, everything but, or even including the kitchen sink.

A subject, or interest or purpose, is clearly stated in the title or abstract; it is "abrasion resistance of concrete surfaces", or in heading and subheading terms: Concrete—Abrasion prevention. This could be varied, but the book is intended to give information on abrasion resistance of concrete surfaces, and if information on this is asked for, then indexing should lead to this book. Congress tracing notes are 1. Concrete coating. 2. Magnesium. 3. Zinc. 4. Concrete. Under 2, 3, and 4, there will be dozens and even hundreds of entries to be sorted through for those which happen to deal with magnesium and zinc in concrete, and with abrasion of concrete. Concrete coating comes closest. But why not something like Concrete—Abrasion prevention, which the writer and publisher have told the cataloguer is what the book is about? But the cataloguer is inclined to stick to Congress headings and subheadings in front of him or her; the only subheadings under Concrete are—Tables, calculations, etc., and Testing; the only likely phrase is Concrete coating; the references given to this are from Drying oils, Gums and resins, Lacquer and lacquering, Waxes, whereas magnesium and zinc fluosilicate crystals are things which bond with the concrete rather than coat it. But the cataloguer doesn't think as far, and in addition getting a new heading or subheading established takes time and trouble, and cuts down work put through. But so too does unnecessary, woolly multiple entry, which is also bad indexing.

Another example is:

Smith, Edwin Earle, 1923—

Propane fractionation of residual oils, by Edwin E. Smith and Carl Fleming. Solvent extraction of lubricating oils by Edwin E. Smith and Margers Grins 1956

1. Petroleum—Refining. 2. Extraction (Chemistry).
3. Lubrication and lubricants.

Petroleum—Refining seems reasonable for the first subject, though possibly Petroleum—Distillation, Fractional is more to the point. Lubrication and lubricants is an illustration of the conjunctive heading which is far too wide, another is Ships and Shipping, not used by Congress, which can cover anything from a greased needle floating on water to an anchor. If Lubrication and lubricants were divided into two, then for its second subject the book could go under Lubricants—Extraction, Solvent, or Lubricating oils—Extraction, Solvent, which is clearly stated in the title as a subject and interest of the book. Then only a reference would be needed from Extraction (Chemistry), in some such form as see also Extraction as a subheading under the names of substances. For classified treatment of these subjects see 14·3.

The student should remember that not one but a dozen or more entries may go under two such headings as Bearings and Lubrication, say twenty-four entries in all, whereas a reference from Lubrication see also Lubrication as a subheading under Bearings, means only twelve entries and one reference, thirteen cards in all. This kind of unnecessary double entry, and unnecessary title entry, for example a book called Soy beans in systems of farming in the cotton belt, with a title entry as well as a subject entry under Soy beans, probably accounts for a significant proportion of the Congress card catalogue, which fills as many cabinets as the catalogues of many libraries with up to a million volumes fill drawers. The student should note too that a mass of both special and general material under such a heading as Lubrication without subdivision does not help the catalogue user; he may be specially interested in Lubrication, Liquid, Pressure, Solid, etc., and these could be subdivisions by inversion under Lubrication; there could also be subdivision such as Lubrication, Lawn mower, Sewing machine, Washing machine, and so on, but these are more likely to be wanted in relation and subordination to the thing lubricated, and double entry under both Lubrication, Washing machine and Washing machines—Lubrication is hardly warranted economically when one reference from lubrication will reduce it to single entry. There will still be and should be plenty of multiple entry.

With all the criticism there can be of Congress cataloguing, and of other cataloguing copied from it, or based on it, or of the common sources of the dictionary catalogue, mainly in Cutter, it still remains in results far superior to the alphabetico-classed cataloguing exemplified from the British Museum Subject Index, and far superior to the classified cataloguing now to be exemplified. The question is not one of the alphabetical method, in any of its versions, being superior to classified in any of its versions, for one purpose or another. Both students and teachers should be clear on this. The question here is simply one of superiority in the application of one method for the indication or retrieval of information in books over the application of another method. We are not concerned here with ideals, but with realities, not with abstractions but with concrete cases, not with what

might be but with what is, not with what might come to pass, when some formula or panacea of classification, or co-ordinate indexing, has been found, but with what has so far come to pass.

5·4 The Classified Catalogue.

There is no outstanding, well-known, readily available, example of a pure classified catalogue of a really large general reference and research library, national, provincial or university, nor is there any general bibliography which is purely classified, that is with multiple entry consistently by classified entry, instead of single entry with alphabetical indexing. For fairly widespread, and tacitly accepted forms of classified catalogue, bibliography and index we have to turn to public libraries, mainly in Great Britain, and to special libraries, and bibliographies, abstracts and indexes, mainly British. And as a library catalogue the Glasgow Corporation Public Libraries Union catalogue of additions to the libraries, classified, annotated and indexed . . . in five parts, 1929-1952, is taken here, because it is available in published form, and because in his Cataloguing . . . 4th ed. . . . 1948, the standard British textbook, Sharp said: "good modern examples of the classified catalogue in printed form are few and far between . . . in 1929, however, and again in 1934, Glasgow provided an excellent one in its Union catalogue" (p. 26). It is superior to most if not all the classified catalogues of British public libraries existing as Sharp says "in sheaf form or on cards". The Glasgow catalogue says of itself in all its Parts, 1929-1952: "the index of Subjects and Author Names should be consulted. . . . Having ascertained the class-number of the book, reference should be made to the corresponding number in the Class List, where the work will be found with others treating of the same or kindred subjects. . . . The Class List shows the titles of books in an order corresponding with that of the volumes . . . on the shelves . . . this order enables readers to compare books and ascertain which will best meet their requirements. Books dealing with more than one subject have usually been entered in the Class List under the several subjects of which they treat, as—

150 Psychology
Marett (R.R.) Psychology and folklore. 1920

398 Folklore
(150) Marett (R.R.) Psychology and folklore. 1920

In such entries the class number in . . . brackets indicates the . . . principal entry . . . and the position of the book on the shelves. . . ." And Sharp says: "whatever added and analytical entries are appropriate to a dictionary catalogue are equally so to a classified one" (p. 23).

Marett's book is a collection of essays on social anthropology, social psychology and religion rather than one on psychology and on folklore, though it has this general title. However, it is given multiple entry in

the Class list and the Index of subjects and author names has Folklore 398 . . . Psychology 150, and Marett (Robert R.) 150, so that we have classified cataloguing as it is supposed to be, with multiple entry under appropriate class numbers and reference to classes of books, not to particular books, by means of class names or headings and class numbers, in an alphabetical index.

Sharp also says: "the main entry not only falls under the subject with which the book deals, but it falls in close proximity to entries for books on related subjects, whether they be wider or more specific ones" (p. 23). And the Glasgow catalogue itself says books dealing with more than one subject "usually" have multiple entry. There may be significance in his words "main entry" and the catalogue's word "usually". But Sharp also praises Glasgow for its added entry and talks of the "inadequacy of shelf classification or of single subject entry in the catalogue if books are to be made capable of being useful to the greatest number of readers" (p. 331).

Then in another, unindexed reference to Glasgow he praises the superiority of its relative indexing to Dewey's and then says, "much of the detailed indexing in the Glasgow catalogue is due to a useful idea of making the index serve to some extent the functions of added entries. For instance . . . Buckle's The Mind and the film: a treatise on the psychological factors of the film is classified at 791·4, but is indexed also at Psychology, while Howes' Borderland of music and psychology is classified at 781·1, but indexed also at Psychology. The reasoning that has prompted this idea seems obvious and reasonably sound. For nine people who would want Buckle or Howes for their musical or film interest, one would want them for their psychological interest, perhaps" (pp. 157-8).

5·41 The Title Word Indexed Single Entry Class List.

The implication is that Glasgow has hit upon a new idea, but it is a common feature of British classified catalogues; as shown in Chapter 3 it is based on tradition going back at least to Crestadoro's title word indexing, rather than on contemporary reasoning based on any proportions of nine to one in use, and is the rule, not the exception in the Glasgow and other catalogues. Sharp italicizes the words psychological and psychology in the two titles given, but does not explain that though they are the indexing clues they are not italicized in the catalogue.

In the Glasgow catalogue, Part II, 1934 there are four entries under 781·1 Scientific theories, that is of Music, there is no subdivision or subheading for psychology in any relation to music, and when the index gives us Psychology, Music and 781·1 and we turn to 781·1 the only identification of the intended book is the undistinguished word psychology in the title of the third one under the number. Similarly with Buckle's book; it is the tenth book under 791·4 Moving pictures, and psychological is the tenth word in its title, so we have to read through ten titles, and to the tenth word in the tenth to get a doubtful

clue to the idea that this is the book we are supposed to find through the index reference Psychology, Films and 791·4, and we have to read through eighteen more titles for title word clues to other books on psychology and films, which in fact prove not to be there.

Here is another entry in the Class list:

> 192·9 Other British philosophical writers
> Hulme (T. E.) Speculation, essays on humanism and the philosophy of art. 1924

Is this a book of interest to ten people as British philosophy and only to one as something on humanism, and on the philosophy of art and aesthetics? It is not entered with six other books at 149·9 Other systems —humanism, one of which, Balfour's Theism and atheism, has double entry, at 211 and 149·9; and it is not entered at 700 Fine arts . . . 701 Philosophy: theory, utility, aesthetics. The index has Humanism 149·9, 192·9,211,230; how does the reader know at which of these numbers he will find books on the same and kindred subjects? The index also has Art, Philosophy of 192·9, but not 701; it also has Aesthetics 111;701, but not 192·9, because this would be useless to anyone who did not know the close relation of aesthetics and philosophy of art. At 111 we find as the second title in four, Baldwin (J.M.), Genetic theory of reality, being the outcome of genetic logic as issuing in the aesthetic theory of reality called pancalism; this is also indexed under Pancalism, but not under Logic.

The fact is that books are not usually entered under more than one subject; as late as 1952 the proportion seems under 3 per cent; they are often only entered under two when the title shows the book is on two, and in some cases a note is added either to justify double entry, or to justify doing without it. In Part V, Scott-Maxwell (Mrs. F.P.), Towards relationship, has the note: "The psychology of personal relationships with special reference to woman's position in society". Why it is at 301 Sociology:philosophy, theories, is not clear; it is not at 396 Woman's position and treatment, but the index has Women, Society and 301, and this sixty-seventh book in eighty-three at 301 seems the only one there dealing with Women and society, as indicated by the note.

Reliance on title word indexing is shown in Part I, 1939 by a book, classified 171 Ethics and called The Shining way, a little book of common sense, indexed as one on common sense as a subject, and by one in Part V, 1952, called Air-photography and the evolution of the cornfield, and classified at 631·512 Ploughing, subsoil, indexed as one on Evolution, Agricultural, along with Evolution 575;577·8, Evolution, Creative 111, and Evolution, Lamarckian theory 131. The only improvement from Part I, 1929 to Part V in 1952 is more discrimination in indexing insofar as in 1929 there was only Evolution 121, 172·4, 212, 213, 570·2, 575. The method breaks down inevitably because of the chances of book titles; for example, Corn 633·15 will only lead to a book

on maize at 633·15 Corn, maize, if the use of corn for maize is known, and similarly with Corn trade 338·1; there is Maize, Production 338·1 in the index, but not Maize 633·15, because the indexing is only done from titles, for the most part, and maize is not in the title of the book at 633·15.

The method is bad because it is a title word method, with the problem of synonyms, of different names for the same thing in different titles. An attempt has apparently been made, in Part II, 1952, to get over this with mathematics and radio, on the assumption that on being referred from Wireless navigation to 629·1325 the reader knows that radio in the titles of books there means wireless. Almost all index entries for wireless subjects are under both, but there is no Wireless humour 827 corresponding to Radio humour 827, for the 115th entry under 827 English satire and humour, which is Watt (J) ed., Radio variety, and no Radio mathematics corresponding to Wireless mathematics 510·2, leading to the 19th and 65th entries at 510·2 with Wireless in their titles; apparently the 17th title, Mathematics for electricians and radiomen, was overlooked.

It would be better to make a see reference from Wireless to Radio, or the other way about; DC's index has Wireless see Radio, which saves space and tells the user that one is regarded as a synonym for the other; in some cases the reference could be see, or see also, for example with Corn and Maize; the reader would be warned to look for both terms in titles under the class numbers referred to.

The method is doubly, trebly, quadruply bad, because instead of finding multiple or added entries directly under title words as in Crestadoro's dictionary index-catalogues, and therefore all the entries for a title word together, there are in the main only single entries, the reader has to make cross reference from an index for them; and for what are, as Sharp puts it, added entries in function, he has to sort out the entry he has been referred to by the doubtful clue of a title word, which may meet his strained and tired eye only after reading through more than a hundred entries, whereas in his catalogues with a separate index a hundred years earlier in Manchester Crestadoro had a running number, independent of arrangement, as shown in 3·5. The Glasgow method produces, for its added entries at least, an indirect, title word alphabetical catalogue more primitive and unsatisfactory than its forerunner of a hundred years earlier.

Without abandoning its title word basis entirely it could possibly be improved by printing true class numbers in a bold type, for example, Evolution **575** so that the reader would know that he could expect books on the same or kindred subjects at 575, but not at 131 Mental physiology and hygiene, where for Lamarckian evolution he has to sort out Bousfield (P. & W.P.), The Mind and its mechanism, with special reference to ideomotor action, hypnosis, habit and instinct, and the Lamarckian theory of evolution. This is indexed by title words for hypnosis, habit, instinct and evolution, Lamarckian theory, without added entries for

any of them; the thoroughness of the indexing might be commended, but not the method. Besides distinguishing class numbers typographically the title word clues might also be so distinguished, as Sharp distinguishes them in his examples, without explaining why he does it. The title words which the eye has to catch would then be caught more easily.

The class numbers could be extended to make them more or less exclusive call numbers, as discussed and illustrated in 7·2 so that, for example, the book by Bousfield would have its own number, say 131 B2, it being the second book under 131 with its author's name beginning with B, and the index reference Evolution, Lamarckian theory, 131 B2, Hypnosis 131 B2, and so on, would then lead exactly to this book. But if each book or title is given an exclusive call number, based on or independent of its subject class number, then the title word method of indexing can be given up; the indexing would still not be simply of subject classes with the same book in more than one, but it could be independent of titles, as it could have been with Crestadoro's running numbers, although he preferred to base his subject indexing on titles. The method of single entry with indexing referring to classified, but serially numbered entries is illustrated from examples later in this chapter, and in the next, covering the abstracting journals, in which it is almost standard. Book and call numbers for the shelf are discussed in 7·2.

The title word indexing method, with a so-called classified catalogue, may work well enough, even in its most primitive form, either to satisfy librarians, readers, teachers, textbook writers and students, who have been brought up with it as readers and as librarians and know little better, or for the purpose of the popular lending libraries, in which it is mainly used. But it should be clearly explained to all concerned. The catalogue quoted should tell the reader in its preface that if a subject name is looked up in the index and then the class number given, it may or may not be that of several books "treating of the same or kindred subjects"; that he should search his mind and even consult a dictionary of synonyms for alternative names for his subject, and look all of them up in the index; that "books dealing with more than one subject have" NOT "usually been entered in the class list under several subjects", but may, in some cases, be traced through the alphabetical index. As noticed in 5·31, another British catalogue gives no directions at all, whilst this and others give misleading ones.

The student should be told by his teachers and textbook writers that ideally there is multiple entry for multiple subject books, and subject indexing independent of titles, in both alphabetical and classified catalogues, which only differ basically in the way in which their subject classes are arranged. He may be told that at least for some purposes, and in some circumstances, the classified catalogue, with single or multiple subject entry, is superior to the alphabetical. He should not be told without qualification that single entry classified

catalogues, however indexed, are more scholarly, more scientific, more for the student, less for the man in the street, and so on; he should not be told at one point in his textbook that a particular example, which should be unsatisfactory even to the casual enquirer, is an excellent example of the classified catalogue because it has multiple entry, proportion unstated, and at another point in the same textbook that its "index serves to some extent the functions of added entries", extent unstated and by a method unexplained.

5·42 The Classified Catalogue with Numbered Entries.

The type of single entry classified catalogue with entry numbers, as distinct from class numbers, in its alphabetical index is exemplified by the A.L.A. Catalog 1942-1949, an annotated list of approximately 4,500 titles. This is a select list of books mainly for small general libraries. Here is an entry:

615·75 ANTIPYRETICS

1167. Duran-Reynals, Marie Louise (de Ayala) the fever bark tree; the pageant of quinine. 1946. 275p. Doubleday $2·75
Perceptive account of the discovery and use of quinine in the treatment of malaria and the impact of the disease on history. Chapter sources, index.
615·75 Malarial fever Quinine—Therapeutic uses Cinchona SG46-213

The class number in the last line is for the shelf, and the following subject heading tracing notes are for dictionary cataloguing and taken from Congress cataloguing, SG46-213 being its card number. The author, title, subject index to the catalogue has Malarial fever 1167, and Quinine:therapeutic use, 1167, as well as an author and a title reference. The reference Cinchona 1167 is not given. The index is one of particular books, not of subject classes. Quinine:therapeutic uses 1167 leads to a subject class which could include other books on quinine and related drugs; Malarial fever 1167 does not lead to 616·93 the subject class for malarial fevers. This will be a result in any method in which indexing takes the place of added entry; but in this method books are exactly referred to from any subjects by the exclusive entry numbers. The independent subject headings given for dictionary cataloguing are used for indexing, and the heading-subheading Quinine—Therapeutic uses provides relative indexing insofar as it leads to quinine in its therapeutic relation or aspect. It is not relative indexing in Dewey's original sense, because 1167 is a fixed location number, not a relatively located class number, as 615·75 is. This method of indexing is that commonly used in the abstracting journals and exemplified in the next chapter.

5·43 The Classified Catalogue with Added Entries in the Index.

A main and full entry for a book may be placed in a class list and any added entries, usually not so full, in an index, which then becomes a short entry dictionary catalogue with cross reference to a class or

shelf list. It is exemplified in the Standard catalog for public libraries, of the H. W. Wilson Company. Its Supplement, 1954-1956, to the 1949 edition, has the following classified entry in what is called the Catalog:

327·73

DAVIS, Elmer Holmes, 1890
Two minutes till midnight. Bobbs 1955 207p. $2·75
1. Hydrogen bomb 2 U.S.-Foreign relations 3 World politics-1945-

This is followed by extracts from reviews as an aid to book selection. The tracing notes are for dictionary cataloguing. In an Author, Title, Subject and Analytical Index there is

United States—Foreign relations 327·73

Which is a reference to 327·73 in the Catalog for the book by Davis, and other books entered at that number. There is also

Hydrogen bomb 623
see also pages in
Davis, E. H. Two minutes till midnight. 327·73

There is also a short author and a short title entry.

This illustrates the method. Every book has a full entry somewhere in the catalogue, which corresponds to a shelf list. There is no subject entry in the index for the subject by which a book is classified for the catalogue; but there is always the cross reference by class number for the subject, and always the short added entries, which give the shelf or shelf list number as a dictionary catalogue does. The differences from a dictionary catalogue are that the main or full entry is a subject entry in the class list, and that there is no short form of this in the index. On any subject the reader may get two groups of entries, one of main entries in the catalogue or class list and one of added entries under the subject alphabetically in the index. He never has to go to more than two places for all the entries, except insofar as he must go to the catalogue for full entry, giving imprint, price, etc.

5·44 The Classified Catalogue with Reversible Compound Numbers.

The classified catalogue with reversible compound numbers for added entries is that made possible by synthetic classification, and in particular UDC, discussed in detail in Chapter 10. It can however be illustrated in its essentials at this point, from the Science Museum Library List of Accessions to the Library . . . South Kensington, London, S.W.7.

Entries in this list are called references, and a prefatory note says: "The references in the weekly list are minutely classified according to subject by means of the Universal Decimal Classification, and the appropriate class numbers added at the head of each reference . . . they can be readily cut up for mounting separately upon standard

5″ × 3″ cards and incorporated in a cumulative card index either according to author or subject. Generally several class numbers are provided for each reference, so that a copy may be filed under each subject with which the reference is concerned." As already noted the international standard card size is 7·5 × 12·5 cm. which is only approximately 5 × 3 inches. What is meant by several class numbers for each reference is usually not several separate numbers but one reversible or permutable compound or synthetic number, for example:

> 575·17:591·3:599
>
> **Grüneberg, Hans.**
>
> Genes in mammalian development: an inaugural lecture delivered at University College, London, 12 November 1956. London, H. K. Lewis & Co. Ltd., 1957. 25 × 16. pp. 17
>
> 57/3432

This is the only entry given in the accessions list, but the compound number represents Genes (in relation to) Embryology (in relation to) Mammals, and further entries can be made under at least the following 'reversals' of the compound, 591·3:575·17:599, and 599:575·17:591·3. The use of the word reference for entry is discussed at the beginning of Chapter 6.

The purpose then is multiple entry or reference, and an index would have Genes 575·17, Embryology, Animals 591·3, Mammalia 599, as in the index to the Abridged English Edition of UDC, 2nd edition, 1957, and without particular reference to this book. But UDC began with an idea of using compound numbers to specify the subject matter, and even the form of a document, as well as, or instead of, to provide a reversible number for added entries. This idea has been since rejected by UDC authorities, at least in England, but persists in what might be called neosynthetic theory, and another idea has also been added, that of basing all alphabetical indexing on an analysis of classification numbers, called chain analysis, the chain being the successive hierarchical steps in a class number such as 5 Science, 59 Zoology, 599 Mammals, and if necessary of compounding numbers solely for this purpose. On this and the use of colon compounds in BNB see Appendices E-G.

5·45 The British National Bibliography.

The British National Bibliography (BNB), and its card service, should come in here, but it is so peculiar in its practice, so difficult to understand thoroughly without reference to theories not stated in its Preface, so tied up with chain procedure, featuring and Ranganathan that it and they have been put together in 10·8 and Appendices D-G. It is the product, perhaps the final one, of fifty years of metaphysical theorizing, roughly from Sayers' Canons of 1907 to Ranganathan's Colon Classification, 5th edition, 1957, and its protagonists are so confident about it that there are even proposals for the tying to its chain

analysis of class numbers the headings and cross references of the dictionary catalogue.

The student should read as much as he may need on BNB, but unless he expects to need a thorough knowledge of it for examination or other purposes he will be well advised not to go further into it than will enable him to use it as a bibliography and subject index, and to know how far its claims to be an exhaustive index and so on are matched by its performance.

5·5 Card Catalogues.

All the catalogues examined in this chapter and the next are primarily in printed page form, with the exception of the Congress dictionary catalogue. They are examined because they are generally available, and because they are authoritative examples, backed by great libraries, library associations, leading publishers, and by textbooks. The card catalogue however needs attention, because it is the one now almost universally used in libraries, and the one in which most students will be examined and with which they will have to work. And by reason of its form, or rather the indefinite cumulation its form allows, it shows up weaknesses of consultation or information retrieval not so apparent in the printed volume catalogues, which even in their greatest cumulations cover periods and quantities of entries far less than are covered by card catalogues which have been, as it were, long in the wood. Imagine the entries and indexing of the Glasgow Union catalogue and BNB cumulated over twenty or thirty years, and the difficulties of retrieval they would then present, yet the cataloguing and extra indexing of BNB is apparently intended to be copied into card catalogues indefinitely.

The alphabetico-specific or dictionary catalogue has come to a fairly common form on cards and in printed volumes, in catalogues, bibliographies and periodical indexes, and it is a fairly pure form, with some adulteration, but not much compromise or hybridization with the classified catalogue, whereas this is more often than not a skeleton alphabetical catalogue or index, with cross reference to a single entry class list for its entries; but there can be a pure form of classified catalogue, on cards, and cumulation on cards brings out the weaknesses of at least the title word indexing form of single entry classified catalogue and probably forces it towards purity in the interests of efficiency. In any event the pure form of both, on cards, has to be studied because it is the pure form which by some important criteria is the most effective and efficient form, that in which there is multiple entry. And the card form of both with indefinitely continuing cumulation, addition, and subtraction has to be studied from the point of view of organization and control, for which there have to be devices not necessary in the closed volume catalogue. The tracing notes of dictionary catalogue entries on cards, and the dictionary catalogue's subject headings file are examples of these devices, apparently better developed with it than

with the classified catalogue because it has been longer developed as a card catalogue.

Chapter 8 on the Classified Catalogue, pure and simple, and Chapter 11 on the Organization of the Dictionary Catalogue are on the card catalogue form of each. Some reasons are given in the next chapter for supposing that some of the catalogues or indexes described in it are as they are because of their physical form, and their serial publication.

Finally in this chapter the student may note for thought and as indicative of the importance of physical form, that methods of indexing by entry serial numbers, illustrated in 5·42 and Chapter 6, can hardly be used in a cumulative card catalogue, because cumulation or interpolation of subjects and entries, as discussed in 2·3-4, requires an expansible notation, as in class numbers and in the letters of headings themselves. Indexing by title words will still work with entries on cards; indexing by entry numbers would work in theory, if these were extended for interpolation as class numbers are, but the method would break down in practice, because of the much greater number of entries as compared with subjects with distinctive class numbers. A large catalogue may distinguish fifty thousand subjects, but with this number it is likely to have half a million or more entries under these subjects, with additions being constantly interpolated if it is a cumulative card catalogue.

The room taken by large card catalogues is becoming a serious problem, and to overcome it as well as to provide copies there are now signs of a return to the printed volume catalogue. The problem of cumulation comes back, but new methods of setting from punched cards, one only for each book, or from punched paper tape offer possibilities of frequent reprinting with cumulation and comparatively low cost.

Chapter 6

Periodical Indexes, Abstracts, and Special Bibliographies

Any periodical may have its own index, usually at the end of a volume, and even a cumulative index covering a period, usually of ten years, and called a decennial index. The periodical indexes discussed here are those covering a number of periodicals, general or special, and issued serially, that is the periodical index is itself a periodical, and as an index it is usually cumulative, but only to a period of one or two years, rarely more. Those called indexes are usually alphabetical, and usually index articles in periodicals without giving summaries or digests, usually called abstracts. The Engineering Index is exceptional; it is alphabetical, but apart from an additional or alternative card service, it comes out only in an annual volume, without any cumulation, and abstracts of the articles indexed are an important feature of it.

Those called abstracts are catalogues or bibliographies of periodical articles, with abstracts of the articles and extra indexes; for reasons discussed below they usually consist of single entry collections, classified, and issued periodically, even as frequently as once a fortnight, without cumulation, but with annual indexes which may be further cumulated. They are usually called Chemical Abstracts, and so on, and the name abstract shows the emphasis on the function of giving those who may use them an abstract or summary of the content of articles so that they may decide whether or not they would like to read an article in full. But their entries refer or give a direction to the page, volume and date of the periodical in which the article is in full; they must do this to perform their function, so that they are also periodical indexes, though different in form from those called indexes.

The description of an article by title, name of including periodical and so on is commonly called a reference, and those used to this use of the term reference often call entries in other types of catalogue and bibliography by the same word; but reference in this sense must be carefully distinguished from reference in the sense of cross reference between headings or numbers; some abstracting journals also have these, sometimes using 'compare' or an abbreviation for it instead of 'see also'. The name reference is also used for notes in books of other books, and for these the word citation may also be used.

Footnote references or citations may be called documentation and references listed at the end of articles or chapters, or books may be called bibliography or documentation.

The compilation and consultation of catalogues and indexes which

it is now the fashion to call information retrieval has also been called documentation and distinguished from librarianship as discussed at the beginning of Chapter 10.

6·1 Indexes, Abstracts and Union Catalogues.

Periodical indexes and abstracts cover many periodicals, just as other bibliographies discussed in the preceding chapter cover many books, but they analyse or index them, not just catalogue them as wholes. As shown in 3·5 the Index-catalogue of the U.S. Surgeon-General's Library was called an index-catalogue because it indexed periodicals as well as catalogued books. Libraries can and do undertake some of this periodical indexing, and even abstracting, in their catalogues and some of it in published form is still a by-product of library cataloguing. But generally libraries have found this beyond their resources, except some libraries which are specialized in subject, and are information and bibliographical services or centres as much as libraries in a narrow sense.

The inability of most libraries to attempt effective periodical indexing and abstracting should be understood upon a realization that periodical articles on the average take more cataloguing than books, because of their greater subject specialization, and are more numerous; the Liverpool Library catalogue of nearly a thousand pages described in 5·31 and covering over three years hasn't as many entries as some periodical indexes for one year. Time is often wasted in special libraries on speculative and selective indexing, and even abstracting of periodicals, when better results would be obtained by thorough use of published indexes as required. Indexing is often insisted on by library authorities, and attempted by librarians, who do not understand the problem or its magnitude.

Published periodical indexes and abstracts have been developed to do for many libraries what each separately cannot do for itself, and to avoid duplication of work; they supplement library catalogues, and in much of the reference and bibliographical research work of reference and research libraries they may be used more than the libraries' own catalogues. But the periodicals they cover may not be identical with those held by any library, and their entries and references do not give the library locations of the periodicals indexed. A library catalogue will tell whether or not the library has a periodical to which an index refers, and enquiry may not be taken beyond one library; the reader uses what he finds in it, or does without, because time is short or he hasn't sufficient need to take him elsewhere, or to have a periodical, or a copy of an article in it, got from elsewhere. On the other hand, an article which from its entry looks good may be wanted, at any cost, and union catalogues or lists then become important. These do not index periodicals by subject; they are usually alphabetical by author or title according to the rules for the cataloguing of periodicals and other serials, and, what is all important, give the names of libraries in an

area, which may be a whole country, holding each periodical, and details of what each holds. We are not particularly concerned here with union catalogues or lists, but students should realize their importance for the full use of periodical indexes and abstracts by libraries subscribing to them. Some libraries with only 10 per cent of the periodicals covered by an index make better use of an index through the use of union lists, inter-library loans, photocopying services, and so on, than other libraries do which may have more of the periodicals covered by an index, which they have but do not use to full effect in the interests of their readers.

6·11 Specific Reference and Generic Survey.

Periodical indexes are used as issued and in cumulations and for an indefinite period for specific reference, but being alphabetical they cannot be conveniently used for generic survey of literature, that is, for the survey of both the special and the general literature in a fairly wide field such as chemistry, or organic chemistry, or a subclass of organic chemistry. But the fact that they continue to be alphabetical, even in countries with a strong prejudice in favour of classified cataloguing, shows that they meet a major need, that of specific reference.

Abstracting journals are used as issued, for generic survey, for which they are more or less classified, and as their subject indexes do not appear until the end of the year they can hardly be used currently for specific reference. When the indexes are available they are used more for specific reference than for generic survey, because there is on the whole more reference to literature for specific information than for generic survey, and/or because 'back' reference is more often specific than it is generic, and because there is more back than current reference. Currently a man working in a fairly wide field may want to know what is going on all over it, and currently anything that helps generic survey helps him, but when he has a specific problem to deal with, and has to consult back as well as current literature, then the direct specific reference of the alphabetical index might suit him better. There has been too much assumption and not enough research on this question of specific reference and generic survey use, of all kinds of catalogues, and on the merits of alphabetical and classified cataloguing generally, but in general reference library practice both readers and librarians generally use alphabetical indexes before classified abstracts, and only fall back on the latter, not because they are classified but because they are more detailed in specialized fields, and include abstracts; what is used in the first place is the extra alphabetical index, not the classified arrangement, if only because the former is cumulative and does include multiple reference to a single entry.

6·12 Cumulation and Multiple Entry of Abstracts.

Cumulation in printed volume catalogues of any kind always presents a problem of economy and efficiency; it is always being cut down rather

than increased, for example in the Wilson indexes and catalogues, because consumers cannot or will not meet the cost, and the problem is greatly increased with abstracts. An entry without an abstract in Wilson's Industrial Arts Index takes about a square inch of space, in the Engineering Index with an abstract about three square inches, and in Chemical Abstracts with an abstract about three and half; entries run about twenty-four, twelve, six to a column respectively. This means that four lots of six entries can be cumulated, or six articles given about four entries each in the IAI in about as much space as is required for six uncumulated, unrepeated entries with abstracts in Chemical Abstracts.

The problem is something like that of books on the shelves as compared with entries for them on cards in a card catalogue, but intensified. Generally speaking we cannot duplicate books for different classifyings, but we can, with the Dewey system of relative location and expansible notation, keep books in one order on the shelves. Entries on cards can be multiple, and they can be cumulated without repetition; entries with fixed location on pages in serially issued indexes and abstracts in page form can have multiple entry, but cannot be cumulated from issue to issue without repetition, and with abstracts even multiple entry in one issue proves uneconomic, and cumulation proves inefficient because of bulk.

We are then forced back on single entry without cumulation, not for any reasons of cataloguing efficiency in theory but because of purely physical and cost considerations, and just as our single copies of books on the shelves may as well be classified, and have direct or indirect alphabetical indexing in a catalogue, so our single entries of abstracts may as well be classified, since even if they were in some alphabetical subject order in each issue they would still have to have a volume index, covering in one arrangement the abstracts in all the issues making up the volume and the added entries which would otherwise be made. And there are other consequences of the necessary economy of single entries without cumulation; as will be seen compound class numbers as a means of added entry by reversal cease to have this use, and class numbers repeated from issue to issue in a volume become cumbersome and uneconomic in its indexing, because an issue date or number as well as a class number would have to be given. The class numbers cannot be used for relative location, because the entries must have fixed location and they cannot be used efficiently in indexing, so in fact they have not been used, even when given, and in at least one case in which the UDC classification or order of subjects has been kept, all use of its notation has been discarded.

These are real, practical, considerations, in catalogues in printed volume form, with or without serial issue. The student must always have them in mind; on the one hand he must not lose sight of them in the midst of some abstract, metaphysical, and probably pseudo-scientific theorizing about classification; on the other hand he must

not assume that they fix cataloguing method under other physical conditions such as in the card catalogue and some forms of mechanical or semi-mechanical information retrieval, in which there can be multiple coding, and alternative selection of a single entry according to different subjects. But here we are concerned with alphabetical indexes and abstracts in printed volume form.

6·2 Poole's Index and the LA's Subject Index to Periodicals.

There were forerunners, but the beginning of the present-day exclusively periodical index seems to be Poole's Index, which began by being retrospective but was brought up to date in successive editions. The 3rd edition is An Index to Periodical Literature, by William Frederick Poole, 3rd ed., brought down to January 1882 (from January 1802) with the assistance of William I. Fletcher. A quotation from its preface describes its method and shows, as do entries, that it was based on the title word method. We read: "A single reference to an article will, in most cases, be sufficient but if several subjects of importance are treated . . . or it is likely to be looked for under more than one heading, two or more references will be made . . . as brief and comprehensive as possible. In most cases the author's own title best expresses the subject . . . but if he has given it an obsolete or fanciful title, the indexer will give it a better one, and will place it under the heading where it naturally belongs."

This is part of instructions to collaborating indexers rather than advice to users; the idea seems to be that of indexing articles vaguely remembered by readers and wanted again, rather than that of indexing information hitherto unknown to an enquirer, and also seems to show Crestadoro's influence. But in any case Poole as Cutter's predecessor in the Boston Athenaeum Library was still thinking of cataloguing tied to titles, and Cutter had to overcome his influence. This is a sample of its entries:

> Caterpillars; My Summer Pets. (M. Treat) Lippinc. 4:55
> —Preservation of. (S. H. Scudder) Am. Natural. 8:321
> —Venomous. (A. Murray) Nature, 8:7
>
> .....
>
> Cathari. See Albigenses

Caterpillars in the first entry seems to be an example of the better title, for indexing purposes, provided by the indexer; it is however thought of as a substitute title word, not as an independent heading, and clearly space saving was all important.

The Subject Index to Periodicals . . . issued by the Library Association . . . London, now comes out quarterly, with annual cumulation, and has shown development from something like the original Poole to, but not quite to, pure alphabetico-specific cataloguing, with headings quite independent of titles and cross reference not used instead of added

entry; its headings are still too much influenced by titles and cross reference still sometimes takes the place of entry.

The Preface says "The system of headings. The Subject Index is compiled on the plan of the 'dictionary catalogue', all entries being arranged . . . in a single alphabetical order." But the plan of the dictionary catalogue is all entries including author and title as well as subject in one order, and as there are only subject entries in the Index this talk about the dictionary catalogue plan is confusing, and nothing useful is said about its headings. The Preface also says: "Cross references are freely used, to link up related subjects. They also direct attention to unusual, out-of-the-way topics which would otherwise be overlooked." This is obscure but seems to mean, in a cautious, confused way, that cross references are also used to link up unrelated subjects, instead of multiple entry, and examples of this have already been given from the 1956 volume in 4·7.

Use of title words as headings is shown by the cross reference Sports Buildings see also Pavilions; there is nothing under the heading referred from, all the articles under Pavilions have pavilions in their titles and deal with pavilions for all purposes; it is shown also by entries under Chapel or Church according to the word used in a title, without any consistent differentiation of meaning. There is added entry; several articles under Machine Shop Practice, mainly in the periodical Machinery, deal with the machining of particular products, such as Duplicating machines, and have added entry when cross reference from Machine Shop Practice see also under the names of products, for example Duplicating machines, would have been legitimate and probably sufficient. But an article under Australia:Climate and Weather, on a cyclone is not under Cyclones, whilst one on cyclone damage in Africa is; and there is no cross reference. For some reason, or lack of it, articles on all sorts of things in Australia, but not otherwise particularly related to it, are entered under Australia, though this is not done so much with Canada. But even under Australia there are cross references such as see also Automobile industry, and under this twenty-six entries have to be read through to find two with the word Australia in their titles. If Australia and other countries are to be brought into it, then there should be subdivision by country under Automobile industry, otherwise the method is indexing by title words as in the common British classified catalogue, except that the reference is 'cross' in the catalogue, and not from an extra index.

Lack of system in the headings, and of control by means of a subject headings list, is shown by Hydrogen bomb as a heading in 1955, with the only reference from Bombs to Guided missiles, and an article on the hydrogen bomb in 1956 under Hydrogen, and articles under Guided missiles with no reference from Bombs. In his Documentation in 1948 Bradford described this index as a good example of alphabetical indexing, without naming it, and then used its undiscriminating use of the word cell in headings as evidence that even the good alphabetical

index was inadequate, because it either used title words, or class headings not known to the user. This one still puts some fruit spraying articles under Fruit culture and some under Spraying, under which it mixes spraying for diseases and watering by spraying; but pruning is only under Fruit Culture. Bradford's mistake, or prejudice, was in describing it as a good one. He did not refer to the Wilson indexes. The Preface to the Subject index, and examples from it, right up to date, give the impression that, quite apart from any question of economies in a printed volume index, there is an attempt at the pure, unadulterated alphabetico-specific index based on Cutter's Rules for a dictionary catalogue and Congress practice, without adequate experience in and understanding of principles and practice by those doing and editing the indexing.

6·3 The Wilson Indexes.

The Wilson indexes, published by the H. W. Wilson Company, New York, are compiled mainly by librarians experienced in the dictionary catalogue, and they include the Readers' guide to periodical literature, which at least in effect, is successor to and continuation of Poole's Index. With periodical articles instead of books it follows the lines of the same company's Cumulative Book Index, entries from which have been given in 5·3, and as it is an author and subject index, in one arrangement, it is on the dictionary plan. Here is an author entry:

Compton, George Carpenter
Analida I queen of coffee. Americas 9:10-12 Ap '57

Here are subject entries for this:

Coffee trade
Analida I queen of coffee. G. C. Compton. il. Americas 9:10-12 Ap 57

Beauty contests
Analida I queen of coffee. G. C. Compton. il. Americas 9:10-12 Ap 57

There is no title entry. There is a reference from Contests, see Competitions, and under Competitions a further reference See also subhead competitions under various subjects, e.g. Music—Competitions, so that in this case cross reference to Beauty contests, or the use of this heading is not all it should be, nevertheless cross reference is systematic and usually consistent.

Another Wilson index has been its Industrial Arts Index, now Applied Science & Technology Index. This is a subject index only; examples have been taken from it for comparison with the entry of the same article in the Engineering Index and in Chemical Abstracts, and from the Wilson Agricultural Index for comparison with Plant Breeding Abstracts. In the Industrial Arts Index for 1948 an article on liquid

scintillation counting of tritium and carbon labelled compounds was under Counters (electrons, ions, etc.) and under Tritium; one on Measurement of the tritium concentration in natural waters by a diffusion cloud chamber was under Tritium and under Water—Heavy Water, which is divided class entry for which Water, Heavy would have been more in accordance with specific entry practice; a third article on Estimating the tritium content of tritiated water was under Tritium—Analysis, and under Water—Analysis. Here is an entry from the Wilson Agricultural Index for 1950:

Corn

.....

Genetic research

Gene induced mutation of a heritable cytoplasmic factor producing male sterility in maize. M. M. Rhoades. Nat. Acad. Sci. Proc. 36: 634-5 N 50

Corn is the American name for maize. The entry also appears under Genes (Botany), Mutation (Botany) and under Sterility in plants. It does not appear under Plasmogenes, although this heading seems to cover other papers on the cytoplasmic factor in the sterility of wheat. There are cross references such as Heredity (Botany) see also Genes (Botany).

6·4 The Engineering Index.

The engineering societies of New York, in association, have a library with one of the few classified catalogues in America; they also compile and publish the Engineering Index, apart from the library and its classified catalogue. A preface states that "the thing-process breakdown" is used in the index; this seems to mean little more than that heading and subheading are used for a thing and an aspect or process of it to which articles may be limited, without added entry under the process, but articles on the general application of a process are of course entered under its name; Materials handling has been given as an example.

The preface also says that "see also references correlate similar material and serve to refer general subjects to specific subjects", and that "see references are used to indicate synonymous terms". This would suggest alphabetico-specific entry, but in fact there is in it a great proportion of divided and undivided class entry, with some upward see reference. For example, under Plastics there are Polystrene and Vinyl as subheadings, with upward see reference from Polystrene, but not from Vinyl. One of the articles mentioned above, on tritium, is entered as follows:

Radioactive Materials—Measurement

Liquid scintillation counting of Tritium and C^{14} labelled compounds, D. J. Rosenthal, H. O. Anger. Rev. Sci. Instruments v 25 n 7 July 1954 p. 670-4

Then follows a seven-line abstract in a half-page column. The article with or without abstract, is not under Counters—Scintillation, or Tritium, but there are references from this:

> **Tritium.** See Radioactive materials—Manufacture; Radioactive materials—Measurement; Radioactive materials—Tracers

The reference is not between synonyms; it is to undivided class headings, and when we turn to Radioactive materials—Manufacture, and so on, we have to read through several entries to find those which have tritium in them. This title word indication is inevitable with undivided class entry and upward reference, but fortunately the titles of scientific articles usually mean what they say. Nevertheless see also reference down from general to specific would be better, and would take little or no more extra space, except that the method is also used to avoid added entry of papers such as that used as an example, which covers both tritium and carbon compounds.

Comparison with the Wilson indexes, without abstracts, shows that the major space problem with abstracts is abstracts; the abstract for the above article takes seven lines as against the two or three of the entry itself. Economy requires single entry, and it usually has to be class entry for articles usually dealing with more than one specific thing in one or more classes. Then, as suggested in 6·12, it may as well be classified, not alphabetical entry, but with alphabetical indexing, as in the abstracts now to be considered. With the Engineering Index classified arrangement in it might then be based on the classified cataloguing of the engineering societies' libraries. Nevertheless its continued publication with an alphabetical arrangement shows that where the prejudice and habit are for alphabetical indexing, and not for classified as in Great Britain, the former arrangement continues to be accepted, and even preferred, even though it does not allow of generic survey of current literature over fields as wide as Nuclear phenomena and Water, Sewage and Sanitation, which are undivided classes in Chemical Abstracts, also compiled and published in America.

6·5 Abstracting Journals with Special Classifications: Fuel Abstracts.

Fuel Abstracts is published by DSIR Fuel Research, Great Britain, and the following entry is from vol. 14, July 1953:

> H. BY-PRODUCTS OF CARBONIZATION AND GASIFICATION
>
> 295. SEPARATION OF PHENOLS FROM COAL TAR HYDROCARBONS BY MEANS OF GLYCEROL AND AQUAEOUS TRIETHYLENE GLYCOL: DEVELOPMENT OF PROCESS
>
> Cumming, A. P. C. (J. appl. Chem. Mar. 1953, vol. 3, 98-106). The paper deals with the separation of mixed phenols from coal tar hydrocarbons boiling in the 170-201°. By subsequent treatment of the extract, a final mixed phenols product can be produced containing 0·1% of hydrocarbons or less. (L.)

There is only single entry, with cross references and indexing; for example at the end of class H appears:

See also abstracts

183. New cooling plant for Stuttgart coke ovens.
195. Apparatus for collecting acetic acid from smoke of carbonization of wood.

These are in class E. CARBONIZATION. With reference to abstract 295 the alphabetical subject index has:

Hydrocarbons
Coal tar, and phenols, separation of, with glycerol and triethylene glycol 295

Phenols, in coal tar hydrocarbons, separation with glycerol and triethylene glycol 295

The indexing is selective, not covering Glycol, but that does not affect the method. Note that in the cross references between classes reference is by abstract numbers running right through a volume. Note also that the classification is not subdivided or hierarchical; it is not selected from a general classification such as UDC; it does not have an hierarchical notation such as DC's and UDC's decimal notation, but it is still classification.

6·51 CHEMICAL ABSTRACTS.

Here are three papers as entered in Chemical Abstracts, without the abstracts. They are all on the specific subject, and chemical element, tritium:

3A NUCLEAR PHENOMENA

LIQUID SCINTILLATION COUNTING OF TRITIUM- AND CARBON-LABELLED COMPOUNDS. Donald J. Rosenthal and Hal. O. Anger (Univ. of California, Berkeley). Rev. Sci. Instr. 25, 670-4 (1954); cf. C.A. 48, 5663e.—

Then follows a six-line abstract.

cf. C.A. 48, 5663e is a reference to another abstract of a longer paper with the same title and authors in Chemical Abstracts for 25th May 1954, this one being in the 25th November issue. The reference is to a column indicated by number, and a ninth part of it, the fifth, indicated by e. This is the method of reference used in the index, and as shown in 3·1, something like it was used in Watt's Bibliotheca Britannica in 1824. The abstract given here is 13451e. 3A is one of 41 classes numbered 1-3, 3A, 4-10, 11A-I, 12-15, 15A, 16-31. The numbers have been extended by letters for new classes, but the classification itself is not subdivided. The classes are repeated in fortnightly issues; the column numbers run through the volume, 48, for 1948, divided into five physical volumes, each about $3\frac{1}{2}$ inches thick; the Author Index is in part of the fourth volume, and the Subject and Formula Index is the whole of the fifth.

3A NUCLEAR PHENOMENA

MEASUREMENT OF THE TRITIUM CONCENTRATION IN NATURAL WATERS BY A DIFFUSIONCLOUD CHAMBER. E. L. Fireman and D. Schwarzer (Brookhaven Natl. Lab., Upton, N.Y.) Phys. Rev. 94, 385-8 (1954)

Then follows a ten-line abstract. The reference number is 7443g.

14 WATER, SEWAGE, AND SANITATION

ESTIMATING THE TRITIUM CONTENT OF TRITIATED WATER. Wilmer A. Jenkins (California Inst. of Technol., Pasadena) Anal. Chem. 25, 1477-80 (1953)

Then follows an eleven-line abstract. The reference number is 914g.

Here are alphabetical index entries to these abstracts under Tritium:

TRITIUM. (See also Tritons (tritium ions); and "isotopes of" under Hydrogen)

counting (liquid scintillation) of compds contg, 5663e, 13451i.

in water (natural) 7443g.

TRITIUM, ANALYSIS

detn

in water 914d, 7443g.

There is also:

WATER, ANALYSIS

detn

of T, 914d, 7443g.

There are no entries at all under Scintillation; there is one under Counters Scintillation for 13451e; there is no entry under CLOUD CHAMBERS for the second abstract given above.

Notice that prepositions are given as indexing terms but ignored in the alphabetical subarrangement; prepositions indicate differences of relation, and although much is made of indicating relation in UDC and other synthetic classifications the nature of a relation is not shown by such a general relations device as the colon of UDC. On the other hand, classification in Chemical Abstracts is very broad, and even rough; the second and third abstracts given above are both indexed under Water, analysis, determination of T, that is Tritium, and both deal with its determination in natural waters, but one is in class 3A Nuclear phenomena and the other in class 14 Water, Sewage and Sanitation.

Classification may be influenced by the cover of the journals abstracted and by those doing the abstracting. The first of the two was in the Physical Review. Nevertheless the student, and any critic, should pause and think of the detail and extent of the annual indexing done in Chemical Abstracts, as compared with any other described here, or known to him.

In its extent, detail, and efficiency it is probably by far the greatest analytical indexing so far achieved, at least in English. The classification though broad is adequate for generic survey of the literature of such a field as Nuclear phenomena, fortnight by fortnight; but the greatest use of Chemical Abstracts is for specific reference through its alphabetical index, and in criticizing it in his Documentation, 1948, Bradford criticized it not as a classified but as an alphabetical index, which he assumed too easily was the old catch-as-catch-can concordance of titles indexing. Title words and subject indexing words commonly coincide, but a point is made of departing from them when necessary, and as reference is to the location of the abstract, by column number and column division indicated by letter, title words are certainly not part of the method of reference, as in the kind of classified catalogue indexing exemplified in 5·4. As shown in 3·2, the indexing of Watt's Bibliotheca Britannica was mistakenly thought to be by title words, even by Edwards, whom Bradford quoted in support of the idea that all alphabetical indexing is of necessity tied to titles.

6·6 Abstracting Journals Using UDC: Electrical Engineering Abstracts.

Electrical Engineering Abstracts are edited and issued monthly by the Institution of Electrical Engineers, Great Britain. The example now given has already been used at the beginning of Chapter 4, to which reference should be made, and to 5·44 on the classified catalogue with reversible numbers.

APPLICATIONS. ELECTRIC DRIVES 621·34

621·34:621·311·21:627·88

215. An investigation into the design and performance of electric fish screens and an electric fish counter. N. G. Lethlean. Trans. Roy. Soc. Edinburgh, 62, Pt II 479-526 (1951-53)

The paper deals with the possibilities of employing electric screens for preventing migratory fish from entering inlet and outlet tunnels of water turbines and gives the results of laboratory investigations followed by site experiments under actual working conditions. . . .

The abstract continues to about 180 words in 24 half-page column lines. Under SUPPLY. GENERATION. POWER STATIONS. SUBSTATIONS 621·311·1/4 there is a cross reference 621·311·21:627·88:621·34

The design and performance of electric fish screen and an electric fish counter. See Abst. 215

Note that the reference is from a 'reversal' of the compound UDC number covering the abstract, but to the abstract by serial number. There is no reference at 627·88 etc., though 627·88 is for the protection of hydraulic power plants against ice, silt, etc. The abstract is classified as one on applications of electricity, 621·34; in relation to hydro-electric power plants, 621·311·21; in relation to the protection of dams, not necessarily but usually used for the generation of electricity by water power, 627·88. The compound number does not extend to the fourth, fish 'element', of the subject though it could have been made to do so by the addition of 639·081·1, which is methods of fishing with nets, trawls, traps, pots, etc.

In the index, which is annual only, there is nothing under Fish, or Screens, or Dams or Water power. The only reference seems to be

HYDRAULIC ENGINEERING 626/627
elec. fish screens, 215

Note that the general or class heading refers to a class number, or in this case a wide range of numbers, under which there may be several entries, but the subordinated specific headings refer to the serial abstract numbers running right through the volume. The class numbers of course begin again in each monthly issue. In this case, as noted above, the abstract is not entered at 627·88 or even referred to from that number, and it is difficult to understand how the indexing is done, on what method or principle; the abstract is entered at 621·34 Electric drives, but in the index under Drives, Electric 621·34 there is no reference to it. Other cases show the same kind of inconsistent, questionable indexing; between the classifying, the entries and the cross references, and the alphabetical indexing there is uncertainty of what the editors are trying to indicate to whom, and how.

The classification as distinct from the use made of it, may be satisfactory, and the notation might be satisfactory, if it were really used. But the page of contents, in the order of the classification, gives page references, and the alphabetical indexing depends on the abstract serial numbers, as do the cross references. Therefore it may be concluded that whilst the classification might be used the notation can be dropped, and as will be seen this is what has happened in Plant Breeding Abstracts. The student should carefully note that the notation is not the classification, and that any classification may be used without its notation.

6·61 Abstracting Journals Using UDC, Without its Notation: Plant Breeding Abstracts.

Plant Breeding Abstracts is prepared by the Commonwealth Bureau of Plant Breeding and Genetics, School of Agriculture, Cambridge, England. The example given below is from the abstracts for 1951, and the article indexed is the same as that shown in Wilson's alphabetical

Agricultural Index in 6·3 above. It and its companion Herbage Abstracts are by way of being case studies in the application of a general classification and its notation, and especially of UDC, to the classification and indexing of abstracts. Herbage Abstracts used the UDC classification and gave its numbers, then it used a classification of its own, but still gave UDC numbers, then it ceased to give UDC numbers. Apparently its editors and users did not find UDC a satisfactory classification for the subject field of the abstracts.

Plant Breeding Abstracts began and continued for some years with UDC classification and notation and with an indexing method offered by Pollard and Bradford in their paper in ASLIB Report of proceedings, 9th Conference, 1932, pp. 20-40, and by Bradford without acknowledgment to Pollard in his Documentation, 1948, in which he writes as if Plant Breeding Abstracts was still using the method, though it had been given up by then; another abstracting journal also mentioned by Bradford, as using it had ceased publication. In their advocacy of UDC Pollard and Bradford were faced with a double difficulty; they argued in 1930, in ASLIB Proceedings, 7th Conference, pp. 39-54, that alphabetical subject indexes were necessarily inadequate, but had to admit that though one in a classification might be a minor necessity it was a necessity which they said could be made adequate; less explicitly they tried to meet the fact that with the single entry abstracting journals the compound reversible numbers of UDC were not used as intended, for added entry numbers by reversal. In this double dilemma they asserted that only 'simple' subjects can be alphabetically indexed, not the complex notions of some documents.

In thinking about muddled thinking it is difficult not to become even more muddled, and to go on, not from strength to strength, but from weakness to weakness, as in fact thinking about synthetic classification has gone steadily, before and after Bradford. But we must try to deal briefly and without muddle with the Pollard and Bradford Decimal Reference Index, as affecting the indexing of periodicals and abstracts, and we may do so best by taking a case.

Suppose an article or abstract of a document on lung cancer and smoking, in some classified order, but numbered for indexing purposes by the running number 220. It can be alphabetically indexed for its cancer interest by Cancer 220, but this does not index it for its lung or its smoking interest, nor does further specification of it under Cancer as Cancer, Lung, and Smoking; this only subindexes it under Cancer as being more specifically on lung cancer and smoking. To use the language of UDC further discussed in Chapter 10, the lung and smoking information would still be hidden. But it is equally hidden, as UDC's own editors admit, by synthetic classification, unless a reversible number for the whole 'concept' or 'notion' of the document is used, and reversed for added entries; and it is equally revealed by alphabetical indexing, if there is indexing under Lung and under Smoking as well as under Cancer.

What Pollard and Bradford proposed would be in this case a compound class number and the abstract number, 616-006·6:616·24:613·84—220, representing Cancer:Lung:Smoking—220. This compound number and abstract number, in classified order with others, would be the Decimal Reference Index or Classified Subject Index, without any actual entries under the compounds or their reversals, which would also be given, for example 613·84:616·24:616-006·6—220. And this classified index or skeleton catalogue would then have its own Alphabetical Key, in which there would be Cancer 616-006·6, Lung 616·24, Smoking 613·84. This is the alphabetical indexing of 'simple' subjects, conceded to be both possible and necessary, and by implication any subject, however complex, was reckoned as a simple subject if it had its own UDC number.

In the practical use of any periodical index or abstracts to which it is applied it means two indexes instead of one, to reach the article or abstract, because the Alphabetical Key is only to the Classified Subject Index, which then only gives serial numbers of abstracts. After trial its compilers and users obviously found it adequate and easier to go from either 'simple' subjects such as Cancer, or from these with further specification, such as Cancer, Lung, and Smoking, directly to the abstracts or articles, and the whole idea died what is usually called a natural death.

This may seem merely past history, but at least it is informative history; moreover Bradford's Documentation is still considered an authority, which it is on the history of UDC and FID, from their side; it was reprinted in 1953 with a useful introduction, but still no indication that such boasted and ballyhooed devices as the Decimal Reference Index had died a natural death before 1948, and that indexing was still being effectively and quietly done by the old methods, as in Chemical Abstracts, the Wilson indexes and Plant Breeding Abstracts at present.

Here is the article by Rhoades in Plant Breeding Abstracts; this is the only entry under the classification Agriculture—Crops—Cereals—Maize; articles on particular plants are classified according to the plant because it has been found that the greatest number of requests is for information on particular plants. The classification of UDC is still followed, but its numbers are not given; the only number appearing is the number of the abstract in the volume, then used in all the indexing which takes the place of added entries, as it always did.

1012. **Rhoades, M.M.**

Gene induced mutation of a heritable cytoplasmic factor producing male sterility in maize.

Proc. Nat. Acad. Sci. Wash. 1950:36:634-35

This is followed by a nine-line, page-wide abstract, and there are at least the following references to it in the annual subject index:

Cytoplasmic inheritance	1012
Genetics	
Cereals	1012
Maize	
Botany	1012-4
Cytology	1012
Genetics	1012-3
Mutation	1012
Sterility	1012

6·7 SPECIAL BIBLIOGRAPHIES.

The student should also remember that besides library catalogues and serially published indexes to periodicals, and abstracts of articles in them, there are special bibliographies by the thousand involving the same problems, and that some of them should be known for reference work. Only a few specimens illustrative of method can be instanced here.

A classified list of published bibliographies in physics 1910-1922 . . . by K. K. Darrow and published as a Bulletin of the National Research Council in America is an example of a subject bibliography, in this case of bibliographies, with its own classification, its own decimal notation and an index referring to the class numbers.

A Guide to the literature of mathematics and physics . . . by N. G. Parke, published by McGraw-Hill in 1947, is an example of an alphabetico-specific, self-indexing bibliography, which also has a "Classed arrangement of subject headings". This sort of thing has been called a 'synoptical table' and has been used in some alphabetical encyclopaedias as a means of systematic study. In the early days of the dictionary catalogue, as shown in Cutter's rule 188, it was proposed as an aid to readers, was supported by Hulme and rejected by Cutter as not getting sufficient use to warrant the labour of compilation. Lately it has been suggested that what was meant or implied was some tying of the dictionary catalogue subject headings and references to an hierarchical classification and the chain procedure method of indexing, but a broad alphabetico-classed or even subject-classed rearrangement of alphabetico-specific headings is not an hierarchical classification, complete with notation, and everything written by dictionary catalogue authorities supports the view that what they consider a supreme virtue of the dictionary catalogue is the freedom of its compilers to use any subject headings and to make any 'hierarchy' of references from general to special and so on without being tied to the subjects and hierarchies of any classification. But on this further see Appendix F.

Phyllis M. Riches' Analytical bibliography of universal collected biography, published by the Library Association, London, 1934 is an example of the 'analytical' bibliography, which not only catalogues but also indexes or analyses a collection of books. Its own description is as follows:

"The books analysed and indexed are written in English, and include both English and American publications. There are two main parts:

1. The Index of people written about arranged in alphabetical order and having date of birth and death . . . and a short description, such as 'Poet' or 'Statesman'. Under each name the books in which short biographies appear are set out in alphabetical order of the authors' names. Each book title is brief, so that the Main Index is as concise as possible without losing any of its usefulness.

2. The second part of the work is a Bibliography of the works dealt with, being partly evaluative . . . This section . . . is arranged under the authors' names . . .

To make the Bibliography more useful, three indexes have been added. There are:

(*a*) A chronological list of persons dealt with, arranged according to centuries;

(*b*) An index of persons dealt with, arranged alphabetically under their profession or trade;

(*c*) An author and subject bibliography of biographical dictionaries."

Besides being an example of an analytical bibliography this is also a good example of the multiple approach bibliography.

In some examinations students have been given an outline of material and asked for a scheme for a bibliography of its subject. It is sometimes tempting, but not what is wanted, to say classify by DC or UDC with author and subject indexes, or make a dictionary catalogue. A special scheme is often warranted in a bibliography, but at the same time the essential problems, especially those of notation and other apparatus, are those of the general library catalogue, and of the periodical indexes and abstracting journals, and there is no reason why, if a librarian has to compile a special bibliography, he should become one of the all-too-many amateurs who attempt the compilation of catalogues, indexes and bibliographies, without sufficient knowledge or experience of method.

Chapter 7

Shelf Arrangement, with DC, EC and LC

Dewey's DC, Cutter's EC and the Congress classification LC, have two things in common; they come before UDC and are therefore pre-synthetic, and they have been used mainly for shelf arrangement. Only DC was intended for cataloguing as well; it has been used by libraries adopting it for the shelf, and for a classified catalogue based more or less on the shelf list, as shown in 5·41; but outside Great Britain, whilst a great majority of English-speaking libraries have used DC for the shelf, they have used it with a dictionary catalogue in which shelf numbers are of course given but in which there is otherwise no connection between subject cataloguing and shelf classification. It might seem that those who prefer alphabetical subject catalogues would prefer the same shelf arrangement, and that they are inconsistent in not doing so, but as we have noted, classified shelf arrangement is almost universal, despite some reaction from it in theory, already mentioned in 1·5.

It was said by Shera in Tauber's Subject analysis of library material, 1953, to be "too complex for the general public library and . . . completely inadequate to the demands of large research collections"; what seems to be under criticism essentially is the unavoidable linearity of both catalogue and shelf arrangement discussed in 2·6, and inability to show all subject relations by classification, along with the obvious limitation of shelf arrangement that it does not allow the multiple entry and analysis possible in the catalogue. But even whilst rejecting 'hierarchical' classification as too complex for the general public library, the reference department of which can be a very large collection, the same writer in the same article advocated for popular or public libraries, "categories according to 'reader interest' . . . Current affairs, Family life . . . with appropriate subordinate grouping". Categories are strictly final, fundamental classes or qualities of things, but the word category is now commonly used as a loose synonym for any class, but especially a comparatively broad one, and "categories . . . with subordinate groupings" are hierarchical classification.

For the great closed access stack collections of very large reference libraries, running into millions of volumes from all times and places, some alphabetical or chronological order may finally prove more efficient and/or economical for the physical retrieval of books, after they have been identified through catalogues, and there is some agreement that subject subdivision cannot and should not be taken as far on the shelf as in the catalogue, alphabetical or classified.

There is far less subdivision in the 15th edition of DC, which was the

first radically edited edition after Dewey's death, than there was in earlier editions back to the 7th of 1911. In his articles in the Library Association Record for 1911-12 on the Principles of book classification E. Wyndham Hulme criticized this edition as too full, at least for shelf classification, and as including detailed subject classification for which there was little or no literature in separate book form. The 14th edition, 1942, is almost twice as detailed as the 7th. The theory of the 15th is that of broad shelf classification and detailed alphabetical cataloguing, but even for the shelf the classification is too broad for anything bigger than a medium sized general library; it has been severely criticized, and later editions are likely to be detailed again, though perhaps more selectively than the editions from the 7th to the 14th.

7·1 Shelving and Cataloguing.

The classification of books cannot be as specialized on the shelf as in the catalogue, because they can only be classified by their general subjects, they cannot be analysed, and they cannot go in more than one place, that is, have the equivalent of multiple entry in the catalogue, unless there are multiple copies, and even when there are multiple copies these are usually kept together so that their availability may be readily known, or earlier editions may be 'in stack' but still at the same number. Even if books on the shelves were arranged alphabetically by subject there would not be multiple and analytical entry, and so complete indexing, and cross reference from one subject to another would be cumbersome, often involving movement in a large library along aisles and up and down steps. There would have to be cross reference even for the same subject because of the differing placing of books according to what happens to be the major and minor of two or more subjects treated, and because of the placing of some books in stack and some in open access, some on octavo shelves, and so on. Books themselves cannot be satisfactorily or sufficiently arranged for subject indexing; they cannot be made self-indexing; what corresponds to single entry in a catalogue is generally inescapable, and since this is so and there has to be an index or catalogue, the arrangement may as well be a classified one, or as is sometimes said, shelf and catalogue should be complementary, if the catalogue is alphabetical.

In a book called Classification of books, 1937, Kelley pointed out and perhaps over-emphasized what was her thesis, the limitations of shelf classification as a method of indicating or indexing books as a source of information; with realization of the limitations of linearity on the indication of subject relations her book may have led to the theoretical reaction against classification both on the shelf and in the catalogue. This reaction has had little influence on shelf classification in practice except perhaps in the very largest, mainly closed access libraries, and in favour of broad rather than close classification. As books on shelves must be arranged and numbered in some way they may as well be classified, at least where there is open access, because

classification allows readers to browse over large subject fields, within which they can do some indexing of their own, and even in large reference and research libraries with a large proportion of stock in closed access stacks some students are given stack access, which would be practically useless without classification.

The classification does not mislead the reader provided he knows that all the information on his subject cannot be brought into one class, or into one sequence, that all classification is imperfect and made more so by varying classifying, and that only thorough indexing, which is never sufficiently thorough or free from error, and patient searching on his part will reveal or retrieve all, if he wants all; the most embarrassed person in a library is sometimes the one who has shown to him even a small part of the 'all' on his subject which he began by asking for. Classification on the shelf is the half loaf that is better than no bread; it gives readers satisfaction and it often allows the librarian himself to shortcut the cataloguers' catalogue, alphabetical or classified, and make up for some of its deficiencies.

What we must keep in mind are the differences between books and catalogue entries for them. Books are not uniform in size, and they cannot be broken up; entries can be sufficiently uniform in size to go in one sequence, and there can be entries for parts of books; so the arguments about methods of arrangement on the shelf and in the catalogue are affected by different conditions, as the arguments about card catalogues and catalogues or indexes in book form are affected by different conditions.

Obviously individual volumes cannot be broken up, and there are sets of volumes which are held bibliographically to be individual or indivisible. There are also series of volumes with a series title, such as Today and tomorrow, which can be broken because the titles of separate works in them are not meant to be kept together, and are not regarded as in themselves incomplete without the rest. In a particular case the difference is that between Darwin's Origin of species in a set of his 'works' with a volume number, and the same work in a series such as Everyman's Library with only a series number, not on the title page or the spine of the volume. Works in such series are usually classified separately, because so many works are issued in series that if these were kept together, at 080 in DC, our shelf classification would be far more ineffective than it is. Sets which cannot be classified separately can be analysed in the catalogue, and periodical sets are analysed, as shown in Chapter 6, in the serially issued periodical indexes and abstracts; series which are classified separately can be listed together in the catalogue, in a series entry.

7·11 Size, Access and Subject Classification.

We come closer to problems which are shelving and classification problems, but not subject classification problems, when we consider

that volumes can differ in size from 'thumbnail', miniature or 'bijou' volumes to the 'elephant' and even 'extra elephant' folios, standing four feet high; it is not economic or efficient to shelve volumes side by side when they are widely different in size, though on the other hand it is not economic or efficient to have more than three or four separate runs of volumes according to size, although space may be saved by increasing the runs.

Shelving by size defeats the purpose of subject classification, and so too does another factor which is variously one of economy, efficiency and security, that of open and closed access, that of reading or circulation room shelving and that of closed stack or storeroom shelving; and still another factor is bringing ready reference and most used books to a point in a reference library where the staff can use them and where their issue can be supervised. In a large reference library these can number, with periodical indexes and the like, over ten thousand volumes. A variation of this is 'special reserve' in a university library.

A reference library reading room to seat five hundred readers at once, would have to be a room of about 12,000 square feet; without side windows, and no more doors than are necessary, and with three tiers of shelving round its walls it could only display about 50,000 volumes. The library might not draw more than five hundred readers at a time, and so not have reason for a bigger room, or more rooms, for readers, and yet might well have a reference collection of more than 500,000 volumes. The economic proportion of reading room open access is then only 10 per cent, and 50,000 may be close to an efficient open access stock for most readers, because to increase it means bringing into open access an increasing proportion of books and periodical sets of only historical interest.

Although we talk so much of subject classification, and although books are classified by subject before they are distributed as open access and stack, and according to size, in the result what we have primarily in most libraries is classes or groups of books by location, then by size, and then by subject and form. The subject classification in each location and size is the same, and so the various orders are said to be parallel; if there are books on the same subject in all of them the same class number will find them. The three principal sizes in shelving, are books up to about 10″ high, over 10″ up to 14″, and over 14″, and these may be called and even given on catalogue cards as 8vo, 4to, and fol., because originally sheets of paper in standard sizes folded eight times down to sizes about 8″ to 10″ high, four times down to sizes from about 10″ to 14″, twice down to the larger folio sizes. But sizes are now usually given in cataloguing, if at all, in centimetres, and purely for bibliographical purposes, whilst shelf locations and sizes which are necessary in finding books are indicated by letters prefixed to class numbers, such as S333 meaning a stack octavo, SQ333 a stack quarto, F333 an open access folio.

If books are shelved out of order, without altering the notation, as when DC 400 Language is shelved next to 800 Literature, this is called broken order. Parallel and broken order are to be distinguished from alternate order or classification allowed in the classification itself. In DC Biography may be 92 or 920 alphabetically arranged by person, or classified, 921 Philosophers, 922 Clergymen and so on, or classified to the subject, for example 610·9 or 610·92, Medical biography.

Books in some subjects or forms or special categories, such as rare books and pornographical books, may be given special notations, often of the fixed location type. Sometimes they are classified according to the general classification and then have a special classification or notation substituted; this obviously defeats the purpose and use of a general classification, but may have some use in shelf listing and classified cataloguing.

7·12 Shelf Classification and Subject Specification.

As discussed above, shelf classification may be broader than alphabetical or classified subject and form distinction in the catalogue; the former may not extend to detailed aspect, form, and process subdivisions, especially of UDC, which has auxiliary tables meant for catalogue rather than shelf classification, and it may not extend to detailed subject subdivision used in the catalogue. In a dictionary catalogue subject specification is not determined by that of the classification tables, as shown in 4·4; their degree of specification is often not sufficient, but with a dictionary catalogue the specification of the classification tables is usually accepted for the shelves, for example fox hunting, beagling, hawking, and so on, would all be specific in the catalogue, whilst DC's unextended number 799·25 would be used for all of them on the shelf. In the common public library classified cataloguing illustrated in 5·41 the index distinguishes, for example, humanism, but in the class list and on the shelf this goes to 144 which covers empiricism, pragmatism, humanism, instrumentalism and utilitarianism in the DC tables without distinction. One purely practical problem is that the more specialized a book is the longer the number tends to be, and the thinner the book, on the spine of which the number has to go, and be read.

Subject classification as such does not provide for size and location distinctions although some classification systems have included notation for some of these distinctions, and it does not provide for distinction of books on the same subject, except of course in the comparatively few cases in which a writer is treated as a subject; DC has, for example, 184·1 for the philosopher Plato. So there is a severely practical problem of distinguishing persons as authors within a class, and sometimes as subjects within a class, by what may be called author or personal numbers, or of distinguishing particular books in other ways within a class, as by date of publication, and one of distinguishing books by a combination of numbers, so that every book may have an

exclusive 'call number', by which it may be got from the shelf without quotation of its author and title, and by which its loan may be briefly recorded.

7·2 Book and Call Numbers.

On a subject such as wireless, already numbered 621·384 in DC (14th ed.), there may be a hundred books on the open shelves of a library, all generally on wireless, or not further classified, and to find any one of them readily there must be some subarrangement, and subnotation. Note that the problem is not one of further subject classification. A question, discuss the subarrangement of books in a subject class, has been taken by some students to mean discuss the further subject subdivision of such a general class as Useful arts; unfortunately the word class is used ambiguously for the basic co-ordinate classes of a classification, such as Philosophy, Religion, etc., in DC, and for any subject subdivision however specialized.

Supposing some books on wireless by Brown and some by Smith, if we mark the former 621·384 Bro and the latter 621·384 Smi, we have reduced the area of search for either, and we have a self-indexing alphabetical suborder for known authors on the subject, but we have still got the books by Arthur, Bertram and Cuthbert Brown mixed up, and we haven't distinguished John Brown's Introduction from his Manual.

Suppose we add the date of publication in the form 621·384/1957 or with the date under the class number, or use some shorter code numbers or letters for the years, with extensions for more than one book in a year, then we have a chronological order which puts the later books last, but is only self-indexing for a particular book when its date of publication is known, and this is far less commonly known than authorship. And we still may not have an exclusive call number.

British public libraries commonly use accession numbers for recording loans; but these numbers are not shelf numbers, they may confuse readers by presenting them with a numbering system quite unrelated to that of the classification, and the resulting loan records are not in classified order for statistical purposes. On the other hand, the numbers are simple; a library may have 621,384 as an accession number and this is still not as long or complicated as 621·384 Bro. J.e., or 621·384/1957 and so on. American public libraries use some extension of the class number and if necessary some part of the book title for loan record purposes, though they may also have accession numbers for purely accession record purposes, which do not concern the public. And most Canadian and Australian libraries have preferred this, and use the Newark instead of the Brown loan recording or charging system, which has been most common in Great Britain; not because they are Americanized but because they think it suited to their needs. The use of accession numbers for loan records in Great Britain may go back to accession shelf order, before classification, and to closed access in

and out indicators, for which class numbers were unsuitable. In closed access days, reversible number tabs in a frame above a counter showed by the colour facing outwards whether a book noted from the catalogue was in or out. However we cannot discuss loan systems here; we are only concerned with call numbers as means of keeping and finding books in order on the shelves, but we should note that the need of exclusive numbers in recording loans is a factor to be taken into consideration in some libraries.

Dewey began by using his decimal notation to indicate size as well as particular books, so that 420·3·7 would mean number seven of books over $2\frac{1}{2}$ decimetres high in the subject class 420 which was English language, but later he opposed all such uses of his decimal numbers, even with separation by a vertical or horizontal stroke which works quite well in practice. He said there was danger of confusion, but he was probably concerned increasingly to keep the decimal numbers exclusively for his classification, which he began calling decimal in his second edition of 1885. What he said about book numbers in his last introduction, dated 1926, should be carefully read. This is the introduction given in the 14th edition of 1942, not in the 15th of 1951, but the Biscoe time numbers said to be on pages following the Relative Index were not given after the 13th edition of 1932.

Special time numbers or actual dates have not come into much use for shelf arrangement and on the spines of books. Serial numbers 1, 2, 3 . . . according to accession order have been used with separation from the class number by an horizontal or vertical bar, despite Dewey's objections, and they have sometimes been called 'specific numbers', a name which can lead to confusion with other already confused uses of specific in relation to subject. These numbers tend to give a rough order of publication which is useful, as Dewey says, "in science and useful arts", but it can only be guaranteed by time numbers based on publication dates. The latest book acquired may be the earliest published, and as numbers derived simply from accession order grow in length, and earlier books are lost or replaced, their numbers are sometimes used again, so that the latest book may become the first, and is overlooked by the reader who has got the impression that the order is one of publication. Author arrangement is now most common in all subjects and maintained by authors' names as given in the binder's titles, or by one or more letters of the authors' names after the class number, or by the initial letters of names followed by numbers, so that, for example, C563 stands for Churchill, and C568 for Cicero.

Charles Ammi Cutter, C991, was one of the first if not the first to work out a table of these alphabetico-numerical numbers for surnames, and any such numbers whether used for persons as authors or as subjects, or for other subjects, arranged alphabetically are now commonly called Cutter numbers. The tables most used for surnames were compiled by Kate Sanborn and called the Cutter-Sanborn tables though they are not an expansion of Cutter's original table.

So the three methods in common use are: the accession order method, which is the use of numbers within a subject as discussed just above, and must be distinguished from the use of actual accession numbers in loan records; the initial letter method with local variations; the Cutter number method, usually with the Cutter-Sanborn tables.

7·21 THREE-LETTER NUMBERS.

As far as shelf order in a small library is concerned there will rarely be sufficient books in a class to make their order a matter of consequence. The trouble is that some small libraries grow; even a small one may have fifty or more books classed at Biography, and in any case, if only two books have the same class number they need to be distinguished if the class numbers are used to describe them in recording loans. Also, in going from the catalogue to the shelf, a book is identified beyond question much quicker if it has an exclusive number.

The most convenient way to arrange books having the same subject number is alphabetically by author. This arrangement can be indicated by adding to the class number sufficient letters of its author's surname, or of the title when the author is unknown, to distinguish it from other books in the same class. If the first three letters are used this will be sufficient to distinguish most of the books in the small library. Where it isn't, the method can be extended in various ways as in the following examples.

The object is to give each book, and even each volume when a book comprises more than one, a number which will be exclusive to it and will indicate its exact place on the shelf.

Saintsbury, G. First book of English literature	$\frac{820\cdot9}{\text{Sai 1}}$
Saintsbury, G. Short history of English literature	$\frac{820\cdot9}{\text{Sai 2}}$
Methuen, A. Anthology of modern poetry 1st copy	$\frac{821\cdot908}{\text{Met a}}$
..... 2nd copy	$\frac{821\cdot908}{\text{Met b}}$

If small letters, a, b, c, are used exclusively for duplicates they signal that there is more than one copy of the book so marked. Bear in mind that a duplicate for library purposes is another copy of the same edition of a work, and not another edition of the same work; but if the edition is of no importance, as frequently is the case with different editions of fiction titles, the different editions can be treated as duplicates.

7·22 AUTHORS WITH THEIR OWN CLASS NUMBERS.

The greatest difficulties arise with men of letters whose separate works are classified together and who have books written about them as well as by them. DC (14th ed.) gives separate numbers for many standard authors; for example, 821·47 Milton, 822·33 Shakespeare, 823·83 Dickens, 824·75 Lamb. So much is cut in the 15th edition of DC that 822·3 "includes Shakespeare, Ben Jonson, Beaumont and Fletcher"; 822·8 "includes Barrie, Wilde"; strange bedfellows. When an author has an exclusive class number it is not necessary to add anything to distinguish him in the class. This solves some difficulties, but not all. Books 'on' and 'by' remain unseparated. This separation and still further groupings are effected and indicated by schemes such as the following. It is shown here with Shakespeare's class number, but can be used with any other.

$\frac{822\cdot33}{B}$	Biography
$\frac{822\cdot33}{D}$	Criticism
$\frac{822\cdot33}{G}$	Miscellany
$\frac{822\cdot33}{H}$	Quotations and Tales from Shakespeare
$\frac{822\cdot33}{J}$	Complete and partial collection of his works
$\frac{822\cdot33}{K}$	Individual works

These can be further particularized by additions:

Lee's Life of Shakespeare	$\frac{822\cdot33}{D:Lee}$	Dowden's Shakespeare	$\frac{822\cdot33}{D:Dow}$
Lamb's Tales	$\frac{822\cdot33}{H:Lam}$	Globe edition of the works	$\frac{822\cdot33}{J:Glo}$

Shakespeare's Macbeth $\frac{822\cdot33}{K:Mac}$

Schemes of this sort ensure sufficient shelf order, and a subclassification for what are sometimes called voluminous authors, and corresponding subheadings or catch titles may be used with the author catalogue entries. Something more may still be needed to provide an exclusive call number; but this may not be worthwhile for the shelf and for loan purposes. An edition, for example, of Shakespeare's Macbeth can be distinguished by addition of an editor's name as in 822·33/K:Mac Verity. If an author hasn't a separate class number then something like 823·91/Kip:D would have to be used for criticism of Kipling. Schemes of this sort may seem complicated and not worthwhile, but the annual

interest as it were on the investment, in keeping and finding books, checking shelves, recording loans, can be well over 100 per cent, and many a library that has got over the fifty thousand mark has regretted that it did not begin with something more than single- or even three-letter additions to class numbers.

7·23 Book Numbers and Close Classifications.

The difficulties of providing exclusive call numbers provide an extra argument for close classification. The more closely books are classified the less likelihood there is of more than one book by the same author or authors of the same name at one class number. If there is only one book in a class then there is no need for addition to the class number. Nevertheless the labour of giving a minimum addition such as three letters, or a Cutter number to a book when it is catalogued is less than that involved in getting a book in hand and all the cards for it, in order to do this when a second book is added to the class.

7·24 Cutter Numbers and the Cutter-Sanborn Tables.

Using letters from personal names is simple, and does not require tables, but coincidence creates difficulties; there are about twenty English language names beginning with Rob, about the same number with Tom, and over seventy with Sta, and coincidence increases with the size of a collection, and the number of books in a class, especially 92, even in a small library; hence Cutter numbers and the Cutter-Sanborn tables. Here is a section from the Cutter-Sanborn tables:

Robb	631	Toc
Robbins	632	Tocq
Robbins, F	633	Tod
Robbins, J	634	Todd, G
Robbins, M	635	Todd, M
Robbins, S	636	Todd, S
Robbins, W	637	Tode
Robe	638	Todh
Robert	639	Todl

The figures belong to both name columns; Robbins, S is R636, and Todd, S is T636; all Robbins with initials A to F would be R632, and Tocqueville would be T632. For a name or part of a name not actually given the rule is to take the one above where it would come in, and so there is R636 for Robbins, T, unless this has been used, in which case the one below. Decimal extension can be used, R6361 or R636·1, but the point is hardly necessary and seems only to have been copied from DC. Variation is possible and allowable, and the same number need not be used for the same name in every class, because arrangement is of course first by the class number to which the Cutter number is subordinated.

Coincidence is reduced by Cutter numbers, but something like 820·9/S152F and 820·9/S152S may be necessary to distinguish the

two books by Saintsbury given above. And if 92/N216 were used for Napoleon as a subject then 92/N216B might be needed to distinguish a life of him by Belloc, and so on. This kind of distinction is desirable even though one book may be in open access and another in stack, because books are transferred from one parallel order to another, and if 92/N216B is transferred from open access to stack only S for stack has to be put in front of the whole number to distinguish it from S92/N216A, already there. Book numbers should be assigned only after reference to the shelf list, to avoid identity of numbers, so that they are the business of the shelf lister rather than of a cataloguer or classifier who may not be responsible for the shelf, and book numbers should be determined as far as possible in anticipation of growth and future changes, such as of location.

7·25 Cutter Numbers for Subjects.

In his classification, EC, which has a literal notation, Cutter sometimes used initials to provide main subject notation and an alphabetical subarrangement, as in VELG, Shooting—grouse, VELP, partridges, VELPH, pheasants and so on. Bliss also did this in his BC, for example, QT8 Secret Societies, QT8K Kiwanis, QT8L Lions, QT8O Oddfellows, and so on. This mnemonic use of initials as literal notation in a main subject classification should be distinguished from the use of Cutter type alphabetico-numerical 'numbers' for final subject specification. As shown above, the Cutter-Sanborn table numbers for persons as authors can also be used for persons as subjects when they do not have main classification numbers, but Cutter type numbers can also be used for other subjects in what may be called terminal specification. This is one of the most important devices extensively used in LC and not in other classifications, for example TX558 Dietary studies, with TX558·P3 Dietary studies of peaches and so on. Other examples and discussion are in 7·5(6). The student might ponder that a book on a Churchill by a Churchill could have the number 92/C563/C563, and one on a Roosevelt by a Roosevelt the number 92/R781/R781.

7·3 The Shelf List or Register.

For proper stock control there must be some inventory, register or list of books in a library according to their order on its shelves. This is necessary for both continuous stocktaking and stocktaking at annual or wider intervals, and for the recording of temporarily or permanently missing books, until they are written off stock. The shelf list or register may be called a catalogue, and like art gallery catalogues which follow a numbered order of the pictures on the walls it is more a catalogue according to the original definition of the word than the catalogue which is an index to the shelves. But in library practice now the shelf list and an accessions register are not usually called catalogues, and should not be confused with an author, title, and subject catalogue.

The early idea of a shelf list as a catalogue is discussed in 3·1. A

shelf list, with or without added entries, may be used as a catalogue, which then of course must be a classified catalogue, and as discussed in 3·7, the economy of combining a shelf list with a catalogue probably had more to do with widespread adoption of the classified catalogue in Great Britain than theoretical arguments in its favour. If there is a dictionary catalogue there must be a separate shelf list, which was often kept in manuscript volumes called registers even after the card catalogue was introduced; other forms were the sheaf or looseleaf and the card list, but often with several brief entries, to a looseleaf or card. This had advantages in actual stocktaking, but the unit card copy of the main catalogue entry probably provides the most useful and easily provided shelf list, which will serve some of the purposes of a classified catalogue. For one thing it is good enough to copy photographically if there is, for example, a request for a list of all the library's holdings in French literature, a request which cannot be answered from a dictionary catalogue, but does not justify a classified catalogue because of its rarity.

Even if the catalogue is classified it will not serve satisfactorily as a shelf list in any but a small library. The catalogue should be in one sequence, whereas for convenient use a shelf list has to be divided into parallel orders, and notes have to be written into it not intended for public use. It is a tool for the staff, not for readers, and may in part serve as what has been sometimes called an 'official' catalogue, used by cataloguers in checking for precedents; full entries in a shelf list are therefore useful, and the classified order shows what books have already gone to a number. For this reason the shelf list, apart from its essential purpose, is a much more useful complementary tool in a library with a dictionary catalogue than in one with a classified catalogue.

As noticed at the beginning of this chapter, three classifications have been particularly intended or used for the shelf, DC, EC, and LC, and are presynthetic. DC is being dealt with throughout this volume for reasons given in 2·1. What follows on EC and LC should be sufficient for general purposes of comparison of EC and LC with DC, and with the later synthetic classifications. If the student is for any reason making a special study of EC or LC then he should study the classifications themselves and other material on them, some of which is referred to here. Cutter's EC is a 'dead' classification, quite unlikely to be studied now for practical use or in great detail, but it is historically important.

7·4 Cutter's Expansive Classification (EC).

Cutter published his Rules for a dictionary catalogue in the year in which Dewey first published his DC, 1876; he preferred the dictionary catalogue with specific entry to what he called the systematic catalogue, for "facility of reference", and apparently DC and the undoubted improvements it offered for the classified catalogue did not make him change his preference.

He issued his Expansive Classification in 1891-1893 without any of the voluminous metaphysical prolegomena of some later classification makers, saying simply that it was "the result of much study and thought", that it had "borne the test and received the improvements of five years use", and that it was a "scheme for arranging the books of a library so that similar works or works treating of similar subjects shall stand together on the shelves", and he could have added, "or in the catalogue". We might add, would that others had said no more, so that we would be less confused and have less to learn.

Cutter applied the Dewey system of relative location and relative indexing in all essential respects, but with a literal notation for his subjects, supplemented by numerical form numbers, 1-9, and place numbers of not less than two figures; he did not keep extensions of A for form, as Dewey kept extensions of 0, and as he used a different notation for forms and places he may in this respect have anticipated the auxiliary notations of UDC and later classifications, but it does not appear that UDC was influenced by him, as it was certainly influenced by DC. A typical EC number would be HG45·7 for a British trade unions periodical; H is Social sciences, HG Guilds, Trade unions, etc., 45 Great Britain and ·7 a periodical, for which the DC number would be 331·88094205, and the UDC number 331·881(41)(05). Gearing is TGD in EC, and 621·83 in DC; HWS is Socialism in EC and 335 in DC; on the whole EC has shorter, even much shorter numbers, not only because of the longer literal or alphabetical base, but also because of later and better distribution, and because the place numbers do not bring in the whole of a history number; and compared with UDC no 'sign of association' is needed; this is because of the change in notation for place which shows that the number is a place number and not an extension of the subject number. The classification itself, as distinct from the notation, is better and fuller than DC's at the time, but with all its merits it is a dead classification, partly because DC had already become established, and partly because there was no organization behind EC to keep it going. So far Dewey's, which was the first Dewey system classification, has been the only one-man classification to survive, and as time goes on it is more and more difficult for any classification not backed by a strong, non-profit organization to survive, and be kept up-to-date, for reasons which should be obvious, but do not seem so to librarians who even lately have adopted a one-man classification such as Bliss's BC.

EC was, however, a strong influence on Congress, which also adopted Cutter's dictionary catalogue, with the effects discussed in 3·7; but it altered Cutter's classification and notation for its classification, known as LC, far more than it altered his alphabetico-specific entry.

7·5 Library of Congress Classification (LC).

Along with DC and UDC, LC should be studied to some extent, because it is a live classification, because it has been used extensively

outside its own library, though not as extensively as DC and UDC, because it has a great and wealthy organization behind it, and because it was devised to meet a practical purpose, as briefly stated as Cutter's, and has not been wrapped up in pseudoscience and muddled metaphysic, as three of the dead or dying classifications, SC, BC and CC have been. Assuming LC is not being studied for practical purposes, then it should be studied as a possible rather than as an actual alternative to DC or UDC, and differences between it and them should be noticed.

It is not in a convenient volume with an introduction as are DC, and UDC in the Abridged English edition and the Trilingual Edition, and its schedules or tables, in many parts and with separate indexes to different classes, are only in the larger reference libraries. They should be examined if possible, but apart from them it can be considered as discussed here, and in Berwick Sayers' chapter on it in his Manual, especially in the 3rd edition of this, 1955, in which he treats it more as a bibliographical classification than he did in the earlier editions, in which he criticized it for its failure to be what it did not pretend to be, a philosophic and evolutionary classification of knowledge, according to the 'canons' which Sayers himself has qualified almost into contradictions of what they were. He includes an outline or summary, and gives similar outlines of other classifications. It is interesting to make the comparisons he makes of overall order, with reference to a supposed "order of the sciences" but they are not now considered of importance. All the general classifications could have the same classes in the same order, and still be different in important ways; for example, in their notations and in their use of form numbers and of auxiliary tables.

LC can also be studied more fully and practically in Grout's Explanation of the tables, etc., of LC, 1940, by students to whom this is available. There is also a good chapter in Mann's Introduction to cataloging and the classification of books, 2nd edition, 1943, which should be fairly readily available to the student and should be read.

As already shown in 5·32, it is important not to confuse the classification of Library of Congress with the subject headings for its dictionary catalogue; these have been published by Congress in one volume, and in an abridged form in Sears' list. In the Congress list LC numbers are given for subjects, so that the list can be used as an index to the classification, and as a list of decisions on classifyings, but it is not published as one and it is not 'relative'.

Grout quotes from Sayers' Manual, 1st edition, 1926, in which he said that changes from Cutter's EC destroyed LC's logical order, and that the "resultant outline is arbitrary rather than historical or evolutionary or indeed in any way scientific". By "scientific" Sayers did not mean scientific as bibliographical classification and notation, but in the sense of the "order of the sciences". Congress, as quoted by Grout (p. 3), said, "the system devised has not sought to follow strictly the scentific order of subjects. It has sought rather convenient sequence of the various groups considering them as groups of books, not as

groups of mere subjects." All that can be added to this is that convenient sequence is scientific order for bibliographical purposes; no authority on science and logic has ever said there is one scientific order of subjects; this is just a dream of some philosophizing librarians. What is wrong, for example, with LC's placing of Education L, between K Law and M Music is simply that it is not studied with either, not that it is, or is not in some evolutionary order between Law and Music. In Cutter Education was after Charity, as in DC.

Important points to note about LC in comparison with DC and other classifications are:

1. Its subject order is based on that of EC, with variations, and its notation is mixed, actual class numbers being usually two letters and three figures, which are not hierarchical; on this see 2·6.

2. It is a classification for the collection of a particular library, and only intended for the shelf.

3. It is a bibliographical classification in the sense that its notation is distributed over books in a particular library rather than over subjects in the abstract. Students often say that LC was worked out "as they went along", but it is the nature of classifications with notations that they must be worked out to a comparatively fine point in advance, though in the working out the actual and intended scope and content of a particular collection may be taken into account. Subject headings can be determined entirely as required, if they are to be arranged alphabetically, as in the Congress catalogue and its list of subject headings, but not if they are to be arranged by subject, in classes, subdivisions, and so on. On this see also 2·5.

4. The classification is not used by Congress for subject cataloguing, but because of the great extent of the collection it is detailed; it could be used for classified catalogues, and has been used, and for some subjects it is as detailed as some special classifications.

5. Mnemonic or constant form numbers are not used, for example TE180 is Roads and pavements—Specifications and contracts; TF195 is Railroad engineering—Specifications and contracts. LC is the only general classification since DC in which constant form numbers have not been used, but as Sayers agrees in his 3rd edition, this may not be the great weakness or disadvantage it has been supposed to be. The size of the schedules is increased by repetition of form numbers, which are different, but there are none of the difficulties in classifying of applying numerous auxiliary tables or systematic schedules which arise with UDC and BC, and in a still more complicated way in CC's number building; there is no certain evidence that readers gain anything from constant form number, and in LC the mistake of applying constant form or place divisions mechanically, as they are, for example, in DC at 342, is avoided; by dividing Constitutional law 342 by the geographical history numbers DC widely separates the kindred constitutions of the British Commonwealth. On the other hand, there is cer-

tainly no advantage in having periodicals, etc. in one order under one subject and in another under a closely related subject.

6. It uses Cutter type numbers for final subject subdivision, as already explained and illustrated in 7·25; but these are not mnemonic or constant, and could hardly be, because the same subjects do not all recur in different classes. In Ethics amongst the Vices Anger is BJ1535·A6, whilst in Psychology amongst Emotions Anger is BF575·A5. The point is not necessary since the initial letter after a figure indicates a change in notation. In no other classification is alphabetical suborder so commonly used, as it can and should be at points at which there is no commonly accepted or useful classification and notation is often only a disguise for arbitrary order or for a classification which may have some use in some connections but not in others; for example, the dog subclassification at 636, and the order of other fowls at 636·59, in DC. In his 3rd edition Sayers recognized the importance of this alphabetical subarrangement. It may be one of the things which will come into greater general use in the future as a means of keeping the classifications up-to-date more easily; and it is curious that as it was used so much in LC for subject subdivision or specification, it was not also used for subject qualification, for the aspects and processes of subjects, and the forms of documents. Note for example and comparison that at 157·3 DC (14th ed.) says: "as no authoritative scheme for classifying emotions has yet been devised the individual emotions may be arranged alphabetically". But no notation is suggested. None is needed for the catalogue in which names in full can be used, but something shorter is wanted for the shelf.

7. Although the classification of a particular library, LC has been widely used, especially in university and college libraries, and more so than any other general classification except DC and UDC. Its schedules are too voluminous and expensive for small libraries, and it has no general index, but its numbers are given in Congress catalogues, on its unit cards and in its subject headings list. And whilst lacking the usual mnemonic form numbers it has other 'distributive' tables, worked out in detail, which could be used in large reference libraries. Savage used it in Great Britain in the Edinburgh Public Libraries, and its use as an alternative to DC and UDC is discussed in his Manual of book classification and display, London, 1946, which is unusual amongst textbooks in its discussion and advocacy of the principles of book classification of Hulme, published in the Library Association Record for 1911-12, and reprinted by the Association of Assistant Librarians; Hulme praised LC. His principles run counter to those advocated by Sayers, who does not give a balanced picture of Hulme, and quotes him inaccurately. Finally LC has the resources of a great, non-profit institution behind it, the only two others even approaching it in this respect being DC and UDC.

An examination question on LC which brings out lack of knowledge and preparation in students is one on the following lines: compare

LC with any other classification known to you in its treatment of documentary forms, subject aspects and processes common to many subjects and in its use of alphabetical arrangement. Students know it does not use mnemonic form numbers, but often have little knowledge of its use of alphabetical subject subdivision and its use of Cutter number type notation for this, and some even confuse the necessarily alphabetical order of the letters in its notation with alphabetical subject order. Obviously the numbers BF575·A5 and BJ1535·A6 must be filed alphabetically as far as BF and BJ, but the subjects represented by BF, Psychology, and BJ, Ethics, are obviously not alphabetically in order with each other or with other subjects in B or throughout the classification; if they were there would be an end to subject classification. At the end of the numbers the Cutter type numbers are in alphabetico-numerical order, and they do represent final subject subdivisions in alphabetical order. A general weakness in students, rather than a mistake, is to show lack of appreciation of the differences between using Cutter numbers, including those from the Cutter-Sanborn tables, for persons as subjects and as authors, and using Cutter type numbers for subjects which are not persons.

The Congress entry for The Coast of coral by A. C. Clarke has been given in 5·32, with the LC number QE566·G7C53. In this class number G7 is the Great Barrier Reef alphabetically under QE566, Geology—Coral islands and reefs, and atolls, Special, A-Z; C53 is a Cutter author number, for Clarke, probably from Cutter's original table. Here is the relevant extract from the classification

QE500 Dynamic and structural geology

.....

QE565 Coral islands and reefs. Atolls
566 Special, A-Z
e.g. ·G7 Great Barrier Reef, Australia
571 Erosion and deposition
Cf. GB, Physical geography

and in the Index to Class Q Science there is Coral islands and reefs: QE565.

Here is the subject heading corresponding to the classification in the subject headings list:

CORAL REEFS AND ISLANDS (QE565)
sa Reefs; also names of coral reefs and islands
x Atolls
xx Geology; Islands; Reefs

Subject headings and subject headings lists are discussed in Chapter 11, and the alphabetical arrangement of headings in Chapter 12.

Chapter 8

The Classified Catalogue, Pure and Simple

The classified catalogue is defined here as pure when it has multiple entry in the class list, and does not rely in any way on alphabetical indexing as a substitute. The alternatives have already been illustrated in Chapters 5-6. The classified catalogue is defined here as simple when it uses simple class numbers such as those of DC without any mixture of the compound class numbers of UDC and later synthetic classifications, illustrated in 2·5, 5·44, and Chapter 10. A card catalogue has been assumed, as the common library catalogue, compared with the published index or bibliography in 5·5, as one offering no economic or physical difficulties for multiple entry. And the unit card defined in 5·32 has been assumed, for purposes of author and title entry or indexing as well as classified subject cataloguing.

A library using the same classification on the shelf and in the catalogue has been assumed and each book of subject interest has been assumed to have at least one subject entry, corresponding in classification to the shelf classification of the book; other subject entries for the same book would then have both the class number by which the entry is filed and the class number by which the book is shelved. This is illustrated by the example in 5·4 from a printed page catalogue.

Any catalogue can be used as an index or indicator of books by subject in any copies anywhere, and so as a bibliography, but a catalogue of a particular library must also indicate the places of its copies on its shelves. Author and title entries need only give the main subject entry number which is also the shelf number. The subject classified part of the catalogue as a whole is called the class list. The author and title part is called the author and title file, and is assumed to consist of full entries with the shelf numbers, so that no reference to the class list is necessary in the author and title approach. The index to the classification used in the class list is by definition not an index to particular books, but to classes of books by subject, and is called here the classification or subject index. The important difference between indexing subjects as being in a class though undifferentiated in it, and indexing books for subjects by which they are not classified is discussed in 4·8, which should be read or reread here.

The class list is discussed first, then the author and title file, then the classification index, and then the organization of the catalogue as a whole from the point of view of its compilation and maintenance. Comparisons are made with the alphabetico-specific or dictionary catalogue, to show common essentials or fundamentals, formal differences, and essential differences. In this respect the likenesses in function of

the classification index of the classified catalogue and the cross references of the dictionary catalogue are considered most important and have already been discussed in 4·7. Comparisons are made here rather than in the later chapters on the dictionary catalogue, to help the student who is already familiar in practice with the dictionary catalogue but not with the classified catalogue, and, on the other hand, to help the student whose practical familiarity is with the classified catalogue and who is going on to a theoretical study of the dictionary catalogue in later chapters. The student should not confine himself to one or other, and may not be able to do so in any examinations which he is taking. If he is interested in and familiar with the dictionary catalogue he should not assume, as many with this limitation do, that classification in any context means only, or can be twisted to mean only, shelf classification.

Students have been given the following statement to discuss, and told its context, the first edition of the Abridged English Edition of UDC, 1948, which they were supposed to have studied. "It is necessary always to keep in mind that the aim is not merely to specify the contents of a document, but to be able to produce it . . . when required. Thus the classifier should continually ask himself, what are the needs of those for whom he is doing the work and what will, presently, have to be looked for and where." One trouble is that in many libraries a 'classifier' classifies only for the shelf, and a 'cataloguer' does both subject and author cataloguing, so some students seize on classifier in this sense and do not study the rest, which, even without the general context the student was supposed to have studied, fairly clearly refers to classifying for a catalogue with or without classification for the shelf.

On the other hand many students, teachers and textbook writers, familiar only with some sort of classified catalogue, become absorbed in the abstract study of classification, the supposed order of the sciences and so on. There is disproportionate treatment of this questionable theory in many of the textbooks, and more recently there have been the Ranganathanite theories of "symbiosis" of the dictionary and the classified catalogue "by chain procedure", and of a derivation of dictionary catalogue headings and cross references from class numbers. Some students may be interested in the latter, but they should understand that it is not sufficient, and is not accepted in countries in which the dictionary catalogue is the rule and understood to be the dictionary catalogue according to Cutter's Rules. On this see further Appendix F.

8·1 The Class List and Classifying.

Classifying for the class list of the classified catalogue is not different from classifying for the shelf, except that we may classify more closely for the catalogue. We may, however, assume here the same degree of specification for both; then we determine a subject and class number for a class list entry for a book, and if this is only one it serves also without question for the shelf; if there is multiple entry, then there

are several subjects and class numbers, and one has to be, and only one can be, selected as the shelf number.

The Congress entry and unit card in 5·32 for Clarke's Coast of coral gives three classification numbers, but they are alternatives for the same subject, by which Congress would shelve the book, which is Geology—Dynamic and structural—Coral islands and reefs—Australia—Great Barrier Reef. It gives an LC number, a DC 14th edition, and a DC 15th edition number for this book, on the shelves; it also gives three subject headings: 1. Great Barrier Reef, Australia, 2. Pearl-fisheries—Australia—Great Barrier Reef, 3. Photography, Submarine. These are not alternatives; they are the headings it would and does put the book under in its dictionary catalogue, with a repetition of the full entry under each, and in a pure classified catalogue the book should go under three corresponding class numbers, at least, with the full entry under each if it is a card catalogue. Now consider:

Clarke, Arthur Charles, 1917-

The coast of coral. With photos. in color and black-and-white, by Mike Wilson and Arthur Clarke. [1st ed.] New York, Harper [1956]

208 p. illus. 24 cm.

919·43; 551·96; 639·412; 778·73; Wilson, Mike; Title

The tracing note at the bottom of the card could be on the back. It indicates that the book is to be, and subsequently has been, shelved at 919·43, entered under that number in the catalogue, and additionally under the other numbers, and entered in an author-title file or catalogue under Wilson, Mike and under Coast of Coral as well as under Clarke, Arthur Charles, in each case using a copy of the card with an extra heading or number, so that seven copies of the card would be used. But on the placing of tracing notes in classified cataloguing see 8·7. In any case the indexing of the class numbers and any cross references are not given in this tracing on any copy of the card, just as they are not on the Congress dictionary catalogue unit card.

The class number 919·43, which is for Queensland description and travel, is suggested as one at which there should be an entry, and the one by which this book might be shelved, at least in some libraries; so it is given first. The number is not specific for the Great Barrier Reef because the tables are not specific beyond 994·3 in History for Queensland, and the number 919·43 is built from 919 and 994·3 as the tables of DC (14th ed.) direct. Note especially that Germany—Description and travel would be 914·3; the first 9 is left off the History number, which is a bit tricky for Oceania, which is 990. The number 639·412 is for Pearl fishing. This could be extended to 639·41209943 for Pearl fishing —Queensland, if advised, as could 778·73 for Submarine photography. This number building is discussed in Chapter 9.

The extension of class numbers by individual names, such as Great Barrier Reef, in class list entries is not common in DC class lists. As

shown at the end of the previous chapter, it is common in LC, in which Cutter type numbers are used instead of names because the class numbers are intended only for the backs of books on shelves, not for the arrangement of entries. As noted in 7·5(6), it may be important in the future of classification.

On every subject entry except the one corresponding in classification with the shelf number, two numbers have to be given according to some form or convention which tells the catalogue user which is the shelf number; one way of doing it is illustrated in 5·4 by the entry for the book by Marett at 398 Folklore which is shelved at 150. Another is to put the shelf number under the other, and if the cards are typed to use a red ribbon for it; another is to give the shelf number always on one side of the entry, and the entry number on the other, even when they are the same, and this is probably the best when multiple entry is the rule and not the exception.

It is possible in central cataloguing to give data for both classified and dictionary cataloguing. In this example

919·43	551·96	Great Barrier Reef
639·41209943		Pearl fisheries—Queensland
778·73		Photography, Submarine

Double data has been given in this way in central cataloguing by the State library in New South Wales. Most if not all the libraries using the service have dictionary catalogues; they find the classified order of the Bulletin in which entries are given useful in generic survey for book selection, and find the extra class numbers useful in allowing choice for the shelf number. On this see also 11·73, and note that despite any superficial resemblance the method was not based on and is not intended to serve the chain procedure indexing methods discussed in Appendices E-G.

8·2 Subject Names and Class Numbers.

The specific subjects of a book have to be determined, in words, before class numbers can be found for them. We may sometimes realize a book is on a subject in a class, without quite understanding what the subject is, and then by examining the class in the classification tables we may arrive at the subject, but far more often we know what the subject is, at least by name, for example, automation, and cybernetics, but have difficulty in deciding an including class.

In the dictionary catalogue cross references can be made from any number of possible including classes without regard for the want or uncertainty of any of them in any classification tables. For example DC (14th ed.) classified theosophy as a philosophy at 149·3 and as a religion at 212; it also classified anthroposophy as a philosophy at 149·3, but nowhere as a religion. And it does not give a specific, exclusive, number for either. The dictionary catalogue needs no table or list to make both quite specific under their names and to refer to both

from Religion as well as Philosophy. As discussed in 2·4 and 4·3, specific subjects have specific names far more than they have specific numbers in any classification. Names for specific subjects, as it were at large, have been but should not be confused with the subjects of particular books; in a sense Sabbath breaking as a cause of the decline of the British Empire, which has been the subject of several books or pamphlets, is a specific subject, but for any purposes of classifying and indexing, and however we deal with it, by simple or compound numbers, by single or multiple entry, it is a relation of two specific subjects with well-known names, Sabbath breaking or Sunday observance, and British Empire. A DC number for Sunday observance and the British Empire, pro and con, might be 263·40942; the UDC number would appear to be 351·857(41), or if it were to be a reversible number for multiple entry, 351·857:941. On the confusion of subjects at large or simple subjects and the complex subjects of particular documents see 4·2 and 6·61. And for further illustration of practical classifying and some rules see Chapter 14.

8·3 The Author and Title File.

This is important if the classified catalogue is intended to be as much an author and title catalogue as the dictionary catalogue; it should serve those who want to look up books under the names of authors known to them as well as it serves those who want to look under subject for books not known to them by author, or not known to them at all, even by the supposed colour of the cover. It is a defect of classified catalogues in the forms discussed in 5·4-45 that they substitute mere author indexing, with at the best only short titles, for full author entry; but a classified card catalogue can allow for a full author approach, and for author indexing of the shelves without reference back to the class list just as well as a dictionary catalogue can, and by the same means, the unit card. Headings for author and title entries are a matter for author and title cataloguing which usually extends to descriptive cataloguing, and provides the entry which goes as a subject entry under a class number or subject name. On this see also 2·7.

8·4 Indexing and Cross Reference in the Classified Catalogue.

Dewey said in his introduction to DC (14th ed., p. 24) "the Subject Index of this system is a skeleton dictionary catalogue, covering everything not fully covered by the 'name catalog' ", presumably the author and title entries. "Instead of giving book titles under each heading, the number refers to all those titles simply and directly. The index may be made on any of the various dictionary plans, with all the advantages it may possess. To us, simplest seemed best. We give only short heads with brief indication in doubtful cases of viewpoint taken in assigning class numbers." The last is what is now meant by relative indexing, whereas he meant by it indexing by class numbers, in the same relative order wherever used, instead of what was the practice before his time,

indexing, if at all, by the page numbers of the particular edition of the classification or classified catalogue, or by entry numbers. This has been discussed in 1·4 and 2·1.

Now, because custom has staled his almost infinite variety and familiarity has bred contempt, Dewey is not given the credit he deserves, even by his fellow Americans. But at some points he claimed too much for the Dewey system; to say the index to a classified catalogue is a skeleton dictionary, or alphabetico-specific subject catalogue, is like saying that a valley without water is a skeleton lake. The index refers simply and directly to headings and therefore to entries under them, perhaps, and certainly there need not be the double indirection of Bradford's Alphabetical Key and Decimal Reference Index discussed in 6·61, but the very definition and advantage of the dictionary catalogue is that like a dictionary it is self-indexing and has entries directly under its headings, without reference, however simple, from an extra index.

Dewey might have said a classification index is a skeleton list of dictionary catalogue headings, but even this is a very dangerous half-truth, just because the index is one of a classification, and therefore only of its classes and class relations, and lacking the freedom and flexibility of the headings and cross references of the dictionary catalogue and its subject headings list or file. It is the half-truth or misunderstanding which fosters the ideas of chaining the headings and cross references of the dictionary catalogue to some chain analysis of class numbers, of the sort discussed in Appendix F. However, in other directions there are important functional correspondences between the indexing of the classified catalogue and cross reference in the dictionary catalogue; these have been discussed in 4·7 which should now be read or reread. These correspondences and their significance for a true understanding of the common bases of all indexing methods are neglected by those who are inclined to think that classified and alphabetical are quite unlike, as chalk and cheese. They are as unlike as oil and water, insofar as they won't really mix or compound, though one may go with the other; but they have important properties in common.

8·41 Cross Reference in the Index.

It is often said that in the index to a classification or a classified catalogue there need not be the cross reference between synonyms which there is in an alphabetical catalogue, because class numbers can be given under every name for the same thing, and this is generally true. The index to DC has Triticum aestivum (Hordeae) field crops 633·11 and Wheat (Hordeae) field crops 633·11, references under Apiaries, Apiary, Apiculture and Bees to the same numbers, without cross reference, and so on. But as shown in 5·41, with the example of radio and wireless there can be a saving of space and surety of not missing any relations or subheadings by referring from one to the other and giving all the details and class numbers under only one. There is cross refer-

ence from Wireless to Radio in DC's index, and almost a page of repetition saved in the 14th edition. And whilst there are some numbers given for phrases beginning with Corn, there are the references see also Maize, and Corn, Indian see Maize.

8·42 Cross Reference in the Classified Catalogue.

It has been said without qualification that the classified catalogue, unlike the alphabetical, hasn't and need not have any cross reference within it. Theoretically perhaps it need not. If the reader knows the principles of the relative or relations index, and how to use it, then if he used DC's index, which could, selectively as required, be the index to a particular catalogue, and if, for example, he looked under Young Men's Christian Association he would be referred to 267·3, and if he looked under Young people's societies he would find the relation religion 267·6 and the relation sociology 369·4. But this is not quite perfect; apparently the Y.M.C.A. and young people's religious societies are not quite the same thing; DC separates them, and even in the tables (14th ed.) 267·3 for one and 267·6 for the other are a page apart. On the same assumption of perfection in indexing and in readers, cross reference could be much reduced in the dictionary catalogue. The reader would do better in DC's index with marriage, under which amongst other relations he would find ethics 173·1, matrimonial customs 392·5, private law 347·6, sacraments 265·5. But an ignorant man might want marriage etiquette, and not realize it could be covered by 392·5, although there is also 395 Etiquette, and he might confuse etiquette and ethics.

The tables have the cross reference, which could also be in a catalogue, 369·4 Young people's societies for religious societies see 267·6, which still misses the Y.M.C.A. There is also 173·1 Marriage and divorce see also 347·6 Family law, and 265 Marriage see also 173 Ethics of the family. But there is no reference to or from 392·5 Marriage—weddings. For comparable cross references in UDC see 1·5.

The trouble is that both indexing and cross reference are imperfect in the classified catalogue in practice, whatever they might be in theory, as they are in the alphabetical, especially for those who lack education, general knowledge, and school training in the use of libraries and their catalogues. And the cross references of the classified catalogue are more imperfect than its indexing, because they are highly selective, and little if anything better than arbitrary in selection. The relative index is not perfect, but because of confusion between indexing a classification and indexing particular books with only single entry too much may be expected of it.

8·43 The Relative Index to a Catalogue.

Sharp in his Cataloguing (4th ed., p. 157) has already been quoted on this in discussing single entry cataloguing and the Glasgow Union catalogue in 5·4-41. He quotes Cranshaw who, apparently referring to

Part III, 1938 of the Glasgow catalogue and the 14th edition of DC, says, "Dewey's index has 9 places for Psychology; Glasgow, dealing with actual books, has 29. For civilisation, Dewey's index shows 4 places, Glasgow things 20 not too many." But Glasgow has, for example, Psychology Children's drawing 707, where there is a book called the Psychology of children's drawings; Civilisation, Language and 401, where there is a book called the Spirit of Language in civilisation; Civilisation, Hebrew, and so on with country history numbers, for books which happen to have civilisation in their titles, as was a fashion with history books. 707 is not the number of a place in the classification for psychology, nor are 297, 321·8, 323·1, 332, 370·4, 933, 938, 940·11, numbers for places in the classification for civilization. Whilst generally approving Cranshaw, Sharp says perhaps he has rather over-stated the case against Dewey's own index because "much of the detailed indexing in the Glasgow catalogue is due to . . . making the index serve to some extent the functions of added entries". Sharp at this point in his book approves of this; his argument at other points in the same book is that added entry should not be done by extra indexing in the pure classified catalogue, any more than it should be done by cross reference in the alphabetical catalogue; as he has said elsewhere in his book, "whatever added and analytical entries are appropriate to a dictionary catalogue are equally so as to a classified one" (p. 23); and in still another part he refers to the inadequacy of single entry (p. 331). James Duff Brown may have been confused about indexing classes and indexing books when he began in 1898 in his Manual of library classification by praising Dewey's "particularly elaborate and useful" relative index, and then in 1912 in his Library classification and cataloguing called it "rather superficial and selective". And his single place classification of 1906 already mentioned in 1·5 and discussed in Appendix B was perhaps as much an attempt at cutting classification down to a procrustean bed of single entry as at getting entries for a thing in all its aspects together.

The relative index is simply an index to the classification, to its subjects in their different class relations; it can exist quite apart from any catalogue and its entries, as it does as the index to classification tables, and as a published subject headings list for a dictionary catalogue does. As shown in 4·8, it indexes included classes which do not have their own specific class numbers, such as Curling in Ice games and Bright's disease as a kidney disease but it does not index particular books, in the pure classified catalogue, except insofar as it indexes the classes in which books are entered.

8·5 Indexing the Classified Catalogue.

Suppose that by extraordinary chance a book on ballet is the first to be entered in the class list in DC's primary class 700 Fine Arts Recreation. It is given the specific number 792·8, but though there is as yet nothing else in 700 into the index goes Art, Fine 700, Recreation 700, Amusements 790, Theatre 792, Ballet 792·8. Why the whole

hierarchy or chain when, if the book on ballet were the first in the field in a dictionary catalogue the whole chain, Recreation see also Amusements see also Theatre see also Ballet, would not go in, though it could be in eventually.

The downward references of the dictionary catalogue, and the collateral references such as Opera see also Ballet, are not derived from a class number, which would not even be thought of if the catalogue were not a library catalogue or library cataloguing aid, and it is only a coincidence that the hierarchy of downward cross reference likely to be found in a dictionary catalogue with books on Recreation, Amusements, Theatre, Ballet, in a decreasing degree of generality, corresponds with the hierarchy of the DC number 792·8. The downward cross reference series, Science see also Chemistry see also Chemicals see also Acids see also Sulphuric acid does not correspond with the hierarchy of 547·7 which is Science, Chemistry, Organic chemistry, Acids; Technology see also Chemic technology, see also Chemicals see also Acids see also Sulphuric acid corresponds as far as its specification goes with 661·2, which is Useful arts or Technology, Chemic technology, Chemicals, Acids; but the headings and cross references of the dictionary catalogue would usually be determined without reference to, without realization of, the hierarchical implications of either class number, even if used as a shelf number. The fact that dictionary catalogue specific headings and cross references thereto are not tied to class numbers is not the reason why a hierarchy of downward references is not put in the dictionary catalogue for a book at the end of the chain. The reasons explained in 11·22 are that dictionary catalogue practice is to make reference to a heading only when there are entries under it, and only from the immediately more general headings, so that there would or could be a reference made, Theatre see also Ballet, even if there were no entries as yet under Theatre, but no reference Amusements see also Theatre, until there were entries under Theatre, and no reference directly from Amusements to Ballet.

There is no use in referring in the dictionary catalogue to Theatre for the sake of a book on ballet because this is not subordinated to Theatre, but in the classified catalogue using DC it is, and in turn this is subordinated to Amusements and this to Recreation, so Recreation 700, Amusements 790, Theatre 792, Ballet 792·8, all lead to a class of which Ballet is a part, and if a reader looks up Amusements in the index it has to be presumed that he may be interested in any species of it, though in fact he may have no interest in any of the species numbered 792. And so with the same presumption though still less likelihood of satisfaction if Ballet is all there is, if he looks up Recreation 700 or Art, Fine 700. But of course the case would be extraordinary and only has theoretical interest, for both catalogues.

Indexing by the chain or hierarchical method seems to work, and in fact always has, within limits. It will not work as a panacea, without the tail wagging the dog, without building up impossible and only

supposed classification numbers for no other purpose than to derive alphabetical indexing from them. It would not be unreasonable to have an index entry, Dancing, Ballet 792·8, which DC hasn't, or the cross reference 793·3 Dancing, for choreography and ballets see 792·8, which it has; but neither can be derived by chain analysis from 792·8, because the chain doesn't include dancing. And if a book were on both dancing and the ballet and entered under both 792·8 and 793·3 the result would be the same; chain analysis of 793·3 for Dancing would produce different indexing, alike down to 79, but different for 793 and 793·3. Appendices E and G show the limitation of classified catalogue indexing by chain procedure, and also that BNB occasionally gives such an index entry as Dancing:Ballet 792·8 although it is not produced by chain analysis of the number.

8·6 Headings in the Classified Catalogue Index and the Dictionary Catalogue.

Some headings and subheadings in the index to the classified catalogue are a counterpart of the headings and subheadings of the dictionary catalogue; they are in a sense a skeleton dictionary catalogue, without the entries, and must be, because they both provide the same specification of the subject matter of literature, by subject and then by subject aspects and processes. We can have Sheep in the dictionary catalogue, and then cross reference to Merino sheep, or as a following heading Sheep, Merino; in the classified catalogue index it is sufficient to have the index entry Sheep 636·3, because the species of sheep are in 636·3; it is not sufficient to have only Dancing 793·3 because all the species of dancing are not in 793·3 and we must have Dancing, Ballet 792·8 and Dancing, School, or Dances, School 371·89 (DC, 15th ed.). We must have subheadings for aspects or relations in the classified catalogue index, for example Rabbits—Shooting 799·2732, and we could have Rabbits—Shooting in the dictionary catalogue, but not necessarily, because in this all about the rabbit is under Rabbit, with or without aspect and process subheadings, whereas in the classified catalogue there is a scatter by aspects and processes, and we must have what we call relative indexing which may give us Rabbits—Breeding 636·9 as well as Rabbits—Shooting 799·732 and Rabbits—Zoology 599·32. On this see also 11·3 and 14·7.

8·7 Classified Catalogue Compilation Control.

Card catalogues, whether classified or alphabetical, are cumulative or open catalogues, or should be, because that is the purpose of a card catalogue, as shown in 1·6. But as well as having entries put into them they have entries taken out, and they also have problems of maintaining consistency; a printed catalogue or bibliography in volume form on the other hand is a closed catalogue, nothing comes out of it, nothing goes into it, except by annotation and interlineation which is never satisfactory; there have to be controls whilst it is in preparation, and

special care may be taken because it is final in form and detail, but once it is off the press and bound the controls used in the course of preparation are like a building's scaffolding which does not remain with it. The controls of the card catalogue may begin by being directions or suggestions for compilation, as are the tracing notes of Congress catalogue cards as issued for general use, and the practices and problems now under consideration may be illustrated by examining the 'tracing notes' of the Congress card in this respect. They are the best known example, and many of the essentials do not differ as between the classified and the alphabetical catalogue.

Congress unit entries as they appear on its cards and in its printed and bound catalogues reproduced from these or following the same style have been given in 5·32. The tracing note proper, of added entry headings, and other data, LC and DC shelf numbers and the card's own order number appear on the front, after the entry proper. This placing of this extra information intended as a guide to catalogue compilation on the front of the card is an important economy in printing, and it is probably a convenience for the compiler, especially when cards are in the catalogue, although if notes on the back of a card are written at the top, but upside down in relation to the front, they can be more easily read in the catalogue than they can when well down towards the bottom edge on the front. And this information on the front can confuse readers, and some students, because they think it has something to do with the consultation of the catalogue. A compromise might be to put a heavy black line under the entry, even above the collation and series line, and the rest well below as obviously a note, with the heading now common on forms: for office use only.

Confusion increases when tracing notes of heading or class numbers are extended to references, and notes of indexing in the classified catalogue. This has been done in libraries on the entry for the book giving rise to the references or indexing; it is conveniently placed on a 'main entry' as a direction to someone making extra cards, for references, or indexing, as well as for entries. But it is a bad place of record because the entry with the note on it may be withdrawn subsequently, without any transfer of the note; and it certainly confuses students.

The use of cross reference and indexing persists as a means of avoiding multiple entry of particular books, for good and bad reasons, whereas ideally cross referencing and indexing should only refer to headings or class numbers and to all books under them. When the student sees in actual practice tracing notes of references or indexing on the entry for a particular book, or is asked to give them so in a practical examination he is often persuaded that, nevertheless and notwithstanding all he may have been told and read, the cross reference or indexing, or even the note itself, is a substitute for multiple entry of the particular book, whereas this is only the innocent first cause or occasion of it.

For example, one student asked to discuss the class entry of a book

on money under Economics as additional or alternative to its specific entry under Money in the dictionary catalogue, with a cross reference from Economics, said that added entry under Economics was unnecessary, because the reader seeing by the tracing note that it was on economics would not need the class entry. This shows the difficulty of teaching and learning discussed in 4·2; the question is not what is on an entry when we get to it, but how we get to it, and what indexing function its heading performs. The answer briefly is that entry only under Economics would not be specific entry, that duplicate entry under both the general and the specific subject unnecessarily increases the bulk of the catalogue, that it forces the reader interested in the general subject to read and reject entries under it for special material, and is made unnecessary by the 'downward' reference, Economics see also Money, just as in the classified catalogue the index reference Economics 330 leads to entries at 332, and makes unnecessary the entry under 330 of books which should be under 332.

The entry under the same number as that by which a book is shelved is regarded here as its classified catalogue, or at least as the class list main entry, and tracing notes of headings of all other entries may be put on it as on the dictionary catalogue main entry. But this is not a subject entry, the other is, and classified catalogue tracing notes might be better on the main entry in the author and title file if this is a full entry file and not just an author and title index to the class list; or they might be divided, added subject entry tracings going on the main class list entry, and other added entry tracings, for title entries and any for editors and so on, going on the author and title file main entry. An entry must be traced before other entries can be traced from it, and the book itself and any record from which entries may be traced, except the accession register, is likely to give author and/or title, and shelf number, so the main class list entry may be reached directly or through the author and title file. There is nevertheless a case for division, on the ground that the business of the class list is only subject entry, and of the author and title file only author, title and related entries.

The subject entry tracings need only be by class numbers of added entries, and if, as argued, it is undesirable to trace references and indexing on an entry for any particular book then there should be some control of the subject index to the classified catalogue, though not as much thought seems to have been given to this as to the dictionary catalogue subject headings list. In some respects it may not be as necessary; the classified catalogue necessarily has its subject index as part of it, and this may serve, but there seems to be some need of an extra record, which should probably be in numerical order.

8·71 An Index and Cross Reference Control File.

There has been talk of a classified subject key for the dictionary catalogue, considered in Appendix F, but not much thought seems to have been given to an orthodox tool for the classified catalogue correspond-

ing to the subject headings list or file of the dictionary catalogue. With both catalogues something can be done by 'going out to the catalogue', from the cataloguing room into the hall or reading room where the catalogue is and checking it, but this may be hit and miss, and going out to the catalogue is a fruitful source of wasted time and money in cataloguing, however good an excuse it may be for a bit of perambulation, and combined with going right out for morning and afternoon refreshment. One of the values of tools which save reference to the catalogue itself is that they save time, not only by saving the excursion to the catalogue, but also by simplifying checking of the point in question because the record is free of data irrelevant to the query.

A copy or copies of the classification tables can be marked in some way, just as published subject headings lists can be, and if required have additions and extensions written in it; Dewey himself had this idea. But with dictionary catalogues of much size it has been found better to maintain the library's own subject headings file on cards, and a separate file is suggested here for the classified catalogue.

Suppose when the first entry was made under 792·8 for a book on ballet a card were made for filing under 792·8 as follows. This is of course in the control file, not in the catalogue, or its index.

792·8

Ballet 792·8
Dancing, Ballet 792·8
782·9 Ballet music s.a. 792·8 Ballet
793·3 Dancing s.a. 792·8 Ballet

This would be a record of index entries and catalogue cross references already done, and a check would show what had been done whenever 792·8 was used again; if and when the last catalogue entry under 792·8 were taken out this card would show the catalogue cross references and index entries to be removed, and if this removal were only thought to be temporary they could be filed temporarily with the control card in the control file, where they would be picked up on the classifying of another book on the subject. If there were no catalogue entries under 792 whilst there were entries under extensions of it there would still need to be indexing of the including class 792, cross reference to it, and a control card:

792X

Theatre 792
808·2 Drama s.a. 792 Theatre

A cross in pencil after the number would serve to show that for the time being there were no catalogue entries under 792, the Theatre generally; if and when an entry were made under 792 then the cross could be rubbed out. All catalogue cross references and index entries and entries in a control file should be only on the authority of one cataloguer in charge.

Some such method of record of classified catalogue cross references

and index entries analogous to the headings file of the dictionary catalogue would need further consideration and possibly elaboration in practice. Sharp draws attention to the need of something of the kind and mentions a "catalogue alterations book" (Cataloguing, 4th ed., pp. 279-82).

Such a file is also a control of classifyings. Dewey thought the index to the tables could be such a control, by which clerks could do the classifying of libraries, simply using the index without reference to the tables. This is bad because the fitness of a class number for a subject can only be ascertained by going back to the number in its including class; and there is plenty of room for argument and decision on subjects and subject aspects unforseen by the classification makers or editors. A dictionary cataloguer with a book called and on forensic medicine thinks he will use that name as a heading for it, but the subject headings file says Forensic medicine see Medical jurisprudence, and he uses that without any need of going out to the catalogue and any danger of inconsistency. Given Forensic medicine and chemistry, law 340·6, public health 614·23 in the index to DC (14th ed.) a classified cataloguer might want to use 614·23, but on looking this up in the control file he might find nothing and then on checking 340·6 find that this had been used; that is, he would know what the precedent was without going to the catalogue. If there was nothing at either number he would know a decision was required and could argue for 614·23.

A final point in favour of a control file on cards is the general one that card files are expansible, whereas written-in classification tables like written-in catalogues in volume form become a mess.

Chapter 9

Number Building in DC

Number building is the making of class numbers for subjects and forms out of other numbers or parts of numbers. Dewey along with other and more essential novelties introduced number building; all the classifications since DC use it, more or less than DC, LC being the only one using it less, and special developments and applications of it beginning with UDC are called synthetic classification. The student who is not required and doesn't want to study UDC or synthetic classification need not read the next chapter, but no student can pretend to be well informed who does not know something about UDC and synthetic classification, and every student should understand DC's number building from which synthetic classification was developed.

9·1 Number Building and Mnemonics.

Any class number in any classification is of course made out of a fixed and limited number of figures or symbols, for example in DC all class numbers are made up of the figures 0-9 and the decimal point; number building means using numbers or parts of numbers in a constant sense, or in the same sense as they have in some other numbers. In DC the figure combinations 01-09 at the end of numbers have constant or mnemonic meaning with few exceptions, and any extension of 016 Bibliography, and some other numbers, is always a whole number from elsewhere in the classification, less any unextended noughts, and with the same meaning; for example, 016·6 is a bibliography of useful arts, and 016·621384 is a bibliography of wireless, 600 being Useful arts, and 621·384 being Wireless. Note that as well as the noughts being left out of 600 the point is left out of 621·384, because there is never more than one point, always after the third figure in a DC number, however it is made up. Except for these omissions the whole of two numbers, 016 and another, are joined together. In 338·17311 there is a whole number and part of another one. The economics of agricultural products is 338·17, extended by extensions of 63, so that as 633·11 is wheat 338·17311 is the economics of wheat production.

The figures by themselves haven't constant meaning; if they had then only ten subjects could be numbered by 0-9; but in some combinations 5, for example, always means Italy and Italian, whilst as the first figure in a number it always means science, because all 500 is Science; all 300 is social sciences, but in some combinations 3 always means a dictionary; a dictionary of science is 503; the Italian language is 450,

450·3 could be a dictionary or encyclopaedia of the Italian language as a subject, but an Italian language dictionary is 453; in other combinations 3 is the novel, so that 853·03 is a dictionary of the Italian novel. But 945·03 is Italian history from 962 to 1122, and a dictionary of Italian history would have to be 945·003.

Some of these combinations are already given in the classification tables, for example 453, 853, 503; others are left to the classifier to make up, but only according to the directions given in the tables.

The constant use of some figure combinations results in their meaning being remembered; they become mnemonic, and they are called mnemonics rather than constants, because Dewey introduced the idea and the word and made much of them, though what may be more important than the memorability of the constants is the constancy which makes them memorable. The constancy of some of the combinations is an aid in number building, and it may also have some importance insofar as it reduces the size of the tables. But as already shown with reference to DC in 7·5(5), there can be catches in constancy, amounting to weaknesses in classification.

Four kinds of number building or constants may be distinguished in DC as (*a*) the form numbers, (*b*) the country numbers, (*c*) extension or division of class numbers by parts of other numbers, (*d*) extension or division of class numbers by the whole of other numbers from any part of the classification.

9·2 DC's Form Numbers.

Dewey used 01-09 for the subdivision of subjects, not by further specification of the subject, but by what he called, 01 Theory or philosophy, 02 Compounds, outlines, 03 Dictionaries, cyclopaedias, 04 Essays, lectures, addresses, 05 Periodicals, magazines, reviews, 06 Societies, transactions, etc., 07 Study and teaching, 08 Polygraphy, extracts, etc., 09 History. This is varied from class to class slightly, mainly by the use of 08 for such things as tables and calculations where appropriate; and as shown below, in some places one or more of these numbers have been used for unanticipated subject specification coming at the beginning of a subject. Nothing is more widely constant in DC than the use of these numbers for what he called form; the name has stuck in application to such subdivisions and numbers for them, perhaps unfortunately, because they are a mixture of subject aspects, such as the philosophical or historical aspect, and forms of the document such as the dictionary or periodical form. Study and teaching might even be regarded as a process, and in a few places in DC a 'form' number with extensions has been used for processes, such as breeding in 636·082 Stock breeding. But this is an adaptation from UDC; usually in DC if such processes are provided for it is in special extensions of subject numbers, and not by any form or auxiliary tables.

It has been found convenient to put such subdivisions of the litera-

ture of a subject, which are not further specification of the object, first in classification, before further specification of the object, and using the figures 01-09 for them ensured that they would come first in the ordinary arithmetical order of the numbers. Students often get the cart before the horse; they say Dewey used 01-09 for his form numbers because the numbers are general; they are not general, but simply first in order, and he used them to get all subdivisions of the subject, not affecting the generality of the class of things named, first in an order of subdivision, so for example the philosophy of social science 301 . . . its periodicals 305 . . . its history . . . 309, all come before the specific social science, Statistics, 310. Students also say the form numbers are ·01-·09, which is only the case when the nought comes in the fourth place; and some even say that the point is a sign that they are form numbers; these are usually students familiar with UDC and working back to DC; in UDC as shown below there are several auxiliary tables, all consisting of figures, but distinguished by different "signs of association".

It is often said a subject can be interpolated anywhere in a classification; a subject can, but it cannot always have a number at the appropriate place without some violence to or modification of the notation. Numerically if all figure combinations beginning with 0 are appropriated for something, in DC 'form', and 1 and its extensions are already appropriated for something else, then something else again cannot be given a number in between, and this will also hold as between letters such as A and B. In DC, for example, 620·1-9 was allowed for the usual form divisions of Engineering in general, and then 621 used for Mechanical and electrical engineering; this meant that there were no numbers in between for a growing literature on engineering materials, their strength, testing and so on, common to most species of engineering and therefore appropriately coming first. Dewey took ·01 for this, and then used 02-08 in the usual way, which brings a highly specialized literature before the forms of the general literature; other examples of this adaptation of form numbers to unforseen subject specializations are in 070 Journalism, and in 610 Medicine in which 610·7 has been used for Nursing. Some difficulties of classification and notation are often treated as though they are peculiar to DC, and overcome in later and better classifications; this one at least is inherent in all classification and notation, and the results of it appear in all classifications, although there may be more and more obvious examples in DC because it was the first. The form numbers were not introduced into DC until the second edition, 1885, and 01-09 were used from the start for period subdivision in History, so that this was not a modification of the form numbers. As noted in 9·1, the history form subdivisions if required can be kept in order by using 00 or even 000 for them, but little or no general use of this possibility has been made in DC, except that in 620 Engineering 001-009 is used for another general table for statistics, costs, and so on.

9·3 Country Numbers in DC.

The country or geographical extensions of DC numbers are a special case of extensions by both the whole and the part of a number, and illustrate the effect on number length of using whole numbers from a main classification for extension of other whole numbers instead of numbers from a special table, which can be shorter, but may not be if they include special distinguishing signs, as in UDC. In DC Adult education in Europe would be 374·094; in UDC it is 374(4), a difference of only the point in number length, but the first round bracket is necessary, because without it 3744 would be 374·4 Correspondence schools, as in DC; and the second round bracket is necessary if anything else follows the place number in UDC, as it may. When a notation is mixed a change in it, as from letters to figures or the reverse, can be made without any distinguishing sign. As shown in 7·25, LC uses, for example, TX558·P3 for Dietary studies of peaches; P3 standing for peaches, and the point before P is unnecessary because the change from figures to letters shows a change to another notation or table. Other examples are given in 7·5(6).

In DC the class 900 History covers Geography, Biography and History, that is general history, mainly political. The history numbers are 930-999, in which, for example, 94 is Europe and 942 England and Great Britain. Geography, Travels, Description is 910-919, in which 913-919 are for countries, and 914·2 is the British number, an extension of 91 by the 42 of 942, with the point in its one and only DC place. Note that Australia is 994, so that dropping the first 9 still leaves two in 919, and Australian geography etc., is 919·4. In number building exercises students are often tricked by a figure in one sense which may go out, and the same figure in another sense, which has to stay.

The first 9 of History is dropped in many places, for example 314-319 Statistics of countries, so that those of Great Britain are 314·2, and those of Australia 319·4, and in Geology 550 the geology of Europe is 554, and that of Australia 559·4, but in most cases the whole number is used, as in 374·0944 Adult education in France. Note also that the modern history numbers only are usually used in subdivision; the geology of Italy is 554·5; 553·7 is not the geology of Ancient Rome; it is Mineral waters as a subdivision of economic geology. By the common method of extending by the whole number, 580·942 is the History of botany in England, but note for careful differentiation, 581·942, the Plants of England and Great Britain.

DC has not always provided for this kind of differentiation; in Education 370·109 is "History of educational theory divided like 930-999", and 370·93-99 is History of education in special countries. In Economics 330 there is no explicit provision for the same distinction in the tables, but there is nothing to stop users of the tables making it for themselves

and using, for example, 330·10942 for economic theory in England, and 330·942 for economic history of England.

Note that extension of a number by a whole number is not the same as extension by the whole classification. 580 and 581 can both be extended by 93-99 for countries ancient and modern, but neither 580 or 581 are divided by the whole classification; 581·3 is Plant embryology, not plants in the social sciences; 581·6 happens by accident or design to be Economic or applied botany and therefore in a sense plants in the Useful arts, but 581·7 is the Descriptive anatomy of plants, not plants in the Fine arts. Note also that whilst 09 can usually be applied and extended for geographical distribution or history of a subject, because it is the constant or mnemonic form number for history and place, 9 without the 0 cannot be. There must be special direction, as for the extension of 581·9. Without the 0 the figure 9 can be used for any subject specification, for example 549 Mineralogy, 369 Other associations and institutions, 179 Other ethical topics.

Other numbers are used for geographical or national distribution. There is some, but not complete correspondence of the national literature with the national history figures, as in 942 English history, 820 English literature, 943 German history, 830 German literature. And the literature numbers are then used in language, or the reverse, except that whilst 410 is Comparative philology 810 is American literature. This illustrates the way in which Dewey always preferred practical advantage to any theoretical consistency; there is not an American language as there is an American literature; on the other hand comparative literature is not as much a subject as comparative philology; it was not thought of for the earlier editions, and the form numbers 801-809 were adapted for it later. Newspapers by country follow literature, except that 7 and 8 for Ancient Greek and Latin literature are used in 070 for Modern Slavic and Scandinavian newspapers.

Note that in all the number building covered and to be covered in DC the numbers which are combined, wholly or in part, are always already in the one classification and notation, 000-999, with extensions; there are no extra, special tables. Even the form numbers are not outside the single 000-999 notation; but they do not come from 000-099, though there are some similarities, for example 050 General periodicals and 05 the form number for Special subject periodicals; they are only not repeated under every subject because they are constant or mnemonic. The numbers which are combined are already in the one classification and notation, and the combinations become numbers in one order, with only one rule of arrangement; for example, 581·8 Histology and cytology of plants is not a built-up number, 581·942 Plants of Great Britain is, but both file not only in the same order, but also by the one simple rule for order of simple arithmetical numbers. And because they are all simple arithmetical numbers no extra, special rules of arrangement, which become necessary in UDC, are necessary in DC.

9·4 Extension of DC Numbers by Parts of Others.

The extension of 338·17 by the extensions of 63 has already been illustrated in 9·1. Other examples could be given, and may be found by the student himself in the tables. The important point for him to note is that these and extensions by the whole of any number are not at the discretion of the classifier; there must be direction in the tables, even though it may be only the general direction which covers the form numbers and extensions of 09. Dewey himself (DC, 14th ed., intro., p. 32) gave the example of the early classifier who extended 636·1 Horses by 682 Blacksmithing to make 636·1682 for Horse shoeing, but in later editions 636·168 is American ponies, and Horse shoeing is either 682·1 or 636·10834.

At first sight subdivision of one class corresponding to subdivision of another for the same things, for example Farm crops in 633 and 338·17, seems to have great possibilities, but what may be lost sight of is that what is the useful, scientific, logical subdivision of some things at one point is not so at another. The example has already been given in 7·5(5) of DC's mnemonic or constant subdivision of constitutional law by country geographically, which separates the closely related constitutions of the British Commonwealth countries. This is not a great weakness in DC just because its use of this device has been selective, apart from subdivision by country; it has proved a great weakness in some neosynthetic classification, especially so-called facet classification, in which an attempt has been made to reduce knowledge to elements or nuclei, called facets, on a chemical or physical analogy, and then to combine these to represent and classify knowledge in all its aspects. UDC, the original synthetic classification, shows mainly the weakness of too much division by the whole classification; the primary arrangement of subjects does not prove to be satisfactory as classification or indexing of the same subjects in subordination. The order of metals in chemistry is not satisfactory in mining and metallurgy, and whilst a subject subclassification may be useful at one point an alphabetical subarrangement of the same things may be better at another. In DC (14th ed.) Gardening, special plants and flowers 635·93 is extended ·933-939 according to Botany 583-589, and Injurious animals 632·6 according to 590, but at both places the subclassifications applied have little use, and are not self-indexing as alphabetical subarrangements would be, with or without the Cutter number type notation used in LC. One of the curiosities of subject classification is the extent to which it has become as it were a point of honour not to use alphabetical subarrangements.

9·5 Extension of DC Class Numbers by the Whole Classification.

At some points, but comparatively few, it is useful, and economic, to subdivide by the whole classification, that is, using as extensions of a

number the whole of any other number in the classification. The extension of 016 Bibliography in this way has been given as an example in 9·1; obviously there can be a bibliography of anything, but whilst there may be, for example, packing of some things, there is not packing of everything, abstract as well as concrete, and once a number is to be extended by the whole classification, as required, it cannot be extended for its own specification. This is got over by treating the whole classification as a special table with its own sign of association as in UDC, but as will be seen, there have proved to be unforseen difficulties in UDC's whole number compounding, which has been made a maid of all work and a way out of other confusions, which it has only confounded.

The reversal of a number extended by a whole number is not possible in DC. In it 375 Curriculum divided by the whole classification gives 375·2 for the Place of religion in an educational curriculum; the two elements are 375 and 2, but these in reverse are not Religion and the School curriculum; there is no DC number 2·375 and 237·5 is Hell, as a species of after life. The UDC device which can be used with DC numbers, would give 375:2, which could be reversed as 2:375. The student should note that two or more elements in a compound, each consisting of one or more figures, are reversed or permuted; a succession of single figures is not just put the other way round, which in the case of 375·2 would give 257·3, which would be a subdivision of Parish work. Students should also note again that though a point divides 016 and 621384, and 375 and 2 as whole numbers, except for noughts in the second case, it is not a sign of association corresponding to UDC's colon; it only comes between the two numbers because the first is of three figures. Students working back from UDC to DC have made this mistake. In 336·2786292 Taxes on motor vehicles, the number extended by the whole classification is 336·278 Special taxes, and the extending number 629·2 Motor vehicles, in Engineering. At 629·2 there is a special extension for taxes, 629·21342, but 1342 has nothing to do with class number 134·2, which is a subdivision of Hypnotism. UDC uses 336·22:663 for Taxes on drinks, and this could be reversed.

9·6 'Horizontal' Order in DC Built-up Numbers.

With built-up or compound numbers in synthetic classification there can be problems not only of what UDC has called 'vertical' order, that is of a series of compound numbers all beginning with the same simple number, but also problems of what it has called 'horizontal' order of the simple elements in a compound number. There can be more than one element in a DC number, though little is said about this in its theory or practice, for example, 780 Music and 942 Great Britain and 03 a Dictionary makes 780·94203, a Dictionary of British Music, reading from left back to right, and there appears no possibility that this could mean a British dictionary of music, which presumably could be

represented by 780·30942. With UDC 780(41-4)(03) for the same thing requires special rules of order, because there can be several other alternatives or additions.

9·7 Document Specification by DC Numbers.

There was not in Dewey's mind, nor apparently in anyone else's before Otlet's, any idea of using classification numbers to provide codified descriptions or specifications of documents, as distinct from providing numbers for classes in which documents are entered according to subject and form. DC may allow 780·9420803 for a Dictionary of nineteenth century British music, but Dewey did not propose such numerical specification of the subject and form of the document beyond useful classification and subclassification. Though now discarded in UDC's thinking, there is still this idea of document specification in other synthetic classification thinking. In discarding it one UDC authority has suggested that Dewey's form numbers were somehow responsible; these may have given Otlet the idea, but though they were Dewey's they did not give it to Dewey or if they did he made nothing of it.

9·8 Compound Reversible Numbers, Added Entry and Dewey.

As shown above, Dewey introduced the practice of extending numbers or dividing subjects by the whole classification, but this does not mean that he thought of his compounds as a means of added entry by 'reversal'; as shown his numbers are simple, however arrived at, and he did not provide any means of reversal. If we want to put Taxes on motor vehicles under both, then we have to use the number 336·2786291 which is a compound of two numbers, but irreversible, and the number 629·21342, which is simple and irreversible. Too much credit as well as too much blame may be given to Dewey, and not enough of either to the father and founder of UDC, Otlet. In many cases Dewey does not give us any number for two things in relation, for example DC has no equivalent for UDC's 621·56-72, which is not reversible, for Refrigerator lubrication, as well as no equivalent for UDC's 621·56: 621·89 for the same relation, which is reversible. With DC in greatest detail in the 14th edition, in places in greater detail than UDC, we cannot either subdivide refrigeration by lubrication or lubrication by refrigeration.

9·9 Number Compounding to Represent New Subjects and Dewey.

It is an idea of neosynthetic, and especially facet classification theorists rather than of UDC editors and enthusiasts, that there are elements of knowledge comparable to those of physical matter, out of which compound subjects are made, though as shown in 6·61 Bradford implied this idea, perhaps unconsciously; it then follows from this entirely unsupported assumption that there can be numbers for the elements or fundamental facets of knowledge, which can be forever

combined to make numbers for old and new subjects. Obviously this is still more remote from Dewey and his number building.

The student should now have some idea of Dewey's number building for its own sake, and he should study it further as explained by Dewey himself in the introductions to his tables up to the 14th edition. He should have some idea of what it is not, in comparison with that of UDC and other synthetic classifications, and he should have some idea of what led up to these, if he is going on to them, and he should go on to UDC, if only because it is a classification in wide use, and with a future.

Chapter 10

UDC and Synthetic Classification

In FID, formerly IIB, UDC has had an organization for its own propagation which has been an important factor in its success. Two men were mainly responsible for this organization, Otlet and Lafontaine, but of the two Otlet seems to have been mainly responsible for the adoption and adaptation of DC, and the idea now generalized as synthetic classification.

Both Otlet and Dewey were very young men when they worked out their ideas, so youth cannot be held against Otlet any more than against Dewey. But Otlet was a young man of means; he didn't have to work his way up as Dewey did, partly by assisting in a college library, and if he had there was not in Belgium, or in continental Europe generally, anything like the ferment of library and bibliographical development which there was in the eastern states of America, with Jewett, Winsor, Poole, Billings, Cutter, all at work, and reaching a peak in the 'annus mirabilis' of 1876.

Otlet who died in 1944, was born in 1868; he was trained as a lawyer or advocate, like so many 'amateurs des livres', but he became interested as an amateur first in the bibliography of the social and then of the physical sciences, which was not the usual course of the gentleman book collector. His special interest became subject bibliography, and to emphasize interest in information rather than in books themselves, or libraries, he and his associates later substituted the word documentation for bibliography, and talked of documentation centres rather than libraries or information offices; hence the Federation Internationale de Documentation or FID in place of their original Institut International de Bibliographie or IIB. With this went a distinction between librarianship and documentation which has never been accepted in English-speaking countries in which more documentation has been and is being done by librarians and libraries than has been or is being done under the name documentation. But in Europe the attitude of librarians and libraries on subject cataloguing, already discussed in 3·2, had much to do with the rise of the documentation movement and did much to create and justify Otlet.

Classification as a means of organizing subject bibliography attracted Otlet, as might be expected in the countries and language of the 'catalogue raisonné', and whilst on a holiday and talking to a stranger he first heard of DC; the stranger had read something about it in a newspaper. To understand how this excited him and those to whom he later introduced it we have to remember that the metric system of measures introduced with the French Revolution is a decimal system which was

intended to replace all non-decimal measures, such as our measures of length and money, and did so thoroughly in continental Europe; also the American Revolution had been associated with the French Revolution, and the freeing of small nations which went with it. This amazing American had applied the decimal or metric system to the classification of knowledge, so the Dewey system must be quite scientific. Indeed it is, but not because of the decimal notation, which has persuaded scientists and other amateurs to adopt UDC more than anything else.

After some time and difficulty he got a copy, presumably of the second edition of 1885, and with an older man, Henri Lafontaine, began what came to be an extensive collection of entries on cards classified by DC. Field, a Harvard man, and presumably an American, had already founded the Concilium Bibliographicum at Zurich; he persuaded them to adopt the 75 × 125 mm. size card and this did much to make it the present international standard, although British users of UDC, such as the Science Museum, London, still go on calling 5″ × 3″ the standard. As their collection is said to have numbered 400,000 'fiches' or cards by 1895 they must have employed assistance from their own private means, and in this and in organizing a Conference Bibliographique Internationale in 1895 at Brussels under royal patronage they had the assistance of a man of wealth, Ernest Solvay. Great Britain and America, the two most advanced countries in bibliography and documentation, were not represented at the conference, at which there were few if any who would now be regarded as trained or experienced librarians or bibliographers. Resolutions were carried for the adoption of DC as a basis for what became UDC, for the development of international and universal classification, for the setting up of the Institute, and the maintenance of a central catalogue or index.

We are not concerned with this central catalogue which had finally to be given up, or even with the controversy which went on as to whether some sort of co-operation could and should be ensured by common use of UDC. The controversy can be studied from the side of UDC and FID, with suggestions of betrayal and sabotage, in Bradford's Documentation. We are concerned with what Otlet had in mind. And this seems to be well stated and summarized in something he wrote, in French, in the Institute's Bulletin, vol. 1:230-42, 1895, Sur la structure des nombres classificateurs. He said, 'en resumé':

"In short the decimal classification should be at the same time a classification and a bibliographical notation. As a classification it should provide classes in which ideas are subordinated one to another successively in different ways, according to the principal or secondary rank given to them. As a bibliographical notation it should be really a universal code capable of expressing by figures, grouped in factors self contained and permanent in meaning, all shades of ideologico-bibliographical analysis. These factors will express the limitation of the principal idea by an auxiliary idea, which will sometimes be another principal idea taken as a whole from any part of the classification,

sometimes a bibliographical category of general application, such as the auxiliary table of time, of place, of language, etc., sometimes even the nomenclature of the subject.

"Varying the combination of these factors with each other will do away with the making of entirely new classification numbers each time it is desirable to classify the same entries from different points of view. So the encyclopaedic needs of the universal bibliographical catalogue and those of special bibliographies will be reconciled."

There it is, almost as it became, although the first edition was not published until 1907. There is to be classification of subjects or ideas, but the numbering system is to be a code, to express not merely subjects, but documents, with all "les nuances de l'analyse ideologico-bibliographique". Figures are to make class numbers, each with its own permanent meaning; but two or more can be factors expressing the effect or limitation of one idea or subject on another; the one limited or qualified will be a principal idea, from the main classification, a limiting or qualifying idea will be another taken from anywhere in the main classification, or it will be from a category of common application, and may even be the name of a subject. But what is all this for?

It seems partly for document specification for its own sake, and partly to provide a set of factors expressing each document which can be varied in order so that the same set will have different places in the classified catalogue order, so that a document can have multiple entry without further classification, simply by varying the order of the factors originally discovered to express it. The set of factors for a particular document in one order may provide the only classification it needs from the point of view of one special bibliography; in another order it may provide the only classification it needs from the point of view of another special bibliography and so on; in all possible orders the set will meet the needs of the Repertoire bibliographique universel, the central catalogue actually set up and maintained for some years in Brussels. Such a catalogue is not necessarily universal in the sense of including all books; it is universal in the sense of cataloguing for general use, but without analysis for every possible accidental or incidental use. The difference has been discussed in 1·8. And in the name Universal Decimal Classification the word universal was not intended to refer to the universal or complete cover of all knowledge in the classification but to its apparatus for classifying a document, as a whole, from every point of view.

It seems that the specification of the document was to be partly for its own sake. But how far this was at any time Otlet's own idea is not clear, at least without further and more detailed study of his writings. It certainly was for multiple entry by what came to be known in English as 'reversal'. But it is also not clear how far Otlet intended the 'coloning' of main class numbers to be alternative to the use of the common auxiliaries and the special analyticals, as a means of increasing the possible number of reversals for the sake of multiple entry. The more

coloning there could be the more his idea of varying the combination for multiple entry, without entirely new classification, would be served, and yet he seems to have reduced rather than increased possibilities of this in his original plan, and present confusion may be the result of unforeseen consequences of inconsistent developments of the original plan between 1895 and publication. Further study of the development of UDC and its use might clear up this point.

10·1 Decimal Differences Between DC and UDC.

The DC numbers 600, 620 become 6, 62 in UDC, and 621·3841 becomes 621·384·1. These are all read as decimal fractions, so that all numbers beginning with 6 come after 5 and before 7, and there is no need to use noughts to make up whole numbers as in DC; the reading is not as easy in the face of established habits, and the shortness of the comparatively few very general numbers is a doubtful advantage. The initial decimal point used to explain the method of reading and arranging the numbers is understood, the full stop is then used for the same purpose as the comma in a long number such as 6, 213, 841, though differently placed, and there is a further complication. Whereas DC form numbers are 01-09 two of UDC's auxiliary tables are ·0 and ·00, so that Shoeing of horses, which by a borrowing from UDC is 636·10834 in DC, is in UDC 636·1·083·4 because ·083·4 is a special table number, introduced by the point, and with its own point to facilitate reading after the third figure. The ·00 table is for Points of view or aspects; 636·1·003·1 is Horses from the economic viewpoint, and 636·1·003·12 Horse valuation.

In theory, and in some practice there can be, for example, 53·01 Physics—theory, and 530·1 General principles of physics in that order, but these likenesses except for the place of the point seem to be avoided, to prevent confusion, and the ·00 and ·0 extensions can usually be read as main class number extensions without the point, and without upsetting any intended order.

10·2 Order Differences Between DC and UDC.

Order differences between DC and UDC arise mainly out of UDC's auxiliary tables. As shown in 9·1, all DC numbers however made up are simple numbers for arrangement purposes, and as shown in 9·6 they seem to present no difficulty of 'horizontal' order, that is of the parts or elements in a made-up number. The basis of the horizontal order in UDC is the same as that of a DC number, that is, the logical order of what is being represented, for example, either a dictionary of British music, or a British dictionary of music; then the order from left to right is from what is most essentially the subject to what is least essentially the subject. Take for example 78·009(44) "19"(021) = 40; this represents a document on music, 78, from the point of view of public relations, ·009, in France, (44), in the twentieth century, "19", in the form of a manual, (021), in French, = 40. If we were to cut this

down we would do so from what is least essential to the subject classifying of the document, that is its language, towards what is most essential, which is what we would ordinarily call its subject, music; but the example is now of little more than theoretical interest, because this codified specification or description of documents for their own sake is not now recommended or practised with UDC. As a rule the horizontal order is usually stated as main class number, in this case, 78, special analyticals, not represented in this number, point of view, in this case ·009, place, (44), time, "19", form, (021), language, = 40. The student who may be examined on UDC should learn this order with an example or two.

An example of the vertical order, that is of different compound numbers each beginning with the same simple number, also tends to be theoretical and artificial, because it assumes entries for the same or different documents, as on a subject by language, as on the same subject by form, by place, by time, from points of view, by different processes applied to it, and a complete example is not likely to occur in practice. But suppose the document on music from the point of view of public relations, etc. to have multiple entry under 78 and 78 extended, as follows:

78	Music
78=40	Music—Literature in French
78(021)	—Manuals
78(44)	—France
78"19"	—20th century
78·009(44)"19"(021)=40	—Public relations
78·01	—Philosophy
781	—Theory

Note: 1. As 1901- is the twentieth century "19" represents the twentieth, not the nineteenth century.

2. To subclassify books on music by language this must be the first subdivision and so on. Other subdivisions may be given after the one intended to subclassify, as in 78·009(44), etc., but not before it. And if we wanted to subclassify the literature on music by language, by form, by country and so on, then the same document would have to have multiple entry. Confusion of document specification and subject and form classification and subclassification led to assumptions that a compound number such as 78·009·01(44), etc., somehow subclassified a document by all its elements at once. It doesn't, anyhow, but of course in practice there would be little or no subclassification of the literature of a subject by all the possible subdivisions.

3. The order, called vertical, may be looked on as the opposite of that called horizontal, insofar as it is an order from what is least essential to the subject classifying of the document and others towards what is most essential, so what comes last is a further specification of the subject by an extension of the simple main class number 78 to 781. Basically the logic is that of DC and other classifications; it is that of descent from

general to specific, but with added complications in the subdivision of aspect, form and process of the general subject before this is further specified in itself.

4. This special UDC use of the terms horizontal and vertical has nothing to do with the use of them for what is now called linearity and discussed in 2·6; this linearity applies to UDC as to any other classification.

This example of vertical order does not give all the auxiliary tables and variations of whole number combination in UDC; one which does is just as artificial and unlikely in practice, but is necessary and useful for study and teaching because the order still applies even though all the tables are not likely to come together in practice.

The student who may be examined in UDC must be prepared to be examined on the orders of the tables and on them in other respects, now to be discussed, taking them first together in the usual vertical order, and then separately. The only variation of this order, as given in the Abridged English Edition, 2nd edition (p. 11), is that "Place (1/9) may follow Time" . . . "if considered more restrictive", that is to say if Place is thought to affect the subject more essentially than Time. The edition quoted is referred to here as AEE2. The only later edition with English text is the Trilingual (Abridged) Edition, 1958; its General Introduction in English follows closely, if not exactly, that of AEE2; the French Introduction Generale seems to be a translation; the German Einleitung seems to have variations and different examples.

10·3 Auxiliary Tables and Compound Numbers in UDC.

Here is the simple number 675, for Leather and the leather industry, with all the signs of association and auxiliary tables in the 'vertical' "filing or listing order of compound U.D.C. numbers". The numbers in round brackets at the left are only for identification in the following comment.

(1)	675+678	Leather and rubber
(2)	675/678	Leather, paper, textiles, rubber (675,676,677,678)
(3)	675:93	Leather in history
(4)	675[37]	Leather industry instruction, or Leather—Study and teaching
(5)	675=20	Leather, works on in English
(6)	675(021)	Leather, a manual
(7)	675(44)	Leather in France
(8)	675(=927)	Leather among the Arabs
(9)	675"18"	Leather in the nineteenth century
(10)	675 Smith	Leather, Smith manufacture
(11)	675·007	Leather industry—Personnel
(12)	675-78	Leather industry—Safety devices
(13)	675·02	Leather dressing

Of these (8) and (10) are not given in the filing or listing order of AEE2 (p.11), but (8) is given as auxiliary table (f) Common auxiliaries of race and nationality, and (10) as (h). Alphabetical and (non-decimal)

numerical subdivision; (4) is treated in AEE2 as a variant of (3). The Trilingual Edition gives another sign, the apostrophe, grouped with (1) and (2); this appears in the German Einleitung, but nothing seems to be made of it in the French and English introductions, and it doesn't seem to be mentioned in AEE2. It is a special sign of 'synthesis', for use so far only in 546, 547 and 678. This synthesis is of such things as chemicals, and not of class numbers generally, as in synthetic classification.

(1), the plus sign, joins two or more non-consecutive UDC numbers for subjects treated in the same document, the subjects being "commonly associated concepts", but not treated in relation or as affecting each other in the document. Like some but not all of the other compoundings this may be said to be now damned with faint praise; obviously a document on leather and textiles and rubber as separate subjects could be and should be entered under 675 and 677 and under 678. Filing difficulties are raised by 675+677+678, which seems to reflect the earlier and discarded idea of specifying the document rather than classifying it according to its subjects. Note that the compound is of two, or more, main class simple numbers, and that it could be filed in an order of these numbers in any permutation or reversal, 677+675+678 and 678+677+675, as well as with the elements in their numerical order of 675+677+678. But this is not done with this sign; when compounds are to be permuted or reversed the colon sign of (3) is invariably used. As shown below, this is said to be one of its purposes. There is nothing wrong with this as a rule or convention, but the student should note that there is no magic in the colon itself, either in this system or in Ranganathan's Colon Classification in which it is used in non-reversible compounds. The sign is simply one of several equally suitable to the purpose, among them the plus and minus sign. The plus sign as used has something of its mathematical sense, but the minus sign, called hyphen, hasn't, and the equal sign hasn't. The use of more or less mathematical signs in addition to decimal figures has done much to give UDC the mere appearance of being mathematical or scientific. Signs ordinarily provided on a typewriter are desirable, and the sign & could have been used instead of the plus.

(2), the stroke sign, /, indicates consecutive simple numbers in their numerical order from one before the sign to one after it, for example 675/678 for a document on leather, paper, textiles and rubber, these being together in the classification with the consecutive numbers 675 to 678. The numbers compounded are main class numbers, but there is no reversal, which would hardly be possible because by definition they are consecutive. This device has more use than that of addition. Suppose a book on birds 636·6, dogs 636·7, cats 636·8, other animal pets 636·9; if it were classified generally as 636 Animal husbandry it would be lost, whereas 636·6/9 groups its subjects in place. But the classification table calls the tune: fish as pets have a number, 639·34 or 639·93, not consecutive with 636·6/9, and the only possibility seems to be 636·6/9+639·34, or 639·93.

(3), the colon sign, :, is used not only for a relation of two things such as religion and science, 2:5 or 5:2 as itself a subject, but also for any relation of two or more 'concepts' as expressed by UDC numbers, whenever the compound is to be reversed for added entry; so it is used as an alternative or substitute for at least (6) and (11) to (13), but without any change in the vertical order to match the change in function. It becomes a general alternative or maid of all work, but at a fixed point in the order with several consequences affecting subject and form order and therefore classification, and it requires the special consideration given to it in 10·4/5.

(4), the square brackets sign, may be used, as an alternative to the colon, "when the relationship involves a subordinate concept for which no separate entry is required by reversal" (AEE2, p. 12). It was introduced in AEE1, in 1948, apparently with a vague idea of reducing the indiscriminate, logically muddled use of the colon, but without any clarity of logic in distinguishing co-ordinate and subordinate relation of ideas; in the Trilingual Edition, 1958, it is only mentioned in the General Introduction in English, and seems to be on its way out again.

(5), the equal sign, by itself "serves to designate", with numbers, "the language or linguistic form of any subject denoted by a main U.D.C. number". The table is "recommended only for very detailed subdivision", and where language is important. What is meant is not the language of the subject but the language, in the ordinary sense, of a document on a subject, for example, 22·05=30 for the Bible in German, 6(03)=20 for a Medical encyclopaedia in English. The equal sign is also used with brackets in (8).

(6), the round brackets sign with 0, (0 . . .), is used for the table which is called form and is nearest to DC's form numbers. It is a separate auxiliary table. Like (5) and (7)-(13) it is not in any way division or extension by the whole classification as in (1) to (4); the numbers extended by it cannot be reversed in the order of the main classification, but they are nevertheless compound numbers requiring a special rule of order, whereas DC numbers with form number extensions are still notationally simple numbers. The table however is the same mixture of subject aspect and documentary form, and even thing process, as in DC, without logical distinction, and with far more detail without self-indexing or apparent order. Even in the Abridged Edition over a hundred subdivisions are given, among them (091) Historical presentation, which is supposed to be used for the history of a subject. At 93 History, that is Political and social history, there is a note, "History of specific subjects, use (091), e.g. 51(091) History of mathematics". But the Science Museum Library regularly uses :93 for the history of subjects, though this strictly means the subject in relation to political and social history, and there is little use in reversing the compound. There is more point in using, as it does, :05 and the reverse for a periodical on a subject, instead of, for example, 51(05), which cannot be reversed, except in an extra file, outside the main classification order.

Note that form numbers and main class numbers do not always correspond as in the case of (05) and 05. Main class 091 is Rare manuscripts. A Rare manuscript on mathematics could be 091:51, or 51:091, but there appears to be no alternative form number. There may be no special table number for a main class subject or qualification, or, on the other hand, no main class number for a special table aspect, form or process, and confusion of order is increased because one cannot be used to the entire exclusion of the other.

(7), the round brackets sign without 0, ( ), is used for common auxiliaries of place, which are a place table used where in DC its history class extensions are used; there are simple class number extensions in 91 and 93/9, for example 914·2 is England description and travel, and 942 English history, but English agriculture is 63(420) which in DC would be 630·942. Note the equal number of symbols, because of the brackets necessary to distinguish 63(420) from 634·2. . . . This is one of few tables still recommended for regular use without alternative, such as 63:942 instead of 63(420), and even the Science Museum makes regular use of it for place whilst using 93 for history as a form or aspect, instead of (091).

(8), the round brackets sign with the equal sign, is used for common auxiliaries of race and nationality. With some variations for races without a country the history extensions or place numbers are used, for example, (=994) Australian aboriginals, so Crocodile hunting in Australia would be 639·1(94) but Crocodile hunting by Australian aborigines might be 639·1(=994), if the user of UDC realized there could be a difference. Perhaps strictly Crocodile hunting in Australia generally would be 639·1(94), by aboriginal, native or indigenous people of Australia, 639·1(94)(=1-81), by white races in Australia, 639·1(94)(=2). This illustrates the igenuity of UDC, and the doubts that can arise in its use; and in this case it still does not seem possible to distinguish, if the distinction were wanted, crocodile hunting in Australia by white immigrants of the first generation, and then by nation of origin, and crocodile hunting by descendants of white immigrants, who may be spoken of as native Australians, but not as indigenous or aboriginal.

(9), the inverted commas sign, with some special figures and with actual date figures, is used for the common auxiliaries of time. These are used throughout, including History, in which the Norman period in English history is 942 "1066/1154", and not 942·02 as in DC. There seems to have been some doubt in earlier editions but it is now stated that this time table is "used to designate date, period or other time aspects of the subject matter or content denoted by the main U.D.C. number, and not date of publication or issue" (AEE2, p. 23). In the Complete English Edition, vol. 1, Part 1, 1943, it was said that 622(02)"17" represented the concept "a book on mining published in the 18th century", and 622"17"(02) represented a book on 18th century mining. Presumably a twentieth century book on eighteenth century

mining, in England, would have been 622(42)"17"(02)"19". But by limiting qualification by time to the subject and leaving date of publication of the document to its description in the entry itself one difficulty and doubt in the application of the tables has been removed.

(10). There can be final subarrangement or subdivision by "individual names or numbers". Non-decimal numerical subdivision in the title of this so-called auxiliary table means numbers, usually decimal, but not classification numbers, and usually distinguished by No. In the Complete English Edition, vol. 1, Part 1, 1943, p. 35, it was said: "names of subjects can be placed after the U.D.C. number in cases when the numerical subdivision is not sufficient, or where the entries under one U.D.C. number are sufficiently numerous to make alphabetical arrangement of subject useful, or when an arrangement by subjects is not deemed necessary." The last sentence is typical of the muddled expression that runs right through all English editions of UDC; the writer, probably Bradford, probably meant "when an arrangement classified by subject is not deemed necessary". Nevertheless this held out the possibility of alphabetical subarrangement as in LC, as discussed in 7·25 and 7·5(6); but in AEE2 there is no suggestion of anything more than distinction of individuals, and in the filing or listing order of compound UDC numbers alphabetical subarrangement is not even given. It has been given here in the place it has in the Complete English Edition and in the German Einleitung to the Trilingual Edition, that is between the time and the point of view table, which is quite illogical. Specification by specific names in alphabetical order should come after aspect and process divisions of the genus or class and form divisions of its literature, with any other specification, and probably the mixing of alphabetical specification with subject aspects has had something to do with its unfortunate neglect in UDC; it is certainly evidence that Otlet never really grasped the function and importance of order in classifying and indexing, and never really understood that a logical order must first be determined and then an order of symbols applied which will represent this logical order. This comes out in the next three tables.

(11), the common auxiliaries of point of view, or subject aspects, such as the theoretical, the practical, the economic, down to social and ethical and public relations, are like DC form numbers insofar as they are extensions of the main class simple numbers by figures, apply to the whole classification, and produce in effect a simple main class number. Strictly the sign is ·00, but in most if not all places the extra point could be left out, and for example, 621·3·003, Electric engineering from the economic viewpoint, could be written as 621·3003, or 621·300·3 without any conflict in filing order. They are, however, little more than a crude classification for the filing of office documents, which may be all for which they were originally intended; they are insufficient, and whilst they are used, as shown in 10·4-5, to overcome some of the muddle arising out of overuse of direct colon division by the whole

classification this has to be used to overcome some of their inadequacies, so that muddle is muddled, and further muddled by a conflict of logical and notational order between them and the process or analytical subdivisions, (12) and (13).

(12) is the hyphen analytical or process subdivisions coming in AEE2 between point of view, which is ·00, and the closely related ·0 analytical subdivisions. The two analytical subdivisions are for processes of things not applicable throughout the whole classification, but applicable to large consecutive sections of it, as indicated in the tables, and the main or only difference between them is that the hyphen subdivisions have wider range than the other, for example -72 lubrication is applicable as an extension almost right through 62/9, but ·066 Switches is applicable only in 621·3. And in many places the ·0 extensions seem to have application only where they are given. Their use then seems like that of DC form numbers discussed in 9·2, to interpolate unforseen subject subdivisions.

The AEE2 order brings the logically related analytical subdivisions together, but it separates the notationally related ·00 and ·0, and in the Complete English Edition, and in the German Einleitung to the Trilingual Edition the order given is hyphen, ·00, ·0. The case is one of out of the frying pan into the fire; there never should have been in the beginning the muddle and conflict of logical grouping and notational order of the three tables, which could have been avoided by using the hyphen for point of view, or not using it at all, and using ·00 as now for point of view, and ·0 for all analytical subdivisions, or doing something else more radically different. Documentation using UDC has been called librarianship done by amateurs and this sort of thing shows the amateurism and inexperience of the founders, and of users and editors since, who still don't seem to have a thorough grasp of what is wrong, or slide over and round it as part of their salesmanship or loyalty.

The analytical subdivisions both hyphen and ·0 are useful, even essential, in UDC use, despite their logical and notational muddle, but for reasons discussed in 10·5 extension by the whole classification with the colon is commonly preferred. When they are used then they are best regarded and treated as simple number extensions, like the point of view numbers.

(13) is the ·0 analytical subdivisions just discussed in their logical relation with the hyphen subdivisions and their notational relation with the ·00 point of view table.

This account of the compoundings of simple UDC numbers, with each other and with special auxiliaries, has been given in the way it has to show the difficulties and obscurities of their functions and their arrangement as immediate subdivisions of the same simple number. As stated just before the example, the possibility of all of them together and in some succession as immediate subdivisions of the same simple number is artificial or theoretical, and may be written down if not entirely written off in practice. They are rarely if ever all used with

the same number, or if they are, some are rarely used as immediate subdivisions and hardly raise problems of order, for example whilst an English medical encyclopaedia might be entered under 61(03)=20, it would be unlikely to be entered also under 61=20(03).

Difficulties in the arrangement of thirteen or more different classes of subject subdivision are solved by the rare use of some, intended for the now discarded document specification rather than for classification, and by the substitution of some for others, above all the maid of all work colon extension by the whole classification, with some tempering by the 'intercalatory' use of the point of view table. This leaves the arrangement simpler notationally than it would otherwise be, but makes a shambles of subject subarrangement as something which could be called either classification or self-indexing. What is called coloning for short has then to be considered both for its effect on arrangement and classification, and as a device for 'ensuring' added entry. The latter brings it into the maid of all work use which wrecks whatever logical subarrangement of subjects by relations and qualifications UDC was supposed to have.

10·4 Coloning and Arrangement.

The usual statements about classification with the usual sideswipe at alphabetical arrangement are made for UDC in particular. It is said to be "a classification in the strictest sense . . . so that related concepts and groups of concepts are brought together, and the arbitrary and often haphazard systematization of alphabetical and other arrangements is avoided". This kind of prejudicial comparison has been discussed in 1·5 and 2·4. We need only note that what we are concerned with here is not UDC as a classification table but the results of its recommended application in catalogues and bibliographies, and direct coloning is recommended in a statement that "an auxiliary should not be used for a concept which can be denoted by a simple main number, or by two such linked by a colon". But then we read: "direct coloning may create an unsatisfactory, and even chaotic, order of subdivisions, which can be avoided by judicious use of ·00 numbers." This is in the space of 14 pages (AEE2, pp. 7, 10, 24). In his Documentation Bradford talked of a muddle of a thousand items under such a subject as paper, and proposed the same remedy (2nd ed., p. 76).

Suppose the numerous relations of paper and the paper industry, and remember that the purpose of UDC is not just to classify an odd book or two on paper in a public lending library and its catalogue; it is to classify and index highly specialized literature on such a subject. In alphabetical order under either Paper and the paper industry or 676 we could have Accounts, Advertising, Banking, etc., for these; with direct coloning of 676 we could have :657, : 659, :332·1. Or with more and more varied subdivision we could have intercalation of point of view numbers and indirect coloning; for example, using ·003 for the economic point of view or aspect we could have 676·003:332·1 Banking, :336·2 Taxes,

:337 Tariff, :657 Accounting, :659 Advertising, unless we decided, being judicious, that advertising went with public relations, 676·009:659. The word judicious is nothing more than a euphemism for makeshift.

Here are some quite possible relations of the industry in alphabetical order:

Accounts	Handicrafts	Standards
Advertising	Labour	Stationery
Banking	Law	Tariffs
Bookbinding	Lithography	Taxes
Brokers	Packing	Trade, Retail
By-products	Periodicals	Wholesale
Chemistry	Personnel	Waste
Dictionaries	Photography	Waste utilization
Food protection	Printing	Workers' compensation
Forestry	Publishing	Wrapping, Preservative
Gov't control	Sales promotion	Writing

There are more or less reasonable main class numbers for all these except By-products, Waste, and Waste utilization; but these can be expressed by ·00 numbers without further coloning. And of them only two, Dictionaries and Periodicals, cannot be brought under ·00 numbers, but this would be true of all or most other forms such as directories. Raw materials has its own ·0 analytical subdivision under 676; this would not be used if a reversible compound were wanted, but then there seems to be no reasonable main class number for raw materials, and the point of view number is irreversible. These points illustrate the makeshift or 'judicious' way UDC is now being and must be used. Using direct coloning as much as possible we would get something like this:

676:003·3	Writing	:389·6	Standards	:658·3	Personnel
05	Periodicals	413	Dictionaries	658·86	Trade, Wh'sale
331	Labour	54	Chemistry	658·87	Trade, Retail
332·1	Banking	614·3	Food covering	659	Advertising
336·2	Taxes	621·798·2	Packing	664·8	Food preserving
337	Tariffs	634·9	Forestry	686·1	Bookbinding
338·98	Gov't control	655	Printing	686·8	Stationery
34	Law	656	Publishing	745·5	Handicrafts
368	Workers' comp.	657	Accounting	763	Lithography
382·1	Brokers	658	Sales	77	Photography

676·002·67	By-products
·002·68	Waste
·004·8	Waste utilization
676·03	Raw materials

This shows that the order of the whole classification is unsatisfactory for the subdivision of a subject and results in disorder which even UDC editors call muddle and chaos, complicated by the necessity of using finally three point of view numbers and one analytical subdivision, before going on to straight extensions of 676, some of which are closely related in subject to some of the relations given above, which would precede the straight extensions. Note that 003·3 is a main class number,

for Writing, not the point of view number ·003·3 for Accountancy. The only way out of the chaos is putting the alphabetical subarrangement under Paper in the alphabetical index with the class numbers; but these are subdivisions under a number, and it is not indexing practice to repeat subdivisions of a subject under its index entry; if it were then the index would become as numerous in its headings as the catalogue, and it is difficult to escape the conclusion that if the subheadings have to be alphabetically indexed, because the apparent subclassification is not classification at all, then the subarrangement in the catalogue itself could be alphabetical.

As noted, having said that an auxiliary should not be used if two main class numbers can be 'coloned', the editors then say, having admitted the resultant chaos, that there should be special and 'judicious' use of one of the auxiliary tables, the point of view table, to get some order or classification into the chaos. In the case examined the result could then be something like this:

676(03)	Dictionaries
676(05)	Periodicals
676·001	Standards
·5	Chemistry
676·002·67	By-products
·002·68	Waste
676·003	Economics
:331	Labour
336·2	Taxes
337	Tariffs
338·98	Government control
368	Workers' comp.
382·1	Brokers
657	Accounting
658	Sales
658·86	Trade, Wholesale
658·87	Trade, Retail
676·004·14	Use and application
:914·3	Food covering
621·798·2	Packing
655	Printing
656	Publishing
664·8	Food preserving
686·1	Bookbinding
686·8	Stationery
745·5	Handicrafts
763	Lithography
77	Photography
676·007	Personnel
676·009	Social and ethical public relations
676·009·03	Law
676·0009·7	Public relations
:659	Advertising
676·03	Raw materials

This isn't much better. There is some of the crude, catch-as-catch-can classifying commonly found in office filing systems, but the order under Economics and under Use and application by indirect coloning is still, in the words applied by the editors to alphabetical arrangement, arbitrary and haphazard, without either indexing or classifying value; for example, in the separation under Economics of Workers' compensation and Labour, and of Taxes from Accounting; under Use and application two food uses are separated, and Printing, Bookbinding and Lithography are none of them together. A much better result would be obtained by using intermediate alphabetical subheadings, with subsubheadings. But apparently arbitrary arrangement disguised by numbers as classification is to be preferred to any admission of merit in alphabetical arrangement.

Now, going back to direct coloning, why is so much use or misuse made of it?

10·5 Coloning, Hidden Information and Multiple Entry.

One of the two original ideas of synthetic classification and UDC was that of document specification, of "a bibliographical notation . . . really a universal code . . . expressing . . . all shades of ideologico-bibliographical analysis" or description of documents. And as late as 1943 the Complete English Edition, vol. 1, Part 1, p. 10, said: "libraries of the specialist type, which are concerned mainly with articles in periodicals, or with similar documents relating to very specific subjects, need practically all the detail which is provided . . . for the precise specification of these documents." Notice the confusion of the specification of subjects and of the documents dealing with them. But even in the same paragraph such libraries are advised not to use this detail in published lists and published catalogues, and the concluding sentence says: "over-elaboration in classifying frequently defeats the object in view, as well as wasting time." Five years later, 1948, in AEE1 (p. 7) and in identical words in Bradford's Documentation (2nd ed., pp. 71, 82) the classifier is warned: "the aim is not to specify the contents of a document, but to be able to produce it . . . thus the classifier should continually ask himself, what are the needs of those for whom he is doing the work, and what will, presently, have to be looked for and where." But for UDC there would never have been any idea that the aim of document classifying and indexing ever was to specify, in the sense of describing a document's contents.

There had been, said Bradford, "a small logical defect in the structure", which he blamed on Dewey's form numbers, and some misuse which he blamed on subject experts who "do not realise that the aim . . . is not to specify the contents of a single paper, but to bring together references to all papers having . . . characteristics in common"; such an expression as 526·9:336·211·1(431)"1927"(075)=3, for a guide to Prussian cadastral surveying in 1927 is justly described, he said, as "not classification but idle jesting". No man had done more than Brad-

ford himself to persuade subject experts that specifying documents was the great purpose and achievement of UDC.

Part of the reaction against this document specification came from realization that subordinate elements in a compound, including the analytical subdivisions, 'hide information', and in AEE1 (p. 109) restraint in the use of analytical subdivisions and auxiliary numbers was urged in heavy type, "because they tend to hide the information from the point of view they are intended to specify". But this can be misleading and mystifying because it is a conclusion from premises which are unstated, and questionable. Because of the emphasis on document specification there had been confused, wishful thinking, that merely by codifying a document as being on something or in some form, it was thereby indexed as a document on that subject or in that form. This has been discussed and illustrated in 10·2(2). But while subordinate elements in a compound don't index information it is not quite right to say without qualification that they hide it. There is now, in AEE2, no talk of document specification, but there is of hiding information, and of getting it out of hiding, and to understand this thoroughly and critically we have to go back to the other original idea of synthetic classification, and work forward.

Otlet had the idea of the compound reversible number "to do away with the making of entirely new classification numbers each time it is desirable to classify the same entries from different points of view". But this was part of his idea for central cataloguing for all purposes, and what is now left of it, or substituted for it, is the idea that the reversible compound 'ensures' added entry, as if separate numbers would not, could not be made to ensure it. So the argument about hidden information really is that if a document is on two or more subjects in relation and it is to be entered under two or more, this can only be surely done by a compound class number, and one which is reversible; therefore a subject, or information, expressed by a subordinate element in an irreversible compound is 'hidden', that is, cannot have an entry, because the compound is irreversible. But if there can be multiple entry by separate simple or irreversible numbers the whole argument falls to the ground. And it may be that multiple entry by separate simple numbers may be not only possible, but also better.

We are told: "the : (colon) sign, most important of the connecting symbols, is used generally to link two or more U.D.C. numbers denoting related concepts of (approximately) equal value, the numbers being reversed to ensure separate entries for the coordinate ideas, e.g. 17:7 Ethics and morals in art (reversed as 7:17), 31:63 Statistics applied to agriculture, agricultural statistics (reversed as 63:31)." This is typical again of loose thinking and expression running through all editions and explanations of UDC. Two purposes are confused, one of expressing a relation of subjects or terms and the other of ensuring separate entry for each of them; one purpose is that of expressing a relation as a subject and

the other a merely mechanical one of ensuring multiple entry, and the muddle of arrangement discussed above partly results from this confusion. Ethics and art in relation may be co-ordinate as religion and science may be, in the sense that the subject is the relation of one to the other; but statistics and agriculture in the relation given are not co-ordinate; statistics is subordinate, a qualification of agriculture. The introduction of the square brackets alternative for subordinate relation in AEE1 with the example 63[31] was in recognition of this, but the colon is preferred, apparently because the distinction of co-ordinate and subordinate relation is considered unnecessarily subtle or refined, and because it does not serve the dual purpose of expressing a relation and 'ensuring' added entry (AEE1, p. 111; AEE2, p. 12).

We are told that "for example, a document on African rivers should not be classified 916(282) or 551·482(6) when 916:551·482 will ensure that it is indexed under both Geography of Africa and Hydrography of rivers. One on River life (plants, animals), however is adequately classified 577·47(282), since the information is clearly ecological and not hydrographic" (AEE2, p. 10). This is both question begging and special, even specious, pleading.

The question is not one of entering the document under 916(282), which is Africa—Rivers, or under 551·482(6), which is Rivers—Africa, with 916:551·482 and 551·482:916 as an alternative; the question is one of entering it under 916(282) and 551·482(6), or under 916:551·482 and 551·482:916. And the answer to the question is that both will ensure added entry. On the second document the opinion that it is adequately classified by 577·47(282) because the information is ecological and not hydrographical is mere opinion; someone might want to enter this under 577·47(282) and 551·482:577·47 or under 551·482: 577·47 and 577·47:551·482. In this case a colon compound has to be used for river life ecology, whether reversed or not, because whilst there is an auxiliary number for Rivers there isn't one for Ecology, but it does not follow that the colon compound has to be used for the ecology entry, instead of 577·47(282).

Now it may be noted that neither 916(282) or 551·482(6) are as long as 916:551·482, and would not in arrangement be a source of the chaos illustrated in 10·4, and that if both different numbers are given there is more certain indication that added entry is required than if the one colon compound number is given; this by itself does not 'ensure' added entry; there has to be general instruction to the person making the entries, or the number has to be marked in some way.

Another difficulty is the reverse of that arising when there is no subordinate auxiliary number for a subject, as for Ecology in the example just above; it is the difficulty arising when there isn't a corresponding main class number for an auxiliary number. As might be expected, spinning machines are only expressed by an analytical subdivision or process number applicable in 677 Textile and cordage industries. Spinning machines generally are then 677·052, and Cotton

spinning machines are 677·21·052; to get a reversible number for Cotton spinning machines it is then necessary to use 677·21:677·052, instead of 677·21·052, which cannot be reversed and would therefore be said to hide the information from the point of view of spinning machines. Unfortunately the reversible number is then four symbols longer than the other, because the whole hierarchy of Useful arts—Manufactures—Textiles, 677, has to be dragged in twice. Where this is rather obscurely explained (AEE2, p. 26), there is an admission that there has to be some sort of 'convention' or marking to ensure double entry.

The foregoing covers the method of added or multiple entry with UDC and questions the statement that the colon compounds 'ensure' and are the only way of ensuring multiple entry. If the statement is not true, and multiple entry is possible in most or many cases in which it is wanted without colon compounds, then the second of the original ideas of Otlet, UDC and synthetic classification falls to the ground, and we may be nearer to a UDC which is simpler, and an improvement, in detail of classification and in some of its auxiliary tables, on DC. But as well as its method of added entry for consideration there are the circumstances in which UDC editors think there should be added entry.

10·6 Multiple Entry with UDC.

Along with all the talk of colon compounds ensuring added entry, there is now talk of alphabetical indexing doing away with it, on the lines exemplified and discussed in 5·4-45 and Appendix G. This is in AEE2; it was not in the Complete English Edition or in AEE1, in both of which little was said about the practical use of UDC.

We read that "in library catalogues, the subordinate aspects of each heading may be effectively and economically displayed in the detailed alphabetical subject index built up by the classifier for the particular collection: in the example quoted, there will be no real need for the second entries under 677·052, since the scattered information will be brought together in the alphabetical index as follows:

Spinning machines	677·052
cotton	677·21·052
flax	677·11·052
wool	677·3·052."

This may not go as far as the single entry title word indexed catalogue exemplified in 5·41 but it is getting close. The index brings the general and special class numbers for spinning machines together, but the "scattered information" is not "brought together", because there is only single and scattered entry in the catalogue. Again the thought and expression are loose and misleading (AEE2, pp. 10, 26).

Multiple entry is recommended for "abstracts or other lists, in which the items are only broadly classified and the alphabetical index (if any) contains only general headings". This discussion of the actual application of UDC in AEE2 is better than the little there is in other English editions, but nothing is said of the published abstracts such as Plant Breeding Abstracts discussed in 6·6 and 6·61 in which there is only single entry with detailed alphabetical indexing, and UDC classification without any use of its notation. Yet this use of UDC in such published abstracts is certainly not a minor use.

The student should read UDC's own explanations, the best available now being in AEE2, but he should be aware that its actual use is not fully explained, and that all the issues that are implicit in UDC and its makeshifts are not squarely faced. The student is left thinking that it is a scientific, near perfect system, which he is too dumb to understand, or he is left with a multitude of discouraging doubts about it. He can hardly be dumber and more woolly-minded than some of its enthusiasts and propagandists have been, and if he is an orthodox librarian he may take heart from the fact that the crack that documentation has been librarianship attempted by amateurs, is not very far from the truth. This might be said with even more truth about neosynthetic classification except for the fact that its enthusiasts have been more librarians than amateurs, which may lead to the conclusion that there is still no such thing as a really professional librarian.

10·7 UDC and DC in the Future.

There would certainly have been less theoretical confusion and more satisfactory practice if there had never been UDC and synthetic classification, but UDC has a future just because it has become established; at the moment it may have a brighter future than DC, and any classification under theoretical criticism will appear to be worse than it is in practice.

UDC works in many special libraries, though mainly with only partial and limited use of its devices and makeshifts, and plenty of local rules; and as shown in Chapter 6, it works, at least as a classification in some important abstracting journals, and its notation has been used as a basis for the coding of some mechanical selection systems. It works, as other classifications work, though it might be safer to say of it and them simply that they are in use, and that some of them including UDC have means of continuing in use. It is established, with organization behind it, and though this hasn't been sufficient to complete the Complete English Edition begun in 1943 it is far better than the organization behind any other classification except DC and LC, and UDC is the only classification which can fairly be said to be in wide international use beyond the English-speaking countries.

As classification it is basically DC, dating back to 1876, though the charges against DC in this respect, discussed in 2·3, are not as com-

monly made against UDC. In many of its classes it is better and more detailed even than the 14th edition of DC, and even the abridgment AEE2 is more detailed than the 15th edition of DC, in which the needs of large reference libraries, even for the shelf, are not met, and the use of classification in cataloguing is in effect rejected. With its form and place tables, and its point of view and analytical subdivisions which are practically main class extensions, it could be used in place of DC, as a European or British version of it, or it could be used with it. Already in DC there has been some use of UDC tables, for example in 636, as shown in 9·2, and UDC with a few adaptations could be used entirely in place of DC, but without its synthetic devices, and especially without its colon compounding for added entries, even though this is still its pride and joy; or some classes only could be used in place of DC classes, for example, UDC 34 could be used on the shelf and/or in the catalogue in place of DC 34, and no more.

Possibilities of assimilation cannot be gone into here in detail, but there are possibilities, especially if UDC editorial thinking on the necessities and advantages of coloning are revised. The important thing is not to look on DC as simply the source of UDC, but otherwise outmoded, or to look on UDC as little more than the plaything of a few special libraries and some abstracting journals. Both together should be looked on as the decimal classifications, far more closely related than any other two classifications, even LC and EC. They can be used together and they can be assimilated, as no other classifications can; they are both alive in theory and practice, as no other present classification except LC is, or is likely to be.

10·8 Neosynthetic Classification.

DC has influenced classification thinking far more than those who reject it think. It and its author Dewey are mighty yet, and mostly so with those who reject them. They produced the essential method of all later classifications; they produced UDC in particular, and current ideas of the chain analysis of class numbers for indexing purposes derive largely from an inessential and in some respects a bad feature of DC, the close step by step match in the hierarchies of its classification and its notation. This has been taken as a rule or principle in classification whereas it is, or can be, an exception.

UDC generated the ideas of synthetic classification now current; right from Otlet's ideas of bibliographical notation as a universal code or language come loose talk of class numbers as code numbers as in BNB, ideas of class numbers as a classificatory language to be used even as a basis for the headings and references of the dictionary catalogue, and as a means of perpetuating classifications, by providing basic, or nuclear or elemental terms out of which all others can be forever compounded. It is the librarian's perpetual motion and philosopher's stone rolled into one, and framed in a squared circle.

Principally representative of this neosynthetic classification is the theory and practice of Ranganathan in India and his disciples in Great Britain, expressing themselves in BNB, and in this theory and practice there appear to be two principal developments or modifications of Otlet's original synthetic classification.

DC's mnemonic or constant or standard form numbers as developed into UDC's auxiliary tables, and especially its analytical subdivisions, are developed still further into standard parts, the facets and foci of Ranganathan's CC, out of which the main class numbers for all subjects, past, present and future, are to be built, like chemical compounds out of chemical elements, the physical atom out of its nuclei, and toy models out of a child's building set; the analogies are Ranganathan's own.

Compound class numbers are to specify the document, or as it has been put as late as 1958 by Wells, they are to be co-extensive with the subjects of the works catalogued (Indian librarian, June 1958). Ranganathan supported by Vickery in England said that what should be aimed at "is translating into ordinal numbers the entire thought content of a book—all its foci, all its crisscross of subjects and forms and all its interlacings—fully and literally" (Journal of documentation 9:48-57, Mar. 1953). But at least in Wells' application of Ranganathan in BNB the object is not either document specification for its own sake, or multiple entry under compound number reversals. It is to allow of the single entry of the typical public library classified catalogue exemplified in 5·41, but with its indexing by chain analysis of compound numbers representing all the subjects of a multiple subject book.

If the classification used does not allow such numbers there is, Wells says, a serious dilemma, which "if not resolved will ultimately destroy the effectiveness of the classified catalogue". But behind this there is an assumption as there is behind UDC's case for colon compound numbers, discussed in 10·5. The assumption of the neosynthetic classification of BNB is not one that there should be multiple entry ensured by reversible colon compounds, but one that the effectiveness of the classified catalogue depends on single entries indexed by the chain procedure method, which then requires compound numbers, "co-extensive with the subjects of the works catalogued", if these have multiple subjects. But there can, and should ideally be multiple entry, with the class number of each entry only co-extensive with the subject for which the entry is made; or there can be single entry with indexing not chained to chain analysis of class numbers, and with one of the alternative methods of reference discussed in 5·41-3.

The assumptions of the neosynthetic classification applied in BNB and derived from Ranganathan do not hold any more than those of Otlet's synthetic classification, and there is no longer Wells' dilemma on the resolution of which he thinks the effectiveness of the classified catalogue depends. The classified catalogue may still not be effective except for some simple uses, because of the difficulty of providing even simple numbers for simple subjects at large, and not co-extensive with

the subjects of multiple subject documents, but it has a better chance than it has if it is supposed to require such co-extensive numbers.

If the student wants to, or has to bother himself further with all this confusion worse confounded he must turn to the appendices. Ranganathan and all his consequences are discussed in Appendices D-G, and Bliss's attempt to catch up with synthetic classification is discussed in Appendix C.

Chapter 11

The Dictionary Catalogue: Organization

Students who have become familiar in practice with the dictionary catalogue and alphabetico-specific entry are the great majority in English-speaking countries outside Great Britain, and therefore the overall majority. If they have struggled through Chapters 8-10 to this one they may feel that they are home, and like Charles II will never go travelling again. The dictionary catalogue, they may say, is certainly pure and simple. But they may still have a lot to learn about it.

The minority familiar in practice with a version of the classified catalogue, including the minor minority familiar with UDC, may find this and the next chapter difficult, and wonder what all the fuss was about in discussing the classified catalogue.

Both should realize that the theoretical and complete explanation of anything, with all alternatives, is usually more difficult to comprehend than the practice with a particular alternative, with which they may have grown up. They should realize too that theoretical as well as practical knowledge, and comparative knowledge, are just what are expected of the student in examinations, for which it cannot be assumed that he is always going to work with one version of one method, or even if in fact he is, that he needs to know nothing else, and should have a diploma for knowing nothing else.

The dictionary catalogue certainly works, with some adulteration, but on the whole with far less impurity and hybridization than the classified catalogue, and librarians and library assistants in North America and Australasia find it well within their powers, in both compilation and consultation, with results at least as good as those got with the classified catalogue elsewhere. And above all it should be remembered that catalogues are to be judged by ease and efficiency in consultation, not by ease and economy in compilation.

This chapter repeats or revises some of what has gone before, but it is mainly on the organization of the dictionary card catalogue on its subject side; the student should not regard this chapter and the next as complete. On the theory of specific entry he should read or reread 4·3-5, and for the practice of specific entry, with examples, he should read or reread 5·3-32, and then go on, making cross reference where suggested. He should also study Appendix H giving alphabetico-specific subject practice in the form of a code or rules, and in final revision and in practice he may prefer to rely for almost all points on Appendix H rather than on this and the next chapter.

11·1 CUTTER AND KAISER.

Cutter's Rules for a dictionary catalog, 4th edition, 1904, reprinted 1935, is the only authoritative, if not the only code for alphabetico-specific entry and the dictionary catalogue. In it not only the relevant rules, but also their head and tail notes, and the prefatory definitions, should be read and pondered, but though they are still sound and should be studied as the basic and definitive text they are not up-to-date in important respects. Appendix I is a commentary on them, and Appendix H is a tentative up-to-date code for both card and page form catalogues.

As shown in 4·7, Cutter's Rules were almost entirely for the closed catalogue in printed volume form, not for the cumulative card catalogue, and some of them and his discussion of them can be confusing for the student who thinks and has to think in terms of the cumulative card catalogue, which has both difficulties and facilities different from those of the other, as discussed 1·6, 5·5 and 6.

As shown in 4·5, Cutter had not quite cleared his mind on the important distinction between the specification of things as subjects, and their qualifications, in relation to the use of subheadings; he was not explicit on degree of specification for his specific entry as discussed in 4·4; he made a distinction unnecessary in literature indexing between a species or class and individuals in it; and he rejected phrase inversion which is now generally, though not consistently practised, although the logical result is subdivided class entry, as discussed in 4·4.

For these reasons a commentary on Cutter's relevant rules has been made an appendix which students should, but need not read, unless some detailed knowledge of his rules and reference to them are examination requirements.

Since Cutter there has been retrogression rather than progression; at least some of his confusion about what is and is not alphabetico-classed entry remains in Library of Congress theory and practice, and there is still confusion about the functions of cross references and the use of title word as a substitute for true subject entry, as discussed in 4·7, 5·32, and this chapter.

The only real advance of importance was made by Kaiser, in what he called Systematic Indexing, and his distinction of 'concrete' and 'process'. This is very important in its rationalization and systematization of the use of subheadings in specific entry, but unfortunately its importance has not had the general or impartial recognition it should have had; in its argument and terminology it is out of the main stream, and though fundamentally both brilliant and sound it is not easy reading. A brief commentary on this too has therefore been made an appendix, for the student to take or leave, as he decides or is required.

11·11 SPECIFIC ENTRY.

Specific entry is the usually accepted method of the dictionary catalogue on its subject side; the words have the meaning given to

them by Cutter when he said in his Definitions: "Specific entry, registering a book under a heading which expresses its special subject as distinguished from entering it in a class which includes that subject. . . . Specific entry, by the way, has nothing to do with species."

By species he may have meant biological species, because Darwin's Origin of species had been published in 1859, and popular philosophy derived from it was, and still is an unfortunate influence on thinking about bibliographical classification and indexing. Species in the original logical sense has a lot to do with what is specific and what is class entry, as shown in 4·5. And as shown in 4·4, all methods of subject classifying and indexing are more or less specific. What distinguished Cutter's method and what he called specific entry is the entry of books directly under the names of their particular subjects in alphabetical order.

His basic rule appears to be: "161. Enter a work under its subject heading, not under the heading of a class which includes that subject." But this is not as good as the definition quoted just above; it begs the question at least in wording, insofar as what we want to fix is a work's subject heading, and in practice subject headings are not always as specific as the subject of the work, insofar as a work on Siamese cats will not be under Domestic animals, or Domestic animals—Cats, but may be under Cats, not Siamese cats, or Cats, Siamese.

11·12 The Usage Principle.

The usage principle given in a headnote to rules 167-175 may help, though not in the way he intended. It says: "General rules, always applicable, for the choice of names of subjects can no more be given than rules without exception in grammar. Usage in both cases is the supreme arbiter, —the usage, in the present case, not of the cataloguer but of the public in speaking of subjects." He is only thinking of usage as determining choice between Radio and Wireless, Artificial satellites and Sputniks, Apiculture and Beekeeping and so on as headings. But as shown in 4·3 with other examples, usage is to talk of cats, whether Siamese or Manx, but not of Domestic animals—Cats, or Felines—Cats. So we must be as specific as the noun, and may be as specific as the adjectival phrase.

This works well with adjective-noun specification, but leaves some difficulties when the more specific thing has its own name; can we include kittens under cats, puppies under dogs, ponies under horses, hammocks under beds, without breach of specific entry? The answer can only be sometimes yes, sometimes no. Children are distinguished from people, but kittens are not usually distinguished from cats or puppies from dogs, or even women from girls; ponies may be distinguished from horses, and hammocks would be distinguished from beds. The question is one of degree of peculiarity, or difference in our ideas and names of things. People hardly think of a hammock as a bed,

or on the other hand of a kitten as anything more than a young cat. This principle applies and also those of number of entries, specialization in the field, and so on discussed in 4·4.

11·13 Title Words and Specific Entry.

Cutter's other basic rule or principle is that of his rule 172, already discussed in its historical context in 3·6. He says: "Enter books under the word which best expresses their subject, whether it occurs in the title or not"; but this is misread by some cataloguers, who almost make the rule: enter under a word which is not in the title. More often than not a word which best expresses a subject, or names it in common use, is in the titles of books and they should go under it. Only sometimes is a title allusive, or metaphorical, as Water into gold, for irrigated farm land; if this title were literal it would have to be turned into a heading and subheading something like Gold—Extraction from water, but there would be the words gold and water in the heading. Only sometimes is a title more general than a book's actual subject; books dealing not with all or some, but with only one kind of football, and yet called just football are examples of this. However, the real weakness of title word entry is not that it does not produce specific entry, and headings consistent with usage, but that it does not produce headings for the same subject identical with each other, the obvious example being Radio and Wireless; and the principle is defeated, that as far as possible all the entries for books on a subject should be together.

The persistence of title word entry with specific entry is discussed and exemplified in 5·32. It is a fault, but perhaps not a worse one or one more common than that of redefining subjects and using new definitions or names as catalogue headings; this commonly goes with class entry. We found out, say the cataloguers, that hammocks are beds, so we put them under beds; we found out that mattocks are just picks, and picks are agricultural implements, like spades, so we put them under agricultural implements; we found out that automation is mechanization, sort of, so we put it under mechanization. And with this too goes a confused idea that they are informing the public of what the subject is. But the reference librarian is left at night with a reader and a new subject, wondering what they, the cataloguers, will have put it under, well and truly under, and only certain that they will not have put cybernetics, for example, under the name the reader has read in his newspapers. The cataloguers may even say that they have decided that flying saucers are hallucinations, and have so catalogued and classified them. All this applies as much to the classified catalogue and its index as to the headings of a dictionary catalogue.

This most important part of cataloguing, and classifying, is further discussed in the last chapter on subject determination and practical work. Here we are concerned with the organization of the catalogue, as in Chapter 8.

11·2 HEADINGS, ENTRIES AND REFERENCES.

For an understanding of the organization of the dictionary catalogue the terms entry, heading, reference, title entry, and subject entry, must be carefully distinguished.

Books are entered or described or catalogued under headings and any description or cataloguing of a book under a heading is an entry. But sometimes the book or work or document is an article in a periodical or a chapter in a book, and in the entry for it, which may be called an analytical or index entry, the containing periodical or book is referred to as in the following examples, so that the particular article or chapter can be found.

Here are author and subject analytical or index entries for a chapter in a book and for an article in a periodical:

CUTTER, Charles Ammi.
Library catalogues (U.S. Bur. of Education—Public Libraries in the United States. . . . Part I, Washington, 1876, Ch. 27.)

CATALOGUING, LIBRARY
CUTTER, Charles Ammi.
Library catalogues (U.S. Bur. of Education—Public Libraries in the United States. . . . Part I Washington, 1876, Ch. 27.)

LILLEY, O. L.
How specific is "specific" (Journal of cataloging and classification 11:3-8, Jan. 1955)

SPECIFIC ENTRY
LILLEY, O. L.
How specific is "specific" (Journal of cataloging and classification 11:3-8, Jan. 1955)

Because there is a reference to the containing work analytical entries for chapters in books and articles in periodicals and even entries for whole works, are often called references. On this see also 5·44 and 6. Reference in this sense of entry must be distinguished from reference in the sense of cross reference between headings, for example Radio see Wireless, and Wireless see also Television.

A subject name referred from, as in both these examples, is a heading, but what is under it is a cross reference to another heading instead of an entry of a book or article. When the cross reference is a 'see' or 'direct' reference from a subject name which is not used for entries to one which is, then there are no entries under the subject name or heading referred from, at any time; but when the cross reference is a 'see also' or 'indirect' reference, then there can be entries under the heading referred from. There cannot be both 'see' and 'see also' references under the same heading.

Sometimes a 'see also' reference is made in anticipation of entries under a heading referred from. For example, if a new library had books on television before it had any on wireless it would not have any entries under Wireless for the time being, but might make the cross reference

Wireless see also Television straight away, so as to guide readers interested in both. The word 'also' is misleading as long as there is nothing under headings referred from, but it would be wrong to say Wireless see Television, even temporarily, because the two words are not synonymous; and readers are confused by special, complicated references. Some cataloguers prefer to leave 'see also' references out until there are entries under the heading referred from. On this see further 11·22.

11·21 Cross Reference and Entry.

There is still confusion or conflict about the difference in function between entries and cross references. Entries of the same book in many editions under a subject may be saved by a cross reference from a subject entry to author entries, for example:

ECONOMICS
SMITH, Adam
Wealth of nations
For this work in various editions
see under SMITH, Adam

But this is not to avoid multiple subject entry of a work, as discussed in 4·7 with reference to Cutter, and what we are considering here is the practice of making cross references do instead of additional subject entry.

In its simplest or crudest form this practice allowed a reference between entirely unrelated subjects. This was mainly in printed catalogues, indexes and bibliographies, and was space saving; one entry was made for a book under its principal subject, and references were then made to this from other subjects with which it dealt, for example Tennyson, Alfred see or see also Dickens, Charles for a book dealing with both. For this in periodical indexes see 6·2. Cross reference between unrelated subjects is not now made in the best dictionary cataloguing but, in the best American theory and practice as discussed and illustrated by Sears and Akers, cross reference between related subjects is still held to do away with any need of entering the same book under related subjects, or at least this is held not to be desirable if the material under a heading referred to is the same as that under the heading referred from.

Sears' List of subject headings, 6th edition, p. xxiv, says: "a book on inventions and patents will be entered under (1) Inventions (2) Patents. The subject heading list suggests a 'see also' reference Inventions, See also Patents. This should not be made if all that is to be found under Patents is this book which is already listed under Inventions because no additional material will be found there."

Akers's Simple library cataloging, 3rd edition, pp. 30-1, seems to imply that entry of a book on two related subjects should not be made under both, but that there should be a reference to the one under

which the book is entered from the one under which it is not entered. She gives the example of a book on ballet and pantomime and says a reader is puzzled or misled, if, on being referred from one to the other, he finds the same book under both. She sees a difficulty, that not all books on one will deal with the other, and a reader referred from ballet to pantomime for a book on ballet but only entered under pantomime may not know from the entries which one of the books under pantomime is on ballet. But, she says, he can examine all the books entered under the heading referred to, and finding one on the subject he has been referred from he will be satisfied.

One objection to this is that it will give the readers, and other members of the staff, or even the cataloguers working in a different capacity, extra and unnecessary work; another related objection is the one that all the books on a subject should be entered together no matter under what other subjects they deal with and are entered under. As discussed in 4·7, Cutter saw the difficulty but supposed he had solved it, in the note to his rule 176, by the addition of the author's name to the heading referred to, in his example, Gothic architecture see also Spain—Architecture (Street). But this does not get over the second difficulty, that the reader does not find all the books on Gothic architecture entered together.

It is true that a reader may be puzzled if he is referred from one heading to another and finds the same book under this, especially if it is the only one. But the contrary view is that even so there should be double entry and cross reference, that cross references should only be used to draw attention to related subjects, not as substitutes for additional subject entries, and that in any type of catalogue all the books on a subject should ideally be entered under it, no matter what other related or unrelated subjects the books are on and entered under. References are not made until there is at least one entry under the heading referred to, and so each reference is occasioned by a particular book, but once in it serves for all books on the same subject and is equally independent of all of them.

11·22 'Downward' References and 'Collateral' References.

All 'see also' or 'indirect' cross references usually have the same verbal form, but two kinds are distinguished in function. One kind is the 'downward' reference and the other the 'collateral' reference.

'Downward' references are from classes or general subjects, such as Domestic animals or Dancing, to included subclasses or species, such as cats, and dogs, or ballet, and pantomime. Collateral references are between subjects which are related without one being subordinate to the other. Subjects are related by being in the same genus or class, but cross references are not made for this relation, for example cross reference is not made between cats and dogs. It is made between ballet and pantomime because they are related by the miming factor, not because both are in the class Dancing, and in the class Theatre. Refer-

ence and lending libraries are in the same general class, Libraries; but there is no other common factor of importance, so reference is not made from one to the other; school and children's libraries are in the same general class, Libraries, but they also have the important common factor of use by children and so cross reference is made.

There can be a hierarchy of downward reference from a most general subject or 'genus generalissimum' or universe of discourse to the most specific in it. This may be an 'infima species', or last possible species, within which, however, there can be individuals to which reference can be made; so we may refer Scholars see also Historians, and Historians see also Thucydides. Cutter made much of the distinction in logic between a species and the individual in it, in his definitions of individual, specific and subject, but in cataloguing and for the purposes of reference it does not seem to matter.

An example of a hierarchy of downward references is Chemistry see also Chemicals, see also Acids, see also Sulphuric acid. These downward references are only made as required, that is, when a heading to which reference is made is first used for entries; reference is then only made from the more general subject immediately 'above' and if there is nothing under, or to put under this, the reference may not be made from it until there is, so the hierarchy may be broken and incomplete. In practice, however, there tends to be material catalogued on the more before the less general subject, so that downward references need not be held up, and the hierarchy tends to begin with a general subject such as chemistry and extends downwards. It is, however, quite possible for a library to have, for example books on cats and on dogs before it has one on domestic animals generally, and books on ballet and ballroom dancing before it has one on dancing generally.

It would be misleading to refer a reader to a heading with no entries under it, and so he cannot be referred to an intermediate link in the chain if there are no entries under it. And if there are entries under it then reference should already have been made. On this in comparison with the classified catalogue see 8·5.

11·23 'Upward' and 'Downward' References.

References may be made 'up' as well as 'down', and though often they are not they should be made 'up' in an alphabetico-classed catalogue, because the reader has otherwise to guess at the genus or class to which a specific subject has been subordinated. And for the same reason a classified catalogue has to have an extra index.

It has been said that upward references should be made in an alphabetico-specific catalogue and Kaiser supported this; against this is the argument that the reader who wants specialized material on a subject, and who may have been referred 'down' to it, doesn't want to be referred 'upward' again to the general literature he may have just left and doesn't want. Cutter argues for only occasional upward reference in his rule 188, and his view has prevailed; but there may be excep-

tions, in which reference may be made upward from a specialized subject on which there is no specialized material entered, to a general subject which is not commonly known to include the special subject. For example, in a children's library reference might be made upward from glaciers to geology, in the form "for information on Glaciers see books entered under Geology". Mann gives this example in her Introduction, 2nd edition, p. 151.

11·24 Reference From and Reference To.

Students are often confused because they do not clearly understand that, for example, School libraries see also Children's libraries is a reference 'to' Children's libraries and 'from' School libraries. References are only made to headings under which entries are being made, for example, the reference School libraries see also Children's libraries, is only made when an entry is made under Children's libraries, and is looked upon as a reference 'from' School libraries although it is also a reference 'to' Children's libraries.

11·25 General and Subheading References.

See also references from an including to included classes, that is downward references, may name each of the included classes, on a succession of cards or on one card. So there may be in succession, in alphabetical order of the headings referred to, for example, Philosophy see also Atomism, Philosophy see also Cosmology, Philosophy see also Idealism. Each card is made as required and filed first by the heading referred from and then by that referred to. References from one heading may also be collected on one card, being added to as required; alphabetical order of the headings referred to may not then be maintained and disorder may not matter much, but a rewriting of a card with several references on it, in strict alphabetical order, is desirable.

Such references may also be generalized, usually with an example; Philosophy see also under the names of philosophies or philosophic systems, e.g. Idealism. But a reader may then waste his time looking for headings such as Pragmatism, Monism, etc., not yet used, so that the generalized reference should not be used unless there is literature on a majority of the specific subjects. Such a reference as Churches see also names of individual churches is only used when the things referred to are individual rather than specific and there is a lot on them individually in the catalogue.

References may be made to subheadings, as discussed in 4·6; for example, Lubrication see also the subheading Lubrication under Machinery, Motor cars; or Lubrication see also the subheading—Lubrication under the names of things lubricated, e.g. motor cars; or Lubrication, for the lubrication of particular things, e.g. motor cars, see the subheading Lubrication under their names. An aspect, process or documentary form must be distinguished by subheading before there is cross reference, which is then to the subheading. Lubrication and

Motor cars—Lubrication are related as including and included class, the cross reference is therefore according to principle, and produces the economy discussed in 4·6, without any breach of the principle of multiple entry, which does not require entry under both class and subclass or genus and species. Lubrication and motor cars are not necessarily related as lubrication and oil are, so that all books on motors will not necessarily deal with lubrication, and a reader should not be referred from lubrication to motor cars with the idea that he should go through the entries, and even the books themselves, under Motor cars, sorting out those containing full or special treatment of motor car lubrication.

11·26 Proportion of References and Entries.

There might be twenty entries under Electroplating in the catalogue of a not very big library, but only two 'see' references and seven 'see also' references to it. This shows how loose is the assertion sometimes made, that the dictionary catalogue has more references than entries. This assertion seems to have arisen out of the practice of using references instead of added entries, as discussed in 11·21. When a dictionary catalogue is being first compiled there may be more references than entries, for example, with the first book catalogued on electroplating there could be nine references for one subject entry. In the same way when a classified catalogue was first being compiled an entry at 671·73 would justify the following references in its alphabetical index; Useful arts 600, Manufacturers 670, Metal manufacturers 671, Metal finishing 671·7, Metal plating 671·73, Electrodeposition of metals 671·73, Galvanoplasty 671·73, Plating 671·73, which is at least nine index entries for one subject entry. But as entries increase for the same subjects the proportion of references in both types of catalogue decreases.

11·3 Cross References and Class Numbers.

In dictionary catalogue practice, based on Cutter's Rules and on the practice of the Library of Congress and the Wilson indexes, downward references are not limited to one genus-species or class inclusion relation, for example there can be a reference to marriage from sacraments, from family law and from sex customs, and to dogs from domestic animals, pets and canidae and to ballet from dancing and theatre.

This means that all the downward references to, for example, wool cannot be worked out by a 'chain procedure' method from the sheep number 636·3 because this is a domestic animal, not a textile number. And it is not worth having compound class numbers such as 636·3:677·3 just to work out cross references from them. The attempt to tie cross reference to class numbers is discussed in Appendix F, and the use of chain procedure in indexing the classified catalogue in 8·5.

An important difference between an alphabetico-specific and a classified catalogue is that the former brings all aspects of a subject under the subject, where it may distinguish them by subheadings, for example

Marriage; Marriage—Customs; Marriage—Law; Marriage—Sacrament; whereas the classified catalogue, and the classified shelf, puts subjects in one or more aspects or classes, for example, agricultural products in a manufacturing and an economics class or aspect as well as an agricultural one. But it may not give a subject in as many classes or aspects as can be distinguished by subheadings to it in a dictionary catalogue, and the subdivision of a specific subject by aspects, processes and forms is not limited by what is done in a classification, but by what is done in the literature catalogued.

The relative index to a classified catalogue is necessary to tell whether there is anything on a subject in it, and under what aspects or classes in their place in the order of the classification. It does this by such entries as Wool growing, 636·3, Wool manufacture, 677·3 and as already shown in 8·6 these can be the counterpart of headings and subheadings in a dictionary catalogue, in which however the aspects or relations may not be given as subheadings, unless there is a fairly large number of entries under the heading, because all the entries are under wool, and not scattered by aspect as in the classified catalogue. But subjects in the same class, such as wool and cotton, are scattered, and have to be related by the downward references from the including class Textiles. A dictionary catalogue is self-indexing in the sense that when wool is looked up in its alphabetical place entries are immediately under it, and it is also self-indexing in the sense that entries and references are in one alphabet. It is not self-indexing in any way that would make cross references unnecessary.

11·4 Entries and References in Order.

When cross references and entries have been made as required they have to be filed with others, and entries can average about one for every volume of a library, and so half a million for a library of half a million volumes. Such a library will include hundreds of periodicals each with several, in some cases dozens, in some hundreds of volumes, but with only a few entries for each periodical. A small library with few periodicals should have a higher proportion of entries and references to volumes.

The problems of arrangement which arise with large numbers of headings and subheadings are discussed in the next chapter. But here the student should have some idea of the appearance of entries and references in a catalogue, for example:

CORROSION AND ANTI-CORROSIVES 671·73

MOLLOY, Edward, ed.
Electroplating and corrosion prevention.
London, G. Newnes, [1954].
278p. illus. 22 cm.
1. Electroplating. 2. Corrosion and anti-corrosives. I. Title
TS670·M59 671·73 55-17407

CORROSION AND ANTI-CORROSIVES

See also Acids—Handling and transportation; Electrolytic corrosion; Metals—Corrosion; Rust; Rustless coatings.

ELECTROPLATING

MOLLOY, Edward, ed.
Electroplating and corrosion prevention. London, G. Newnes, [1954].
278p. illus. 22 cm.
1. Electroplating. 2. Corrosion and anti-corrosives. I. Title
TS670·M59 671·73 55-17407

ELECTROPLATING

See also Brass plating; Chromium plating; Copper plating; Electrometallurgy; Metals—Finishing; Metals—Pickling.

GILDING SEE ALSO ELECTROPLATING

MOLLOY, Edward, ed.
Electroplating and corrosion prevention. London, G. Newnes, [1954].
278p. illus. 22 cm.
1. Electroplating. 2. Corrosion and anti-corrosives. I. Title
TS670·M59 671·73 55-17407

Note that if an already printed unit card were not used the main entry tracing note could be left off the added entries, that is, in a dictionary catalogue off those for this book under Corrosion and Anti-corrosives, and under Electroplating.

Note that all the above entries and references will be in that order but not next to each other; dozens of references and hundreds of other headings and thousands of other entries might be filed with them. The student working in a small library, or not working in a library at all, often suffers from a lack of realization of how a very large number of entries and references function in relation to each other, and as discussed in 4·2, is apt to forget that the purpose is the indexing or retrieval of something not yet known to the reader, that is an entry with which he does not start. The student working in a large library, with a cumulative card catalogue well established before even the head cataloguer was born, can suffer from a failure to see the forest for the trees, or the tree for the leaves, though the tree or the forest is there.

The principles of a true dictionary catalogue are the same whether it is on cards or in printed volume form; published catalogues such as those described in Chapter 5 will be more readily available to many students for examination than a large, well-constructed card catalogue, in which only one entry at a time is seen, and there is a repetition of a heading on card after card.

11·5 Tracing Notes and Main Entries.

As discussed in 8·7, any card catalogue, bibliography or index has a problem of control over its entries in the physical form of removable cards, because these are removable and because they are cumulative, usually for an indefinite period. And for the same reasons there must be some control over the headings and cross references of the dictionary or alphabetical catalogue. Old and new must be kept consistent, and cross references must be withdrawn if headings no longer exist because all entries under them have been taken out, because books have been lost or discarded.

This control is done by means of 'tracing notes' or 'tracings' on entries themselves and by extra records or tools known as subject headings files and lists. Neither 'tracings' nor lists are part of the catalogue for its users; the subject headings file or list is not usually available to them, and it would be confusing if it was; the tracings are given as private footnotes on the face of cards or on the back of them, and are not usually given at all in published and duplicated catalogues unless these are intended as 'tools' for librarians.

For the purpose of catalogue construction and maintenance an author entry for each book, or if there is no author entry, a title entry is treated as the 'main' entry, although in the use of the catalogue it may be no more important and even less important than subject entries for the same book. In the classified catalogue the subject entry in the class list is usually regarded as the main entry, although conversely for many books the subject entry may be less important than the author 'indexing'.

In relation to the main entry other entries are added entries; their headings are noted on the main entry, in the first place so that the added entries can be made under their headings, and in the second place so that they may be traced. If, for example, a book is lost or withdrawn entries for it should be taken out of the catalogue. Its author and/or title are known from the shelf list, its subject headings might have to be guessed at; the author and/or title being known the 'main' entry can be found and by its tracing notes the added entries can be traced.

Notes of references to a heading may be put on the entry first made under it. They may be noted in this way when those who make added entries also make references; but if so and if a subject entry on which they are made is withdrawn they should be transferred to another, and so on to the last subject entry under a subject heading. If and when this is withdrawn, then the references to the heading should be withdrawn. Alternatively, references are only given in a subject headings list or file. Library of Congress cards give tracing notes of added entry headings, but not of references, which are only given in its subject headings list. If references are given only in a subject headings list or file, then it must be a rule to check this if and when there is only one entry under a subject heading and this is withdrawn.

The dangers of putting tracings of references, or in the classified catalogue of indexing, on the entry which is the first occasion for them have been discussed in 8·7. To sum up briefly: the tracings may confuse the user of the catalogue, especially if they are on the front of the card; he thinks they are some direction intended for him; and they certainly confuse the student who thinks references or indexing are somehow some form of added entry or a substitute for it, especially if he has been used in practice to a form of catalogue in which cross reference to or indexing of a single entry takes the place of multiple entry.

11·6 Library of Congress Unit Cards.

Here is a Library of Congress unit card or entry for a book; this is a 'main' entry by or under author, or title in the absence of author, duplicated or copied for added entries in which the headings given in tracing notes are written or typed in above the main entry heading which then becomes an author subheading for subarrangement under added entry subject headings.

MOLLOY, Edward, ed.
Electroplating and corrosion prevention.
London, G. Newnes [1954].
278p. illus. 22 cm.
1. Electroplating. 2. Corrosion and anti-corrosives.
I. Title
TS670·M59 671·73 55-17407

Note that tracing notes are repeated on all LC unit cards only for reasons of economy in card printing; if the main entry were repeated in full but without its tracing notes, each card would still be a unit card. An example has been fully explained in 5·32 and another is given at the end of Chapter 7.

Note again that the tracing notes are only of headings for added entries, and not of cross references which may have long since been occasioned by earlier entries, and would be needed for later entries, for other books on the same subject. Repetition of references to headings on every entry on which the headings are tracings would take up more space in many, and indeed most cases, than a 125 × 75 mm. card provides and it requires more labour and expense than is justified, as well as being misleading.

11·7 Subject Headings Files and Lists.

A subject headings file is the separate record of the subject headings and references of a library catalogue or bibliography kept as a tool for its compilers. A subject headings list is usually published in book form for general library and cataloguing use, though in origin it may be the subject headings file of a particular library. The list published by Congress, with supplements, is its own file, and Sears' list published by the H. W. Wilson Company for small libraries is an abridgment of this.

Insofar as a list is published for general use it is comparable to classification tables or schedules. It is, however, important to note that an overall subject headings list is not an essential preliminary for dictionary cataloguing as overall classification tables are for shelf classification and for classified cataloguing. Subject headings and references can be taken straight from the common language and can be put in alphabetical order in a subject headings file or a catalogue as required. Class numbers for subjects cannot be chosen or made up and fitted in as required. They must be taken from tables, which may be added to and modified by interpolation and number extensions, and combinations, but must in at least outline and elements for combination be made up in advance. On this and the difference between Congress headings and its classification see 7·5.

One of the dangers in the use of published or standard subject headings lists is an assumption that books can or should be forced under one or other of the headings listed. Some examination candidates who are allowed to take a subject headings list into an examination room are apt to limit themselves to it despite all advice and instruction to the contrary; and the way in which they cling and confine themselves to such an abridged list as Sears' is evidence of their misunderstanding of the flexibility of specific entry; or of the poverty of their minds. Cutter thought Congress cards would make his rules unnecessary, as shown in Appendix I; central cataloguing has been a factor in their disuse, and perhaps a greater factor has been the publication of subject headings lists and over-reliance on them.

11·71 'Refer Tos' and 'Refer Froms' in a Subject Headings List.

Eventually there would be in a subject headings file or list something like this, which is from the Library of Congress list:

ELECTROPLATING (TS670-692)

sa Brass plating; Chromium plating; Copper plating; Electrometallurgy; Metals—Finishing; Metals—Pickling

x Electrodeposition of metals; Galvanoplasty

xx Electrochemistry; Electrometallurgy; Gilding; Metalwork; Plating; Silver-plating; Silvering

This gives references from and to electroplating; those from the heading are only an aid in using the list, those to it are the ones we would make upon adopting the heading for entries. The first group introduced by sa are the 'see also' references from the subject, which are only to help us in the use of the list. If the cataloguer decided on Brass plating as a heading for a book in hand he would turn to Brass plating for his references to it. Next, marked by x are the 'see' references to the subject, and finally marked by xx, the 'see also' references to it. As just noted, 'refer tos' or 'see alsos' in a subject headings list help the cataloguer to get down to the most suitable and specific heading for a book; students often mistake them for a direction on what to put in the catalogue. The 'refer froms' show the references which should be

made to a heading if and when it is used for the first time. Earlier lists only gave the 'refer tos', that is, they did not give under a heading the references to it. The starting and finishing point in using a list and in making or checking headings and references is always a particular book being catalogued, and it should again be noted that cataloguers should not bind themselves or hold themselves bound to the headings and references in a list; if they do then sooner or later they defeat the specific entry rule, by giving some books class instead of specific entry; and they force some books under wrong headings.

Note in the example that Electrometallurgy appears in the see also refer tos and the see also refer froms, because the reference is collateral rather than downward, and once there are entries under both Electroplating and under Electrometallurgy there will be a reference from Electroplating to Electrometallurgy and from Electrometallurgy to Electroplating, but not before.

If a subject name has only a reference from it to a preferred heading then that is all that appears under it in a list, for example, Mycology see Fungi. If there are no references from a heading to more specific or collateral subjects then there will only be 'refer froms'; for example in Sears':

MUSICAL REVUES, COMEDIES, ETC.
x Musical comedies
xx Opera: Operetta

We then find under Musical comedies:

MUSICAL COMEDIES
See Musical revues, comedies, etc.

under Opera:

OPERA
See also Ballet, musical revues, comedies, etc.; Operetta
x Comic opera; Dramatic music; Grand opera; Music, Dramatic
xx Drama; Music; Musical form, Theatre, Vocal music

under Operetta:

OPERETTA 782
See also Musical revues, comedies, etc.
x Comic opera; Dramatic music; Music, Dramatic
xx Music; Musical form; Opera; Vocal music

under Comic Opera:

COMIC OPERA
See Opera; Operetta

under Dramatic music:

DRAMATIC MUSIC
See Opera

under Grand opera:

GRAND OPERA
See Opera

11·72 Specific Entry and Subject Headings Lists.

Note that these examples from Sears', whilst illustrating the methods and forms of subject heading lists, are open to criticism as headings and references for specific entry. Congress also gives Comic opera, and Dramatic music see Opera, but Comic opera and Grand opera are species of opera; and all Dramatic music is not opera. So we might want Comic opera, or Opera, Comic, Grand opera or Opera, Grand, and Dramatic music, or Music, Dramatic as specific headings, with see also references from Opera instead of see references to it. Another glaring example of see reference up from specific to general and in contradiction of specific entry in the Congress and Sears' is Dry cleaning see Cleaning; on this breach of specific entry by Congress see 5·32.

Sears', 6th edition, p. xvi, is very emphatic about specific entry, saying: "the first exact rule is what is known as the rule of specific entry. Enter a book under the most specific term (i.e. subject heading) which accurately and truly fits the subject presented in the contents of the book. To illustrate, a book on all classes of birds is given the subject heading Birds . . . while a book on a single class of birds alone, such as Water birds . . . is given the subject heading Water birds." Yet in the list itself the upward see references from Comic opera and Grand opera to Opera and from Dry cleaning to Cleaning deny this. Sears' says the general rule is not to make upward see also references (p. xxii), but note that these are sometimes made as shown in 11·23, and being not just see, but see also, they do not exclude specific entry of the subject referred from.

Examination candidates who may be allowed the use of a subject headings list such as Sears' as an aid in the examination room, but not as determining degree of specification, and references, for subjects, should realize that some of its headings and references may not satisfy the requirements of the examination.

11·73 Class Numbers and Subject Headings Lists.

Note that class numbers may be given, as an aid in determining subject headings and in classifying for the shelf, although they are not essential for subject heading and reference purposes, and headings and references are not limited to those implied in the class numbers. In central cataloguing and in subject heading lists class numbers could be given for all headings referred to and from so that the same tools could be used for dictionary and classified cataloguing. In the N.S.W. Public Library's Monthly Bulletin Molloy's book appeared in a classified list at 671·73 and 620·112 with the following entry:

MOLLOY, Edward
Electroplating and corrosion prevention.
Lond., Newnes, 1954. Diags. illus. tables
Electroplating (671·73) Corrosion and
anti-corrosives (620·112)

On this see also 8·1. Class numbers could be given in a subject heading list as follows:

RAILROAD LAW 385
See also Eminent domain (333·13) Railroads accidents (614·8)

11·74 Lists in Catalogue Consultation.

Published subject headings lists and classification tables and their indexes are not suitable for use by catalogue users because they may give both more and less than is given in a catalogue. A subject headings list is also less suitable than classification tables, because the 'refer froms' and the 'refer tos' and the methods of indicating them are meant for catalogue compilation and maintenance, not for its use, and are confusing even to inexperienced cataloguers, and to students, if they do not study them carefully, and exercise themselves in their use.

11·8 Published Lists and Private Files.

A published list of subject headings may be used as the subject headings file of a small library, and Sears is designed for writing in. In a large library, especially a reference library, this writing into a list is not satisfactory, and a card subject heading file should be maintained. Here are extracts from the list published by Congress of its own headings, and from Sears' abridgment of this for small libraries.

Subject Headings

USED IN THE DICTIONARY CATALOGS OF THE LIBRARY OF CONGRESS

SIXTH EDITION

Mulattoes. (*Anthropology, GN645; U. S., E185.62*)
sa Jackson Whites.
x Octoroons.
Quadroons.
xx Miscegenation.
Negroes.

Mulberry. (*Culture, SF557*)
sa Paper mulberry.
xx Sericulture.
—Diseases and pests. (*SB608.M8*)
sa Mulberry blight.

Mulberry bacterial blight. *See* Mulberry blight.

Mulberry blight. (*SB741.M*)
x Mulberry bacterial blight.
xx Mulberry—Diseases and pests.

Mulching.
x Mulsh.
Soil mulching.
xx Gardening.
Horticulture.
Organiculture.
Soils.

Mule deer.
x Black-tailed deer.
xx Deer.

Mules. *See* Asses and mules.

Mules (Spinning machinery) *See* Spinning machinery.

Mulisas. *See* Mulizas.

Mulizas.
x Mulisas.
xx Folk-songs—Peru.

Mullets, Gray. *See* Gray mullets.

Mullite. (*QD181.A4*)
xx Aluminum silicates.

Mulsh. *See* Mulching.

Multigraph. (*Z48*)
x Multilith.
xx Copying processes.

Multiplier (Economics)
sa Circular velocity of money.
xx Business cycles.
Circular velocity of money.
Economics.
Income.

Multiplier phototubes. *See* Photoelectric multipliers.

Mummies. (*Egyptology, DT62.M7*)
sa Embalming.
xx Archaeology.
Burial.
Embalming.

Mumming. (*Christmas customs, GT4985; English folk-drama, PR635.F6*)
xx Carnival.
Masks.

Mumps. (*RC168.M8*)
x Parotitis.
xx Parotid glands—Diseases.

Muncey language. *See* Munsee language.

Munda folk-songs. *See* Folk-songs, Munda.

Munda languages. (*PL4501-9*)
sa Kherwari language.
Kurku language.
Mundari language.
Santali language.
Savara language.
x Kolarian languages.
xx Indic languages.
Kherwari language.
Kurku language.
Santali language.

Mundal (Artificial language) (*PM8637*)
xx Languages, Artificial.

Mundari language. (*PL4559*)
x Kohl language.
Kol language.
xx Munda languages.

Mundas. (*DS432.M8*)

SEARS LIST OF SUBJECT HEADINGS

SAMPLE PAGE OF CHECKING

(Abbreviated entries taken from various pages of the Sears List)

Anglical Church. *See* Church of England

✓Angling. *See* ✓Fishing

Anglo-Catholicism
See also Oxford movement
xx Catholic Church; Church of England; Oxford movement

✓Fishes (Use geog. subdiv.)
Names of the special fishes are not included in this list but are to be used as needed, e.g. Perch; Salmon; etc.
See also Aquariums; Fish culture; Fisheries; ✓Fishing; Marine fauna; also names of fishes, e.g. Perch; Salmon; etc.
x Fish; Ichthyology
xx Fisheries; Marine fauna; Vertebrates

✓Fishing
See also ✓Trout fishing
x Angling
xx ✓Fishes; Sports

✓Salmon fishing

Salesmen and salesmanship
See also Advertising; Business
x Agents; Selling
xx Advertising; Business; Commerce; Commercial travelers; Retail trade

✓Salmon fishing
xx ✓Fishing

Saloons. *See* Hotels, taverns, etc.; Liquor traffic

Troubadours
See also Minnesingers; Provençal literature
xx French poetry; Minnesingers; Minstrels; Poets

✓Trout fishing
xx ✓Fishing

Truancy (Schools). *See* School attendance

Chapter 12

Dictionary Catalogue: Form and Arrangement of Headings

We speak of alphabetical or dictionary catalogues and of alphabetico-specific entry as though alphabetical arrangement were simple and of one kind, but it can become complicated, and there can be alternatives even for the arrangement of subject headings and references apart from author and title headings, when we have to get a single word, and this word extended into a phrase or by a parenthetical qualification or by subheadings, into one order. The problem is something like that of arranging compound class entries beginning with the same number, discussed in 10·2-4, but with important differences.

The great merit of the dictionary catalogue is its direct indexing or information retrieval. This depends on the use of a known arrangement of headings without reference from it to another arrangement as in the index to a classified catalogue, and the only commonly known arrangement of headings is their arrangement according to the established order of the letters constituting them; this is known as ABC or alphabetical, and has been discussed basically in 2·4.

Alphabetical order has not only the advantage of being commonly known but also that of being comparatively simple; as applied in catalogues in its most complicated form it is simpler than the order of a classification notation such as UDC's but not as simple as DC's with its single table of numbers. And as applied in dictionary catalogues it is not as simple as in the extra indexes to classified catalogues, for two reasons. In the dictionary catalogue author, title and subject entries are in one order, as they are not, and of course cannot be in the classified catalogue, in which subject entries classified by subject cannot be filed with the alphabetically arranged author and title entries; and in the subject entries of the dictionary catalogue an attempt may be made at more or less classified subarrangement which is done in the classified subject part of the classified catalogue, but not usually in the alphabetical index to the classification. In the index to a classified catalogue a reference may be made to a subject such as advertising as a whole, and the complications of subarrangement are then in the subclassification and notation extensions of the subject.

There are rules of arrangement, the most authoritative code now being the ALA Rules for filing. But these need careful consideration in principle if they are to be applied satisfactorily.

12·1 'Letter by Letter'.

It is convenient to talk of alphabetical order in the dictionary catalogue, and of complications of it, but strictly speaking, alphabetical

order is simple and complications only arise with departures from it. These may be, and are justified, but strictly alphabetical order should not be departed from without a thorough understanding of why and how.

The simplest, the strictest alphabetical order is that known as letter by letter. Single words can only be arranged alphabetically letter by letter; but consider Art, Artichokes, Art in schools; this is strictly alphabetical or letter by letter, but there is an obvious temptation to depart from it, and at least an excuse that phrases beginning with Art should come before a longer, unrelated word. But even with multiple word headings there may still be letter by letter and apparently a strict alphabetical order of the whole heading without regard for word breaks, as in most encyclopaedias, for example:

Art
Artaxerxes
Arthur, Albert
Arthur, Leslie
Arthur, William
Arthurian Legend
Artillery
Art schools
Art unions
Artwork

but after all even this is not strictly letter by letter, not

Arthur, Albert		Arthur, Albert
Arthurian Legend	but	Arthur, Leslie
Arthur, Leslie		Arthur, William
Arthur, William		Arthurian Legend

Not Arthur A, i, L, W, but Arthur A, L, W, i.

Notice has been taken of punctuation, the comma, or of persons with the same family name as forming a class; strict alphabetical order has been departed from and some classification introduced however little; it is classification of names of the same kind, personal names, and not classification of related subjects such as Art and Music, without regard for the spelling of their names, but it is still classification. And this illustrates the greater difficulties or temptations of dictionary catalogues, especially those of large reference libraries, as compared with encyclopaedias.

Even the largest encyclopaedias have not the variation and multiplicity of persons as authors and subjects, of corporate bodies as authors and subjects, of other subjects, of titles and series, which even a medium-sized catalogue may have in its headings; and subheadings in most encyclopaedias are in the entries under the headings not in the headings themselves. As shown in discussing Cutter's Rules in Appendix I catalogue subheadings used to be regarded as being for subdivision of titles under headings rather than for subdivision of headings, and so were regarded somewhat as subdivisions are in articles under headings

in encyclopaedias; they were subarranged alphabetically, and even in letter by letter arrangement were treated as going with the heading they subdivided. However, the basic rule now is to arrange 'word by word' and not letter by letter right through multiple word headings.

12·2 'Word by Word'.

This is stated in ALA Rules for filing in "1 Basic rule . . . b) Arrange word by word, alphabeting letter by letter to the end of each word", but not over two or more words, as in encyclopaedias, and usually illustrated by headings beginning with 'New' as a separate word and as part of another as in New England, Newtown, New Zealand. In word by word this would be New England, New Zealand, Newtown.

12·3 Person, Place, Subject, Title.

One difficulty has however to be got over before we can proceed 'word by word' as in Light, Light Brigade, Light waves, Lighting. A word may be the name of a subject, a person, a place, or be a title, and be exactly the same in spelling and basic meaning. A word is rarely all four but the same word can be fairly commonly two and even three, and it is generally agreed that there should be some sorting out. So in larger catalogues at least the rule is applied which is Cutter's rule 300, and ALA rule 24 a)—classed order. This classed order is Person, Place, Subject (other than person or place), Title.

When persons, places, subjects, and forms, and titles, or some of these are named by the same word each class is exhausted in all its cases and qualifications or extensions before going on to the next; for example, all persons whose name is Light, followed by all places called Light, followed by the subject Light with all its qualifications, followed by Light as a title, that is, the single word Light as the name of a poem, or a play or a novel, followed by phrases beginning with Light, such as Light Brigade, followed by words beginning with Light such as Lighthouses, Lighting, which are separated from Light as a subject, although they are related subjects. This illustrates the point that the 'classes' by which strict alphabetical or letter by letter arrangement is broken are not subject classes; one class is 'subject', but only when dealing with the same word, with qualifications of it by other words but not extensions of it into longer words, or phrases, so that as shown in the example of dictionary arrangement in 1·5, Arteries and Arthur come between Art in education and Arts and crafts.

If the rule of Person, Place, Subject, Title is followed then the further arrangement of subjects as subject can be treated separately, and this rule is now assumed as one which is followed in all but very small catalogues.

12·4 Letter by Letter, Word by Word and Logical.

If we arrange or file strictly alphabetically, letter by letter, without regard for any added symbols of punctuation, then no pur-

pose will have been served by their consistent use with the idea of securing some classification of subjects. Such a code as the ALA Rules for filing catalog cards . . . 1942 gives rules to overcome the minor difficulties of abbreviations such as St for Saint, and to overcome the more or less major difficulties of the dictionary catalogue as a combined file of author, including corporate author, title and subject file, in which all of these entries may in some cases begin with the same word or the same letters. Assuming a separation of subject headings beginning with the same word, rules are then given for what is called 'logical' arrangement of these headings amongst themselves. These rules will work, but much more consideration is wanted of supposed advantages, and how they may be secured, than is given in any of the codes and textbooks.

There are fundamental problems of subarrangement common to both the alphabetical and classified arrangement. The discussion here is with particular reference to the alphabetical catalogue, and the possibilities of 'logical' subarrangement along with alphabetical arrangement and the usage principle.

If usage did not give way at all then we would have, for example, Analysis of water . . . History of water . . . Holy water . . . Water . . . Water in the body, but these are all expressed so that Water is the first word, and there are then questions of expression or form and questions of order, related to each other. Congress gives us:

Water—Analysis

Water—Pollution

Water (in religion, folklore, etc.)

Water, Holy

Water gardens

Water in the body

Waterfalls

This is logical, but with the related inconsistencies of Water in religion, folklore, etc. and Water in the body differently expressed and separated in arrangement. Questionable uses of parenthetical qualification are discussed in 12·5 and 12·9. Here are the standard alternatives without it:

LETTER BY LETTER	WORD BY WORD	LOGICAL
Water—Analysis	Water—Analysis	Water—Analysis
—Pollution	Water birds	—Pollution
—Purification	Water conservation	—Purification
Water birds	Water, Distilled	, Distilled
Water conservation	Water gardens	, Underground

LETTER BY LETTER	WORD BY WORD	LOGICAL
Water, Distilled	Water—Pollution	Water birds
Waterfalls	Water polo	Water conservation
Water gardens	Water power	Water gardens
Water polo	Water—Purification	Water polo
Water power	Water rats	Water power
Waterproofing	Water rights	Water rats
Water rats	Water supply—Rates	Water rights
Water rights	Water, Underground	Water supply—Rates
Water supply—Rates	Waterfalls	Waterfalls
Water, Underground	Waterproofing	Waterproofing

Note that as 'letter by letter' is not taken as far as subheadings it can be more logical than 'word by word', and needs the dash and the comma for its distinction of subheadings and inverted adjectives. This distinction is not made in 'word by word'; punctuation is only needed for sense, and the dash is often used in it for both subheadings and inverted adjectives. In 'logical', punctuation is essential and produces a logical result, but only if the punctuation is used to represent logical distinctions, and of course used consistently, so that if there is to be subarrangement according to the logic or function of words then form or expression as well as arrangement has to be taken into account. On simplified orders, without logic and with uniform punctuation, see 12·91-2.

12·5 Logic and Form.

In the water series Water polo might be inverted, to group with Polo, but the reference Water polo see Polo, Water would still have to be filed; this applies to inversions generally, and for the purpose of heading arrangement it doesn't matter whether there are entries or references under a heading. References and entries are separated in filing, and there is debate as to whether references should come after entries under the same heading or the reverse, but this doesn't affect the order of the heading, with any inverted adjectives, or subheadings, or parenthetical qualifications.

Congress hyphenates more uninverted adjectival phrases than are usually hyphenated but these are filed with unhyphenated phrases as in Water gardens, Water-gas, Water gates, so that the result is the same. It creates problems by its inconsistent use of parenthetical qualification by means of round bracketed words and phrases following headings; these are logically or functionally inconsistent with each other and with other forms of heading extension, but they are filed together, after subheadings and before inverted adjectives, so that we find, for example, Water—Waste; Water (in religion, folklore, etc.); Water, Baptismal; Water gardens; Water-gas; Water gates; Water in the body; Water-jet. And whilst Milk in religion and Cats in religion are treated like Water in religion, that is with the prepositional qualification in round brackets and filed between subheadings and inverted adjectives, Gods in litera-

ture and art is without round brackets and so files, not between but after Gods—Language, and Gods, Healing.

Now compare the following:

CONGRESS	RECONSTRUCTED
Cookery	Apples—Cookery
Cookery (Apples)	.....
.....	Cookery
Cookery, Camp	Cookery—United States
.....	.....
Cookery, American	Cookery, Camp

There are over fifty subdivisions of Cookery by foods in the form Cookery (Apples); this comes close to alphabetico-classed entry in an alphabetico-specific catalogue, in which the only generally approved form of alphabetico-classed entry is the inverted adjective form, which would be Cookery, Apple; but why not Cookery see also the subheading Cookery under the names of foods, e.g. Apples—Cookery, or in Congress's own form, Cookery . . . also subdivision Cookery under specific subjects, e.g. Apples—Cookery. This is its much commoner practice, as under Taxation, Testing, and many other processes. Since parenthetical qualifications are by rule filed before inverted adjectives the subdivisions of Cookery by foods are separated from kinds of cookery such as Cookery, Camp and from Cookery by country or nationality, in which subdivision is by the inverted ethnic adjective. But these then are separated from each other simply by sense, without any filing sign. This illustrates the way in which the choice of headings, their forms, and their arrangement must be considered together.

The difficulties of maintaining logic and consistency in a very large cumulative catalogue in a period of development have been insuperable, and cumulation and economy may require consistency with inconsistency. No other body has attempted what Congress has done, and it is used as an example only because it alone has made an attempt on the scale which gives us satisfactory samples. The statement of theory and practice in its Subject headings, a practical guide, 1951, is far more open to criticism than its actual practice over half a century.

There is an assumption that a reader goes to a catalogue with a subject name or phrase clearly in mind; if this were established then the filing method which got him most quickly and easily to his specific subject with a specific qualification might be justified. But there is some evidence that even university professors don't understand or readily follow exact alphabetical order, and little evidence that users want not only a specific subject when they go to a catalogue, but also a clearly defined qualification of it, or that they can guess the wording, punctuation and filing of the qualification the library has chosen to use. The argument that logic and punctuation may as well be ignored is rested on this, but so can be the argument that users may be helped by logical grouping, even though they may not perceive the logic; and there is

some evidence that the more intelligent readers, that is those more intelligent than most cataloguers, and there are plenty, at least see illogicality even if they do not notice logicality. Logicality is not easily displayed over the many drawers of cards which even one subject may take up in a very large catalogue, but guide cards will help, and more can be done in catalogues and bibliographies in book form. An attempt at an improved model may not be wasted, so here is a Congress sub-arrangement reconstructed.

12·6 CONGRESS FORMS AND ORDERS AND ALTERNATIVES.

Congress	**Reconstruction**
Agricultural colleges	Agriculture—Colleges
cooperative credit	—Competitions
credit associations	—Cooperation
engineering	—Cooperative credit
exhibitions	—Credit associations
laws and legislation	—Engineering
libraries	—Exhibitions
machinery	—Laws and Legislation
research	—Libraries
societies	—Machinery
Agriculture—Competitions	—Museums
—Museums	—Profession
—Statistics	—Research
, Cooperative	—Societies
, Primitive	—State relations
Agriculture and the State	—Statistics
Agriculture as a profession	, Primitive

Here is another example with a word which hasn't different adjectival and noun forms, but other inconsistencies are possible. Why Drying apparatus—Food, but Lumber drying, why Drying apparatus—Food, but Fruit—Evaporation? In form Drying apparatus—Food is alphabetico-classed, but this could be remedied by using Drying apparatus, Food:

Congress

Drying apparatus—Food
—Lumber see Lumber drying
—Textile fabrics
Drying of food see Drying apparatus—Food
Drying of fruit see Fruit—Evaporation

Congress	**Reconstruction**
Food—Analysis	Food—Adulteration and Inspection
—Bacteriology	—Analysis
—Bibliography	—Bacteriology
—Evaporation see Food, Dried	—Bibliography
—Preservation	—Conservation
, Artificial	—Contamination
, Canned	—Evaporation
, Dried	—Laws and Legislation
, Enriched	—Poisoning

Congress	Reconstruction
adulteration and inspection	—Preservation
conservation	—Preservatives
contamination	—Spoilage
industry and trade	—Substitutes
laws and legislation	, Artificial
poisoning	, Canned
preservatives	, Dried
relief	, Enriched
spoilage	industry and trade
substitutes	relief
supply	supply

12·7 The Periodical Indexes.

The invaluable Wilson indexes are if anything less systematic or logical than Congress. For example, in Industrial Arts Index subheadings under Water we find Analysis, Bacteriology, Bound water, Heavy water, Standards, Testing; then follow inverted headings, Water, Distilled, and Water, Underground. If Bound water and Heavy water had been inverted the alphabetico-classed form would have been avoided. Uninverted, unpunctuated phrases follow water by country. Water in the body comes in between Water heating and Water laws and legislation; and then after Water pipes, Steel—Testing, comes Water pollution, then Water power, divided by country, then Water purification. Similarly muddled sequences are to be found under Food.

The LA's Subject Index to Periodicals hardly offers detail enough for comparison. But we find Aeroplane accidents, Aeroplane engines—Fuel supply, then Aeroplane industry, then Aeroplanes—Air conditioning,—Brakes,—Controls,—Electrical equipment,—Fueling . . . Propellers see Propellers, Aerial. We also find Aeronautics—Study and Teaching but Agricultural education. Obviously subarrangement is generally neglected, though it is an essential element in indexing. The only consolation for dictionary cataloguers is that it is much worse in classified cataloguing.

12·8 Subheading Subdivision or Categorization.

It is common practice to separate period and place subheadings in two orders from form, aspect and process subheadings in one order. The latter can be subdivided but there are then all the difficulties of classification pointed out by Cutter under his rules for arrangement and subheadings. Subclassification of qualifications is not a breach of specific entry, but it has all the problems of classification. It is not easy to maintain the distinction between this and alphabetico-classed entry once much subclassification of subject qualifications is attempted, and with it there must always be a reduction of the self-indexing power of the dictionary catalogue, which is its great advantage.

Something like this can however be tried with variations from subject to subject:

Aeronautics
—Abstracts
—Bibliography
—Periodicals
—by period
—1800
—1801-1900
—1901-1950
—1951-
—by place
GB
USA
USSR
—Point of view, relations, etc.
—Economics
—Education
—Fiction
—History
—Poetry
—Processes etc.
—Public relations
—Research
—Statistics

By period is probably better in most cases as a subdivision of —History. The common treatment of History as a documentary form rather than as an aspect of a subject shows the difficulty of making and maintaining the required distinctions, which increase with what are vaguely called aspects, relations, process. Probably the process distinction should only be attempted, if at all, with the subdivision of things which are physically 'processed', for example Cats—Cleaning,—Combing etc., and not with abstractions or generalizations such as Aeronautics, Commerce, etc.

12·9 Parenthetical Qualifications.

Congress now puts parenthetical qualifications between subheading and inverted adjectives as in the example already used above:

Cookery—Bibliography
(Apples)
, American

But the result is not logical because it does not use parenthetical qualification consistently.

Under Mass it uses the word by itself for the sacrament. Then Mass (Canon law), then Mass (Chemistry), then Mass (Music) in that order. The letters have the same meaning in Mass, Mass (Canon law), and Mass (Music) but quite a different one in Mass (Chemistry). Obviously no placing of parenthetical qualifications, inverted adjectives and subheadings in relation to each other will remedy this muddle of mean-

ings, which breaks Cutter's rule 339. The only remedy is complete reconstruction which would give something like:

Mass (Chemistry)
—Bibliography
Mass (Religion)
—Law
—Music
, High
, High, Pontifical

or,

Mass, Chemical
—Bibliography
Mass, Religious
—Law
—Music
, High
, High, Pontifical

Parenthetical qualification if used at all should only be used to distinguish meanings of the same letters, as in Shingles (Diseases), Shingles (Rock), Shingles (Roof) and for these Shingles, Body; Shingles, Rock, Shingles, Roof, would serve better. If there is not very careful restriction of the use of parenthetical qualification, as there is not by Congress, then any attempt at logical order must break down.

12·91 ALA Simplified Order.

A simplified order in the ALA Rules is word by word, ignoring punctuation. The ignored punctuation then only looks silly and there is this note in the rule, "Libraries adopting this arrangement will find it desirable to adopt also a uniform method of punctuation in the headings, either a period or a dash", as in:

Art
Art—American
—Ancient
—Baroque
—Berlin
—Bibliography

In a small catalogue, or rather under a subject with few subdivisions in any catalogue this won't matter, much; under a subject with many subdivisions of different logical kinds, and many entries it will and if this 'simplified' order is used there should be a preliminary guide card with the notice "abandon hope all ye who enter here". The result will be almost as bad as the subarrangements of the classifications.

12·92 A Code of Rules.

As an up-to-date authoritative code of cataloguing rules should be used for author and title entry, such as the ALA Cataloguing rules . . . 1949, so a code should be used for filing. The best now available is the ALA Rules for filing catalog cards . . . 1942, already referred to,

and for subject filing its rules Nos 33-35 should be studied. These give the Person, Place, Subject, Title order for the same word as Personal name, Place name, Subject name, Book name or Title, and for Subject subarrangement within this they give rule 34 or "Subject-arrangement 1 (Based on L.C. list)" and rule 35 on "Subject arrangement 2 (Simplified order)" as alternatives. They also suggest in a note to rule 35 that "small libraries may prefer to adopt a single-alphabet arrangement", which is a 'word by word' arrangement without distinction of Person, Place, Subject, Title. But even for small libraries there seems little if any advantage in this "single-alphabet arrangement" because in their catalogues the number of entries under the same word is not such as to present much difficulty in any order, in either compilation or use.

Subject arrangement 1 (Based on LC list) is a 'logical' order in which subheadings, inverted adjectives, and parenthetical qualifications of the same subject heading or entry word are grouped. Within subheadings aspect, process and documentary form subheadings are in one group, in one alphabetical order without distinction; for example, Cotton—Bibliography:—Diseases and pests;—Grading;—Tables;—Taxation;—Testing;—Weights and measures; period subheadings are in another group, arranged chronologically; place subheadings alphabetically in another. But note that racial, linguistic, style and some period distinctions may be by inverted adjectives introduced by a comma, and these all come after subheadings introduced by a dash and in one alphabetical suborder, for example Art, American; Art, Ancient; Art, Baroque; Art, Greek; Art, Immoral; . . . Art, Primitive. Compare this with the separation of Cookery by foods, by methods and by country discussed in 12·5.

The complications of alphabetical arrangement just dealt with may appear to provide a compelling argument for the classified catalogue; but they do not prove as complicated in practice; they are no more difficult and certainly more logical than the arrangement of synthetic classification numbers such as those of UDC; and after all, cataloguing methods are to be judged, not by simplicity and ease of compilation for cataloguers and clerks, but by the simplicity and use of the catalogue for users of it.

Indexing by chain procedure in BNB has lately been supposed to facilitate filing "by avoiding the clumsy succession of groups . . . which can be so confusing in the dictionary catalogue"; this indexing is examined in Appendix G.

Chapter 13

Special Bibliographies, Materials and Methods

Librarians may regard themselves as users rather than as compilers of bibliographies and indexes which supplement their catalogues, but the methods of compilation are the same, for example the dictionary catalogue methods used in the Wilson indexes and the synthetic classification methods more or less used in some abstracting journals. And many of the indexing and abstracting services are by-products of library indexing and would hardly be economically possible if they were not.

Moreover, as the librarian is a user or consumer and probably the principal one, he should know something about their compilation if he is to use them to full effect, and to be able to be properly critical of them as a user in his reference work. So something needs to be said about published indexes and bibliographies, about their organization and about the use of special classifications in some of them, and about the latest 'co-ordinate' indexing and mechanical selection, the very limited application of which so far has been in special bibliographical or documentation work, rather than in what would ordinarily be called library cataloguing.

Included in these extra bibliographies, catalogues and indexes are central, standard and union catalogues and cataloguing services which are important in cataloguing and classification economy generally, including descriptive cataloguing and author and title as well as the subject approach, and in book selection and acquisition. Within his own library the librarian may have problems of special treatment comparable to those of the bibliographies and indexes he uses to supplement his main or general catalogue for his reference work; these problems arise with special materials not covered by his shelf arrangement and cataloguing of books or documents in volumes—material such as pamphlets, trade catalogues, maps, films, music and archives.

13·1 Central, Union and Standard Cataloguing.

Examples of central cataloguing, with cards if wanted, are the services of Library of Congress, and the British National Bibliography or BNB, discussed in 5·32 and Appendix G. Congress catalogues in book form are reproduced from its cards; BNB cards are reproduced from its weekly bibliography. This bibliography is intended to be a book acquisition aid, and is supported by publishers and booksellers; the entries include book prices, and on cards intended for cataloguing this is a weakness at least outside Great Britain, and one criticized overseas by both booksellers and librarians because British and overseas prices are not the same.

There are also more localized central cataloguing services, right down to those of central libraries for their branches; but central cataloguing as such is not limited to subject cataloguing, and this is true also of the standard or model catalogue for libraries, which is meant more as a book selection and cataloguing aid rather than as a library catalogue for use as such. Wilson's Standard catalog has been given as an example of one solution of the multiple entry problem in 5·43. Union catalogues tend to be author and title catalogues without subject entry, because their purpose is not as much to show what books, or periodicals, there are on a subject, or by an author, as to show libraries in which there are copies of an already identified book or periodical. But the current National Union Catalogue of Congress may be noted; it is Congress cataloguing with its tracing notes and arranged alphabetically by its main headings, with additional union entries without tracing notes. Its Library of Congress Catalog (of) Books: Subjects, is its own subject entries under alphabetically arranged subject headings with cross references, but the tracing notes are omitted from the entries.

Central cataloguing and book selection and acquisition aids, including trade bibliographies, overlap, notably in BNB. Trade bibliographies are bibliographies designed for use in the buying and selling of books; they help in cataloguing and classifying by subject even if they only give class numbers, as in the case of National Book News issued by the National Book League in Great Britain. The ALA Booklist in America gives class numbers and standard dictionary cataloguing tracing notes. Examples of pure trade bibliography of cataloguing interest are the English catalogue of books discussed in 5·1, Whitaker's Classified List in 5·2, and Wilson's Cumulative Book Index in 5·3.

13·2 Periodical Indexes and Abstracts: General and Special Classification.

Periodical indexes and abstracts are the most important supplements to the librarian's own catalogue, and have the same cataloguing problems, the two basic ones being choice between direct alphabetical and classified arrangement, and with the latter between general and special classification. If Chapter 6 on Abstracts, periodicals indexes and special bibliographies has not so far been studied as bearing on their compilation it should now be studied on their consultation, as supplements to the library's own catalogue. A librarian who cannot at least use such abstracts and indexes as those covered in that chapter for the retrieval of information on such subjects as triethylene is a good deal short of being complete, however much he may know about book pockets, plastic book covers and the oddities of English imaginative literature.

DC and the classifications which have been considered in Chapters 7 and 9 are general classifications, in the sense that they cover the whole range of knowledge, information and literature. DC was intended for general libraries and LC for a particular general library, but at the same time Dewey always intended that his DC could be used for more or

less special libraries and bibliographies; UDC especially was designed for central, general and special cataloguing as discussed in Chapter 10.

The idea of a central catalogue or index at Brussels was given up, in favour of co-operative or co-ordinated bibliography in special subject fields with UDC as the common factor. The arguments, which are developed in Bradford's Documentation, are that bibliographies or indexes, separate and in different languages, sizes and shapes, but using the same classification and notation, would be in effect the universal catalogue first intended, and that whilst knowledge may be specialized it cannot be studied and should not be classified in isolated fragments and by different schemes. But different catalogues may be according to the same system or classification, and still far from uniform; subject specializations are in many cases a selection of things which are scattered in a general classification and not in an order preferred by the specialists; and the devices of synthetic classification do not overcome this problem of scatter and order.

UDC seems fairly satisfactory for electrical engineering because this is almost self-contained in it, and for plant breeding, because whilst the theoretical bases of plant breeding are separated from the practical and from the actual growing of plants, the order seems satisfactory. So UDC is used for abstracts in electrical engineering with its notation and for plant breeding without its notation; but in Herbage Abstracts UDC having been tried for some years has been given up in favour of a special classification. The prejudices of specialists have something to do with the rejection and choice of a classification, but they may still be right in rejecting the treatment of their specialization and its subject relations in a general classification, and an FID survey made in 1949 showed that after fifty years of intense propaganda in favour of UDC by FID and its predecessor IIB, only 34 out of 231 abstracting services used UDC; 4 used DC and 185 used a special classification or were alphabetically arranged.

Part of the case for the use of an established general classification for a special subject field is that the making of any satisfactory classification, special or general, is more difficult than appears to the amateur and beginner. And there is more of a case for using a general classification in a special library than in a special bibliography because the library is likely to have a wider subject range of books than the bibliography will of entries. But this can be got over in a library by using a special classification for its specialization, and a general classification for the rest, the special classification being sometimes an extension, and more or less an alteration of a class, such as Forestry or Education, in a general classification.

There are now many special classifications using the notational methods and devices developed in and from DC. There are some which make little or no use of these methods and devices, and some which are not even hierarchical, that is consisting of classes with subclasses and subsubclasses. The mistake should not be made of assuming that special

subject arrangements in which the methods and devices of the standard or general classifications, and of hierarchical classification, are not used, are not classifications.

Chemical Abstracts, published by the American Chemical Society, is the best known example of a literature index based on a classification consisting of unsubdivided classes without any notation which is or could be used for specific reference purposes, and as shown in Chapter 6, whilst Plant Breeding Abstracts still uses the hierarchical classification of UDC in the abstracts as published, it does not use for any purposes of arrangement, reference or indexing any of the devices of UDC.

As shown in Chapter 6, the single classified entry with alphabetical indexing is commonly used in abstracting journals. There is now the theorizing of the (British) Classification Research Group to support the idea of the synthesized classification number, representing all subjects and subject aspects of the document and used by the breakdown method of Ranganathan's 'chain procedure' to provide the entries of the extra index or key. And as shown in 10·6 in discussing the new (2nd) edition of the Abridged English UDC the idea of alphabetically indexing a single entry has now some UDC approval. But in practice the single entry method has been used, notably in Chemical Abstracts, without any synthetic or hierarchical classification and in Plant Breeding Abstracts without any synthetic notation. And the method has been used not on any theoretical ground, but simply for reasons of economy.

It would be uneconomical and even impracticable to repeat an abstract in one issue of an abstracting journal, and much more so to cumulate them as entries are cumulated in periodical indexes such as those of the H. W. Wilson Company; so each abstract is given only once, under one classification, in one issue of the journal, and is then alphabetically indexed for all its subjects in an annual index, in which it is referred to, in Chemical Abstracts by a page number and a letter indicating a part of a page, and in Plant Breeding Abstracts and other abstracting journals by an abstract number, in a series running from issue to issue right through a volume.

The librarian supplements his cataloguing by periodical indexes and abstracts because the day is past when a library could afford the cost of periodical analysis except in a comparatively small field in which it may be specialized and in which it does the indexing, and possibly the abstracting for others, in some published form. He also supplements his catalogued book collection by other material which is different physically and in other ways; for example, many pamphlets haven't a value of sufficient endurance to warrant cataloguing and all that goes with it, on the average more costly than the pamphlets themselves. The temporary value of a pamphlet of subject interest may be far greater than the enduring value of some fragment of literary interest, but the pamphlet may be satisfactorily 'retrieved' during the time there is value in it and demand for it, without the cataloguing that proves necessary

to meet the infrequent but long recurring request for the fragment, which is of very little value in itself or in its influence, but happens to have that value permanently.

13·3 Pamphlets and Trade Catalogues.

Most libraries keep a file or files of material in pamphlet form, which may consist of paper-covered books of less than a hundred pages published separately and/or published in monograph series but treated as separates. Trade catalogues are a special class of this material. Items in it may or may not be catalogued by author and/or subject, and whether all or some of it is catalogued or not there may still be an index showing under what subject class numbers or headings the monographs in a particular series, or the trade catalogues of a particular firm, are to be found.

This cataloguing or indexing hardly affects the question of the material's arrangement, nor does the way in which it is kept physically. It may be kept in pamphlet boxes, which was once the common practice, or it may be kept in the drawers of vertical files, as it mostly is now. If a pamphlet box is treated as a volume and put on the shelves with books, then of course the box must be classified as a whole. But if such boxes are kept together and used like the drawers of a series of vertical files, the pamphlets in them can be classified or arranged alphabetically by subject, as in vertical files.

The question here is the choice of arrangement of this material, between classified and alphabetical, and a question involving this may be set in either the classified or the alphabetical section of a paper on classification and subject headings.

One question set has been: "Justify your preference for an arrangement of uncatalogued pamphlets on agriculture EITHER by a classification such as DC or UDC OR by the headings of Wilson's Agricultural index."

Some candidates justified preference by type of library: "if my library were a special library on agriculture I would, of course, use a classified arrangement, preferably UDC, because this arrangement would be more scientific; if my library were a public library then alphabetical order would do and would probably be more suited to the library's readers", or words to that effect. This shows the great height from which public libraries are looked on by some special librarians. It implies the argument or assumption that classified arrangement is scientific however and for whatever it is used, and alphabetical is not, and a lumping together of all 'public' libraries, including large reference libraries with collections of over half a million volumes used for all research purposes and small suburban or country libraries with only a few thousand volumes including children's and fiction, and little research or even reference use. Less uninformed assumption of this sort, and more distinction of types of library are necessary if the argument from type of library is to be used effectively.

Pamphlets may have either class numbers or subject headings written on them and be arranged like cards in a catalogue, classified or alphabetical. As there is usually only one copy of each there cannot be 'added entry', except by cross reference, for example a piece of stiff paper or board may take the place of a pamphlet under 636·7, or Dogs, and have written on it see also Smith. Cats and dogs under 636·8, or under Cats. But another entry or cross reference is not usually made in such a file; if the item is thought worth multiple entry then it is usually fully catalogued and treated as a book, or as a pamphlet in a pamphlet volume in the making. The pamphlet or vertical file usually consists of material not thought worth full cataloguing or permanent preservation, or of material awaiting sorting out.

The arguments for or against alphabetical or classified arrangement are basically those for or against alphabetical or classified cataloguing, with some consideration of the fact that the material is documents themselves and not just entries for them.

On this consideration it might seem that the pamphlet file should be classified, as books on the shelves are. But readers do not usually have the access to a pamphlet file which they have to shelved books, and the arrangement of the pamphlets is usually meant to be a substitute for their cataloguing; it is meant to be in some degree self-indexing. If they are classified then their classification has to be indexed; if they are alphabetically arranged by specific subject then they are directly self-indexing, like the entries in a dictionary catalogue or the articles in an alphabetically arranged encyclopaedia, though there are still problems of cross reference.

Pamphlets used to be classified, even in libraries with a dictionary catalogue, probably because they were a form of book material, and as a reader had to go to the catalogue or the classification schedules or to an index to them to find the shelf number for, say, cabbage growing, he, or a library assistant, could use the same number to consult the pamphlet collection. In libraries with a dictionary catalogue the later tendency has been towards alphabetical subject arrangement of pamphlets, following the subject headings used in the catalogue, or those used in a periodical index, or those used in a special subject headings list for vertical files; the comparison with the catalogue has outweighed that with the shelf. But a library with a classified catalogue is likely to arrange its uncatalogued pamphlets by the same classification, used both in the catalogue and on the shelf.

The question then seems to have come down to one of cataloguing or indexing method. Is the pamphlet file used in a generic survey of literature, or for specific reference? If it is used for the latter more than the former, then as with encyclopaedias, the direct self indexing of alphabetical specific entry seems to have a decided advantage. And the use of pamphlet material seems to be mainly for specific reference; the reader does not ask what pamphlets have you on the whole field of economics, for example, or cereal growing or agricultural pests, but

have you an up-to-date pamphlet on hire purchase or on rust in wheat.

A current periodical index may be used as a source of headings, because pamphlets are like periodical articles in being up-to-date and possibly ahead of subject headings lists such as Sears' in their subject matter, and they are often reprints or preprints of periodical articles. This is a reason why a pamphlet file is kept and material in it discarded as it is caught up with by catalogued books.

13·4 Picture Files.

There are special arguments for a classified arrangement of picture files for school use; they are surveyed generally for lesson material, and the same picture may include, for example, a desert, a camel and an oasis; if it is classified with other pictures of one part of North Africa alongside pictures of other parts of the same desert area, all of them can be gone over for included pictures of a camel, a desert, an oasis, a man in a burnous and a woman in a yashmak.

13·41 Maps and Topographical Photographs.

Maps are best arranged geographically, and the geography or history arrangement of a general classification may be followed. But collections of maps presenting difficulties are usually collections of large-scale maps; for example, the parish maps of a county or state, which require distinction going beyond that of the general classifications; they may be best filed by the reference system of some 'ordnance' large-scale mapping of a whole country or continent. The reasoning applied to maps may also be applied to photographs of localities.

13·5 Films.

Moving picture films, film strips, and 16 mm. and 35 mm. microfilms present special problems of physical organization, filing and finding, rather than special problems of classification, cataloguing and indexing. They can hardly be made self-indexing because they cannot be turned over physically as pamphlets can and they cannot be read directly at the shelf or read for information supplementing that given on their labels; this also means that they cannot be 'browsed' over as books can at the shelf. But there is still a case for classified arrangement and notation as facilitating collection of films on related subjects, for example in the field of agriculture, or description and travel, and the selection of substitutes in the same subject field when a named film is out. But there may also be a case for overall accession order filing, by which the numbering used for the collection of films from their shelves or drawers can be made as simple as possible.

This is consideration of physical arrangement, not of cataloguing and indexing. Most documentary film and educational film strip catalogues have been alphabetico-classed or classified, usually on some special system, with added title and specific subject indexes; but the

reason has in most cases been amateur, inexperienced, untrained catalogue compilation, with the usual lack of knowledge of specific entry principles and methods, and the usual assumptions about the scientific superiority of classification.

13·51 Sound Records.

The arguments which apply to films also apply to gramophone disc records, and to tape recordings of sound. There is the same problem that the record cannot be read or heard without apparatus, which is not at the shelf. But satisfactory dictionary catalogues of gramophone records have been compiled and published by gramophone companies.

13·52 Sheet Music.

Sheet music can be read at the shelf or at the vertical file, and classes of music, such as symphonies, concertos, dances, songs, folksongs, may be generally arranged for selection, so there is a case for their classified or alphabetico-classed arrangement. But the cataloguing and indexing of music is probably still best on the dictionary plan with specific entry and multiple entry, or cross reference for musical arrangements and so on.

13·6 Manuscripts.

The methods of book cataloguing can be applied and adapted to unpublished manuscripts and typescripts, such as historical manuscripts, but their comparatively limited number and subject range, even in libraries which have collections which are large as collections of manuscripts, and the special care which often has to be taken of them as unique material, means that classification has little application to them. They can be indexed for special subjects, but this tends to break down with large numbers, and the common practice is to 'calendar' or describe them generally, leaving it to the student to estimate their special use to him, and to go through any that he thinks likely to be of use to him.

13·61 Archives.

Archivists regard their work as quite different from that of librarians, unless they have also been trained as librarians; then they tend to think that their training and experience with books are useful for archives work, and that there are some fundamental common principles, though the usual methods of cataloguing, indexing and classifying books do not apply.

Archives in the strict and proper sense are office or official records of government departments, business firms and even private families and persons, no longer in current use, and a fundamental principle of their arrangement is that they should be kept as far as possible as originally filed. The unit tends to be the series; which may be kept or discarded as a whole, and a series may occupy hundreds of running

feet of shelving. In theory a series could be subject indexed, applying the principles of specific entry, but in practice because of sheer bulk this is less practicable than it is with manuscripts which are not, by the strict definition of archives work, archival documents. In one series there may be tens of thousands of inward and outward letters dealing with thousands of different persons and subjects and because of the way in which they are preserved, their physical and descriptive character, and their bulk, what we understand by cataloguing and classifying, and by catalogue, bibliography and index, have little application to archives, which is not to say that the same person cannot be qualified as both archivist and librarian and that books and archives may not be kept under one general management. But those questions are outside the scope of this book.

13·7 Co-ordinate Indexing.

Co-ordinate indexing and mechanical selection or retrieval by punched card or other comparable methods are possibly advances in some respects on what is now sometimes called conventional cataloguing, both dictionary and classified, which may for convenience be called conventional here. But actual replacement of conventional cataloguing by these new methods has so far been within very narrow limits; how much the student should or is likely to be asked about these developments at present is hard to say, and it is hard to say anything useful about them without going into detail and argument. Talk about the wonders of science, and electronic brains and machines that are going to do this and that but aren't doing it yet, or are doing it there but not here, is just useless weekend magazine stuff. As little as possible is said here, and only with the idea of clearing the ground. If the student wants to or has to, he can then turn to the writer's Chapter 7, Mechanical selection and coordinate indexing, in his book Information indexing and subject cataloging, 1957; to pp. 431-40 in Holmstrom's Records and research in engineering and industrial science, 3rd edition, 1956, and to current material in such periodicals as the Journal of Documentation, London, and American Documentation.

Suppose there are books under Smoking in a catalogue, and a reader wants to know which of them are on smoking and cancer; a bright assistant might say, let's look under Cancer as well and those under both will be those which are on some relation between smoking and cancer. This is the essence of co-ordinate indexing: the books on both are put simply under both without qualification, and not, for example, under Smoking—Effects, Deleterious—Cancer and/or under Cancer—Causes—Smoking, and those on the relationship are found by comparing or co-ordinating entries under simple terms or class numbers, the entries being in forms designed to facilitate this. The name co-ordinate indexing, discussed incidentally in 4·3, may be as good as any, but it may suggest science or magic which isn't in the method; the student who may have mathematical ideas of co-ordination should note

that it is not spatial co-ordination such as is used in finding places on a map, though in some highly mechanized version it might be developed on these lines.

Batten seems to have hit on it in England independently of some earlier account of it in French; he published an account of it in ASLIB proceedings, 1947, pp. 37-9, and in Punched cards, their applications . . . ed. by R. S. Casey and J. W. Perry, 1951, pp. 169-82. He matched entries in a semi-mechanical way by representing documents by numbers on cards, one card for each subject and one number for each document in a series on every card. Suppose document number 35 to have a hole punched alongside it on a card for Dogs in a classified arrangement at 636·7, and the same document number to be punched on a card for the Blind at 362·41, then if these two cards were taken out of the file and held together there would be a hole right through both at 35, which would indicate that document 35 was on Seeing dogs for the blind, perhaps; three cards might in the same way indicate which of five documents on Seeing dogs for the blind were on these in relation to the Education of the blind, or the Psychology of animals. Batten worked with patent specifications in a limited subject group, and used a special decimal classification, but this does not affect the essentials of the method. The student must be careful of any assumptions or loose statements that any of the methods under discussion do actually catalogue in the sense of taking a book in hand and saying what its subjects are and determining headings or class numbers for them. The machines, the electronic brains, can only relate data fed into them according to relations fed into them, all of them predetermined by human mental operations. And the mechanization of cataloguing so far is merely retrieval of entries in some physical form, far below the level of complication of the calculation done by the so-called brains.

Advantages of co-ordinate indexing in the manual forms developed by Batten and Taube are supposed to be saving of compound headings or numbers, of cross references, and of full multiple entry, though multiple entry of a different kind is essential to the method; it is also said that there can be unanticipated retrieval of information not possible with conventional cataloguing.

It has been suggested, for example, that there would have been much earlier discovery of DDT as an insecticide if there had been co-ordinate indexing of information on DDT and on insecticides; but this is utter nonsense. Until there was experiment about 1939 in which DDT was rediscovered and found for the first time to be insecticidal, and until there was a document stating this, information on it could not be retrieved because it had not been put into a document and didn't even exist as knowledge. Suppose a document on a chemical mentioning very incidentally that amongst a hundred other possible uses it might be used for removing warts, this information could not be subsequently retrieved by any method of indexing unless something corresponding to the entry of conventional cataloguing were set up under Warts as well as

under the chemical. That is, there must always be information in a document, discovery of it, anticipation that it may be wanted and then some kind of indexing, before there can be retrieval, and the only superiority that one method can have over another in this respect is that its economy may allow of more entries being made; but the problem of universal bibliography discussed in 1·8 is not solved.

Disadvantages of the method are that there is no description of the documents indexed on the indexing entries; even with entry only by numbers comparatively few can be given under a heading or class number; and a method involving the withdrawal and matching of entries is hardly one that can be left to the reader. It is not conventional cataloguing and by not being conventional it is hardly suitable for the conventional library, even suppose it could cope with the number of subjects and of different documents on them in even a small one. Claims made for these methods do not always leave it clear to the student that they have only limited and highly specialized application. And on this particular method the student should note that although Batten called it, in 1947, a punched card system, it is not what is generally meant by a punched card system; the holes are not used in any way to hook out entries; cards are taken out as conventional catalogue cards could be, and the holes on them then only used in the matching process. It should also be noted that whilst the cumulative purpose of the conventional card catalogue requires only one entry on each card the method of co-ordinate indexing requires as many 'entries' of the documents by number on each simple term or number card as possible.

Taube in America, whether independently or not, used the method alphabetically and gave it the name co-ordinate indexing in the early fifties. He went much further in co-ordinating 'terms', in alphabetical order rather than subjects in numbered classified order, so that electric and motors might have to be co-ordinated for electric motors and the two again with lawn mowers for electric motors on lawn mowers, and again for electric motors in razors. And he matched document numbers by what has been called the terminal digit method, without punching holes; the hole method had been used by others in America and became known as the peek-a-boo system. Taube tried to apply this to the indexing of co-ordinations in an extra index, in a highly mechanized form, rather than to the actual co-ordination or matching of entries.

He endeavoured to reduce all subjects to the simplicity of single 'terms' or words, so that, for example, in bottled milk and bottled beer there would be one common and two different terms, and he called his special system the Uniterm system, which his Documentation Incorporated has commercialized, with later mechanized versions called Matrex information control systems, including Termatrex 40, and so on.

The system basically has all the limitations of Batten's, with the added looseness of mere word rather than subject co-ordination. Taube himself makes light of the difficulties of such ambiguities as those of the words history and science touched on in 4·6, with suggestions that

after all the man rarely bites the dog, and that whilst Venetian blinds may be a subject in an information system Blind Venetians are not likely to be a subject in the same, or in any system. This is all very funny, but others who are interested in unconventional methods of indexing are not so sure, and point out the difference between the effect of bacteria on paint and the effect of paint on bacteria, both of which could occur in the information retrieval system known as Chemical Abstracts.

13·8 Mechanical Selection and Punched Cards.

What is also essentially co-ordinate indexing has been used independently in true punched card and comparable methods, and their essential advantage is that there can be with them multiple indexing of the same document without any kind of multiple entry and with the full 'main' entry of conventional cataloguing. A document can be fully described on a card; this can then be 'coded' for several subjects of the document, then by setting the machine according to the coding of a subject, the entry can be sorted out or selected, mechanically, for that subject, and from a number of cards those can be sorted out which are not only on rabbits but also on myxomatosis, and also on mosquitoes. The codings are 'co-ordinated' so that only cards with two or more codings on them are selected.

In the simple manual forms of punched cards with such names as Keysort and Copeland-Chatterson, holes round the edge of a card are opened into slots in some combination representing a subject, then a needle or bodkin through the place where there is a hole lifts out those with the hole intact, and drops those which have been opened, these being the wanted cards, and for a combination of holes there can be successive sorts, or more than one needle can be used at a time. These are not mechanical sorting systems, and not sorting through systems. because the order of the holes round each card is fixed and known and the operator applies the needle to one or more holes found by him through his knowledge of their order, which is that of figures or of letters.

In fully mechanized punched card or comparable systems using light spots on continuous film and so on, the machine sorts right through the entries in any order and picks out those for which it is set. It must go right through because if the entries were so marked and arranged that all those wanted came together at a known point there would be no economy in mechanical selection, but there would of course have to be multiple entry for the multiple subject document, which is avoided by the coding and selection of one entry for one or more of several subjects. But if there is only one entry coded for several subjects then whatever the order each entry can only be at one point, for only one of its subjects, or for its authors.

The interested student should think carefully over these elementary facts of life, and be wary of claims that science has found a way round

them. The economy of this sorting is at its highest when for statistical or other office purposes a high proportion of entries has to be sorted out, say those for a factor such as a calendar month, which could mean one twelfth; the economy declines as the number of entries to be sorted out in one running through is reduced. For this reason preliminary hand sorting is an important factor, perhaps the most important, in the economy of mechanical sorting for literature indexing purposes. Applied to such a field as plant breeding entries relating to any particular crop may be arranged in a classified order by crop; they can then be taken out manually by crop and mechanically sorted for such things as inheritance, mutation and so on. As shown in Chapter 6, this is the basis of single entry in Plant Breeding Abstracts and has also been used in the application of mechanical selection to these abstracts.

The difference is that mind, eye and hand can go to a point in a known order with not much loss of speed whether the total number of entries is one thousand, one hundred thousand or one million; the machine has to go right through and so loses increasingly in the race as the number of entries increases. This and the fact that a machine is necessary with an increasingly complicated coding system, the withdrawal of entries from a catalogue, and the reduction of the number of people by whom or for whom they can be consulted at one time, means that the conventional catalogue is still far more efficient and economical for the conventional library, from the suburban public library to the British Museum and Congress, and for special libraries unless their specialization is as special as, say, plant breeding or paint.

13·81 'GENERIC ENCODING'.

Specific subject names such as dogs, alphabetico-classed headings such as Animals, Domestic—Dogs, and class numbers such as UDC numbers, can be reduced to representation by holes and the like, which are then the actual physical device used for extraction. The use of alphabetico-classed headings with code indications such as ANDO for Animals, Domestic, has been called generic encoding. The student should be clear that the letters ANDO then only indicate the places of holes, light spots and the like on the entry in its physical form. In a 'memorandum', the need for a faceted classification as a basis of all methods of information retrieval, in the Library Association Record for July 1955, the (British) Classification Research Group seems to suggest that mechanical selection coding, or at least any form of generic encoding, requires an hierarchical classification complete with an hierarchical notation, but this is no more inevitable or desirable in mechanical selection than it is in conventional cataloguing. In co-ordinate indexing and mechanical selection all the arguments about classified and directly specific entry begin to come in again, and there are also arguments in favour of purely random coding, on mechanical and mathematical grounds.

13·82 Zatocoding and Random Coding.

Mooers who has patented his Zatocoding strongly favours random coding of entirely specific or unclassified, unrelated terms which he calls 'descriptors'. In his simple machine he uses cards notched round the edge, and for selection vibrates them on a variable grid so that the notched ones settle down. Again the numbers of subjects and documents which can be handled with economy of time are limited; he talks of systems of only a thousand 'descriptors' and only ten thousand documents, and though he began by rejecting any necessity of taking subject or term relations into account he has had to modify his views in this respect. Like others in the field he is an engineer or chemist without general experience in cataloguing.

Random coding is not the same as random or irrelevant order, as when author arranged entries are sorted through for subject purposes. Random coding is not related to any spelling of words or to any classification, and mathematically is supposed to be more economical in punching and coding, because it results in even use of available coding. Coding is 'superimposed' when, for example, holes numbered 3, 15, 24, 30 might represent one subject and holes 5, 15, 17, 30 another. This can result in what have been called false drops, and there can also be blank sorts. If, for example, some form of term co-ordination were used and there were known to be entries for boot, nail, and polish, a co-ordination of nail and polish would be blank if there were only entries for boot and polish and for nail and lacquer.

13·83 The Code Dictionary or Extra Index.

Mechanical selection and co-ordinate indexing require some extra indexing of the codings and/or of terms which can be co-ordinated, and whilst this indexing has been treated as casually as the extra index to the classified catalogue there is evidence that some of the basic problems, and costs of indexing, supposedly escaped by coded mechanical selection and by co-ordination of terms, are only passed back to the index.

13·84 Limitations and Possibilities of Mechanical Indexing.

The greatest weakness of mechanical or electronic brains applied to indexing has been their inability, (1) to cope with the very large number of what are known technically as information 'bits', needed in even a small library catalogue or bibliography. Several of these 'bits' may be needed to code even one letter of a word; (2) to provide what is called a 'rapid' or 'direct access memory' for a very large number of bits, that is to enable the machine to select, on request, in the apparently direct way the mind does from its millions of 'bits'.

Loose talk about memory in these machines obscures the difference between storing a lot of information and being able to retrieve it, that is, being able to remember a wanted piece when wanted, and obscures

the difference between the automatic and autonomous memory of the human brain, and the memory of the electronic brain, which has first to be told by the human brain what it has to remember.

The best recalling device so far for what is a comparatively small amount of information by library standards is that of the comparatively long sort right through. By some mechanized version of true geometrical co-ordination it might be possible to go directly to a subject, but the subjects would have to be in some order, though this might be two or even three dimensional as compared with our present linear orders; and with an order which is known to the human mind which creates it, and can memorize it, the speed of the human mind is still hard to beat. The interested student who may ponder on all this and read some of the literature must be very wary of loose talk which runs right through it on dimensions in indexing; co-ordinate indexing is said to have brought dimensions into indexing not known in conventional cataloguing, alphabetical or classified; synthetic classification is said to have brought dimensions into classification not known to simple, 'enumerative' classification, and when we get to the poor old illogical dictionary catalogue we find claimed for it, just as soundly, by Pettee, that in it, by its cross references freed from the limits of any classification scheme: "the logical analysis of the classed catalogue is exalted to a third dimension" (p. 59 of her Subject headings). All this talk of dimensions is entirely analogical or metaphorical and has nothing to do with the true dimensions of co-ordinate geometry.

The economic possibilities of mechanical selection are in compilation rather than in consultation, and through its true single entry. This does not require any form of 'co-ordinate' indexing, that is, any form of selection of entries coded for both bottles and milk, for example, because we can code on the one card Bottled milk or Milk, Bottled, just as we can code Bottles, and Milk, separately, and in either case we will have to have a code dictionary or index to be efficient and economical for consultation as well as compilation, and in it both Bottled milk, and Milk, Bottled. This is not to say that some co-ordinate indexing may not be used in mechanical selection, but the point should be made clear that the economy of mechanical selection is dependent on the coding for selection of single entries, which can carry codings much as the unit card of conventional cataloguing carries tracing notes, and is not dependent on co-ordination of isolated terms. The assumption of merit in co-ordinate indexing may be as questionable as that of merit in compound numbers for added entry discussed in 10·5-6.

The possibilities are still limited for the compilation and consultation of anything more than highly specialized catalogues; they are greater for the combination of punched card or comparable indexing with the preparation of published classified and indexed abstracts for which machines might do the sorting of entries coded for both classification and alphabetical indexing. Some of the research in progress, especially that of the American Chemical Society, seems to be with current biblio-

graphy in view rather than cumulative library cataloguing. And there are also possibilities in the combination of indexing or retrieval of entries with retrieval of actual material, such as abstracts, in reduced form, which are then retrieved at the same time, possibly even in enlarged copies. This is the line of development explored in Shaw's Rapid Selector and in Kodak's Minicards, and it goes much further than remedying one of the principal defects of the Batten and Taube manual forms of co-ordinate indexing noted above, that of not producing by the major retrieval operation even the conventional cataloguing description of a document. It may produce the document itself even if only in an abstract or reduced form. But for the time being conventional cataloguing in libraries of all kinds has hardly been affected.

Chapter 14

Practical Work and Subject Determination

Actual work in library cataloguing, in literature indexing and bibliography includes the maintenance of the whole system, whichever or whatever it is; this should be understood in theory, but even head cataloguers and classifiers do not always understand fully from the bottom up, a system they operate in practice, and in examining old established catalogues the remains of principles and practices may often be discerned which present cataloguers have not recognized; they are often in charge of a catalogue which had tens and even hundreds of thousands of entries before they took charge, or even before the time when, as junior acolytes, they first served the sacred cow. Maintenance and organization of the catalogue as a whole is necessarily the subject of theoretical papers in examinations. Practical work tends to be the no less important determination of subjects of books and corresponding classification headings and numbers and alphabetical subject headings. It will extend in examination to cross references in the dictionary catalogue and indexing in the classified catalogue, though assuming the catalogue to be the ideal multiple entry type then in actual practice this will only be when the subject is a new one. Usually it is not, and when it isn't the work is routine or according to precedent, once the subject of the book is determined.

Supposing a book on a subject to be already in a library and fully processed, and another coming into the cataloguing department, which proves to be on the same subject, then the second should have the same class number as the first for the shelf, though not the same call number, as discussed in 7·2, and the same class numbers or subject headings for the catalogue. It should be safe to assume that any necessary cross referencing for the dictionary catalogue or indexing for the classified catalogue, has been done. But for examination purposes the student is often required to treat a book as though it were the first, to show if he knows all that should be done by way of cross referencing or indexing, and he may be asked to do it in a form which can upset his understanding of what he is doing, as discussed in 8·7 and 11·5.

In actual practice there is often some check to make sure that what should have been done on the cataloguing of the first book on a subject has been done and to see if it is desirable to alter it; following the precedent of the first book uncritically can be a cause of bad subject cataloguing of successive books on the same subject, especially as the first book added to a library may be the first book on a subject which has not yet clearly emerged with a generally agreed-on name.

In discussing and illustrating practical work in this chapter not all

the processes of shelf classifying and cataloguing a book are gone over; for example, the addition of book numbers and shelf listing covered in 7·3 are not repeated, and little is said about cross references and indexing and the maintenance of such checks on these as a subject headings file. These are covered in Chapters 5, 8, 11 and alphabetical arrangement in the dictionary catalogue is discussed in Chapter 12.

All these processes mean some division or sequence of labour in cataloguing, and if there is a staff amongst which labour is divided there should be consideration of aptitudes, especially for the subject approach as distinct from the author, title and descriptive cataloguing approach. This is a question of actual as distinct from practical in the sense of practice work for the student, but some practice may be by way of actual work in a cataloguing department and some students and teachers may be helped by something about this, and the related question of whether practical cataloguing in examinations is practical or not.

14·1 Actual Work and Practical Work.

Many good cataloguers on the author, title and descriptive side are poor on the subject side. If they are not good at classifying they cannot be good at subject headings, or the reverse, because both depend on having good general knowledge, and a high ability to make distinctions which are far more subtle and numerous than those of author, title and descriptive cataloguing, and cannot be reduced to rules and a code, as these have been. And of course it is duplication of work by different people to have the examination of a book, and thinking and enquiry about its subject for shelf classification done all over again for subject cataloguing, whether alphabetical or classified; the same person should do both shelf classifying and subject cataloguing whether classified or dictionary, and probably a head cataloguer or assistant cataloguer should be in sole charge of all shelf classification and subject cataloguing, in any library which isn't very small or very big.

One of the major sources of time wasting and high costs in cataloguing departments is checking on the subject side; it means practically double cataloguing, because the checker has to go all over the book again, finding out what its subject is, and then has to do the usual checking of lists and decisions again. There is a strong tradition in the cataloguing more than any other library department, that books and readers are made for the librarian and not the reverse, that cataloguing must be made interesting, even amusing, and that all cataloguers must be allowed to do all the cataloguing and classifying of books they handle, but the tradition is hard to justify on any ground but special privilege.

It is also urged that young cataloguers must be given experience by letting them pick and choose and do their best with books, and then checking their work with them. This can be controlled to some extent by selecting books according to apparent degree of difficulty and their experience. But books are not always as easy as they look, and rarely equally difficult or easy in both branches of cataloguing, as any examiner

knows who has tried to select books for tests using the same books in both branches; and when it is known that work will be checked it is not always done thoroughly; juniors often leave for the checker the very difficulty which would give them experience, and they are slow because they lack experience.

A carefully selected understudy to a senior doing all the subject side will learn more in six months than someone whose aptitudes have not been studied, working the other way, will learn in six years. Examination candidates themselves are often deceived by haphazard cataloguing experience; they think they have learnt enough, especially for a practical paper, through practical work, and do not read or study systematically. Other candidates whose study has been entirely theoretical, but orderly and thorough, often do much better in both theoretical and practical work; this happens particularly when the candidate relying on practical experience has had this experience in a library with poor cataloguing methods and from cataloguers who are using some local system, complete with its own terminology, and have not themselves passed any examinations.

A student who has worked in a cataloguing department for six months, or six years, should not rely on this. It might be a good department and still not give a student systematic experience. Students who have worked in a cataloguing department often come out of an examination room bemoaning that "in the cataloguing department we never had one of those", whatever it was. Candidates without the opportunity of actual employment in a cataloguing department who get a good grasp of principle, systematically study the classification and/or subject headings list they are to use, but not to follow slavishly, and do plenty of exercises, often do better.

It is agreed that cataloguing department experience does not always make good cataloguers, because, it is said, they lose touch with the practical side, the consultation side of the catalogue. As illustrated in 11·13, cataloguers often fail to realize that their task is one of indexing by means of known subject names, not one of interpreting or explaining or educating, and they do not always compile their catalogues so as to make them certainly reliable in consultation. But tests have not shown that work at a reference desk makes better cataloguers or that cataloguers are better reference librarians. At the reference desk the cataloguer often remembers that a book on a subject on which information is wanted went through his or her hands, but doesn't remember "what we did with it", and doesn't seem to realize that not being able to find "what we did with it" through the catalogue is a reflection on their cataloguing. What makes good cataloguers is aptitude and thorough grounding in what the catalogue should do, and how it can be made to do it.

There is specialization in librarianship and bibliography, but there are not two professions, one of librarianship and one of bibliography, not two professions, one of librarianship and one of library cataloguing,

not two professions, one of chief librarian and one of chief cataloguer. Both chief librarianship and chief cataloguership suffer from this idea; in all but the largest libraries the chief librarian should exercise some oversight over his cataloguing department, especially on the subject side, and even do some of a head cataloguer's work. Cataloguing and classifying are so essential and important in librarianship that a librarian who merely employs a cataloguer and fancies himself as an administrator, or educator, or littérateur, is less than half a librarian, whose place might as well be taken by a teacher or an administrator. Cataloguing and reference work are the two essential departments of library work, in which a chief librarian must be active to be a librarian, and public librarians with a staff of less than a dozen who say they must have a head cataloguer, because they are too much occupied with administration or book selection, are only implying their own inefficiency or laziness.

Most students are not helped by being able to take 'tools' such as classification tables and a subject headings list into an examination; they cannot do without the former; they would be better off without the latter. They tend to rely on having them in the examination room as a substitute for perusal, that is thorough reading, beforehand, only to find that they cannot work with them quickly or certainly enough under examination conditions, through lack of familiarity. But if they don't have them the complaint is made that examination room conditions are unreal, because there are not the aids, the opportunities of consultation and recourse to the catalogue for precedents, there are in the cataloguing room. One answer may be that the conditions of some cataloguing rooms are unreal.

Examination candidates may be asked to make a main entry and indicate added entries, and references to headings or index entries, for books of average difficulty with about half an hour for each, and the standard of work which secures a pass is lower than that which should be accepted in actual cataloguing; a cataloguer with classification tables and a subject headings list who couldn't do the same for half a dozen books of average difficulty in less than three hours would certainly be an incompetent cataloguer. And the purpose of an examination is not to pass in students who do not show some promise of being competent cataloguers; it is to pass them out.

This chapter is mainly on methods and rules or principles which can be applied in deciding the subject or subjects of books or documents, and in deciding corresponding classification numbers and subject headings. Nevertheless the student should try to get a feeling for a catalogue as a whole, perhaps the one he may use in reference work, or another he may have an opportunity of examining. Students are usually taking examinations in all branches of cataloguing, in book selection and acquisition and in reference work or aid to readers, about the same time, and they lose heavily by thinking and working in compartments, so that, for example, whilst studying a periodical index as a reference

tool, or a trade bibliography as a book selection and acquisition tool, they do not also study them as problems, and the solution of problems in cataloguing, indexing and bibliography. And in cataloguing by itself one of the worst faults in actual and practical work is not seeing the wood for trees, the organization and arrangement of the catalogue as a whole as well as entries going into it, like stitches in a piece of knitting which finishes up looking more like a sack than a sock. One of the almost fatal weaknesses of Otlet in his work on synthetic classification and UDC for cataloguing was that until he had a catalogue on his hands he had not really worked with one as a whole, and neglected and muddled the essential business of arrangement. Organization, arrangement and maintenance have been dealt with, especially in Chapters 8, 11 and 12; what is in a way more fundamental, the determination of the subjects of particular books for the purpose of classifying and cataloguing them, has been left to this chapter.

14·2 Book Subject and System Subject.

If we ask the question, what is the subject of a book, the answer may seem simple. The subject of a book is what it is about. For example a book is about golf, therefore its subject is golf, and in an alphabetico-specific catalogue we will make a subject entry for it under Golf, and in a catalogue classified by DC we will make a subject entry under the number 796·352 with the alphabetical relative index entry Golf—Sports 796·352.

The simple answer works for a lot of books which are simply on simple subjects. But even for these it only works in terms of our cataloguing and classifying system, in terms of what some writers call our information retrieval system. Suppose the book is on a species or variety of golf called miniature golf and in our retrieval system we are no more specific than the noun or no more specific than our DC tables, as discussed in 4·4 and 11·12, then the book is about miniature golf but its subject in our cataloguing and classifying is golf, without the book's further specification of the subject as miniature golf. Suppose again that the book or document is about plus fours, in our information retrieval system, alphabetical or classified, its subject may be trousers, or sportswear, which includes the subject of the document but does not include any part of its name.

Suppose again that the book is on golf, without any further specification of golf, such as miniature or clock or professional golf, but with further specification of its subject by limitation of it to the history of golf, or to golf umpiring or to the stroke in golf called putting; our classified retrieval system may allow Golf history with the number 796·35209, in DC, and even Golf umpiring with the number 796·352·072 from UDC, but neither DC or UDC as they stand allow Golf putting; our alphabetical retrieval system being much more flexible and potentially detailed would allow Golf—History;—Putting;—Umpiring, as aspects or processes of golf, but we might not take it so far; we might say that

we do not use subheadings other than —Dictionaries,—History and a few more comparable to DC's 01-09 form numbers.

We determine the subject of the book but only as part of a process which is fitting its subject to one distinguished in our system, the subjects of which are a series of procrustean beds to which we cut down, or rather more often stretch out, the subjects of the books we catalogue and classify.

We may make a new subject distinction for a new book, and so for all later books on its particular subject. This can be and is done more flexibly and freely in direct alphabetical than in classified indexing working to tables which have their limits, whatever synthetic devices they may have of the kind discussed in Chapter 10. For example, a book on flying saucers or the Loch Ness Monster can be put immediately and directly under Flying saucers or Loch Ness Monster, and it is well and truly indexed without any prejudice, that is without any judgment or classification. Any classification of flying saucers and the Loch Ness Monster implies a judgment on what they really are, and whilst we might find flying saucers or unidentified flying objects fairly easy in a flying class, without alphabetical indexing, it would be difficult to find a class including the Loch Ness Monster without alphabetical indexing. But in direct alphabetical indexing books are often 'put under' as discussed in 11·13, and there is the bad practice of fitting every book to a heading in a subject headings list, discussed in 11·7.

It may seem then that subject determination difficulty is not in determining the subject of books, but in fitting their subjects to our system. But even the determination of books' subjects as the first step is not as easy as it looks, and requires further consideration first of what we mean by subject, and then of how we approach the book.

14·3 Subject and Interest.

Cutter defines subject as "the theme or themes of the book, whether stated in the title or not", and in a footnote to his note on his definition of class he refers to distinctions of subject matter and nature or essence in books. As well as theme, nature, essence for something different from subject matter, the words purpose and interest have also been used. A book may be undoubtedly about frogs or rabbits, but its interest or purpose may be comparative anatomy, or simply anatomical dissection for students of human medicine, in which students are given practice in dissection and instruction in anatomy, physiology and histology on animals which are comparable in structure with humans. The distinction between the frog or rabbit as subject matter and comparative anatomy or dissection as interest or purpose is then important; we may enter the book under the former but we should enter it under the latter as well, or make some cross reference such as Anatomy, Comparative see also under the names of animals used in Comparative Anatomy.

An example has been given in 5·32 of the indexing of subject matter without the indexing of purpose or interest, even though this is clearly stated in the title of the book, called The effect of various surface treatments using magnesium and zinc fluosilicate crystals on abrasion resistance of concrete surfaces. The book is undoubtedly about Concrete coating, Magnesium, Zinc and Concrete, under all of which it was put by a Congress cataloguer. In a special library with an interest in Magnesium it should undoubtedly go under something like Magnesium—Uses, and it could be put under this in a general library, but above all in general cataloguing the interest or purpose of the book should be covered, in this case 'abrasion resistance of concrete surfaces', for which Concrete—Abrasion—Prevention could be used as a heading in direct or indirect alphabetical indexing. Note that this essential subject of interest is stated in the title though in different words. The nearest the cataloguer got to this was Concrete Coating, probably because this was the nearest already established heading in the subject headings list, and getting a new heading established can be quite a business in a large cataloguing department.

The next example in 5·32 is one of the somewhat different but related fault of two headings, and two entries, both too general, instead of one heading and subheading and one entry, probably from the same cause, not going beyond already established headings.

Note that it is easy to go outside a subject headings list or to add to one, in fitting a subject in the system to a book's subject, because the only limit is that of language at large. It is not as easy to go outside a classification, which is a fixed and limited language or code which can never be sufficiently flexible or synthetic. In UDC Concrete might be 691·32, and possibly the analytical or process subdivision -784, Protection against exposure to weather, dust, etc., could be applied in 69 to make 691·32-784 for Concrete—Abrasion prevention. Lubricants are 621·892, and 621·892:622·775 or 621·892:66·067 might be used for Lubricants—Extraction. DC would not allow of this synthesis or number building.

The distinction and expression of subject in the sense of interest or purpose is dealt with further under 14·4 Titles and text in subject determination, 14·5 Subject and title analysis in subject determination and expression, 14·6 Subject relations and subject analysis.

14·4 Titles and Text in Subject Determination.

Reaction from title word entry in favour of independent subject headings had led to too much neglect of, and variation from the title in subject entry, as discussed in 11·13. And however a book's subject may be indexed, this must be determined from information given in the book, beginning with its title, but not stopping with it. There must always be a check, which may show, for example, that a book called Hieroglyphics by Arthur Machen is a collection of essays on

various subjects, not one on ancient Egyptian writing, and one called Primates is on monkeys, not on the Archbishops of Canterbury.

A book is opened at its title page which reads School algebra, by W. E. Paterson; a very brief but thorough examination shows that it is exactly as named, an algebra or textbook of algebra for schools. Clearly the specific subject is algebra, but does school imply or require any qualification? We might use the DC class number 512·02 for it, on the shelf and in a classified catalogue, or the corresponding subject heading and subheading Algebra—Textbooks; but the textbook distinction is not easly maintained, and not of much use except in a library for teaching and teachers, such as a teachers' college library in which textbooks at various levels might be fairly elaborately distinguished, on the shelf and in the catalogue. The subheading—Study and teaching, or the corresponding form number 07 might be used, but should not be, because they are for books on study and teaching methods and choice of subjects in a curriculum, not for textbooks. This illustrates the kind of thinking and distinction even the simplest book requires to ensure good cataloguing and classifying which will help users of a library, and hold marks in an examination. There are always traps for young players, even in the easiest shots.

Another book is opened at the title page which reads Documentation . . . 1948, by S. C. Bradford. The title is a single word, which has been said to be "not suffering from unemployment", and in UDC we find 002 Documentation, Generalities concerning compilation, sorting and methodical arrangement of documents. This might well fit the book; but on examination it proves to be devoted to explaining and making a case for UDC against other classifications, and for classified as opposed to alphabetical cataloguing, and we find in UDC, 025·45 Documentary classification Decimal systems: DC (Dewey), U.D.C. It could of course have entries at both numbers in a classified catalogue, because it is on the general problem as well as a particular system. Then looking for headings for the dictionary catalogue we find that in the Congress subject headings list, 5th edition, 1948, the year in which the book was published, Documentation was not listed as a subject name. Classification, Decimal was, with see references from Decimal classification and Dewey Decimal Classification; but Universal Decimal Classification had neither entry nor reference. However, as pointed out in 11·7, we are not, and should not allow ourselves to be bound by any list of subject headings in any edition, and may lose marks in an examination if we do; we can enter this book under Universal Decimal Classification, and Documentation, and Federation Internationale de Documentation, with which it also deals, with reference from Decimal classification and from Documentation see also Universal Decimal Classification, and from Documentation see also Federation Internationale de Documentation. The relation of entries and references is discussed in 11·21-2.

By the time the 2nd edition was published in 1953 Congress had Documentation as a heading and put the 2nd edition under this, and

under Bibliography—Theory, methods, etc. but still not under Universal Decimal Classification or Federation Internationale de Documentation. In DC 14th and 15th edition 010 and 025·4 seem appropriate class numbers for this book.

This example shows the need for looking well behind a single word title which at first sight seems to be all we want. It could also have an analytical entry for its chapter on alphabetical subject indexing. We may think it a prejudiced and ill-informed chapter on alphabetical cataloguing, but it represents a point of view, and whilst we must be selective in cataloguing, and particularly in making analytical entries, we should not use the unfortunate necessity of being selective as an excuse to be critical or censorious in cataloguing, any more than in book selection.

Another book is opened at its title page, which reads Place, taste and tradition: a study of Australian art since 1788. What is it about? An assumption from its title is confirmed by the account on its jacket, known as the publisher's 'blurb', by its list of contents, and its author's preface. Neither title nor blurb are to be trusted without some confirmation but the blurb often gives a summary of what an author intends; in most cases a book's text need not be read, and less than five minutes is enough to decide what it is about, provided the cataloguer has learnt to recognize and cut away irrelevancies quickly. This book is a history of the art of the white people who call themselves Australian, of its theories and values with special reference to the influence of place, taste and tradition. But how much of this goes into classifying and cataloguing, once we reject nonsense about 'translating' a book's whole content in the number or heading under which it goes. For a start it should go with a 'straight' history of Australian art, called The Story of Australian art, by W. Moore, 1934; both are basically Art—Australia—History, or Australian art—History, classified at 709·94. 'Native' art would be distinguished as Australian aborigines —Art. In addition this book might well have an entry to cover 'taste'; as shown in 5·32 with another book Congress uses Esthetics for this and then falls back on a title word entry to distinguish taste. Some libraries besides using Esthetics as a heading would also use something like Taste in Art and would prefer it for this book. The point and purpose is to get the book into the hands of the reader, to index it for him as one on Australian art, and on taste. There will be in every book on a subject some special point of view on it, some interpretation, some special emphasis; the reader can decide for himself if the point of view, or interpretation, or emphasis is what he wants, by looking at the book, and the cataloguer should not be over-influenced by what happens to be in the title of one and not in another; he should remember that a book title is part of its advertising; it may be an honest and helpful summary of its subject and emphasis as in this book; at the other extreme it may be designed to give the impression that a book is

quite new, quite different, when it is just another version, possibly more up-to-date, but not essentially new or different.

What is a book called From serf to citizen? It is another history of England for schools emphasizing social aspects and development towards democracy, as most histories have done for some years; the title advertises this emphasis but the book is little or no different in this respect from others simply called a history of England, or of the English people. In a recent fashion the word 'civilization' was often used in such titles, but the books were not on civilization as a subject, as Buckle's History of civilization is; the titles just advertised an emphasis on the development of civilization in Engish history. But the warning against ignoring the title just because it is the title has to be remembered, and another point taken into account.

There is a sound rule of one subject heading one subject; for example a heading, or class number, intended to cover one subject should not be used to cover another which may be related in some way, in content or name, but is not quite the same. For example, what is meant by writing, authorship and English language composition must be carefully distinguished; entries for literature on cicadas must not be put under locusts or grasshoppers though cicadas are commonly called locusts in Australia; and arms and armour should not be used, as it has been in a catalogue, to cover coats of arms, coats of mail and bullet-proof waistcoats, not to mention armaments and helmets. And this can happen with a class number such as 399 for Customs of War, even with relative indexing, if the meanings of words are not carefully checked. But some words, especially of philosophical meaning, are vague and controversial in meaning, for example culture, and if an author says he is talking about culture it is just as well to enter his book under Culture and let the reader decide whether it is what he wants or not, rather than to say we only use culture for something different.

14·5 Subject and Title Analysis.

Subject analysis has been in recent years a term like documentation, and later, information retrieval; it has not suffered from unemployment, and like the word arms it can mean somewhat different things; as Hood said of the poor soldier, a cannon ball took off his legs and he laid down his arms. Its uses and applications to the determination of subjects and entries are discussed in 4·6. Insofar as a title is a true and sufficient statement of a book's subject then analysis of its subject may begin and end with its title, but there has to be analysis of titles to sort out what is really relevant to the subject for indexing and classifying purposes; in practice title and subject analysis can hardly be taken separately; and title analysis often reduces what appears to be a complex to a simple subject.

Take an actual title: Why the whistle went: notes on the laws of Rugby football for new players, old players and spectators of all descriptions. It is at once a title giving too much and too little. An experienced

student confronted with this in a practical examination would cross out all but laws of Rugby football in thirty seconds. He would then note that he had a specification of a subject by an adjectival phrase, in which the specific game football is further specified by the adjective Rugby. He would realize that it might be considered good enough to give Football as a specific entry heading, but also that he would show better knowledge by being more specific, and by looking inside the book he would find that he could be even more specific than Rugby football, because the rules dealt with are those of Rugby Union football, as distinct from Rugby League football. Then he would decide whether he could invert the phrase, and whether he should, and even within the strictness of Cutter's rule 175 he would conclude that he could invert because the name football is commonly used alone for each of the 'codes' wherever it is played, and even that he should. Then turning to the remaining 'term' he would realize that its laws or rules were a qualification or limitation of the thing Rugby Union football, and not a further specification of it, so that in specific entry he could use—Laws or—Rules as a subheading; this might not be done in actual cataloguing, but the good student would do it in examination to show his full awareness of possibilities.

The student may say that all this could not be thought out and written down in the time allowed for one book in an examination; but the principles and their general application are supposed to have been thought out and learnt to the point of habit beforehand, and the student is no more expected or allowed to think all this out for the first time in an examination than a player is expected or allowed to think out a football movement for the first time when the ball is actually in play. The student, whether in the cataloguing or the examination room should be able to write down Football, Rugby Union—Rules from such a title as quickly as a player makes a movement according to the rules, and in the examination room the student is allowed far more time for such a book than a cataloguer should be allowed.

Classification for the shelf or catalogue takes more time, because there has to be a double translation or determination, in this case from the title into Football, Rugby Union—Rules, and from this into class numbers. But classification is not commonly as specific or satisfactory representation of the subject of the book as alphabetical headings and subheadings.

BNB gives 796·33[1] for this book in its entry (56-17459), in accordance with the practice discussed and illustrated in Appendix G, but 796·33 is the unextended DC number for all kinds of football, and BNB uses the same nominal extension [1] for four kinds of football in one annual volume, and it doesn't provide for the laws; the best that could be done even with the 14th edition of DC is 796·3300037, the 00037 being from its miscellaneous common subdivisions in Supplementary table 2. This would not be used in actual practice and 796·33 would be taken as all that might be reasonably expected in an exami-

nation, though extra marks might be given for the rest. UDC in the Abridged Edition has 796·333 for Rugby but does not distinguish League from Union; (094·7) might be added for Rules though this is not entirely satisfactory.

A title which is a true and economic description of a subject, Protective helmets for motor cyclists, analyses for the dictionary catalogue into the specific subject Motor cycling and the qualification—Safety devices—Crash helmets, which could be given directly as Motor cycling—Crash helmets; there could also be the entry Crash helmets, Motor cycling, or a cross reference Crash helmets see also the subheading Crash helmets under Motor cycling. The best that could be done with DC and UDC would be with the latter, 796·72:629·118·6-788; this represents Sport—Motor cycling in relation to Engineering—Road vehicles—Safety devices, and could be reversed; but it doesn't get down to crash helmets, and may remind a Kaiserite of one of his few sarcastic remarks; of 629·124 in UDC and its fifth step of subdivision he said: "we have just emerged far enough from the fog to mistake an icebreaker for a ferry boat." And even 629·124·76 does not distinguish Pilot from Patrol boats. The student shouldn't waste time trying to take classification any further than it will go, but of course he should have a good idea how far this is before the examination.

The student should note that the analysis of a subject has always to be verbal in the first place, and then translated in one or more steps into the form of indexing being attempted. Even Ranganathan 'transforms' a syntactical description such as Systematic study of the entomological diseases of the teakwood forest of Burma, into a verbal hierarchical form (Forestry)(Teakwood):(Diseases)(Entomological):(Biology):(Systematic study):(Burma), and then into his colon 'language', JAT:4K83:G:12:438. He takes his transforming too far because he takes his translation or codified specification of the whole description of the document too far. But there must be sufficient verbal rearrangement for the indexing in whatever 'code' it is attempted, and given one which is truly descriptive of a book's subject matter and not allegorical or allusive, a title is a good starting point. In the example just given an experienced cataloguer would take out 'diseases of . . . teakwood', turn it round into teakwood diseases and have sufficient for all the indexing of the document which would be done in most libraries by any system. It is important to cut away in the title what is irrelevant and what is not going to be used, but it should not be ignored just because it is in the title.

Take a title, Copper metabolism: a symposium on animal, plant and soil relationships. The preface says Copper was selected as the primary topic in order to allow a . . . coverage of . . . soil science, animal and plant nutrition and bio-chemistry. This is the sort of book that is apt to throw the student into a panic, because of all the subjects named, and he is likely to throw them all in. But it might well be covered by Copper—Metabolism, refer from Nutrition, Mineral; Nutrition, Animal;

Nutrition, Plant; Soils. Another book, Mineral nutrition of plants and animals, would go under Nutrition, Mineral with the same references. The test is of course much simpler for the dictionary cataloguer; the classified cataloguer has to find class numbers, and if there is any complexity or novelty in the subject then he may only find unsatisfactory makeshifts. Copper metabolism in UDC might be 546·56:577·17, or 546·56:576·8·095.

Co-ordinate indexing as a subject illustrates the want of a name as a dictionary cataloguing difficulty, already examined with this illustration in 4·3, but the general term Subject cataloguing could still be used, just as the general class number still has to be. Cybernetics is an example of a name emerging with the subject and leaving the dictionary cataloguer only with the difficulty of references to it; this corresponds to the difficulty of finding a class number, but there is a freedom which there is not in classification. We can refer from Automation; Servomechanisms; Brain; Psychology, Physiological; Reflexes, and half a dozen more of the relations which Cybernetics has or hasn't on its band wagon, without prejudice. On this see also 4·3, 8·2 and 11·3.

Subjects which are things which can literally have a finger put on them, concrete things, on the whole present less difficulty in their specification and qualification, than abstract subjects, and amongst these what may be called subjective subjects are more difficult still. Two books, one called The English inheritance and another The Frame of order, an outline of Elizabethan belief, illustrate the gordian knot sort of subject, in this case cut by some such subheading as—Intellectual life under the name of the country. Congress puts a book called Social control: social organization and disorganization in process, under Sociology; Social psychology; Social problems, with a title entry. And it might be hard to do better; it classifies it by DC at 301.

14·6 Subject Relations and Subject Analysis.

Loose, ambiguous thinking about the 'relations' of 'terms' results in poor subject analysis and poor indexing. History of botany, lubrication of motor cars, religion and science, are all relations of terms or words; but the first is hardly a relation of subjects; the second can be regarded as naming either a process of motor cars, or a species of lubrication, or both; the third cannot be regarded as naming either a process or aspect or form, the science of religion, or the religion of science, or a species of either religion or science; it names the conflict or interaction of two things as itself a subject.

The first as a type presents little difficulty; although the Science Museum, London might use reversible 58:93 for it, as illustrated in 10·4(6) a history of botany is not a part of what is usually understood as history, and there is little point in any heading except Botany—History, or in any corresponding number except DC 580·9, or UDC 58(091). It may however be noted that there is in DC's form, in UDC's and others, confusion between a form of treatment of a subject such

as the historical form, which treats an aspect of the subject, just as the philosophical form does, and a documentary form, such as the periodical and the dictionary form; this has been discussed in 9·2.

With the second as a type there is a tendency, especially under the influence of synthetic classification, of 'Uniterm' co-ordinate indexing, and talk of 'terms' instead of subjects, to ignore logical or functional differences between terms, and in effect to make double entry under Motor Cars:Lubrication and Lubrication:Motor cars, not as much out of efficiency as out of ignorance of logical distinctions and their application to indexing, as discussed in 4·6 and 11·25.

This double entry may appear to satisfy the ideal of bringing all the material on a subject together. But whilst a seeker of information on motor cars is quite likely to be interested in their lubrication, and would welcome a subheading or subdivision Lubrication under Motor cars, and a seeker of information on lubrication is quite likely to be interested in Lubrication, Liquid; Lubrication, Pressure; Lubrication, Solid, and so on, the latter is not likely to want together the literature on Lubrication, Lawn mower, Motor cars, Sewing machines, and so on. A cross reference Lubrication see also the subheading Lubrication under such subjects as Electric razors, Lawn mowers, Motor cars, Sewing machines, will give him literature on any of these applications if he wants it, there will be immense saving of entries, and as pointed out in 11·25, no breach of the principle of multiple entry.

Synthetic classification and co-ordinate indexing brought in pretentious talk about subject analysis, and at the same time encouraged sloppy subject analysis leading to uneconomic, and even inefficient multiple entry. But this has always been present in dictionary cataloguing, especially with cataloguers lacking the aptitudes discussed in 14·1, and because of the failure to develop a proper logic or grammar of specific entry, and a tendency to keep within an established subject headings list or file. Congress illustrates it, as already shown in 14·3. In another example a book on the analysis and lubrication of bearings is put under Bearings and under Lubrication and lubricants; as so much lubrication is of bearings this may be justified, but a mass of entries under Bearings without the subdivision—Lubrication is not justified. A book called Textile waste treatment and recovery; a survey of present knowledge concerning the treatment and disposal of waste water produced in the textile industries, is given four entries under four headings under each of which there would be dozens and even hundreds of entries: Textile industry and fabrics, Textile factories, Factory and trade waste, Water—Pollution. This might well be described as everything but the kitchen sink; yet analysis shows there is one specific subject, with a qualification, and two qualifications of this, which gives us Textile factories—Waste—Treatment, and Textile factories—Waste—Recovery; and perhaps better than these two and sufficient would be Textile factories—Effluent, with references from Water—Pollution and Factory and trade waste.

The third type exemplified by Religion and Science can usually be reduced to the second type, in this case Religion—Relations (of with)—Science, the (of with) being omitted in a dictionary catalogue heading, for which however the conjunctival form Religion and Science is usually preferred. It should be noted that this does not mix the two types as they are mixed in synthetic classification and co-ordinate indexing; the former tends to make a relations sign such as the colon in UDC one for an indiscriminate linking of 'terms', as discussed in 10·5 and the latter tends to co-ordinate terms without regard for differences in meaning and relation. DC gives special numbers for some relations as subjects, for example 215 Religion and science, 322 Church and state, 377 Religion and education, but could only cover Children and television by double entry, under 136·4 and 792·95.

14·7 Cross References and Indexing.

A student examined on subject entry in the dictionary catalogue is usually requested to give the necessary cross references to the subject headings he determines for a book, but what is required and the form in which it is required may differ widely in examinations by different authorities. The student may be asked to give a subject heading for a book on sulphuric acid, and the hierarchy of downward references which a dictionary catalogue could have from Science through Chemistry, Chemicals, and Acids down to Sulphuric acid, though in actual practice all these references would not be made at once. Or the student may be asked only to give the immediate references to a subject which in actual practice would be all that would be made to a subject if the references had not been made already, for example, Dancing see also Ballet, Theatre see also Ballet, Pantomime see also Ballet, but not Amusements see also Dancing, see also Theatre. This is discussed with these examples in 11·22.

A student examined on subject entry in the classified catalogue is usually asked to give the alphabetical index entries necessary for the class numbers he determines; suppose he gave 661·2 for Sulphuric acid he would probably be required to give a hierarchy of index entries: Useful arts 600, Chemic technology 660, Acids 661·2, and if he used UDC, Sulphuric acid 661·25 and Acid, Sulphuric 661·25. This is discussed in 8·5.

The student may also be required to give index entries for the classified catalogue in true relative index form, for example Wool—Growing 636·3, Wool—Manufacture 677·31, and in this his first verbal statement of a subject will help him. He must think wool growing, or sheep farming, before he can classify a book which is on the farming of sheep for wool, that is, he has to think of the relation or class of the specific subject wool before he can classify it, and this class or relation or aspect is the relation of the specific subject which he is expected to show in his indexing. It is also the aspect which can be a subheading in the dictionary catalogue. On this see also 8·6. But note that relative indexing

which would require Meat—Cooking 641·66 and Meat—Preservation 664·9 because the classes or relations are different, would not require Meat Preservation—Freezing 664·94 because freezing is an extension of a class, and extensions or subdivisions of a class are not usually indexed.

On the difference between a relative index to class numbers, and an index to classified entries see 8·43. In some examining what is or has been assumed or accepted is not the true classified catalogue with multiple entry discussed in Chapter 8, but the alphabetically indexed single entry class or shelf list discussed in 5·41.

14·8 Rules for Classification.

Some cataloguers are good on the author and descriptive side of cataloguing as discussed in 14·1, just because this side can be and has been reduced to fairly detailed rules. These rules are complicated, especially for the material coming into a large reference library, including serials and the publications of corporate bodies as well as books by personal authors, but the complications of these rules are simple as compared with those of the subject matter of books. For this we may talk of rules, and there is such a helpful book as Merrill's Code for classifiers, but what we must work by most of the time are not so much rules as guiding principles, which are essentially the same for subject headings in the dictionary catalogue as for classification for the shelf and the classified catalogue. The following rather miscellaneous 'rules' have been given mainly as classifying rules, but where they apply to the determination of class numbers for subjects they apply equally in essence to subject headings. Consideration of classifying is limited to DC. For the compound numbers of UDC see Chapter 10. For dictionary catalogue rules particularly see Appendices H and I.

Classifying by Subject, Then by Form.

Polytopical works, periodicals, newspapers, encyclopaedias of a general character are classified as such, that is, by 'form' at 050, 070, 030, subdivided by country. Bibliographies may also be classified as such, and subdivided by subject.

Works of imagination are classified by form, first as literature, then as the literature of a particular language, then as poetry, then drama, etc.

Otherwise classify by subject first, for example, a history of chemistry first as Chemistry 540, and if the extent of the collection makes it worth while separating history, add '9' to make the form number, thus 540·9. A history of philosophy goes primarily to 109, one of religion to 209, and so on.

Classifying by Purpose.

Two books may have a similar content, but differ in purpose, for example, the Oxford book of English verse and Hepple's Lyrical forms.

Classify the former as a collection of English poetry, 821·08, and the latter as a treatise on the theory and technique of poetry, 808·1.

Aspects and Applications.

Generally classify books on material or concrete things according to aspect first, for example, a book on the economics of the sugar industry to 338, one on the manufacture of sugar to 664. Generally classify books on abstract subjects to the subject first, and then by aspect, if this is provided for under the subject and does not entail too much extension of the notation, for example philosophy of law to 340·1 and the psychology of education to 370·15. Electric engineering goes to 621·3, and not 537, because DC provides a place for it in Useful arts, but not all the applications of the sciences are provided for in this way, so the applications go with the science. Except in a library devoted to science rather than to technology, an 'applied' is preferred to a 'pure' place, if there is one. The study and teaching of a subject goes to the subject, except when its place in a curriculum is being considered, then it goes to the curriculum number under Education 375; for example, The place of science in the curriculum will go to 375·5 and not to 507 where books on the teaching of science will be placed, but not textbooks.

Illustrative Material, 'Interpretations' and Contributory Research.

Books on Shakespeare's law, science, etc., go to 822·33, the number for Shakespeare. Weigh carefully the purpose and use of a book. Classify one on the trial of the Dorchester labourers at 331·88, as a contribution to the history of trade unionism. The trial as such has no special interest. And deal similarly with trials of famous people, e.g. Socrates and Hastings. A book such as De Kruif's Microbe hunters is of more value to a popular library as part of the history of medicine than as a treatise on bacteriology, and is therefore placed in 610·9, History of medicine, rather than at 589·95 Bacteriology, or 616·01 Pathology.

Books on the theory, philosophy, and forms of literature usually take their illustrations mostly from one literature, but unless they are decidedly studies in and of one literature they should be classified as general. Hepple's Lyrical forms has already been given as an example.

Books are frequently described in their title or elsewhere as being on A, as illustrated in, or with special reference to B, or as A in B, or A and B, for example in a book called British Imperialism and Australia: an economic history, and in one called British Empire in Australia: an economic history, great emphasis is laid on British controls of Australian economic development, but their main subject is still economic history of Australia.

By their nature and sometimes by their intention, generalizations, fundamental explanations, supposed underlying causes, can be used to interpret particular phenomena which are then regarded as special instances of the general 'law'. Evolution or Darwinism, relativity,

psychoanalysis or Freudism, economic determinism, dialectical materialism or Marxism have all been applied in special fields. Classify according to the phenomenon interpreted, and not according to the principle of interpretation. Common titles are 'A' in the light of 'B' or A and B, e.g. Art in the light of psychoanalysis, or simply Art and psychoanalysis. In some cases only a preface, introduction, or the book itself will reveal the principle of interpretation. For example, Christopher Caudwell's Crisis in modern physics was a Marxian interpretation of physics from Newton to Einstein, and his Studies in a dying culture was a Marxian interpretation of some literary men. The discovery that an author is explicitly relating the particular thing A to the generalization B may affect the subject cataloguing of the book, but not its classification on the shelf. Be careful of letting either agreement with an author's viewpoint or antagonism to it improperly influence either classifying or indexing.

If possible compare the discussion of the same points in Merrill, W. S. Code for classifiers, 2nd edition, 1939, paras 13 and 16.

Related, Opposed and Contrasted Subjects.

Books debating a choice of alternatives, e.g. Communism or Democracy, are classified according to the one advocated by the author. But a few classic controversies, such as Free Trade and Protection, have specific places in DC.

If subjects are co-ordinated, such as would be the case with a book on electricity and magnetism, and the embracing number is remote, in this case 530, Physics, classify according to the first dealt with, unless the second receives more attention.

If the notation makes subjects immediate branches of an inclusive subject, class under that, for example, a book on horses and cattle at 636, not under 636·1 or ·2.

If one thing is dealt with as a factor explaining or influencing another, classify according to the thing explained or influenced, for example, the influence of climate on national character. If dealt with generally this would go to 910·24, Human geography, if of a particular country to that country's geography number.

Collected Works.

Classify collected works according to major interest, achievement and reputation of the author, e.g. a collected edition of Scott, pre-eminently a novelist, 823·73; Carlyle, pre-eminently an essayist, 824·82.

Do not bring all an author's works together unless they are in a collected edition; for example, separate editions of Scott's poems should not be put with his novels, or Shaw's novels with his plays. When volumes are designed and marked so that they can be sold separately, do not keep together on the shelves unless the majority of the titles are represented by other editions classified separately.

Essays.

Owing to the various meanings of the word, books on 'the essay' or consisting of 'essays' may present some difficulties. '04' is a form number for collection of essays, and as such it can be used as a part or extension of any number, e.g. 104 Philosophical essays, 330·4 Essays on economics. Note that it is used for books consisting of several essays, and not for essays published separately, which are to be treated like any other book on a subject. Confusion is most likely in 800. The numbers provided, all of them including the mnemonic '4', should be used as follows:

804 Collections of essays on literature generally, for example, Hearn, L. Essays on European and oriental literature.

808·4 Books on the essay as a literary form, for example, Paddock, H. L. and Tainton, S. A. On writing essays.

808·84 Collections of essays from several literatures.

820·4 Collections of essays on English literature, for example, Lucas, F. L. Authors living and dead.

824 Collections of occasional essays such as those of Lamb, Hazlitt, Addison, and the works of publicists like Carlyle and Ruskin. This number is also used for books on the English essay, for example, Walker, H. The English essays and essayists.

830·4, 834, 840·4, 844, etc. are used exactly like 820·4 and 824.

Translations.

Classify translations with originals, but put anthologies of verse translated into English from several languages with English anthologies at 821·08.

Biography, Reminiscences, Letters and Criticism.

Lives of writers and artists are to be distinguished from criticisms of their work. Books in which criticism predominates are to be classified with their works.

The classifying of biography is influenced by the type of library in which it is included. Classify biography in academic libraries according to the life work on major interest of the subject, and particularly the lives of statesmen according to their country and period under History; for example, a life of either Pitt to 942·07, of Napoleon to 944·05. Classify biography in public libraries at 920. Classify general 'Reminiscences' at 920. Letters are treated as biography, unless definitely considered to be examples of the letter as a literary form. For example, Chesterfield's Letters to 826.

British Empire.

DC has no place for the history of the British Empire as a whole as distinct from the history of Great Britain. Use 942 for general histories

of the Empire, placing them alongside histories of England, but use 910 for geographies of the Empire.

Events and Influences in History.

Prefer a country's history or description number, 930-999 or 913-919 for an account of something in or affecting its history, for example classify a book on the Mau Mau movement in Kenya in the nineteen-fifties as Kenya history rather than as one on the Mau Mau as a secret society or tribal organization; books on Ireland and India in some periods have had strong emphasis on current constitutional issues, but should not go to the constitutional law number unless quite specialized. Students of a country may overlook books classified according to a special interest whereas those with this special interest as affecting a country are not likely to overlook the country numbers. Do not classify books on past or present colonies as books on colonies unless they deal particularly with the political theory of colonization. All countries have at some time been colonies.

14·9 EXERCISES.

The student who is taking examinations needs exercises to familiarize himself with the knowledge he should have, and the tools he may be using in an examination. He needs the kind of exercise and drill which the player of a game gets, not only in practice games but in preliminary exercises and drill which make him skilled in particular rules, movements and strokes of the game, and in the handling of any implement that is used in it.

The exercises at the end are roughly in the order of the book. They assume examination in the decimal classifications, especially DC, in the classified catalogue, pure and simple, as described in Chapter 8, and in the dictionary catalogue with specific entry as described in Chapters 11 and 12. The answers to the exercises should help the student in his studies of both theory and practice, but to get the best out of them he must attempt them fairly, without looking at the answers too soon. Many of the questions allow of more than one answer, some of the answers may be disputed, and despite all care taken there may be a few errors. Nevertheless they should help the student who will try, and will think.

Many students lack the kind of general knowledge which helps in using classification tables, their indexes, and subject headings lists. Some, and even some of their teachers, are apt to protest about technical or special knowledge required, when examiners assume some fairly common or general knowledge, such as the difference between a motor car and an aeroplane. A dictionary is normally available and use allowed of it, in examinations, but obviously the student who makes least use of one has most time to think and work.

It is not an unprofitable exercise, even apart from examinations, and one which can be entertaining, to go through a classification or an

abridgment, for example, the 15th edition of DC or the Abridged English Edition of UDC with a good dictionary or encyclopaedia alongside, looking up the meaning of subject names not already known.

It is also useful to attempt subject determination, with classifications and subject headings, for current books, either the actual books or notices of them or catalogue entries, and then to check results against some subject cataloguing of them; unfortunately many students are handicapped in this respect by not having access to good models, but they can still work this way even with bad ones, if they are critical of what they take as a model. And in attempting this kind of exercise the student should not only think of books and catalogues of books. Useful work can be done with periodical articles and periodical indexes.

The study of past examination papers is useful, if it is for something more than mere tipping of future questions. Many students need exercise in working out exactly what a theory question is about, before attempting an answer. The title and subject analysis of books discussed in this chapter can and should be applied to examination questions.

Two bad and related faults are assumption that a question is the 'so and so' question, for example, the form numbers question, and failure to recognize a question as a special one, often linking up or cutting across two more general questions. Assuming that a question is the form numbers or the specific entry question many candidates immediately pour out all they know, most of it irrelevant to the special question asked. Irrelevancy may not lose marks, but it wastes time, and it is a futile attempt at deception to write "no more time" at the end of an answer to another question on which a candidate has written the little he knows. Some candidates do not grasp the point of a question, others do so but cannot answer it and attempt to twist it to something they know. This sort of evasion, and other attempts at blinding the examiner with science, come commonly from some university graduates, who do not realize that what is wanted is precise, professional knowledge and not a literary essay, such as Lamb's on roast pork, which in any case they do badly.

Writing too much in answer to a question is a very much more common fault than writing too little; there are few questions set in examinations for which a carefully written, well informed answer of two or three hundred words would not be at least a pass. But at the level of such examinations as the Registration in Great Britain and Australia there must be some maturity; candidates who come into librarianship on a school leaving examination are not expected to write with the knowledge, cogency and fluency of a doctoral thesis, or even to write something which could be published; they are expected to get beyond the school examination stage, and many of them would benefit in their librarianship studies and examinations by others at a university level, as internal or external students of a university, even if they are not persuaded that university studies and degrees are something desirable, and more and more likely to be expected of them.

Appendix A

Logic and Philosophy in Classification and Indexing

This appendix supplements 1·7, 7·5 and other sections.

Subject cataloguing or bibliography, or documentation, or information retrieval, whatever its fashionable name for the moment, must be logical, whether it is alphabetical or classified, and no less so than any other art or science. But this does not mean that it must become involved in the art or science of logic, with the difficulties and subtleties of logic as a philosophical discipline, even for those with aptitude for logic and long training in it.

It may be said that the classifying of literature is applied logic, so that theory of logic should be studied. But this is hardly more true of literature classifying and indexing than of other classificatory or taxonomic sciences, such as zoology and botany, and of the general scientific method based on classification, which leads to discoveries such as evolution in biology and the periodic table in chemistry. Classification is inherent and inescapable in almost every pursuit, and logic only provides its final and most subtle rationalizations.

Many of the arts and sciences have borrowed terms from logic, or taken them from the common and loose use into which they had already come. Classification itself, individual, dilemma, predicament, specification, logic itself, are all terms taken from logic into common and loose use. Biology is an example of a science which has given such terms as class, genus and species, meanings which are related to those they have in logic, but not quite the same. But despite these borrowings and the use of classification the sciences have been developed with their own theories, and without much reference to the basic theories of logic itself.

As noticed in 1·7 Dewey and Cutter established what is still the basic theory and practice of literature classifying and indexing without any special aid from logic. Dewey scarcely used a term from logic. Cutter took the term specific for his specific entry, but as having "nothing to do with species", probably meaning biological species, and had in his Definitions a long note on Class, with a footnote: "this note has little direct bearing on practice, but by its insertion here someone interested in the theory of cataloging may be saved the trouble of going over the same ground."

In 1859, the year in which Darwin's Origin of species was published, Edwards noted in his Memoirs of libraries, vol. 2, p. 783, that the many classifications, even up to that time, could be classed as in accordance with some theory of order in the universe or as with "far humbler

pretensions" seeking "but to assort after some convenient and manageable fashion the instruments of knowledge for ordinary employment, and daily use". Sayers in his Manual, 3rd edition, p. 90, refers to this distinction of the metaphysical and the practical without making clear, what should be from Edwards' urbane irony, that he did not favour the metaphysical. And he was one of the greatest of British librarians.

Edwards went on particularly to dismiss as graceful but unsound a pre-Darwinian evolutionary theory applied by a Frenchman Merlin to bibliographical classification (pp. 801-2). But as noted, Darwin's Origin of species was published in the same year as Edwards' Memoirs, and finally established a theory of biological evolution. This in turn established the word evolution as a loose synonym for the development or growth of anything, and as the name of a popular, pseudoscientific philosophy which has had a continuing, muddling influence.

Richardson in America based a crude philosophical theory of a classification of knowledge on the popular philosophy of evolution in his Classification, theoretical and practical, 1901. This was taken up by Sayers, in his canons of classification, in the Library Association Record, August 1907, and his later textbooks, and it is still described by the Library Association in its reading lists for students as the foundation of modern classification, whereas it has never been more than a very crude piece of metaphysical theorizing taken as authoritative by Sayers, and with much less acknowledgment and some trimmings, by Bliss.

Richardson and Bliss in America had little influence there on teaching; Sayers and Burgess in Great Britain, mainly through Sayers' textbooks and those of his pupils, have had great influence. All of them have assumed some sort of "order of the sciences" in nature, on which a classification of knowledge and in turn one of books could and must be based. As shown in 7·5 with reference to LC Sayers judged all classifications by their conformity to this supposed scientific order, and such was the influence of the idea for a time that even Congress itself accepted the unproven assumption of such an order of knowledge, whilst saying, with an echo of Edwards, that it had "sought rather convenient sequence".

This school of thought supposed they had reconciled their theory with classification as defined in logic. Odd bits and pieces of classical or Aristotelian logic were brought in, at first apparently to pad out pretentious lectures and textbooks for the newly established Association examinations in librarianship. Brown who is discussed in Appendix B seems to have been the first to do this, and he was followed by his pupil and successor as lecturer and textbook writer, Sayers, who undertook the reconciliation of Richardson and of Jevons' Elementary lessons in logic by ingenious but mistaken or conflicting use of the Five Predicables, Porphyry's Tree, and the idea of extension and intension of terms, as shown in the writer's Information indexing, referred to in 1·7.

Bliss brought some support to Sayers when the latter's influence was

declining; he thought he had arrived at the final order of the sciences through his consensus theory, and gave it in his Bibliographical Classification discussed in Appendix C. This was a seven days wonder, but the influence of popular and pseudoscientific evolutionary theory on that of bibliographical classification has continued to decline, and in the centenary year of Darwin's Origin of species, 1959, it is likely to be at its lowest for more than a century, not because the hunt for the philosopher's stone, for perpetual motion and a squaring of the circle, has ceased, but because this has taken new twists and turns on top of the old.

Its place has been taken by the theories of Ranganathan and facet classification, discussed in Appendices D-E. It is a characteristic of pseudoscience in general and bibliosophy in particular that they are usually derived by loose analogy from true science in which there is great popular interest at the time. After geology, biology and evolution there was chemistry with its elements, and then nuclear physics with its nuclei, and even the Meccano set with its interchangeable bits and pieces for model building. Out of all these, without one reference to any living or dead philosopher or scientist Ranganathan got his "fundamental constituent terms" and his "derived composite terms", and later his fundamental facets and his foci. Knowledge is said to be made up like chemical compounds out of elements or like physical atoms or molecules out of nuclei, which by analytico-synthetic classification can be put together to represent any subject, new or old, for ever and ever. Unfortunately this tremendous philosophical discovery has no more support than an evolutionary order of the sciences.

Ranganathan was a mathematician put in charge of a library. He uses some mathematical terms, but does not make much, if any, use of mathematical logic. Bradford, in charge of the Science Museum Library, London, seems to have been best at mathematics, and he brought into his Documentation the symbolical or mathematical logic which has largely superseded classical logic amongst logicians, but not discredited it, somewhat as Einstein's physics superseded Newton's without discrediting it. But Bradford seems to have known little or nothing of this logic later than Boole's Laws of thought of 1854, the only authority he quoted, and he made little use of it except to weave a theory that UDC numbers are read as decimal fractions of unity because the figure one is used for the "universe of discourse" in the class calculus of mathematical logic.

In America in recent years contemporary theories and formulae of the class calculus or algebra of classes of symbolic or mathematical logic have been used to justify co-ordinate indexing and an ignoring of functional relations between terms. It may be sufficient for this logic that if the terms coal and mining are intersected or co-ordinated they form a new class or term, coal mining, but it is not sufficient for literature indexing and classifying in which we may have to decide whether we are treating and arranging the composite term as meaning a species or subclass of mining, or a process or property of coal. And in this,

if we want a rationalization in the terms of logic, classical or Aristotelian logic is more useful, or at least simpler to apply for most people.

Another contemporary source of metaphysical theorizing is semantics, and the idea of classification notation regarded as a code or a basic and scientific language. Here the beginning seems to have been in Otlet's idea, discussed in Chapter 10, of classification numbers as a universal code for the codified description or specification of documents; this has been given up in UDC, as shown in 10·5, but it is persistent elsewhere, and some of the ideas of the semantics which has been popular and very close to pseudoscience in recent years seem to have been brought in to support it, although there is little explicit talk of semantics.

Another source of confusion is psychology, and amateur attempts at the psychology of classification, which do not necessarily upset its logic. And in all this, much of it in papers in the British Journal of documentation and in American documentation, confusion is confounded because the muddled thinking of one generation about current pseudoscience and classification is not cleared up; it is simply still more muddled by still more pseudoscience.

All that can be said to the student is, leave it alone, at least until you can catalogue and classify according to orthodox and established methods used in the catalogues, indexes and abstracts which are described in Chapters 5-6, and are not the product of metaphysical theorizing or bibliosophy, which has yet to show practical results that can be seriously considered in quantity or quality.

Appendix B

Duff Brown and His Subject Classification

This appendix supplements the references to Brown and his Subject classification in 1·5, 2·6, and 8·43.

James Duff Brown was born in 1862 and died in 1914. As mentioned in Appendix A Sayers was his disciple and successor as a textbook writer. Brown published his Adjustable classification in his Manual of library classification in 1898, and his better known Subject classification separately in 1906. This came into sufficient use and reputation to have a third edition in 1939, by a disciple and relation, Stewart.

His theory and its derivation have to be guessed at, but between 1898 and 1906 he seems to have been influenced by the "order of the sciences" of Richardson's Classification, theoretical and practical, 1901, and as the master he probably drew the attention of his pupil Sayers to it; he may also have been influenced by his own misunderstandings of Dewey's relative index, referred to in 8·43, and by Otlet's proposals for a synthetic classification, although UDC was not published until 1905. He was most original in his idea of a single place for things, in all their aspects, and in his single table of forms, etc. This seems to be his solution of the difficulty of giving all the possible relations of a subject in a classification and its index.

It is impossible to have all the relations of a thing such as the rose, its botanical name, its gardening, its perfume, its emblematic relation, in a classification, in different places, so let it be in one place, and probably under the influence of the order of sciences idea and not realizing ambiguities in the word science, Brown decided that the one place should be in the 'science' of botany. He criticized classification which he called traditional, customary, conventional, without seeming to realize that classification serves by following a traditional, customary, conventional consensus, and not one which the classification maker thinks would be more scientific, or likely to be adopted in the future. Bliss who was to popularize the word consensus was only eight years younger than Brown but he did not publish till well after 1914 and then admitted some anticipation of the order of the sciences by Brown who also anticipated him by putting useful arts as much as possible with related sciences. Brown was not followed by Bliss in the single place idea, and he was certainly not following DC or UDC in his single table of 980 forms, etc., which he called a categorical table. He says he used categorical in the absence of a more expressive portmanteau word; apparently his dabbling in logic had not led him to the idea of categories as fundamental classes, which are a contradiction of his single unclassified list.

He used single letters and numbers for his subjects, and numbers introduced by a point for his categorical table, so that, for example, D7·7 is a Chemistry periodical. The table appears to be in the order of the main classification; it could have been in alphabetical order, with Cutter type numbers, and there seems no reason why at least its separate index could not have been combined with his classification index. This is relative in Dewey's original sense, of referring to class numbers in their relative order; it is not relative in the sense which Brown and others assumed to be Dewey's sense, because of his single place theory and practice. But whilst strongly favouring this he does allow the "specialist or standpoint classifier" to change his fixed standpoint or class of a subject, in two ways.

Many subjects, such as music, appear in his categorical table, and H900·260 will put Music in his Recreative arts class, instead of in sound in physics; or two main class numbers can be combined, for example 1223 for general gardening, and E600 for the rose in Botany, to make a number for Gardening, Rose. This suggests UDC influence though he acknowledges none; the first edition of UDC did not appear until 1905 but as shown in Chapter 10 Otlet had broached its basic number compounding or synthetic theory and practice as early as 1895.

Some libraries have used SC and still use it, though with what purity is not known; Sayers in his Manual speaks of municipal libraries in Great Britain with average stocks of 100,000 volumes using it; he does not say how far these stocks include lending and branch duplicate stock; he does say it has not "been applied in a great library". It has been found in crude use in an Australian school of arts library, which no longer knew the origin of its system. It was for a long time the supposed British answer to the American Dewey, and said to be more scholarly and scientific, but more and more British libraries preferred DC. The fact that it 'works', if it does, shows what a wide margin there can be in classifying, and how little it may really matter in some libraries, especially in small to medium sized public libraries, provided there are some broad categories. SC doesn't seem to have been suggested by Brown or anyone else for bibliographical use apart from library catalogues which have probably been of the single entry alphabetically indexed type discussed in 5·41, and this single-entry or shelf-list type of catalogue may also have had something to do with his attempt at a single place classification, although a book could of course have more than one subject, each with its single place.

Appendix C

Bliss and His Bibliographic Classification

Sayers quotes Bliss as saying that Brown's SC "crudely resembles in part the order of the sciences". This is the link between Bliss and Brown and Sayers, all with common ancestry in Richardson, who is still asserted by the Library Association in its Classification syllabus to be the founder of modern classification, though obviously the Dewey system is the foundation of all bibliographical classification after 1876.

Bliss was born in 1870, only eight years after Brown, though he published about twenty years later, and died about forty-three years later than Brown. Richardson was born in 1860, and published his lectures on Classification, theoretical and practical in 1901; of this book Bliss said about thirty years later that: "The order of the sciences that it indicates or advocates entitle it indeed to its place among the very few that have nearly solved that part of the problem." By this time Bliss was convinced that he had solved every part of the problem of bibliographical classification, at least in essence.

He says his classification is approximately this final, natural, divine order, "the systems of the sciences and education established in the consensus of scientists and educators and embodied, tho imperfectly, in their institutions, curricula and programs" (BC, 2nd ed., vol. 1, p. 21). But the consensus is not the result of a public opinion poll taken in all places and at all times, which would be impossible, or even of one taken in one place and at one time; it is what Bliss alone decided, remedying imperfections, and so solving that part of the problem.

He allows alternatives in his solution, to the extent that alternative placings are a feature of his BC, for example Naval science can be UN in Useful arts, or RN in Political science, and Religion can be put between Education and History, or between History and Applied social science, or right at the end after Literature, or between Metaphysics and General science. On religion he seems to have been a nineteenth-century freethinker and rationalist, who didn't know quite what to do with it. About Logic he had no doubt, so it has one place, separated from Philosophy by General science, and next to Mathematics; he had no doubt about physical education and outdoor sports such as football, which are in what he calls Anthropology between Physiology and Pathology.

BC is thought superior to DC by its advocates, apparently because its author, though firmly rooted in his thought in the nineteenth century first published it in the twentieth, when he was sixty-five. There is loose talk about the ageing of classifications, as shown in 2·3; BC is a muddle of classification at least as antiquated as DC's and UDC's

and attempts to tell scientists, educators and men at work how they should group subjects for study and research in the future. The result can be examined in his attempt to put some industries with science in B and C, Physics and Chemistry, and others in a spillover U, Useful arts, next to V, Fine arts. So the rubber industry is in C Chemistry, at either CQD or CVR-S; the leather industry is in UC Animal industries, UCU, with five cross references; alternatively Rubber industry can be put in UA Agriculture, at UART, as a leaf and stem product; but it then has a longer notation than in chemistry and a longer one than DC's and UDC's 678, despite the longer base. Bliss thought his literal notation superior to DC's and UDC's numerical decimal notation, but it may be doubted that he would have convinced himself as he did if DC and UDC had not established a monopoly of the decimal notation, and if he had not been influenced by Cutter's EC, with which he seems to have had some association as a young man.

Generally Bliss was conscious of what he called the "economic limits of notation", and very critical of synthetic classification and of documentation, which he seemed to think of as analysis of documents for particular subject interests as opposed to bibliography as the cataloguing and classifying of whole books; he made the usual superficial criticisms of alphabetical subject cataloguing in place of classified, but like Brown he never seems to have thought seriously or deeply on the use of classification for anything more than shelf arrangement and fairly general classified cataloguing. Documentation, he said, was not a term suffering from unemployment, and indeed it hasn't been, any more than its companion term subject analysis, in a variety of senses. He criticized UDC and synthetic classification without quite satisfying himself or the critical reader what is wrong with them, in aim or methods or both; but nothing succeeds like success, and when UDC was being most sweeping in its success, when after a lifetime of already outmoded effort he was bringing his classification out in its second, latest, and perhaps last edition, 1952-3, he allowed what he preferred to call composite specification, by means of auxiliary tables, and by interclass synthesis corresponding to that done in UDC with its colon device.

He talks of constant, variable, adaptable, alternative, intensive, extensive mnemonics, generally and with reference to his Systematic schedules, which correspond to UDC's auxiliary tables. Only four of these have general applicability, and then with variation, which certainly varies and weakens them as mnemonics or constants. In all he lists forty-six Systematic and Auxiliary schedules. Many of these give different aspect and process subdivisions for similar things such as beverages.

His Subject index is poor, with unnecessary subdivisions and unnecessary parenthetical qualifications, for example Whist (card games), but just Whistles. Under Races he has 37 subdivisions for biological senses and subdivisions, but no reference to Horse, Dog or Foot races. The Explanatory notes show no appreciation of the purpose or method

of relative indexing in any sense, but the opportunity is taken to attack alphabetical arrangement once more, with academic facetiousness and talk about alleged difficulties of distinguishing sailing vessels and sailing of vessels, as if Vessels, Sailing, and Vessels—Sailing, or Vessels, Sailing of, did not distinguish them quite well.

He died in 1955 apparently with success achieved. In America only his own library seems to have adopted his system, but in Australia and New Zealand it was being adopted by a few university, college and school libraries, at least for the shelf, and by up to fifty libraries, mainly university, college, school and special, in Great Britain and some of its colonies. A Group had been formed in Great Britain to keep it current and its publishers, the H. W. Wilson Company, were publishing a bulletin prepared by this Group, but by 1957 it was disillusioned and barely carrying on with delayed and irregular publication of the bulletin. Only typewriting and lithographic reproduction made publication of BC possible in the first place, and even with this method it is doubtful that demand would meet the costs of a new edition. In a second introduction, to the third volume of BC, he began struggling when he was over eighty with suggestions which he should have seen and dealt with thirty years earlier, and fighting a rearguard action against the overwhelming Ranganathanites, whom he had earlier welcomed as minor allies. He took up Brown's misuse of the term categorical, along with the "fanciful terms of the Colon Classification"; he made as much as most of 'phases' and 'facets', but said 'focus' was "out of focus for this classifier's old eyes" (p. 23). But he had, like the founders and supporters of UDC, done much to create his own nemesis.

Appendix D

Ranganathan's Colon Classification and Facet Analysis

CC has been adopted by few if any libraries outside India, where librarians and library associations have been divided by controversies centring round Ranganathan, his classification and his theories; a majority of Indian librarians either reject his theory and practice, or are neutral, even with strong nationalist reasons for backing him. If some British librarians had not served in India in the 1939-45 war he might not have made any mark in Great Britain, or had influence on current theory and practice if his leading disciples had not become strongly entrenched on the education staff of the Library Association in London, and on the editorial staff of BNB at the British Museum Library, which, however, whilst housing BNB seems to have given no more support to CC and faceted classification than to any other. None of his British followers seem even to have suggested that CC itself should or could be put into use in any British library or bibliography; they do advocate his theories of facet classification as the ultimate theoretical basis for all classification, for all purposes, and as a basis for all information retrieval methods, including direct alphabetical indexing, through the chain indexing of class numbers discussed in Appendices E-G.

In a textbook for practical librarians, indexers and students, it is difficult to know how far to go with CC, much more so than with the other classifications and their theories. Study of it in its latest, 5th edition, 1957, and reference back to earlier editions, and writings of the master and his disciples, only bring renewed doubts as to what he and they meant and now mean by such terms as isolate, focus, facet analysis, personality. These have been taken progressively from writers of the past seventy-five years; all their inventions have gone into successive editions of CC which requires almost volumes to deal with it critically and comparatively, and to trace back to their unacknowledged sources not only technical terms, or jargon, but ideas themselves.

Here something is said summarily about, 1. the man; 2. his classification judged by established and practical criteria; 3. his theory and practice of 'analytico-synthetic' as opposed by him to 'enumerative' classification; 4. his interclass synthesis; 5. his document specification; 6. his mnemonics; 7. his theory of 'fundamental constituent terms' and 'derived composite terms'; 8. his facets and fundamental facets; 9. faceted classification as it has turned out; 10. facet analysis as it has turned out. His chain procedure is dealt with separately in Appendix E.

1. On the authority of Sayers, who has most claim to being his teacher, but is not quite sure how much to claim of his pupil, he is Shiyali

Ramarita Ranganathan (Sayers' Manual, 3rd ed.). He was born in 1892. From 1917 to 1923 he was a lecturer and an assistant professor of mathematics; "without prior experience he was then appointed Librarian of Madras University Library and sent to England to study". From the British Museum Library he went to the University of London school of librarianship, when Sayers was lecturing there on classification; he found this and library administration were "the only subjects taught on his level".

Within twelve years he had published in India his Five laws of library science, in 1931, and the first edition of his Classification in 1933; then he absorbed Bliss, and in 1937 published in India his Prolegomena to library classification, and in 1939 the second edition of CC, and to date besides this he has had published in India sixteen substantial books on librarianship, and had articles in European journals such as the Journal of Documentation and periodical publications of FID and Unesco. Most librarians have not understood him or not been able to explain him, or whilst praising him have not explained him. An American authority whose output almost equals Ranganathan's has regretted that unthinking librarians have dismissed Ranganathan as unintelligible, but he has not explained him himself; another American authority has said he has gone further than anyone else in introducing order and logic into librarianship, but he doesn't say how, and doesn't seem to have noticed that Ranganathan has contradicted all he himself has to say about the dictionary catalogue. Otherwise there has been little effect by Ranganathan in America, and what there has been in some other English-speaking countries has been secondhand through the writings of his British disciples, especially The Fundamentals of library classification by B. I. Palmer, F.L.A. Education officer, the Library Association and A. J. Wells, F.L.A. Editor, British National Bibliography, London, 1951. This book is "largely founded" on Dr Ranganathan's "researches", and has as its Bibliography, three books by Bliss, including his BC, two by Sayers, and three books and an article by Ranganathan. The chapter on CC in Sayers' Introduction to library classification is also by Palmer.

2. The classification used to have about twenty-six main classes with capitals of the Roman or Western alphabet as notation, and was supposed to have a notation more thoroughly and perfectly hospitable than any other; but things had been left out or put in the wrong places, and altogether nine classes with Greek capital and small letters have been interpolated, but the combined order is neither Greek nor Roman, and of course the Greek letters are not on Western typewriters, and not known to those, now numerous librarians, who have little Latin, and less Greek; and unexpectedly the one thing of all the bibliosophical box of tricks that seems wanting is any philosophic order of the sciences. There is all and more than the usual apparatus of form numbers, place numbers, time numbers, and so on, down to Criticism number and Accession part of criticism number.

3. Ranganathan says (p. 1·12 of vol. 1, CC, 5th ed.): "The Colon Classification differs from the Decimal Classification and the Congress Classification in some fundamental respects. It is their manifest aim to provide ready-made Class Numbers for most topics. Hence, such manuals consist, for the most part, of the Schedules of Classification. And their Schedules are by several times larger than that of the Colon Classification. Each such scheme is called an Enumerative Classification. Colon Classification is not an enumerative scheme." DC is not entirely enumerative as shown in Chapter 9 and UDC is certainly not as shown in Chapter 10.

"In the Colon Classification," he says, "ready-made Class Numbers are not assigned to topics. The schedule in the Colon Classification may be said to consist of certain standard unit-schedules. The standard unit-schedules correspond to the standard pieces in a meccano apparatus. Even a child knows that by combining these standard pieces in different ways many different objects can be constructed. So also, by combining the numbers in the different unit-schedules in assigned permutations and combinations, the Class Numbers for all possible subjects can be constructed. In this scheme the function of the Colon (:) and other connecting symbols is like that of bolts and nuts in a meccano set. It is therefore an Analytico-Synthetic Scheme." In passing we might say that even a child knows that a model-building apparatus such as Meccano only makes imitations of real things, and then only by pretending that what is a pulley one day is the steering wheel of a motor car the next. But like most of those who think with great fertility from analogies Ranganathan only takes from an analogy what suits him.

The "assigned permutations and combinations" are given in formulae, for example in J Agriculture, J(P):(E)(2E) at the head of the unit-schedules; but to understand this the general explanations have to be carefully studied, and then a special chapter on class J; and the first thing which may puzzle the student is that only J is part of the notation. Suppose we have a book on the drying of tobacco leaf as part of the harvesting process of tobacco growing; UDC gives us 633·71 in the ordinary 'enumerative' way for tobacco growing, but at the head of 633 there is "-Landwork for specific crops. As 631"; in 631 we find ·56 Treatment after harvesting . . . as 631·36, and at 631·36 we find 2 includes drying. We may think this complicated enough, but anyone with basic training in the use of DC could learn fairly easily from the explanations of UDC in the 2nd Abridged Edition to arrive at a number for the drying of tobacco in the harvesting process which would be 633·71-1562; and two points to note are, first comparative ease of arriving at this number with certainty, and second the method of doing it which has at least some resemblances to Ranganathan's method of arriving at his number.

First we decide that tobacco is used as a drug, and out of the "Utility Array of (P)" we get J6, then we know or find out that the part of the plant used is the leaf, and from the "Part Array of (P)" we get 5

for Leaf, and so J65; then we decide that Tobacco is the most common or 'first preference' drug, and we arrive at J651; then under "Foci in (E)" in the schedules, we find 7 Harvesting, and the general class formula tells us we are to join this with the colon, to show that it is not just an extension of J651. Incidentally Harvesting generally would be J:7, and this would come first because in the order of symbols the colon comes before any figure. Then we find "For Harvesting . . . Foci in (2E)" including 6 Curing, which seems the nearest to drying, and is a term used with tobacco; so we get J651:7:6. Any classifier is supposed by the "assigned permutations and combinations" to arrive at the same numbers, but he has to begin by making judgments; he thinks of tobacco as a drug compared with beer, a stimulant; but another classifier, who happens to be Ranganathan himself, thinks of tobacco as a stimulant, which he ranks sixth, with tea first, and so gets the number J456 for Tobacco, and J651 for Curry; it seems strange that Opium should be only a stimulant and Curry a drug, but then from other examples it appears that Drug covers what most people would call spices.

The method does not seem essentially different from that of UDC's 'analytical subdivisions', and it may be significant that he calls it "analytico-synthetic"; he takes it further back, as it were, in the hierarchical subdivision of classes, but with what advantage? There is certainly no saving in the time of classifiers, there is certainly uncertainty in classifying, and the statement that the "Class numbers for all possible subjects can be constructed" is not true. Comparison of successive editions show that in Agriculture, for example, he had not thought of Dry farming, and Soilless farming; the formula and the elements given do not allow for the construction of numbers for them, and in later editions he simply worked in for them what he calls "canonical numbers" which are numbers for canonical or basic subjects, which are not elements and not made up; for example M148 is a canonical number for Typewriting because its parts do not represent any combination of type and writing or anything else; but MP for Shorthand is not a canonical number; it is made up of M for Useful arts and P for Linguistics. This class had no provision for sign languages and codes, and doesn't seem to have even in the 5th edition, but in this edition whilst Typewriting M148 and Shorthand MP have been left in M Useful arts, P(1) Calligraphy, P(3) Shorthand and P(6) Typewriting have appeared at the end of P Linguistics. With other complications and anomalies increasing from edition to edition it is understandable that the disciples say less and less about the classification itself as time goes on, and when they do confine themselves to their old examples from his Medicine class.

4. MP for Shorthand is an example of his interclass synthesis which is used most freely in his Useful arts class; he calls this interclass synthesis his Subject device (SD). If the whole number is (SD) it is written as in the example MP, in which as it were both main class elements contribute equally; if the (SD) is dependent it goes in round

brackets. In D69(MC421) for Refrigeration MC421 is already made up of M Useful arts and C421, which is an extension of Heat in Physics. Cooking is canonical. He used to give ME593 for Brewing, taking E593 from Chemistry where it is intoxicants, but why not M31J664, which is canonical cooking added to analytico-synthetic hops from Agriculture? Why MB1 for Calculating machines when it is, literally, Useful arts, or applied or technical arithmetic; but for this he would probably use his Bias Phase device which would give BObM, or BObD, which is Mathematics for engineers.

In these devices for interclass synthesis he comes closest to the relations device of UDC for which it uses the colon; he uses 0 for what it uses the colon for, and the colon more or less for what it uses ·0 and the hyphen for. Having L163 for Arms in Medicine and L36 for Veins he uses L163-36 for Veins, and so on. Diseases of veins of the arms would be L163-36:4. In UDC this would probably be 616·14:611·97. And as in UDC interclass synthesis, especially when it is used to make numbers for 'new' subjects, simply destroys classification in any proper sense of the word, except that one which says that whatever I say is a class is a class; this may be sound logically, but for bibliographical classification the class must have some common use. Of what use is a classification, so-called, which can result in MB1 Calculating machines, MB9 Horology, MC3 Gramophone, MC5 Opticians' trade, MD12 Clay industry, . . . MD5133 Motor-driving, MD521 Boat-rowing, MD525 Navigation, MD53 Aviation? Ranganathan's own insensitivity to classification is shown by such a 'canonical' sequence as M8 Dressmaking, M92 Masonry, M95 Photography, M97 Leather industry, M98 Packaging. And of course this kind of interclass synthesis has no "assigned permutations and combinations"; as shown by alternatives for Brewing above it is at the classifier's will or whim.

5. Ranganathan embraced document specification as a function of a classification notation about the time UDC and Bradford had renounced it, and in 1949 he was giving such examples as L43:421:2: Gz8MC290X9D3, for bacteriological study of the tuberculosis of lungs as influenced by the electron microscope, for mine owners; and then saying, "we have yet to isolate other forms of relation and design the right ordinal values so that the desired arrangement is secured". This was in a paper on Self perpetuating scheme of classification in the Journal of Documentation for March 1949. It is not quite clear whether he is talking about arrangement within a compound number, UDC's 'horizontal' arrangement, or the arrangement of a sequence of numbers, UDC's 'vertical' arrangement; there is no clear picture or set of rules for either in the 5th Edition, and in the index to over one hundred pages of Rules the words arrangement and order do not appear. The British and Ranganathanite Classification Research Group talks of single entry of a compound subject "under the compound class number which uniquely represents it", and then of "the usual cross references" in an alphabetical index; the significant word is 'uniquely'; no matter

how rare, how complex the compound subject of a particular document it is to have its number uniquely representing it, and this still seems to be Ranganathan's and the Group's idea.

6. With his mnemonics in Dewey's original sense Ranganathan is fairly orthodox; in what he calls his mnemonic device he is not. This, he says, "consists in choosing the digit for further division of a class . . . in accordance with . . . different possible significances of the digits available for use . . . the digit 1 is used as a mnemonic for unity, God, world, the first in evolution or time, one dimension or line, solid state, and all other entities, existential or conceptual, which may be viewed as correlates of the above . . . the digit 5 . . . for energy, light radiation, organic, liquid, water, ocean . . . emotion, foliage, aesthetics, woman, sex, crime . . .", and so on through all the figures 1 to 8. "This," he says "is a powerful device . . . it can be handled only by classifiers who are highly attuned to the insight . . . which enables one to perceive directly . . . the very depths of entities. . . . It has not been possible to find similar mnemonic significance in the case of letters of the alphabet. There is an Indian tradition about it. But I have not yet succeeded in getting access to it." Is it an Indian tradition about the letters of the Western alphabet? The talk of entities, existential or conceptual . . . viewed as correlates, echoes Bliss's, though Bliss does not apply it to mnemonics; existential seems a later pick-up apparently not quite understood in its philosophic sense.

7. His idea of 'fundamental constituent' and 'derived composite terms' is a piece of philosophizing of his analytico-synthetic method contrary to his own Law of Parsimony, the law sometimes so-called in mathematics, that no more should be proved than is necessary. In his general use of it he would have been better understood today had he called it a law of economy. In classification we can give an order of what he himself first called characteristics of division, and say that plants in agriculture are first to be divided according to use, then according to part of plant used, and so on. But such characteristics of division are not basic elements of knowledge comparable to the elements of chemistry, or to the parts of a child's model building outfit; yet this appears to be the implication of his Prolegomena. We are not to expect a number ready made for nephritis; we are to look this up in a dictionary which tells us it is a disease of the kidneys; disease and kidneys are then fundamental constituent terms of the universe of knowledge; but they are not, they are only terms of his schedules in which L51 is Kidney and L51:4 Kidney—Diseases. He does not talk about them in the 5th as he did in earlier editions, but still says of his index that it is one "to the fundamental terms in the Schedules of the Classification . . . not the derived composite terms", but in it he does include, for example D69(MC421), which is a composite of two composites.

8. The idea of fundamental and derived terms in knowledge derives from the analogy of the elements and compounds of chemistry, which was at least implied in the ideas of Pollard and Bradford and their

decimal reference index discussed in 6·61; by the forties nuclear physics and relativity had become a source of popular philosophy much indulged in by some mathematicians, and in a physical rather than a chemical analogy he found his fundamental facets or categories, which are Personality, Matter, Energy, Space, Time. These may be illustrated by Dolls (P)—Celluloid (M)—Manufacture (E)—Japan (S)—20th century (T). Personality is a specific subject, Matter seems sometimes to be a further specification, sometimes a qualification, such as raw materials, Energy is usually a Process, Space is Place, and Time is Period. But in practice this theoretical categorization or classification of possible subdivisions doesn't work except with much straining and assumptions of facets inherent but not present. Much was made of them by Palmer and Wells in their book, with talk of facets omitted "because all objective phenomena takes place in the space-time continuum" (p. 49). That was in 1951; but the Classification Research Group of which they are members said in 1955, probably after an internal struggle, that it did not assume "that there is necessarily only a small number of basic categories, which figure in every field of knowledge". Vickery in Systematic subject indexing in the Journal of Documentation for March 1953, had got round to six categories of substantives, including Personality, and he became one of the Group. So the statement made probably represents both disagreement and some face saving. After all there is a limit to the metaphysics fourteen people can agree on, and one at least was a Blissite, and one, Farradane, had his own system, of 'isolates', 'analets', and 'operators' (Journal of Documentation, June 1950 and June 1952).

Attempts at development by the Ranganathanite school seem to be directed towards the idea of somehow indexing or subindexing elements in a compound by merely including them, perhaps in some fixed and of course scientific order. The Classification Group in talking of entering a compound subject only once, says this depends on "the grouping of the unit terms into categories, and the establishing of rules which govern the order of citation of these categories". This is discussed with reference to UDC in 10·2(2).

9. He was obviously aware of UDC which has his devices more than any other classification, but he only made a few passing but critical references to it and to the Institut International de Bibliographie in his Prolegomena of 1937, in which he deals at some length with DC, EC, LC and SC; and though he makes his own use of synthetic classification he does not seem to have adopted the basic purposes of UDC's compound numbers which were added entry by number 'reversal', document specification, and universal bibliography or central general cataloguing which may also be used for special bibliography. Later he made much of document specification, and as he was taken up by FID and Unesco he began making more reference to FID and UDC, and even some acknowledgment. But it was not until 1953 that he

came out in a big way for documentation, with what he called Depth Classification. He published a book with this title in that year, and in vol. 1 of the 5th edition of CC he says of vol. 2 not yet issued, that it "is intended to give the more elaborate schedules necessary for the Depth classification of Micro Thought embodied in articles in learned periodicals. Minute or depth classification . . . is necessary to enable the library profession to play its role in the development of research . . . vol. 2 will have to be issued in separate fascicules . . . by expert classificationists and experts in the classes concerned." It might be thought that a system which can be made to produce the numbers given above already has depth enough, but he may have realized the general inadequacy of the system as it is, and hoped in a new version to make it deliver the goods which it is already supposed to deliver by means of its facet fundamentals.

His faceted classification, as it has turned out, only works even to the extent it does in selected subjects. Elsewhere there is only an elaborate, confusing pretence of a metaphysical basis which isn't really there at all. As shown, the fundamental terms used in Agriculture could not be made to produce numbers for Dry farming and Soilless agriculture, and he had to introduce them as 'Specials', and so in Medicine, most of all the show class for the disciples, he has had to add 'Specials' for branches or applications of medicine such as Tropical medicine. In other classes there never has been more than a semblance of the supposed derivation of Composite from Fundamental constituent terms of knowledge. D41531,5:5 is Engineering D, Narrow gauge railways 41531, Curves ,5, Specifications :5; but D41531 is the enumeration supposed to have been superseded by faceted, derivative classification; ,5 is a subdivision peculiar to D415, Railways, and :5 is a subdivision limited to Engineering. Calling D41531 a focus in the Fundamental facet Personality, ,5 a second focus in this, and :5 a focus in the Fundamental facet Energy only cloaks a breakdown of the facet method and something which is a poor imitation of UDC and its analytical subdivisions and form numbers.

10. All that seems left of general application is 'facet analysis'. The disciples themselves are increasingly wary of CC itself, and apart from the immense work and resources required to produce vol. 2 in fascicules it is unlikely if it were produced that it would have any users. Facet analysis seems to mean either what has been called subject analysis, of particular documents, as a step to their synthetic representation by so-called class or code numbers, or it means the analysis of a subject field to discover a basis for its classification, whether 'enumerative' or 'analytico-synthetic'. Either way it reduces to nothing more than a new piece of jargon for established operations. Those who are holding on to the term as all they have left from the wreck of CC argue it is novel by arguing that 'enumerative' classification was something which it was not, a pure genus-species classification of knowledge, but at the same

time they have to admit that whatever facet analysis is it can be, and has been done with the 'enumerative' classifications, and they can only assert that Ranganathan, and themselves, have put it on a new or right logical basis. But his jargon, his lack of acknowledgment especially to Otlet and his disciples and UDC, his amazing ingenuity on his assumptions, and their lack of wide and impartial comparative study in any detail, make him appear much more original than he really is, the most complete plagiarist of ideas, devices, and terms in the whole history of bibliographical classification.

Appendix E

Ranganathan's Chain Procedure, and Featuring

This appendix supplements 5·45, 8·5 and 11·25.

Chain procedure or analysis is essentially no more than turning an hierarchical class number back into its including and included classes for example, 343 into Social sciences, Law, Criminal law. It has always been a rule of thumb method of checking the indexing of a classified catalogue, as shown in 8·5, but Ranganathan and his disciples have tried to make a system of it, and a panacea, not only for indexing the classified catalogue, but also for providing headings and cross references for a dictionary catalogue, and it is dealt with in both respects in this Appendix and in Appendices F and G. Its basic theory can be studied in Ranganathan's Theory of library catalogue, 1938, pp. 79-122, but briefly it appears to be based, at least so far as it is applied to the dictionary catalogue, on misunderstanding and even perversion of what Cutter said and meant.

Ranganathan says that "the impression produced by Cutter's Rules is that he intends Specific subject of a book to be determined by the cataloguer" (p. 84). Under Entry in his Definitions Cutter said, "subject entry, registry under the name selected by the cataloguer to indicate the subject"; his concern, however, was not so much determining the particular subject of a book; it was entry directly under the name of the particular or specific subject, and suggestions that he and others looked to classification as a means of determining specific subjects, and cross references, are discussed in Appendix F. There is no evidence that Cutter and others vaguely intended something which Ranganathan has realized.

He says specific subject should not be determined by the cataloguer, but by the classification, "which should not be dependent on the discretion of an individual classifier". His idea and attempt at a classification which can be applied with only one result are discussed in Appendix D, and only his disciples Palmer and Wells, in their Fundamentals of library classification, 1951, seem to have suggested that books can be classified by his facet methods without knowing what their subjects are. A book's subjects must be decided and known by name or description before class numbers can be determined for any of them, as discussed in 4·3; no class numbers are required in an alphabetical bibliography which is not a library catalogue, and in an alphabetical library catalogue only one is needed, to show shelf location, however many subject entries a book may have.

For these reasons there hasn't been any classifying solely for the purpose of any chain procedure indexing, nor is there likely to be.

The Ranganathanite school has never escaped from the common confusion of subject specification and qualification in headings and class numbers as discussed in 4·5. Class numbers and subheaded headings express specific subjects, but the last term in an hierarchy is not always a specific thing in a class relation to the things expressed by the preceding terms; it may be a qualification or limitation of it as a subject. If we follow the general rule for chain procedure and apply it to 946 from DC, as Ranganathan does, and if we omit the middle term as he does, we get Spain—History, which is all right; the general rule is to analyse the number or chain backwards, or right to left. Applied to 331·87973 the result is United States—Trade unions, which is not what most dictionary cataloguers, or classified catalogue indexers, would give first preference. But Ranganathan says it is "precisely as Cutter would have it"; he claims Cutter's authority when it suits him, and rejects it when it does not; as shown in Appendix I Cutter himself fell into confusion in his rule 165, and has not been followed in his idea of subdividing country by subject in all cases instead of only in some. And in any case Ranganathan goes on to a special rule of his own which seems as applicable to DC 331·87973 as to his own D3v2 which he uses to illustrate it. He takes the subject number D3 for Mining and the form extension v2 for History—India separately, and says the analysis produces Mining—History—India, not the reverse. But this looks like a reversal of the essential idea and method of chain procedure to get a desired result, and suggests that the desired results will be secured more easily and certainly without benefit of the chain procedure which he takes thirty-five pages to explain.

Difficulties arise with class relations not expressed in class numbers, for example Dancing, Ballet is not expressed by DC 792·8, which subordinates Ballet to Theatre, not to Dancing; and the same number does not imply the collateral reference of the dictionary catalogue between Ballet and Pantomime; Ranganathan says "even the Chain procedure . . . gives us no help with these" (p. 173), but British disciples propose compound class numbers apparently for no other purpose than to get out of them the collateral relations which have first to be put into them.

Analyses or translations of the hierarchies expressed by class numbers may be given in a catalogue for the users' benefit. Palmer and Wells say in their Fundamentals that the user should be assisted "to utilize the systematic arrangement of the classification scheme by writing the meaning against each number . . . the translation is known as featuring" (p. 104). It is space consuming as BNB shows; this might not matter on cards, but for reasons discussed in Appendix G it is not given on BNB cards; and the user may have little use for it, because as illustrated in 2·2 the class relation of a specific subject in the classification scheme may not be one in which he is interested, and in any case his interest for the moment is specific and not general.

Appendix F

Chain Procedure and the Dictionary Catalogue

This supplements 11·3.

The case for getting not only classified cataloguing indexing but also dictionary catalogue headings and references by chain procedure is stated in Ranganathan's Theory of library catalogue, 1938, examined in Appendix E, in Mills, J., Chain indexing and the classified catalogue, Library Association Record, April 1955, the Classification Research Group, The Need for a faceted classification as a basis of all methods of information retrieval, the Record, July 1955, and especially by Coates in The Use of BNB in dictionary cataloguing, the Record, June 1957. He elaborates the supposed evidence that dictionary cataloguers have always thought of classification as a basis of their headings and references, and his article is fairly representative of the scholarship of the Ranganathanite school, and of the way in which the Record admits articles with insufficient literature citation or documentation.

Coates proposes "a classified key to dictionary catalogue subject headings which will serve the same purpose as the subject tracing on, for example, Library of Congress cards. . . . The Key would comprise a list of classification symbols with their respective verbal equivalents in a suitable subject heading form, together with an indication of the synonymous, hierarchical and collateral terms from which references are needed in each case." As noted in 11·6 Congress cards give tracing notes of headings for subject entries, but not the headings from which references would be made; these are given in its subject headings list. Coates does not make this clear, and does not make clear whether the verbal equivalents of class symbols are to give all terms from which references will be needed. As already shown in Appendix E chain analysis of class numbers will not yield all that is required unless numbers are especially compounded for the purpose. For example when the heading Duelling is established hierarchical references are to be made to it from Ethics or Social ethics and from Manners and customs, and a collateral reference is desirable from Fencing. By special rules the compound number 394·8:179·7:796·86 might be made to yield them; none of the simple numbers will. And there is still a 'see' reference in Sears' list from Fighting to Duelling and other special forms of fighting, which is not implied even in this triple compound. Only one number is required for the shelf classification of a book on duelling, and a cataloguer could get all the necessary cross references out of his head and/or a subject headings list in no more time than it would take to analyse his shelf number, and certainly in less time than it would take him to discover the other numbers and analyse them. The method

may also be said to put the cart which is the class number before the horse, which is the entry and reference headings, and which can in any case stand by itself, without any support from the cart, and is a freer, more flexible animal without the cart; to vary the metaphor chain procedure may be but a tin can tied to the tail of the dictionary catalogue.

Coates says the idea that the dictionary catalogue's "subject headings and references should be founded on systematic classification" is not new, but his idea that it is not seems to rest mainly on assumptions that any classification is hierarchical classification with an hierarchical notation and that any orderly arrangement must be classified, and that the words classification and orderly have these meanings in any context.

He says: "Cutter mooted the idea of a 'synoptic table' of subjects to rationalize the pattern of references", but he gives no documentation; he may be referring to Cutter's Rules, 4th edition, pp. 79-80, and there is other literature of which he seems unaware, for example an article by Bowker in the Library Journal for November 1878, On a cooperative scheme of subject entry, with a key to catalog headings, one by Perkins in the Library Journal for 1879, pp. 226-34, and two by Hulme in the Record, 1900, pp. 571-6, 1901, pp. 507-13. The idea was one of a classified or alphabetico-classed list of headings already established in a dictionary catalogue, to give the reader a synopsis of what the catalogue covered in a general subject field without the labour of tracing out all the cross references. There was no suggestion of deriving headings and cross references from class numbers in the first place. An alphabetical bibliography with a "Classed arrangement of subject headings" is mentioned in 6·7, but the synoptic table of headings never came into common use because catalogues were found to be used more for specific reference than generic survey. Cutter said it involved immense labour and that the way in which catalogues are used made it of "little practical utility". But the point here is that, useful or not, to say that the idea was one of deriving headings from a synoptic table is putting the cart before the horse.

Coates says, again without documentation, that Bradford pointed out "that the reference system in an alphabetical subject catalogue is based on a concealed classification". Nothing Bradford ever said on subject cataloguing can be taken as certain in meaning, reliable or proven, but even so, in the context, in his Documentation (2nd edition, p. 58) all he is doing is exaggerating alphabetical catalogue use of class entry and cross references which he says "amount, together to a concealed classification". He is not saying that headings and references are or should be derived from an hierarchical classification and its numbers.

Coates says, again without any page references or even book title, that Miss Pettee, though taking the view that names used as subject headings "transcend the laws of logic of the linear classification", nevertheless designates "an orderly arrangement of subject material" as the

horse which must pull the alphabetical cart. The quotations are his, from her book, Subject headings, the history and theory, 1946. The second is from p. 49 in which she is saying in effect that a subject headings list cannot be just a list of subject names; it has to be organized by cross references, but it is still alphabetical, and there is no suggestion in the context that an orderly arrangement of subject material must be, or should be based on subject classified arrangement. The first quotation is from p. 58, but leaving out her reference to his master; she says that Ranganathan "fails to see that names have a new function that transcends the laws of logic of linear classification". And the context shows that she followed Cutter in considering that far from being a defect the dictionary catalogue's freedom from the class relations of any particular classification scheme is one of its great qualities and advantages. And of course if headings and references are tied, or chained, to a numbered hierarchical classification it must be to a particular one.

THE BRITISH NATIONAL BIBLIOGRAPHY (BNB)

This appendix supplements 5·45 and 10·8, and as stated there only as much of it need be read as may be needed. It is fairly easy to show that BNB's claims to be an exhaustive index are not proven by it, not so easy to understand and show how it is supposed to work, because it gives no explanation of its methods and their roots in chain procedure and other Ranganathanite ideas discussed in Appendices D, E, F; and it may not be continued indefinitely with these methods; nevertheless it may be useful to put on record an attempt to understand its means, as well as to show that they do not achieve the end.

BNB is published by the Council of the British National Bibliography Ltd, British Museum, London, W.C.1, representing the British Museum, the Library Association, the Publishers' Association, and seven other bodies. It is edited by A. J. Wells who with B. I. Palmer, Education officer of the Library Association is author of Fundamentals of library classification, 1951, which they say is based on Ranganathan's researches. It is published weekly, with quarterly and annual cumulations including a combined author, title and subject index to its entries which are classified according to DC, and its claims are set out in a preface repeated in its quarterly and annual cumulative volumes, as follows:

"SUBJECT

One of the most important aspects of this bibliography is its exhaustive index to the subject matter of books. The Subject Section itself displays the works on a subject in such a way that the whole field of literature on a subject can be easily perused. The Alphabetical Section lists all the subjects found in the Subject Section and shows by means of the code number where books on those subjects are listed in the Subject Section. For example under the word Africa will be found a full list of the places in the Subject Section where books in any way concerned with Africa may be found, thus:

Africa	916
Africa: Agriculture	630·96
Africa: Animals	591·96
Africa: Anthropology	572·96
.....	
Africa: History	960"
.....	

The Subject Section is the catalogue or Class list of a classified catalogue and the Alphabetical Section its alphabetical index; the code numbers are simply the class numbers of DC, and not to be confused

with the entry reference numbers, as first given according to the order of entries in the weekly issues, for example (B57-4098), in

201 PHILOSOPHY OF RELIGION

Murry, John Middleton
Love, freedom and society. London, Cape, 18/-. Mar 1957. 253 p. 20½ cm. (B57-4098)
Compares the ethical thought of D. H. Lawrence and Albert Schweitzer.

This is an example of the method of entry and of exhaustive indexing. The book doesn't seem to have any other entry; Religion 200 in the Alphabetical Section indexes the including class, there is a title reference, Love, freedom and society. See Murry, John Middleton, and an author entry, Murry, John Middleton, Love, freedom and society. Cape, 18/- 201(B57-4098); there is no reference to it under Lawrence, David Herbert or Schweitzer, Albert, although their own note says it is on them.

Taking first the claim that the Subject Section displays the whole field of literature on a subject for easy perusal, as shown in 1·5 this is contrary to the nature of subject classification; Brown's single place Subject classification does not show general and special, such as Gardening and Rose gardening together, and the other classifications, including Dewey's and Ranganathan's, scatter the literature of a thing according to aspect treated. In BNB there is perhaps even more scatter than is unavoidable; in the 1956 volume books on automation are in about six different classes, and in the 1957 volume books on the biological effects of atomic energy are in six different classes, from 261 to 623·4543, without cross reference between class numbers. This scatter could be remedied to some extent by multiple entry, but whilst this is overdone in some indexing, in which it could be reduced by cross reference, as discussed in 11·25 and 14·6, it is underdone in BNB as in other British classified catalogues, as illustrated in 5·41.

Added entry is in reference form which is justified by space saving in a page form catalogue; for example,

598·2—**Birds**
Soper, Eileen Alice
Wild encounters see 599—Mammals

The subject of this added entry is called a subsidiary subject, but in one weekly issue, 3rd July 1958, with 386 entries, only 18 or 4·6 per cent have cross reference under subsidiary subjects. An example of the much larger proportion without is a book called Nature and historical experience: essays in naturalism and the theory of history, by D. H. Randall (B58-12017); the only entry is at 191 American philosophy; there is none at 146 Naturalism and none at 901 History, philosophy, theories, etc. UDC type colon numbers are sometimes used,

but not necessarily with reversal for added entry. They seem to be intended as substitutes for the compounds in Ranganathan's Colon classification representing what he calls Bias phase, Influence phase and so on, of two subjects in relation; an example is 327:355 for defence and diplomacy with subsidiary subject reference under 355:327; another example is 327:400 for foreign relations and language, without any entry at 400; another is atomic energy and insurance at 359·7:368, with entry at 368, but not under the reversal of 359·7:368, and generally there is little use of these compound numbers; in the 386 entries in the 3rd July 1958 issue there are none. Because of limited added entry the burden of exhaustive indexing of the subject matter of books must fall on the Alphabetical Section which must by some means become not only an index to subject classes, but also an index to the subject matter of particular books, taking the place of added entries; one question is then the extent of this indexing, and another the method. The title word indexing method is illustrated and discussed in 5·41, and other methods in 5·42-3; BNB has evolved yet another, apparently from Ranganathanite ideas.

The Alphabetical Section does not remedy the scatter of the Subject Section; when the example given is checked, that of Africa, we find that even with this all the books in any way concerned with Africa may not be found through the class numbers under Africa:Agriculture and so on. And in the 1957 volume in searching for the "whole field of literature" on the biological effects of atomic energy we find that we have to look under Atomic and Nuclear, and under Radiation and Radioactivity, without the help of any cross reference between them, and that we have to sort out subject from title entry. The Alphabetical Section scatters subjects according to word differences often derived from titles, as the Subject Section scatters them according to class aspect or relation, but with less excuse; and in many cases it simply doesn't index the subject matter of books.

The example of a book on Lawrence and Schweitzer has been given above; another is one called The Papyrus swamps of Uganda, by George Stuart Carter; it is only twenty-five pages and mainly on the swamp problem, as caused by papyrus growth, but papyrus is the famous forerunner of paper and the book does say something about its uses; yet BNB doesn't classify it as on papyrus or index it as on papyrus, except accidently, by its title. Another is the book called Coast of coral, given as an example of Congress dictionary cataloguing in 5·32 and of 'pure and simple' classified cataloguing in 8·1. Congress enters this under Great Barrier Reef, Australia, with a cross reference to this heading from Coral reefs and islands, as shown in 7·5(7), and under Pearl fisheries—Australia—Great Barrier Reef, and under Photography, Submarine. BNB doesn't classify it as on the Great Barrier Reef; it indexes it as being on this, but without any cross reference from Coral, and the title reference under Coast of coral doesn't help in this case; it doesn't classify or index it as being on Pearl fisheries, or on Submarine

photography. The question is, why does the indexing, that is the alphabetical indexing, break down, when subjects such as papyrus and coral are so obviously subjects by which the books could be usefully indexed. The answer is in the method and the way in which BNB is being used as propaganda for the method.

The heading and entry for Carter's Papyrus swamps of Uganda is,

> 551·48[1]—SWAMPS. Africa. Uganda.
> **Carter, George Stuart**
> The papyrus swamps of Uganda. Cambridge. Heffer, 3/6. Jan [1956]. 25 p. 4 plates, diagrs., bibliog. 25 cm. Sd. (B56-1051)

DC 14th edition gives 551·49 for Swamps physiography and it is not quite clear why 551·48 is used, unless it is taken as the 15th edition number. The figure one in square brackets is always used for a BNB extension of a DC class number, even for different extensions of the same number in the same weekly issue, and appears to cover all that follows it in words; these words are its 'translation' and are used in indexing. The index has Physiography 551·4, no reference to 551·48, then Swamps 551·48[1], Uganda:Swamps 551·48[1], and Africa:Swamps 551·48[1], but not Papyrus 551·48[1]. The method of indexing is by the verbal equivalents of the hierarchical steps of the class number, as given in the headings, with some omissions, but no additions; it is a chain procedure method, apparently with special rules, and some exercise of judgment; but the starting point has to be the number with its own and added verbal equivalents or terms, and what is not given in this way is not used in indexing. One exception noticed is Dancing: Ballet 792·8, although the number and heading referred to is simply 792·8 Ballet, in which Dancing is neither stated nor implied.

Clarke's Coast of coral (B56-11285) is under

> 591·52[1]—Aquatic animals. Marine animals. Observations. Diving. Great Barrier Reef

The classifying is questionable, because the coral insects are no longer alive in the coral, or hardly dealt with, and most libraries and bibliographies have preferred entry under a coral reef number in geology; by chain procedure coral would have been brought into the indexing, with this number; and even with the one preferred by BNB it could have been got in by its chain procedure, if in its heading Coral had been put in between Marine animals and Observations. This and other examples show that what is put in is any word the cataloguer wants to use in indexing, however remote or questionable it is as a subdivision of the class; but in this case Coral would be a proper subdivision of Marine animals, whilst Diving, which in this book is by human beings for underwater photography of almost anything except coral insects, is a questionable subdivision. Reference is made in the index to 591·52[1] from Aquatic animals:Zoology, from Marine fauna, from Diving:Swimming:Observations:Marine animals, from Great Barrier Reef:Queens-

land:Diving:Swimming:Observations:Marine animals; the reference is from the headings consisting of single words or phrases, or by words joined by colons, so in this case there are four references to the class number and its extensions for this book.

There are no references to it from Coral, or from Queensland, or Australia, though the Great Barrier Reef is part of the Queensland coast, and for another book on the lobsters or crayfish of the reef both Australia and Queensland are put in the heading, and reference is then given in the index under Australia and under Queensland. These examples illustrate two points, that indexing is determined when the number and extensions of it for a particular book are determined, and that the extensions or verbal equivalents, as well as being inconsistent, are put in to suit particular books; so each number and its extensions as a whole may be a subject class number but may be and very often is a specification of a particular book, including things which are not essential to the subject by which it is primarily classified, and not always including subject matter by which it could be usefully indexed. Another example from dozens and even hundreds that could be selected is a book (B56-5641), Elements of genetics: Mendel's laws of heredity with special application to man, by E. C. Colin; this is under 575·1—Genetics, though DC has 575·1132 especially for Mendel's law, and BNB commonly uses numbers with ten or more figures in them; the index has Genetics 575·1 and Heredity 575·1, but nothing under Mendel's law.

BNB prefers 599 to both 575 and 591 for mammalian genetics and related subjects, and 599·[1] covers entries for books on mammalian genetics, cytology, physiology, reproduction, polyploidy, parthenogenesis, development, lymphatic system and lactation, with these terms as extensions of the number in different combinations, although in DC 599 is subdivided by mammalian species and such processes as lactation are in 591. In 1956-7 there are eight entries under 599·[1]. The basis of subarrangement is not stated; it is not alphabetical by author, and looks as if it might be according to the order the extensions have as independent subjects in the classification; but even if this is the order it would not be known to a user. If he looked under Milk in the index he would find Milk:Secretions:Physiology:Mammals 599·[1]; but at 599·[1] with entries for only two years he would have to go through eight different headings and about fourteen different terms to find Milk near the end. Alternatively he might go from Lactation: Physiology:Mammals in the index to the number, to find under 599·[1] —Physiology. Secretions. Milk a book called The Physiology and biochemistry of lactation. The key words are influenced but not determined by titles, and they are prominently displayed, but in essence the method comes close to that of the single entry with title word indexing exemplified from the Glasgow Union Catalogue in 5·41. In 1956-7 there are about ninety entries under 248·[1], in about eighteen different subclasses and subsubclasses, in an unexplained suborder. In a catalogue in page form covering only one year's entries the difficulties of work-

ing from the Alphabetical to the Subject Section are not as apparent as they would become in a card catalogue cumulated over ten years or more; and related considerations apply also to the index taken by itself.

In the article referred to in Appendix F Mills says that chain procedure, introduced by Ranganathan "some twenty years ago . . . has only now been brought into prominence by the highly successful use of it by the B.N.B. since 1950", and he says further that "the style followed in the B.N.B. should be consistently maintained, i.e. of plural nouns separated by colons; this facilitates filing by avoiding the clumsy succession of groups under a subject (form divisions, period divisions, country divisions, subject subdivisions, inverted phrases, etc.) which can be so confusing in the Dictionary catalogue". Of course the filing or compilation is facilitated, as it is in the dictionary catalogue if the arrangement is merely word by word ignoring punctuation, or making this uniform, as discussed in Chapter 12. But what about consultation, when there is a fairly rigid adherence to indexing by chain procedure, and to one method of relating terms, without regard for functional differences in the relation? And is it not strange when so much is thought of Ranganathan's distinctions of relations, and something is attempted in the Subject Section of BNB, the distinctions are not thought to matter in the Alphabetical Section, which must be a user's first point of contact with the bibliography?

BNB has 541—Physical chemistry, in its Subject Section, and Physical chemistry 541 in its Alphabetical Section, but in this it hasn't Chemistry: Physical, or Chemistry, Physical 541, which is the direct reference from alternative forms of a subject name which has hitherto been considered an advantage over the dictionary catalogue, which would have Chemistry, Physical see Physical Chemistry, or the reverse, which apparently Mills finds confusing, and unnecessary. BNB has 771·5—Photographic chemistry, which by chain procedure gives Chemistry:Photography 771·5 in the Alphabetical Section, but wouldn't Photography: Chemistry 771·5 be more useful? It hasn't got this, apparently because the "highly successful use" of chain procedure doesn't produce it; a user looking under photography, cement, milk, glass, and so on, wouldn't know BNB had anything in it on their chemistry, unless he thought further and looked under Chemistry; but there is Glass: Laboratory apparatus:Chemistry 542·231, because chain analysis of the number produces it. In some cases chain procedure would give a subject-process order from a simple number, such as Cement—Chemic technology, or Chemistry, or Manufacture, from 666·9, but BNB makes the Subject Section heading for a book called The Chemistry of cement and concrete, 666·9[1]—Cement. Chemistry, which then yields Chemistry:Cement 666·9[1] for the Alphabetical Section. The general result is that instead of having a specific subject index distinguishing relations or aspects BNB has an alphabetico-classed index, as illustrated by Chemistry:Cement,:Dyes,:Glass, and so on; and it does neither what the classified catalogue index is supposed to do, refer directly to class

numbers from alternative forms of subject names, such as Chemistry, Physical and Physical chemistry, or what the dictionary catalogue does, make cross references within the alphabetical arrangement, such as Chemistry, Physical see Physical chemistry. It gets both Chemistry: Physiology:Medicine 612·015, and Physiological Chemistry:Medicine 612·015, by alternative groupings of the figures of the number, but it cannot get both Physical chemistry and Chemistry, Physical out of 541 read backwards, because Physics or Physical isn't expressed in the number.

Either the indexers are blinded by their own science, or indexing has to be for Ranganathan's chain procedure, or BNB's version of it, at all costs, so that if it does not produce useful indexing, then so much the worse for useful indexing. One point in its favour is that whilst the subheadings introduced by the colon are a mixture of subject and aspect subdivisions they are in alphabetical order; under Milk the user finds Dairy industry, Food purity, Secretions, in that order, but as shown above when he turns to 599·[1] for Milk:Secretions:Physiology: Mammals, the order under Mammals is one to which he hasn't a clue.

The translation of numbers called featuring already discussed in Appendix E, is applied in BNB in page form, but not on its cards, and in BNB in page form it is what might be called distributed featuring. For example, in the 1956 volume we find 500—SCIENCE and then forty-four pages farther on 571—PREHISTORY, 570 BIOLOGY, ARCHAEOLOGY being omitted, then on the next page 572/573—ANTHROPOLOGY, two pages farther on 574—BIOLOGY, four pages farther on 575—EVOLUTION, and in the next column 575·1—GENETICS with three entries, followed by

575·2—Variations
575·29—Mutations
575·29[1]—Radioactivity
Auerbach, Charlotte
Genetics in the atomic age; illustrations by I. G. Auerbach. Edinburgh, London, Oliver & Boyd, 8/6. [d Feb] 1956. vii, 106 p. illus. (some col.). diagrs. 19 cm. (B56-2889)

This is the only entry. The featuring or translation yields indexing under the terms given but not under Atom or Nuclear or Radiation, under all of which there are references to other numbers for books on the same or related subjects. However, the point here is that what might be called terminal featuring often takes up more space than a single entry under it; it may be of use to a cataloguer following BNB, but little to one who isn't, and even if he is indexing by chain procedure, he might well prefer to do his own translation; it is of little use to anyone using the bibliography as such, because titles under numbers and general headings are usually sufficiently explanatory, and if not can be explained in a note.

BNB cards do not repeat the featuring, probably because they are reproduced in some way directly from the entries, without resetting by

which the distributed featuring could be brought together. The entry has to begin with the author's name, and only the final line of the featuring is given as a note, for example,

Auerbach, Charlotte

Genetics in the atomic age; illustrations by I. G. Auerbach. Edinburgh, London, Oliver & Boyd, 8/6. d Feb 1956. vii, 106 p. illus. (some col.). diagrs. 19 cm. (B56-2889)

575·29[1]—Radioactivity

As a unit card this could be used in both classified and dictionary catalogues, but the reproduction is poor and patchy for a card service at a national level, and the 'tracing note' is almost worse than useless as a cataloguing aid for either classified or dictionary cataloguing. A Congress card would be more useful for anything but an attempt to follow BNB exactly, and then the bibliography itself would have to be used along with the card, and at least in the bibliography itself there is no explanation of how its entries and featurings are to be used for indexing. Even for those following it a note in the bibliography entries, and on the cards, giving added entry numbers and the index entries as they appear in the Alphabetical Section would be much more useful. The cards also have what is a defect at least outside Great Britain; they give prices in sterling, and these are quite misleading locally, even in New Zealand, for example, because whilst it is on sterling its book prices have to be higher than those in the country of origin. This is one result of trying to kill too many birds with one stone; in the first place an attempt has been made to combine trade bibliography with central cataloguing, and in the second an attempt has been made to use the bibliography entries on catalogue cards without alteration or omission.

As shown in Chapter 5 several British bibliographies and catalogues prove on examination not to be what they claim to be, either in what they claim to do, or in the way they claim to do it, and this one, with which the name of the British Museum is closely associated, is one more. It just isn't as a whole or in any of its parts what it claims to be, an "exhaustive index to the subject matter of books", and even such far from exhaustive indexing as it attempts is unexplained in method, difficult to understand, and in its results poor and misleading indexing.

In Some comments on the Indian National Bibliography, Experimental fascicule, in the Indian Librarian for June 1958, the General Editor of BNB says more about its Ranganathanite methods than he does in its own Preface.

He says that "if specific indexing is to be undertaken", that is by chain procedure, "some way has to be found of making the Decimal Classification numbers coextensive", that is "with the subjects of the works catalogued", that is at least in some cases with their total subject matter. "It is," he says, " a serious dilemma and if not resolved will ultimately destroy the effectiveness of the classified catalogue . . . we have

resolved it temporarily . . . by adding . . . [1] to a deficient class number and developed the class by naming the further subdivisions in words."

He says the Colon classifications offer a better basis; this may be true in their theory, but is doubtful in their practice, to say the least, and no classification can provide workable, economic class numbers of the sort required for such books as one on coral, the Great Barrier Reef, pearl fisheries, skin diving, and submarine photography. But this is not a dilemma for the classified catalogue, which has dilemma enough in providing simple class numbers for simple subjects. It is only a dilemma for the UDC assumption that multiple entry for multiple subject documents should or can be done by means of compound or synthetic reversible numbers, and for the derived assumption that chain indexing of single entries under numbers co-extensive with the complex subject matter of some documents is practically possible and provides satisfactory classified cataloguing. It is not satisfactory cataloguing because there is not the multiple entry which alone will bring the literature of a subject together even as far as classification will allow this, and it is not even as satisfactory as alphabetically indexed single entry can be because of the defects of chain indexing exemplified above. Get rid of the original confusion of Otlet and synthetic classification of coded specification of documents with the subject classification of documents, which even Bradford finally saw was a confusion, as shown in 10·5, and the classified catalogue or bibliography still has its troubles, but at least it is freed of its old man of the sea.

TENTATIVE CODE OF RULES FOR ALPHABETICO-SPECIFIC ENTRY

INTRODUCTION.

These rules have been developed out of stencil duplicated library school notes which first included dictionary catalogue rules for specific entry in 1946. Alphabetico-specific entry is not easily reduced to rules, and like Cutter's Definitions and Rules these were rather artificially divided into rule, example and discussion, and tended to repeat or summarize textbook or lecture treatment; so it was not intended to reprint or revise them. But finally there seemed three or four good reasons for attempting a revision.

Former students said they found them useful, in their studies and subsequent practice. There has not been a published, or any well-known published code since Cutter's, in its 4th and last edition in the year following his death in 1903. In the Preface to this he expressed the view that the central cataloguing and cards of Congress would make his rules unnecessary. He could not help thinking, he said, "that the golden age of cataloging is over, and that the difficulties and discussions which have furnished an innocent pleasure to so many will interest them no more". At least he had the pleasure of knowing that Congress was following his rules and even his classification; if it had not been doing so he might have had a different view.

With the French revolution, said Burke, the age of chivalry had gone, and that of sophists, economists and calculators had come; in that sense perhaps the golden age has gone, and that of bibliosophists, economizers and computers has come. Cutter himself spoke of savings through central cataloguing that could be used in the children's room or at the reference desk. But too much reliance can be placed on the apparatus of central cataloguing, on unit cards with tracing notes and subject headings lists; too much can be left to Congress, and both principles and self-reliance lost sight of. This has been lately realized in America where there is talk of a revision, a radical revision of Cutter's Rules, or even something entirely new, on new principles.

These tentative rules are based on Cutter's, because no other principles have been found to take the place of his in essence, but they are not as closely based on his approach and wording as the earlier ones were, and if they owe anything to anyone's thinking besides Cutter's and the writer's it is to Kaiser's, expressed in his Systematic indexing, 1911, in its way a code, but not one sufficiently in line with current thought and terminology, and far too difficult for common understanding and application, to become established as a code.

A departure from Congress rather than Cutter is in avoiding paren-

thetical qualification as much as possible. Billings used this form in place of subheadings, and Congress has developed a mixed use of it. On this and other points these rules may be regarded as a summary or abstract of textbook treatment, which is another reason for including them; some students may find this approach a better one.

They are however to be regarded and studied as a continuous statement cut up into chapter and verse, with example and commentary, rather than as mutually exclusive rules. Some of them are the same thing from different points of view, and nearly all are only applications of the principles of purpose and method of which a regular statement is attempted in the Definitions.

One thing further may need saying. Cutter first called his code Rules for a printed dictionary catalogue, and only later introduced a few remarks on cards; but the rules are for the most part applicable to a card catalogue. What logic he made reference to is classical or Aristotelian logic; he knew nothing of the later mathematical or symbolic logic, but this does not outmode his rules; the later logic can only provide an alternative method of rigorous rationalization. No mention is made in these rules of mechanical indexing or selection, but this does not require or allow new or different principles; it is only the method of retrieval that is different, and this also applies to co-ordinate indexing in its manual forms, if they are based on specific terms or subject names, and not on a subject classification of these. Mechanical and co-ordinate indexing require a code or term dictionary, and if applied to them these rules might then be called rules for a code or term dictionary, for which they would be rewritten in some respects, but not be logically different.

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1 DEFINITIONS

1·1 *Purpose.*

The purpose of these rules is the indication of sources of specific information.

EX. The purpose of

Economics
Harvey, Jack
Elementary economics. Lond., Macmillan, 1957
Sladen, Edward
Modern commerce. 4th ed., Lond., Pitman, 1957

with the heading ECONOMICS in alphabetical order with others is the indication of Jack Harvey's Elementary economics and Edward Sladen's Modern commerce as sources of specific information on economics.

NOTE. If a particular book is already known by some part of its author and/or title description, and by its subject, then it may be

found by subject in a subject catalogue, as it may be found by author and/or title in an author and title catalogue, which may be combined with a subject catalogue to make a dictionary catalogue, but the primary and important purpose of subject cataloguing is not the retrieval of books already known and known to be on a subject; it is the retrieval of information in books or documents hitherto unknown to the catalogue user. The book called Modern commerce hasn't economics in its title; it might also be entered under Commerce, and under Business, if it dealt with all three. A title entry for Harvey's book would be one under Elementary economics; the subject entry under Economics might be held to make this unnecessary, but this entry would still be a subject entry, not a title entry.

1·11 *Method.*

The method is entry of sources of specific information on things under their specific names in alphabetical order with subdivision as wished according to qualifications, such as aspects and processes of the things especially considered in some of the sources and according to the documentary or literary forms of some of the sources.

EX.

Cats—Diseases—Dictionaries
Kirk, William Hamilton
The cat's medical dictionary . . . Lond., Routledge and K. Paul, 1956

Dogs—History
Vesey-Fitzgerald, Brian Seymour
The domestic dog: an introduction to its history. Lond., Routledge and K. Paul, 1957

Political Science—Dictionaries
Elliott, Florence and Summerskill, Michael
A dictionary of politics. Harmondsworth, Penguin Books, 1957

Wool—Classing
Cowley, Clarence Edward
Classing the clip: a handbook on wool-classing. 4th ed. . . . Syd., Angus and Robertson, 1956

NOTE. Each heading is the specific name of the specific subject of the book, that is of the specific thing which the book is about, and not the name of an including class or genus; in the case of the book on wool the heading is not Textiles, with or without the subheading Wool. None of the subheadings are species of the things named in the heading; they are qualifications or limitations of the thing or object considered as a subject of information, or forms of the information.

1·2 *Sources of information.*

Sources of information are any records of information in writing, pictures or sound, whether public or private and in one or more copies.

NOTE. Cataloguing rules are mainly used for the indexing of information in published literature such as books and periodicals, but may be applied to unpublished reports and to sound records and films. Methods of description of the sources must be varied to suit, but the rules for headings and references and their arrangement will apply.

1·21 *Documents.*

Documents are sources of information with their own titles or numbers to distinguish them from and within other documents.

NOTE. Document is a convenient word for books and chapters in them, periodicals and articles in them, unpublished reports and any other forms and sources of information distinguished under headings by their own descriptions. The document is the source of information but the information indexed may still be only in some part of the document which cannot itself be distinguished as a document according to the rules of bibliographical description; the part however may still be distinguished, for example by a page number.

1·22 *Catalogue and cataloguing.*

Cataloguing is any listing or indexing of collections of documents and a catalogue is any list or index of a collection of documents.

NOTE. A catalogue was not originally an index, though it might be made self-indexing by its arrangement, as in a catalogue arranged alphabetically by author; but any subject indexing of a catalogue or list was not thought of as cataloguing, and if the two were combined in one alphabet the result was at first called an index-catalogue. Later catalogue came to mean catalogue or index in any combination, but attempts have been made to confine catalogue to its original meaning of a list of books and to keep index and indexing for extra indexing or analysis. Catalogue is used here for any catalogue or index or bibliography, and the rules may be applied to any catalogue.

1·3 *Entry.*

An entry is any description of a document under a subject name or heading.

EX. as in 1·1 and 1·11.

1·31 *Analytical entry.*

An analytical entry is an entry of a document which is included in another.

EX.

Australian Literature
Green, Henry Mackenzie
Literature
(Australia., Ed. by C. Hartley Grattan. Univ. California Press, Berkeley, 1947. pp. 291-302)

Corn—Genetic research
Gene induced mutation of a heritable cytoplasmic factor producing male sterility in maize. M. M. Rhoades. Nat. Acad. Sci. Proc. 36:634-5 N 50

NOTE. Analytical entries are sometimes called index entries, and they and other entries may be called references, but this word is kept here for cross references between headings or entries, and not used for references to or citations of literature.

1·32 *Specific entry.*

Specific entry is the entry of a document as a source of specific information on a thing directly under the thing's specific name.

EX. See examples and note to 1·11.

1·33 *Class entry.*

Class entry is the entry of a document as a source of specific information on a thing under the name of an including class or genus of things with or without subordinate specification.

NOTE. The entry of books on Dogs under Domestic animals or Domestic animals—Dogs would be class entry, and a catalogue with such class entry systematically and deliberately used in alphabetical order would be an alphabetico-classed as opposed to an alphabetico-specific catalogue. But the alphabetico-specific catalogue usually has some unrealized or regulated limitation of specification, according to 2·31, for example books on a particular model of Ford motor car under Ford motor car without further specification, or even under Motor cars. A class or general heading is of course specific for general literature, for example Domestic animals is specific for a book on several domestic animals, such as horses, cattle, sheep, goats, pigs, and Furniture for a book on chairs, stools, tables, sideboards, beds, wardrobes. An alphabetico-specific catalogue cannot have subdivided class entry without a breach of its essential principle; for example it might have books specifically on idealism, realism, pragmatism, all under Philosophy without distinction, but certainly should not have

such a heading as Philosophy—Idealism. For subheadings which are not a breach of specific entry see the examples and note to 1·11.

1·34 *Form entry.*

Form entry is the entry of a document under the name of a documentary or literary form.

NOTE. Form as a heading as distinct from a subheading is treated like subject and anything applying to subject may be taken as applying to form unless otherwise stated, but in some cases form and subject entry have to be distinguished in headings, as in ENCYCLOPAEDIAS (Form) and ENCYCLOPAEDIAS (Subject). Form subheadings are a kind of subject qualification, as in POLITICAL SCIENCE—Dictionaries in the example in 1·11.

1·4 *Heading.*

A heading is any name under which documents are entered or from which reference is made, including subheadings unless a distinction is made between heading and subheading.
EX. See under 1·1 and 1·11.

1·41 *Subheading.*

A subheading is any qualification of a subject named in a heading and used to subdivide entries under the heading.
EX. See under 1·11.

NOTE. Many subjects named in headings without subheading are logically a combination of a thing as subject and a qualification expressed in one word, or more than one hyphenated, or more than one as a phrase without punctuation, for example, agriculture, paperhanging, picture-framing, horse-racing, paper making, glass blowing. In ordinary communication combinations of Latin origin and in one word, such as agriculture, bibliography, cartography, are not varied; others such as paperhanging may be variously written as one word or two hyphenated or two quite separated, and they may be so varied in headings and still further varied by conversion into heading and subheading form, and in some cases changed in word forms, as in Agricultural exhibitions changed into Agriculture—Exhibitions, and Bookbinding into Books—Binding. The limiting factor may be said to be usage, but more strictly it is direct or self indexing, which is both the purpose and method of alphabetico-specific entry. In his Systematic indexing Kaiser made what he called Concrete and Process into heading and subheading without exception, and to do so turned Agriculture into Land—Cultivation, and so on, but there must be some exceptions if the literature of a subject is to be under its known

name. Short of complete departure from the known name, opinion and judgment of the extent to which usage may be modified vary, and there is only a subheading in function when a qualification is used as a subdivision. The species or subclass subdivisions of class entry as in Domestic animals—Dogs are of course subheadings in form and function, but excluded by definition from alphabetico-specific entry, in which there can be, for example, Birds—Diseases, and even Birds—Cages, but not Birds—Parrots.

1·42 *Phrase heading.*

A phrase heading is one of more than one word excluding subheadings.

1·43 *Inverted heading.*

An inverted heading is a phrase heading in which the order of words of ordinary communication is altered, other than by change into heading and subheading.

EX. Circulation of the blood written as Blood, Circulation of; Merino sheep written as Sheep, Merino.

NOTE. Prepositional phrases expressing a subject and a qualification as in Circulation of the blood, Diseases of birds, and so on, are now commonly turned into the heading and subheading form discussed in 1·41, and this is distinguished from the inverted phrase expressing a class or genus and a subclass or species, as in Sheep, Merino. Logically this is undoubtedly the subdivided class entry which is not allowed in alphabetico-specific entry in the heading-subheading form. Cutter in his rule 175 only allowed entry of a compound subject-name by its last word when this "is decidedly more significant or is often used alone with the same meaning as the whole name", as in Earth, Figure of, and Providence, Special. The first expresses a subject qualification or aspect and the heading-subheading form would now be preferred; the second expresses a species, and the form is now commonly used when the noun is commonly used alone, as in Tennis, Lawn, and Arbitration, Industrial, and when the noun expresses the primary interest of the literature and its readers, as in Coins, Copper, unless the noun expresses the whole or an important part of the field of a special catalogue, so that Furniture, Steel might be used in a steel catalogue and library, but Steel furniture in furniture catalogue and library. Logically the result of this inversion is subdivided class entry, but it may be justified on the ground that the adjective after the noun is a commonly known and expected form in indexing, and the usual form of ordinary communication in many languages, for example French in which merino sheep are moutons merinos. By its basic principle of entry directly under known names alphabetico-specific entry does not

exclude class entry as such, and may and does use it when the usage of names allows it and the resulting classification is commonly accepted and even expected.

1·44 *Parenthetical definition.*

Parenthetical or extra definition is any word or words added to a subject name to clear up possible ambiguity in the intended meaning of a heading but not treated as part of the name and usually enclosed in round brackets.

EX. Scales (Botany), Scales (Fishes), Scales (Musical), Scales (Weighing).

NOTE. The example is from Library of Congress, but it also uses parenthetical qualification inconsistently with this use and with itself for what amounts to subdivided class entry, as in Cookery (Apples), Cookery (Baby foods), and so on, and for what is subject naming rather than word definition, as in Water (in religion, folklore, etc.). One result is an unnecessary separation of related subjects as in Mass; Mass (Canon law); Mass (Chemistry); Mass (Music); Mass (Nuclear physics); Mass spectrometry; Mass stipends, in which the first, second, fourth and seventh are mass and aspects of mass in the religious sense and the others mass in the physical sense. In these rules parenthetical definition is limited to the definition or words which are ambiguous out of a context, and is not recommended even for this; the inverted adjectival phrase is preferred as in Scales, Plant; Scales, Fish; Scales, Musical; Scales, Weighing. The fact that there may be only a reference from such a heading as Mass (Chemistry) makes little difference because the heading still has to be filed in an order, and in the Congressional order all round bracketed additions to a heading file together without regard for differences in logic or function.

1·5 *Cross reference.*

Cross reference is any reference from a heading to a heading or subheading and from a subheading to a heading or subheading.

EX. Vehicles see also Motor cars; Lubrication see also the subheading Lubrication under Motor cars, etc. Steam engines—Lubrication see also—Bearings; Radio see Wireless.

NOTE. Cross reference is not a substitute for multiple entry of the same document except as provided in 1·51, 3·5 and 3·6.

1·51 *Entry cross reference.*

Entry cross reference is any reference from an entry under a heading to entries under another heading.

EX.

Food Supply
Malthus, Thomas Robert
Essay on population
See under Population for a list of editions

NOTE. Cross reference of this kind and purpose is usually to an author entry.

1·6 *Species and specification.*

Species and specification are the differentiation of things or objects, concrete or abstract, from more general classes or genera.

EX. Law distinguished from Social sciences; Roman law from Law; Beds from Furniture and Wall beds and Hammocks from Beds; Duelling from Ethics, from Customs, and from Sport.

1·7 *Qualification.*

Qualification means an aspect or process or part of something, or a documentary or literary form of documents on it, used to subdivide entries under the name of the thing.

NOTE. See the note to 1·41. A part is not a species of something, for example, legs are a part of a chair, not a species of chair.

1·71 *Subject.*

A subject is anything a document is about and includes any qualification unless a distinction is made between subject and qualification.

EX. Motor Cars—Washing is the subject of a document on the washing of motor cars, but Motor cars and Washing may be distinguished as subject and qualification.

NOTE. A subject distinguished from a qualification is always an object, concrete or abstract; a qualification is something distinguished in discussion of the object or thing but not separable from it in actuality; for example, beds can be separated from other furniture, and at least on paper Roman law can be separated from other systems of law, but the history of law cannot be separated from law because there must be a statement of the subject law before there can be a qualification or limitation of it to its history. This is the justification of subheadings in specific entry which are qualification subheadings; we can indicate beds without mentioning furniture, but we cannot indicate the polishing of either beds or furniture without their indication. But as noted under 1·41 an object and a qualification may be treated as a subject without distinction of the qualification by subheading.

1·72 *Form.*

Form is any documentary or literary form of a source of information which may be heading or subheading under which it is entered.

NOTE. See 1·34 Form entry, and note further that the word form is loosely used for some subject aspects, in both alphabetical and classified cataloguing, for example, history is commonly regarded as a form though it is rather an aspect of subjects; we may speak of the historical form of treatment of a subject, but this form is not the same as the periodical, the essay, the dictionary form of a document.

2 SUBJECT SPECIFICATION AND QUALIFICATION

2·1 *Subject differentiation.*

Subjects are to be differentiated or distinguished according to generally accepted opinion and use, and not according to names and/or special opinion expressed in particular documents, or according to the subject cover of particular documents.

EX. Chemistry and alchemy are generally taken to be different subjects; natural philosophy and science or physics are not, and natural philosophy is treated as an obsolete word for science in the sense of natural science. A book on air pollution and cancer is one on two subjects; it may be indexed as one on one or the other or as one on both, that is with two entries, with or without subdivision according to the relation; it may be under Air—Pollution, and /or Cancer, or under Air—Pollution—Effects—Cancer, and/or Cancer—Causes—Air pollution. The indexer determines how a book shall be indexed, not its author or publisher. See also 3·1, 3·8 and 3·9.

2·2 *Subject selection.*

Subjects on which sources of information are to be indicated are to be selected according to the interests of those for whom the cataloguing is done, and may be the essential or principal subjects of the sources indicated, or incidental or accidental subjects.

EX. Cats is the essential or principal subject of a book on cats; information in it on cat foods would be incidental and information on catgut accidental.

NOTE. In a catalogue of books on surgery a book on cats might only be indexed for accidental information in it on catgut. In general libraries and catalogues books are usually indexed for their principal subjects, because no special interests are being exclusively served and ideas of indexing all the essential, incidental and accidental subjects of books, that is ideas of 'universal'

bibliography cannot be realized; everything on a subject can be indexed, but then the indexing is selective in relation to the documents indexed.

2·3 *Subject specification.*

Subject specification in headings shall be primarily by the particular names of things according to the usage of those for whom the cataloguing is being done.

EX. Horses, not Domestic animals or Domestic animals—Horses, or Equus caballus, not Equidae, or Equidae—Equus caballus.

2·31 *Degree of specification.*

Degree of specification in headings shall be that of the documents entered at least to the most specific noun.

EX. For documents on any kind of bank the heading shall include the word bank and shall not be any less specific than banks; it may be as specific as Savings Banks or Banks, Saving or as specific as Piggy banks or Banks, Piggy. For documents on wall beds the heading may be Beds, but for documents on hammocks it must be Hammocks, because although these may be no more specific than wall beds the name in common use is hammocks and not any name including the word bed. All books on banks might be entered under Banks without further specification, but there would be little point or use in analytical entry for a chapter in one of them on Piggy banks unless the entry were under Piggy banks, or Banks, Piggy.

2·32 *Subject classification or class entry.*

Subject classification or class entry shall not be alternative to specific entry, or additional to it.

NOTE. See 1·33. The degree of classification cannot be certain, for example, is Fruit growing or Citrus fruits to be a class heading for books on orange growing; and class entry defeats the specific reference purpose of specific entry because there will be a mixture of general and special literature under the more general heading for the reader to sort out, unless there are specific subheadings, such as Astronomy—Stars, but this must then be selective and misleading, or there must be a complete alphabetico-classed mixed in with a complete alphabetico-specific catalogue, with two conflicting and confusing systems of upward and downward references. In the note to his rule 161 Cutter said the dictionary principle did not forbid double entry but he gave reasons against it.

2·4 *Subject qualification.*

Subject qualification by subheadings shall be by particular names according to the usage of those for whom the cataloguing is being done.

EX. Wool—Classing, not Wool—Grading, at least in Australia, but Cotton—Grading.

NOTE. See 1·41 on qualifications treated as part of the specific subject and main heading, 2·42 on qualification of qualifications by subsubheadings and 2·44 on classification or categorization of subheadings by intermediate subheadings.

2·41 *Degree of qualification.*

Degree or extent of subject qualification by subheadings is entirely a matter of judgment according to number of entries and the specialization of literature under headings.

2·42 *Qualification of qualifications by subsubheadings.*

Qualifications by subheadings may be further qualified by subsubheadings as though they were headings.

EX. Cattle—Diseases—Diagnosis; Law—Study and teaching—Bibliography.

NOTE. Subsubheadings are no more a breach of specific entry than subheadings, merely by being subsubheadings; the questions involved are questions of function and logical consistency, not mere questions of form.

2·43 *Inverted subheadings.*

Subheadings of more than one word may be inverted as though they were headings.

EX. Motor cars—Painting, Spray; Furniture—Trade, Retail.

NOTE. The question as to whether Furniture trade should be treated as a combination of subject and qualification in a heading or as heading and subheading does not affect the question of inverting Retail, which could be inverted in any case. See also 1·41-3.

2·44 *Classification or categorization of qualifications.*

Class subheadings with or without subsubheadings may be used for specific qualifications.

EX. Horses—Diseases, or Horse—Diseases—Strangles for a document on strangles in horses.

NOTE. This choice is itself alternative to another choice of either Horses—Strangles, or Strangles, with a reference from Horses—Diseases and perhaps one from Horses—Strangles. If the disease itself or the name were not peculiar to horses then Strangles as a heading would be preferred, and might even be preferred if it were peculiar. Any classification, or categorization, or grouping of specific qualifications is class entry, and may be considered contrary to specific entry principles. But it has never been certain either in theory or practice that specific entry principles must apply strictly or consistently beyond the heading which has to be the name in common use of the specific thing or object with which the document deals; this gets the catalogue user directly to his specific subject in the most important sense and further subdivision is a matter of judgment. The usage rule more certainly requires Strangles as a main heading than it requires it as a sub- rather than as a subsubheading; another example is Cameras as a main heading rather than Photography—Cameras, or Photography—Appliances—Cameras. The arguments against classification of subheadings for aspects, processes, parts, are not so much those of logical consistency with specific entry in main headings as those against all classification. It reduces the all important self-indexing value of alphabetical arrangement of subheadings as of headings, because it introduces the uncertainties of classification. Intermediate subheadings such as Aspects, Dictionaries, etc., Parts, Processes, Raw materials, may be introduced under a subject such as Motor cars, but the difficulties of classification are those illustrated by history which is commonly talked of as a form and treated as such in some of the classifications, for example DC and UDC, but is an aspect rather than a documentary or literary form in the sense in which dictionaries and essays are documentary and literary forms; again, what general or intermediate subheading covers Abstracts and Bibliographies? A basic distinction of qualifications is of 'aspects' applying to the subject, 'processes' and 'parts' applying to the object, and 'form' applying to the literature; but as the example history shows this is not readily perceived and it is doubtful that it can be applied with much practical advantage. And at least in general catalogues the tendency has been towards no distinction except for subdivision by country, and chronological subdivision, which cannot be arranged alphabetically.

2·5 *Subject subdivided by place and place subdivided by subject.*

Subdivide subject by place or place by subject according to the primary or predominant interest of the literature and its readers.

EX. Australia—History; Education—Australia.

NOTE. The basis of choice is that people interested in things Aus-

tralian, such as the history of Australia, are not usually interested in history generally or of other countries, unless they are interested primarily in the country, as Australians are in Great Britain; but people interested in such things as education are primarily interested in the subject irrespective of country. One test is the exclusiveness of a subject to a country; obviously the history of Australia is not the history of any other country, but whilst education in Australia has its peculiarities it has far more in common with education elsewhere; another test is the prepositional phrase used: we say history of Australia, but education in Australia. But there must be judgment; for example, are economics or economic conditions in or of a country? The fact that we can say either shows that there is a doubt which must be resolved by decision. Double entry is not usual, but cross reference is used, as in History, see also the subheading History under the names of countries, towns, etc., and Australia—Education see Education—Australia. With towns there is more subordination to the town than to the subject, for example, subheadings such as Education or Schools are used under the names of cities and towns rather than the reverse, because the interest is usually primarily in the city or town and then in its institutions. Subdivision of place by subject is more certainly in keeping with the logic of specific entry than the reverse, for example, New England—Birds represents an aspect of New England, but Birds—New England are logically, though not biologically, a species of birds. This was Cutter's example in his rule 164, and as he regarded specific entry as necessarily exclusive of class entry he preferred place subdivided by subject as a rule, or double entry, on the same ground as he rejected phrase inversion, as discussed in 1·43. But in practice the rule given here has been followed, and as discussed in 2·44 country, subdivisions of a subject are usually separated in arrangement, so that there is an actual or implied intermediate or class subheading; so in essence subdivision of subject by place becomes a special application of 2·44. An alternative to subdivision by subheading of place by subject and subject by place is the 'ethnic' adjective covered by 2·51.

2·51 *Ethnic adjective.*

Use an ethnic adjective to specify subjects by people or race when the subject is divisible by people or race rather than by place.

EX. English literature; Architecture, Spanish; Musicians, Negro; French language.

NOTE. The ethnic adjectival phrase is a special case of 1·43 and in the order of the adjective and noun the principles of 1·43 and 2·5 are followed.

3 SUBJECTS, DOCUMENTS AND ENTRIES

3·1 *Subject and document subject.*

Subjects defined in headings are subjects dealt with in the documents entered under the headings, but not necessarily subjects identical or co-extensive with the subject matter and relations of particular documents.

EX. See 2·1.

NOTE. The idea of entering each document under a representation of its peculiar subject in all its aspects and relations, in what Otlet called "toutes les nuances d'analyse ideologico-bibliographique" has had little or no influence on alphabetical subject indexing; it came in with Otlet's UDC but has been rejected since 1948 by at least its British editors. Later schools of 'synthetic' classification, and particularly the Ranganathanite school of 'analytico-synthetic' classification still appear to assume that for classified cataloguing there must be synthetic or compound class numbers "co-extensive with the subjects of the works catalogued". But subject cataloguing is the indexing of information in documents, and not the cataloguing of documents by their peculiar subjects, each in what Ranganathan has called "all its foci, all its criss-cross of subjects and forms and all its interlacings—fully and literally" (Journal of Documentation 9:48-57, Mar. 1953, Indian Librarian 13:9-15, June 1958).

3·2 *General and special subjects of documents.*

A document may be regarded as being on one, or on several subjects, if these are clearly in one general subject or class.

EX. A book on up to half a dozen hobbies or handicrafts may be given an entry for each one or put under the general heading Hobbies, or Handicrafts.

NOTE. Factors influencing decision are the number of subjects and their naming on a title page. A book such as E. M. de Foubert's Every girl's book of hobbies is an example of one likely to be entered as a whole under Hobbies or Hobbies, Girl's, and possibly under Handicrafts, with the further possibility of an analytical entry (1·31) for one or more of the hobbies. N. A. Poole's Simple crafts for girls: weaving, embroidery, bookbinding is an example of one which would probably be entered as a whole under Weaving, and under Embroidery, and under Bookbinding.

3·3 *Subject and subject matter.*

The subject of a document may be its subject matter and/or its theme or thesis or interest or purpose.

EX. A book on mice and their breeding may be on this as a pet-keeping hobby, or it may be one on use and keeping of mice for genetic or psychological experiments. A book on frogs and their dissection might go under Frogs, and under Anatomy, Comparative—Materials—Frogs.

3·4 *One subject one entry.*

Insofar as a document is on one subject it should be entered under that and no other.

EX. A book on traffic or trade in arms should be under Arms traffic or an alternative such as Armaments—Trade, and not under Peace, or Peace and War, but there can and should be a reference such as Peace see also Arms traffic, and War—Causes see also Arms traffic.

NOTE. If everything that relates to a subject is under it then there is unnecessary and confusing multiple entry, and class entry as discussed in 1·33.

3·5 *Multiple subject and multiple entry.*

A document on several subjects not related as species and genus or as subject and qualification or so that the relation is the subject should have entry for each of the subjects on which it is intended to be indexed, however they may be related by cross reference between headings.

EX. A book on ballet and pantomime should be entered under both even though it is then the only book under one of them and there is cross reference both ways, that is Ballet see also Pantomime, and Pantomime see also Ballet. Another example is Children's libraries and School libraries, another Volcanoes and Earthquakes. Cross reference is not a proper substitute for multiple entry of documents on more than one thing; its purpose is only to draw attention to related things; and this holds for cross reference in alphabetical catalogues as it does for indexing in classified catalogues. See also 3·2, 3·4 and 3·6.

3·6 *Cross reference instead of multiple entry.*

When a subject is subject and qualification or subject and further specification make cross reference rather than double entry.

EX. Either Lubrication see also the subheading Lubrication under Lawn mowers, Motor cars, Sewing machines, etc., or Motor cars—Lubrication see Lubrication, Motor car.

NOTE. Motor cars and Lubrication can be related as a subject and a qualification or as a subject and further specification, whereas Ballet and Pantomime in 3·5 cannot be, so that either way motor car lubrication comes within the definition of a subject,

in 1·71, whereas Ballet and Pantomime together do not; they are two subjects.

3·7 *Subject relation as subject.*

A relation between two things may be a subject, for which there may be single entry with cross reference, or multiple entry.

EX. Science and History, with the reference History and Science see Science and History; or History—Relations—Science, and Science—Relations—History. See also under 2·1.

NOTE. The same words may express different relations which have to be distinguished if the indexing is to be more than very rough; for example, Science—History, Science and History, and even History—Science, are different subjects with different literatures; there is a literature of the effect of bacteria on paints and one on the effect of paints on bacteria. For a time exponents of co-ordinate indexing argued that relations were too subtle, or too difficult to express, or that what was called the direction of relation usually didn't matter, as in the relation of blind and venetian in Venetian blinds, and Blind Venetians; the latter would not be likely to occur. This suited the method of indexing by some co-ordination or matching of entries under mere words or 'terms'. Later it was admitted that relations of 'terms' cannot be so sweepingly ignored in indexing.

3·8 *Prejudice in entry and cross reference.*

Prejudice or opinion about a subject must not influence entry under a heading or cross reference to or from it.

EX. Flying saucer literature should not be entered under Hallucinations or under Unidentified flying objects, and the same applies to the literature of religious visions and apparitions. References may be made more freely, but may well be qualified, for example, Hallucinations see also under the names of things sometimes alleged to be hallucinations, Flying Saucers, Loch Ness Monster, Visions, Religious, etc. See also under 2·1.

NOTE. Propaganda, exposure, education, and so on are not the business of catalogues or cataloguing, but in some cases, and with extreme caution, books for and books against something may be distinguished. One of the advantages of specific entry under commonly known names is that the judgment involved in classifying, for example, the Loch Ness Monster, are avoided; but see also 4·3-5.

3·9 *Anachronism in entry.*

Do not enter documents on a subject in one period under the different name of a related subject in another period.

EX. See under 2·1.

NOTE. Anachronistic entry can be prejudicial entry as in 3·8; for example, entering some books on Julius Caesar under Fascism although they do not relate the two, or entering some political movements since Fascism under the same name. Medieval merchant guilds, contemporary livery companies, trade associations, and trade unions are examples of historically related but different things with different literatures. Note that a change in name, as Political economy to Economics, does not necessarily mean a change in subject. On this see also 4·22.

4 SUBJECTS, NAMES AND HEADINGS

4·1 *One subject for a heading and one heading for a subject.*

Insofar as documents are on a subject they should be entered under only one heading for it, and each heading should cover only one subject.

EX. All documents on cicadas, which are insects in the order Hemoptera, should be under Cicadas, though these are commonly called locusts in Australia; and all documents under Locusts should be on the insect of that name in the order Orthoptera. Documents on white ants may be under White ants, or Ants, White, or Termites, but should not be under Ants because they are not true ants or Formicidae.

NOTE. In applying this rule too sharp or special definition should not be given to some words of disputed or vague meaning, such as Culture; if the writer uses the word it is best to enter the book under it and let the student decide whether the book is about what he wants or not. The choice of headings is influenced by certainty of meaning and ambiguous words are avoided or qualified, but of course cross references are made, but on this see 4·3 and 4·6. This rule is one for exclusiveness of heading meaning in relation to the subjects of entered documents. Note also that a synonym may be ambiguous as in the case of locust for cicada, but need not be, as in the case of radio for wireless.

4·2 *Alternative or synonymous names.*

When there are alternative or synonymous names for the same subject generally choose with regard to a balance of the following considerations:

(*a*) degree of common use and understanding by users of the catalogue;
(*b*) comparative freedom from ambiguity;
(*c*) alphabetical sequence of related subjects.

NOTE. (*a*) leaves no doubt in one place or another in choice between Alfalfa and Lucerne, and Radio and Wireless; in each case one is American usage and the other British, that is general

usage; in a botanical library a botanical name might be preferred for Alfalfa or Lucerne, and a distinction might be made between varieties; (*b*) applies in cases such as that exemplified by cicada and locust; (*c*) applies in a preference for Association football over Soccer, but only if football names are inverted as in

Football, American
Association
Australian
Rugby
Rugby League
Union

and even in this grouping Football, Soccer might be legitimately used.

4·21 *Scientific and popular names.*

Use scientific names if they are used by those using the catalogue, or to avoid ambiguity, otherwise use popular names.

EX. Herpes zoster in a medical library, Shingles (Disease) in a general library.

NOTE. Do not confuse latinized names such as apiculture for bee-keeping with scientific names. In countries colonized from Europe plants and animals which are different in species frequently have the same names as European plants and animals resembling them, or of plants and animals previously known in Europe; the scientific species name may then be the only way out, either as heading or as parenthetical qualification of one, but comparatively few libraries have the specialized literature raising these difficulties. See also the following rules under 4.

4·22 *Superseded and current names.*

Prefer current names of subjects generally regarded as the same subject with different names.

EX. See under 2·1 and 3·9.

NOTE. There should be certainty that the subject is the same, and that the new name has become established, for example are information indexing, subject cataloguing, and information retrieval essentially the same in purpose, though there may be different or new methods, and is information retrieval established as a name; documentation with about the same sense appeared to be, but is not now in as much use in book titles or discussion. Added title or even title catchword entry will often bridge a period of uncertainty, but should be kept under review. The danger in too quickly adopting new names is one of breaking 4·1, or being put to finally fruitless labour in altering entries from an old heading to a new.

4·23 *Concrete and abstract names.*

As between an abstract and a concrete name generally prefer the concrete name for concrete subjects and the abstract for abstract subjects.

NOTE. Subjects are comparatively abstract or concrete, that is, they are more or less remote from actual objects, and whilst this rule may help in conveying an idea there is difficulty in giving it exact meaning. We may think of Ornithology as abstract and Birds as concrete, but this is largely because we are not familiar with the Greek words ornis and ornithos meaning bird; ornithology in full then means Birds—Study and teaching, so that it is a compound of subject and qualification of the kind discussed under 1·41, and not simply an abstract synonym for the more concrete name birds. There are still reasons for preferring Birds to Ornithology as a heading, but they are not that Birds is more concrete; one reason is that Birds is commoner usage, and the other is that it allows of separation of the subject and its qualification in the expression and form Birds—Study and teaching. This illustrates the important point that many names loosely thought of as abstract equivalents of concrete names are something more, for example geology, geography, geometry were different studies of the earth, geo, the first and second still are, the third is now something different; geodesy and surveying now have more the meaning geometry originally had. The supposed abstract equivalent can mean more and the supposed concrete equivalent less, for example Government means something less than Politics or Political theory; preference for the heading Government may lead to a neglect of important distinctions between abstract political theory and levels of government such as the parliament level and the public administration level, each with its own literature, and we cannot always manage with a concrete name and subheadings, for example Man and subheadings instead of Anthropology, Anthropometry, Biometrics, or Metals and subheadings in place of Metallurgy and Metallography. In practice the rule as stated tends as far as it can be usefully applied to be the rule discussed under 4·21 of preferring English names such as Beekeeping to pseudoscientific latinized names such as Apiculture, for physical things and their qualifications. On this see also 5·1.

4·24 *Names of things according to age, size and sex.*

Do not use names distinguishing things by age, size or sex unless there is a body of separate literature to be catalogued.

EX. Use Children in all catalogues, but do not use Ponies, Puppies, Kittens, Tadpoles in all catalogues.

4·25 *Names of things according to order.*

Use adjectival phrases expressing or implying order, usually in inverted form, whenever there is specialized literature.

EX. Education, Primary; Education, Secondary; Egypt, Ancient; Egypt, Modern.

4·26 *Plural and singular names.*

Generally use names in the plural as headings.

EX. Cats not Cat, Maps not Map.

NOTE. There used to be a preference for the singular, and Cutter uses Cat in illustrating specific entry in his rule 161. The plural form seems now preferred in most headings, probably because it avoids the awkwardness of an understood or appended 'the'. There is also the reason that if we prefer for example, Maps—Reading to Map reading the plural form fits in better with subheadings, which allow of a more useful grouping in arrangement than the separation of Map printing, Map reading and so on, from Maps—Conservation, Maps—Symbols, Maps—Terminology, as in Congress headings. On this see 5·1-2.

4·3 *Ambiguous names.*

Avoid ambiguous names as headings under which entries are made and if unavoidable clear away the ambiguity, preferably by an adjectival phrase usually inverted.

NOTE. For examples and for argument against definitive words in round brackets or parentheses see 1·44 and 4·1-2. Names are frequently ambiguous as headings because they are general rather than specific names; their meaning is clear in contexts such as, the shells of the seashore, and, the shells in the ammunition dump, but not alone as headings, and cataloguers in deciding on a name for one meaning which they have in mind often forget that the name can have other meanings, or that it is widely generic. Congress has such headings as Stability of aeroplanes, Stability of ships, and Social stability, but it also has Stability by itself, and only the appended class number and the references in its subject headings list give an idea of the special meaning it is supposed to have, which has something to do with physical dynamics and equilibrium. Both inverted adjectives and subheadings can be used in specifying generic terms, as in Style, Literary, and Typewriting—Style manuals, both used by Congress. But it uses Condensers (Electricity) and Condensers (Steam) instead of Condensers, Electric and Condensers, Steam or Electricity—Condensers, and Steam—Condensers. A generic or ambiguous name such as stamps is likely to attract entries for documents on subjects as different as Stamps, Postage and Stamps, Rubber. Conjunctive

phrases, discussed under 5·3, are sometimes to provide definition, as in Courts and courtiers, and Arms and armour; but the latter has been known to get under it literature on medieval arms and armour, on coats of arms or heraldry, on the armaments industry, and on bulletproof waistcoats.

4·4 *Prejudicial names.*

Avoid names as headings which may be indicative of prejudice.
EX. Use Unemployment relief, not Dole.

NOTE. This rule is on the choice of name for a heading; see also under 3·8-9 for prejudice in choice of heading for a subject, and see also 4·5 on Slang and metaphorical names.

4·5 *Slang and metaphorical names.*

Avoid slang, metaphorical and euphemistic names for headings under which entries are to be made unless they are commonly used and can only be replaced by awkward circumlocutions, which might themselves be regarded as euphemisms.
EX. Do not use White plague for leprosy, or tuberculosis or venereal disease, but use White slave traffic and not some made up name such as Enforced prostitution; similarly with Drug traffic. For popular or colloquial names which are not slang see 4·21 and 4·23, and see 4·7 for trade names.

4·6 *Title words as subject names.*

Prefer title words as headings provided other rules are not broken.

NOTE. Cutter's rule 172 was "Enter books under the word which best expresses their subject, whether it occurs in the title or not", and he added the comment: "it is strange that the delusion ever should have arisen that 'a catalog must of necessity confine itself to titles only of books.' " The delusion arose because cataloguing for a long time meant cataloguing and indexing books by and from their own descriptions, whereas it now covers indexing by independent subject headings, and there has arisen an almost opposite delusion that documents must not be entered under title words. Cataloguers often assume too easily that because they are unfamiliar with a subject and its name as given in a title the name is not common usage; they also think that by giving the subject a name by which they explain the subject to themselves they are explaining it to the catalogue user, but this defeats the basic purpose and method of the catalogue, which is to enter documents under known subject names in a known order. The use of a name by an author and/or a publisher must be taken as evidence that the name is one in common use, unless the contrary can be established. The use of the same name in the titles

of several documents is added proof that it is the subject name under which readers, and reference staff, are most likely to look. But the mischief is often done with the first document catalogued; a heading is established, in an example Metal powders for Powder metallurgy, for the first book entered, and this is then followed for others, with the cataloguer never seeing all the entries together if he does not file as well as make entries on cards. The use of title words as subject headings does not mean that any form of title entry can be substituted for subject entry, but title entry may supplement subject entry when subject name is in doubt, as discussed under 4·22. Metaphorical titles must of course not be taken as literal, for example a book called Water into gold is on farm irrigation not on the extraction of gold from sea water.

4·7 *Trade names.*

Do not use trade names unless they have come into common and unprotested use and have no commonly known alternative.

EX. Linoleum, but not Vaseline, which is the name of a special make of petroleum jelly in which the makers still claim exclusive rights.

NOTE. Loose use of trade names often leads to a confusion of subjects, for example the names Roneo, Gestetner, Mimeograph, are commonly used as nouns and verbs not only for stencil duplicating, but also for spirit and offset duplicating, and in reverse a spirit duplicating trade name, Fordigraph, is used for stencil duplicating. Even Congress uses Mimeograph as a heading for entries. Trade interests often foster this kind of confusion.

5 MULTIPLE WORD SUBJECT NAMES

5·1 *Single and multiple word names as alternatives.*

Choose between single and multiple word names having regard to

(*a*) the name in common use in accordance with 2·3;

(*b*) the possibility of grouping species in a genus or class by inversion in accordance with 4·2(*c*);

(*c*) the possibility of expressing and grouping qualifications by subheadings in accordance with 1·41 and 2·4.

EX. With regard to

(*a*) Ethics, not Moral philosophy or Philosophy, Moral;

(*b*) Horses, Riding not Hacks;

(*c*) Maps—Drawing,—Printing, etc., not Cartography.

NOTE. The temptation is to get too far away from the basic principle of (*a*) in pursuit of the possibilities of (*b*) and (*c*), but the possibilities of (*b*) and (*c*) are not exploited enough because of vague fears of breaching the common usage or the specific

entry principle. For example, Congress scatters sixty-two species of Dog all over the alphabet, using such headings as Airedale terriers, Alan (Hound), Basset-hounds, Beagles (Dogs), Bloodhounds . . . Old English Sheep dogs . . . Wire-haired pinschers. This illustrates the way in which specifying adjectives often become specific nouns in common use, but they can still be used as adjectives; why not Dogs, Airedale terrier, Dogs, Alan hound, and so on even to Dogs, Bull- which may look a bit silly, but is no sillier or more unfamiliar than many headings. The catalogue user is likely to look under Dogs first, and one of the criticisms of the specific entry alphabetical catalogue is met if he finds all dogs together, without really doing violence to established specific entry theory and practice. Congress breaches at least the forms of specific entry with its Cookery (Apples), etc., illustrated in 1·44, and with its Shorthand subdivided by system, e.g. Shorthand—Gregg; it probably has special literature on at least as many kinds of shorthand as kinds of dog, and Shorthand, Dewey . . . , Gregg . . . , Pitman . . . , Shorterhand, work quite well and are in accordance with the accepted inverted adjective form. Subheading possibilities and limitations are exemplified in 1·41 and 4·26, with reference to Congress headings.

5·2 *Hyphenated words.*

Prefer words as a phrase or made into one to hyphenated words.

EX. Water marks or Watermarks to Water-marks.

NOTE. The hyphen of the hyphenated word and the dash of the heading and subheading can be confused in making, arranging, and consulting headings, and the former requires understanding that it is not separated from phrases in filing; the Congress order is Water—Purification . . . Water gardens, Water-gas, Water gates . . . Water-supply, Water-supply—Accounting . . . Water-wheels, Water-worship, Waterfalls . . . Watersheds, Waterspouts.

5·3 *Words joined by 'and' and 'as'.*

Use phrases in which words are joined by 'and' or 'as' when the things joined are not likely to have separate literatures and when the subject is the relation of the two things and is not better expressed in a heading and subheading form.

EX. Locks and Keys; Bolts and Nuts; Parent and Child; Women as authors; but not Bats and Balls, or Gold and Gold mining.

NOTE. See also 3·7 and the note to 4·3. Headings such as Gold and Gold mining are likely to attract what is not even a broad class of specific subjects, but an unrelated miscellany. For such relations as Art and Psychoanalysis multiple entry under, in this case, Art—Theories, Psychoanalytic, and Psychoanalysis—Applications—Art theory is preferable. A heading such as Women as

authors may be necessary to distinguish literature on the question of women as authors from literature simply on women writers.

5·4 *Words joined by prepositions.*

Prefer adjectival or conjunctive phrases or heading and subheading to prepositional phrases.

EX. See under 1·43.

NOTE. There may be need to distinguish, for example, School libraries, the Library in the school, that is the school library as a teaching instrument, and Libraries and Education, that is libraries generally in education generally. Relativity, Philosophical is preferable to either Relativity (Philosophy) or Relativity in philosophy. Consider also Animals—Drawing; Animals—Pictures or Animals—Illustrations, and Animals in Art.

6 CROSS REFERENCE

6·1 *Cross reference between entries.*

Make cross reference between entries only to save repetition of entries for editions of the same work.

EX. See under 1·51.

6·2 *Cross reference between headings.*

Make cross references only to indicate preferred synonyms and relations between subjects.

EX. Radio see Wireless; Domestic animals see also Dogs; Ballet see also Pantomime; Pantomime see also Ballet.

NOTE. Cross references are not a substitute for multiple entry of the same document on different things, but see under 1·5 and 3·5-6.

6·3 *See references between synonyms.*

Make see references from rejected to preferred synonyms.

EX. Alfalfa see Lucerne.

NOTE. See references are only made from a heading under which there are no entries to one under which there are entries.

6·31 *See references from specific to generic or class heading.*

Do not make see references from a heading to a more general heading.

EX. Dry cleaning see Cleaning; Cleaning and dyeing industry.

NOTE. This and many others such as Milk substitutes see Food substitutes are in the Congress subject headings list. They are

wrong because they imply class entry; as shown under 2·31 specification in a heading may not be as specific as that of some of the documents entered under it, but the see reference 'up' shows recognition of the specific subject, and if it is recognized then there should be entry under it, and reference down, not up. The objection may seem merely theoretical, but if there is to be this upward see reference in some cases of limited specification then it must be considered for all; for example Congress probably has literature specifically on the cachalot or sperm whale, but it only has the generic heading Whales, and does not refer to it from Cachalot or Sperm whale, and similarly with billiards and species of billiards, and many other subjects.

6·4 *See also references from a heading to a more general heading.*

Do not make see also references from a heading to a more general heading, except possibly in some special cases in some catalogues.

EX. Glaciers see also Geology.

NOTE. These are sometimes made, for example in children's libraries, on the ground that the including class is not likely to be known or thought of, and then usually in some such form as see also chapters in books on Geology listed under Geology. The objection to 'upward' see also references is essentially that against class as well as specific entry discussed under 1·33 and 2·32. The assumption is that the reader wants specific or specialized literature, and does not want to be referred to more general literature, which he may just have left. It may be argued that if there is nothing specialized then there should be an upward see reference to more general headings, which he might not know; but systematic upward reference, either see or see also, is generally considered to be one of those things which would take more labour and space, and make more confusion than it would be worth.

6·41 *See also references from general to less general headings.*

Make see also references from general to less general headings, but only from those considered immediately more general.

EX. Chemistry see also Chemicals; Chemicals see also Acids; but not Chemistry see also Acids; Ethics see also Duelling; Manners and Customs see also Duelling.

NOTE. References are only made to headings with entries under them, but may be made in the see also form from headings under which there are, at least for the time being, no entries. There may be the see also reference from Chemicals to Acids, though there is nothing under Chemicals, but there cannot be the reference Chemistry see also Chemicals until there is something under Chemicals. There can be reference from more than one more

general heading, as to Duelling from both Ethics and from Manners and Customs. There can be, if the entries permit, a chain of 'downward' references as from Science through Chemistry and so on down to Acid, Sulphuric, and there can be more than one chain, none being determined by the hierarchical class number of the finally specific subject in any classification, even though the number may be used for the classification of the specific literature on the shelf. For example a book on Duelling may be classified by DC with either the number 179·7, or the number 394·8, or even the number 796·86, but none of these numbers will in any way determine the number and the steps of the chains of downward reference which may ultimately lead to Duelling as a subject heading. The theory of 'chain procedure' indexing as applying to headings and references of the alphabetical catalogue as well as to the indexing of the classified catalogue seems to have begun with Ranganathan, especially in his book Theory of catalogue, 1938, but despite some assertions to the contrary, as in Coates' The Use of BNB in dictionary cataloguing (Library Association Record, June 1957), no authorities on the dictionary catalogue such as Cutter and Pettee, to whom he refers, have ever given it any support. Different chains of downward reference leading to the same subject need not be exclusive at every point, for example chains leading from Manners and Customs and from Fine Arts down to Brooches will merge at Jewellery.

6·42 *See also references between co-ordinate subjects.*

Make see also references between co-ordinate or collateral subjects if they have something in common, and make them to and from if and when there are entries under them.

EX. Ballet see also Pantomime, and Pantomime see also Ballet.

NOTE. This example in relation to entries is discussed under 3·5. These references are not made between subjects merely because they are in the same class, for example between Beds and Chairs because they are both Furniture; there is the common miming factor between ballet and pantomime, and this and not their inclusion in the class theatre is the reason for the reference, so because of the common factor children there is cross reference between Children's libraries and School libraries, which there is not between Reference libraries and Lending libraries.

6·43 *See also references from headings to subheadings.*

See also references are made from names as headings to the same names as subheadings.

EX. History see also History under the names of countries.

NOTE. For discussion see under 3·5-6 and 2·5.

6·5 *When references are made.*

Make references only when there is entry under the heading referred to.

NOTE. For discussion see under 6·41.

6·6 *References and classification.*

Do not use subject classification or class numbers to determine references.

NOTE. For discussion see under 6·41.

7 PUNCTUATION OF HEADINGS

7·1 *Dash for subheadings.*

Use a dash to introduce subheadings.

NOTE. The choice of signs is not important, their consistent and exclusive use for the same purpose or function is. In the alphabetico-specific catalogue the function of the dash is to mark qualifications used to subdivide the literature of a subject as discussed under 1·41. It is then also a sign for the grouping of these qualifications under a heading; if they are not grouped but mixed with inverted adjectives as in some arrangements, then indiscriminate use of the dash for both subheadings and inverted adjectives will not matter. This applies to all punctuation. On possible confusion of the subheading dash and the hyphen of hyphenated words see 5·2.

7·2 *Comma for transposed adjectives.*

Use a comma between nouns and adjectives placed after them.

NOTE. See 1·43 and note to 7·1.

7·3 *Brackets for extra definitions.*

Use round brackets for definitions placed after headings and not regarded as part of the name.

NOTE. See discussion under 1·44 and 5·1, and note to 7·1.

8 ARRANGEMENT OF HEADINGS AND ENTRIES

8·1 *Order of headings.*

Arrange headings alphabetically but with all extensions of a word by other words coming before the same word or group of letters extended to make another word.

EX. Water, Water—Purification, Water, Holy, Water polo, Waterproofing, Waterfalls,

NOTE. See also under 5·2. There are alternatives, usually stated as those of letter by letter, word by word, and logical. The textbooks and codes of arrangement such as the ALA Filing rules should be studied, and some rules followed. As shown under 7·1 consistent punctuation is all important as a guide to arrangement in actual filing, but there can also be separation of country subheadings without special signs. Arrangement is complicated when as is usual there is the mixture of author, title, and subject entries of the dictionary catalogue, and a rule for the same word meaning Person, Place, Subject, Form, Title, or some of these, has to be applied; for this see a code such as the ALA code.

8·2 *Order of subheadings, inverted adjectives and parenthetical qualifications.*

Arrange subheadings, inverted adjectives, parenthetical qualifications after the same heading in that order.

NOTE. Congress places parenthetical qualifications before inverted adjectives. But on its mixed use of parenthetical qualification see 1·44 and 5·1.

8·3 *Order of entries under a heading.*

Entries under headings and any extensions of them are grouped first according to the headings and their extensions and then usually arranged by author and/or title, but they may also be arranged chronologically by dates of publication.

9 SUBJECT HEADINGS LISTS

9·1 *Subject headings lists and choice of headings.*

Subject headings lists must not be used as a source of headings to the exclusion of headings not already in them.

NOTE. No list will cover all subjects which will come up, and if all documents are forced under one or another heading of an existing list then the rules for alphabetico-specific entry must be broken, unless there is a rule that documents are to be entered under the headings in the list which come nearest to corresponding with their subjects and under no other. A subject headings file may be kept as a compilation aid or tool, and this may be a subject headings list with additions.

CUTTER'S RULES

This appendix supplements 11·1 for the student who may be required to have a knowledge of Cutter's Rules as a code for the subject catalogue, and for anyone who wishes to go back to the first, and still only generally accepted and authoritative code for alphabetico-specific entry. A more up-to-date and detailed code has been attempted in Appendix H, but it stands only on its own persuasion, and cannot claim the authority that was given to Cutter's Rules, at least before Congress cataloguing and its subject headings list, and Sears' abridgment of this became authorities, as discussed in the introduction to Appendix H.

Space will not allow the Rules themselves and the much more space-taking notes on them to be quoted here, so this appendix to be used effectively must be read with Rules for a dictionary catalog by Charles A. Cutter, 4th ed. rewritten, Washington, 1904, and reprinted by the Library Association, London, 1935. References to the Rules in Appendix H are made in the form of H1·1, to distinguish them from references such as 11·1 to the body of this book. Cutter's Rules particularly on subject entry and cross reference are those in A Entry, 3 Subject catalog 161-188, but others are relevant on the organization of the dictionary catalogue and on subheadings. Many of them are descriptive statements rather than directions, but they are nevertheless useful, and the notes, and some of the preceding Definitions in alphabetical order are still more useful. Definitions which should be especially studied are those under Alphabetico-classed, Card catalog, Catalog, Class, Class mark, etc., Dictionary, Entry, Individual entry, Main entry, Reference, Relative location, Shelf list, Specific entry, Subject, etc., Syndetic. The following numbers are his 4th edition Rule numbers.

113–14 These bear on the differences in economy between page and printed catalogues, as quoted in 4·7.

161 On this see 11·11. His difficulty over the absence of specific names is discussed in 2·4, 4·3 and 8·2. His particular case of movement of fluids in plants is now met by Plants—Circulation, but whilst he thought of some subheadings for what he called topical subdivision of titles under headings in 340 he did not rationalize subject qualifications or aspects in subheading form, as in H1·41, H1·7 and H2·4. Note that he does not exclude class entry additional to specific entry; this is discussed in H1·33 and H2·32.

162–3 This is fairly obvious practice.

164–5 See H2·5. He makes much of the distinction between individual or species member and species, but for subject indexing purposes the distinction seems unimportant, and misleading; we may be less particular than a document, but as particular as an individual; on this see 4·2.

166 This holds, but involves judgment.

167–75 (*The headnote*) See 11·12. He makes following usage appear to follow on specific entry, but it is really the idea of entry under known, or used names in a known order that brings in specific entry, because names are specific, as discussed in 4·3, specific, that is, without relation to any class. But because specific entry became the cart which he put before the horse he made avoidance of class entry a rule rather than what it is, the usual but not the only result of following usage, even with the English language. On this see H1·43, and 4·4.

167 For Emigrés Refugees might now be used, and sometimes a distinction is questionable, for example are French colons in Algeria different from British colonists in eighteenth-nineteenth century Australia, who were even then called Emigrants, that is from Great Britain, and would now in Australia be called Immigrants or Migrants, that is into Australia.

168-9 See H4·2 and H4·2-23. Note that 169(d) does not apply to a card catalogue, and that (e) has little application unless inversion is allowed.

170 Use both headings with cross reference, and prefer entry according to the name used by the writer; see H4·1.

171 The subjects should be objectively opposite, not just the words; atheism as a subject is not the opposite of theism in the way free trade and protection are the opposite of each other.

172 See 11·13 and H4·6.

173 See 12·9 and H1·44 and H4·3. He states this rule again under Style 217, and Arrangement 339.

174–5 In these two rules and the accompanying pages of notes he argues without coming to much conclusion of present value, mainly because he excludes inversion as introducing class entry and does not get down to the use of subheadings for qualifications or aspects, though he does in the note to 175, as in the note to 165, show recognition of the logical difference between species and quality, or aspect. See H1·43 and H5. However, in the light of continuing and increased muddle of specification and qualification since Cutter's day the merit of his struggle with compound subject names should not be underestimated.

176–9 (*The headnote*) It is not quite clear how far and in what way Cutter would substitute cross reference for added entry. He speaks of entry "under each distinct subject" and makes it his rule 176 to "enter a polytopical book under each distinct subject". But he speaks also of entry "under many other headings by way of cross reference", and he talks of economies, in the page form, printed catalogue, which "put the reader to some trouble" but are justified by economy; the economies are cross reference in place of multiple entry and he says "the want of uniformity produced by this mixture of reference and double entry is of less importance". This is in the notes to rules 176 and 178. What he may have meant by entry "under many other headings by way of cross reference" is that a book entered, for example, under Stars is also under Astronomy by way of the reference Astronomy see also Stars. But he also proposed to avoid double entry by cross reference which would not otherwise be made, as discussed in 4·7 and 11·21; his motive is however that of economy in the printed catalogue, and he showed in his rules 113-14, and 148, that he understood that the same economy is not required in the card catalogue. On this see 1·6, 1·8, 5·5 and 6·12. It is important for understanding to realize that Cutter's rules were originally "Rules for a printed dictionary catalogue" and intended to meet its peculiar problems.

177 See H3·2.

178 What he seems to have in mind is such cross reference as Australia—Education see Education—Australia, which is accepted in the card catalogue. See under H2·5.

179 See H1·51.

180 He allows form entry for Encyclopaedias and the like in his rules 189-92 on Form entry.

187–8 The headnote and the footnotes to these rules for cross reference are an important statement of differences in function and method between the alphabetical and the classified catalogue. On an attempt to make his discussion of a "synoptical table of subjects" support the idea of deriving headings and cross references from class numbers see Appendix F. On actual cross reference see 11·22-23 and H6.

194(d) This gives basis for judgment in making analytical entries. See 1·8, 11·2 and H1·31.

217 This repeats in essence his rules 173 and 339 but gives the form for distinguishing the word in different senses discussed in H1·4.

285 This points out that no entry is made under an entry from which there is a 'see' as distinct from a 'see also' reference, which should be obvious from the sense.

300 See 12·3.

339 This is essentially his rules 173 and 217.

340–3 This is the nearest Cutter gets to subheadings, but he does not think of his groupings of entries under a heading as being covered by subheadings which are logically related to the headings as qualification to specification and he is troubled by some of the feeling discussed in H1·41, H1·43, H2·4-44 that any subheading may mean alphabetico-classed entry, although as noted under 174-5 just above he did have some idea of the distinction between aspect and species. Note that he subdivided country by subject for many things such as language for which the ethnic adjective is now commonly used, and his discussion is almost entirely in terms of subdivisions under country, which he prefers to the reverse, as discussed under H2·5. He does not discuss the now common subdivision of subjects by aspect and process, though he did use a few process subdivisions in his own Boston Athenaeum catalogue, as shown by Cattle—Diseases in 3·6. The little he has to say about what are now regarded as subject subheadings is far away from his subject rules, in his arrangement rules, because he is thinking only of breaking up entries under a heading when he comes to arrangement; this is a practical reason for subheadings still, and they are commonly only used to break up entries under a heading, but there has been some realization of their logical relation to headings, and Kaiser based his whole idea of heading and subheading as expressing his Concrete and Process on the logical relation of specification and qualification. He does not seem to have realized that Cutter had laid the foundation of at least his specification or Concrete.

On Kaiser see Appendix J.

Appendix J

Kaiser's Systematic Indexing

The only published and comparatively well-known, but still too little known advance on Cutter's rules for his specific entry is in Kaiser's Systematic indexing, published in London in 1911. It has however, not been recognized as such, even by its author. Kaiser himself only discusses Cutter's Expansive Classification in an exhaustive rejection of classification as a satisfactory method of information indexing; he does not refer to Cutter's Rules, and if had read them does not appear to have seen his own system, with its very different terminology, as a further rationalization of Cutter's specific entry. Cutter is thinking of cataloguing literature, not of indexing information, and in this direction Kaiser's thinking is important, original, and fundamental, certainly not anticipated by Cutter and only caught up with now in a muddled way; but Cutter's specific entry is equally applicable to information indexing, and what Kaiser preferred and developed as a method of information indexing as distinct from literature cataloguing, is Cutter's specific entry, although, unfortunately, his terminology is different from Cutter's and that of librarianship generally, and for this reason and because he reasons so sparely with little explanation for minds less acute than his own, he is not easy to follow. He has, too, been identified with alphabetical indexing because of failure to realize that his premises are common to all types of indexing, and as most of the thinking on information indexing, on analysis, synthesis, and so on, has come out of the classified camp, he has been labelled and dismissed.

He was born on 10th March 1868, in Stuttgart, Germany, and went with his parents to Australia at the age of nineteen. Until 1892 he worked in Australia as a teacher of languages and music; he does not seem to have learnt any librarianship in Australia, although in a few libraries he would have learnt it at least as well there as in Great Britain; his connection with Australia was not known to Australian librarians until recently, and his book had less influence or effect there than in Great Britain. He went to South America in 1892, but does not seem to have had any connection with the New Australia socialist community which went from Australia to Paraguay in 1893. In 1896 he went to Philadelphia and entered on library work, apparently for the first time, with the Philadelphia Commercial Museum. In 1899 he went to London and worked with the British Westinghouse Company, the Tariff Commission, and Nobel's Explosive Company, as an indexer and librarian. In 1908 Pitman published his Card system

in the office, and in 1911 his Systematic indexing, as related works in a series by him, but not taken further. Although a British subject his name and appearance made him unpopular on the outbreak of war with Germany in 1914. He went to New York in 1916, and worked on literature searches in the Engineering Societies' Library and on indexing for the Engineering Index, until he went to the Hercules Powder Company on 10th January 1927, only to be knocked over by a motor car and to die from his injuries on 2-4th February 1927. These details are mainly from an obituary notice in the Hercules Mixer, published by the Company. In his Systematic indexing he says it is "essentially the same as drafted at the beginning", in Philadelphia in 1896-1897.

His book is the principal authority for his theory and practice, but there is also a shorter and more easily read account of it by himself, but with discussion, in ASLIB, 3rd Conference proceedings, 1926; its theory is also discussed in the present writer's Information indexing and subject cataloguing, 1957, and there is a textbook account of it in Holmstrom's Records and research in engineering and industrial research, at least in the first two editions. Holmstrom points out that there was not the propaganda for it which there was for UDC, and efforts by a few disciples to have it discussed at ASLIB conferences were met by the kind of presumptive ridicule from Bradford and others that Ranganathan has heaped on Cutter; it was alphabetical so it couldn't be scientific. In sheer capacity for really scientific and logical thinking Kaiser's was probably the best mind that has ever applied itself to subject indexing. But he had none of the propagandist organizing inclinations of Otlet and Bradford, or the bubbling stewpot exuberance of Ranganathan.

The system as detailed by Kaiser includes a particular form and order of entry, cross reference up and down by means of guide cards, and added entry under country wherever there is subdivision by country, but this may be only because he was dealing particularly with the indexing of commercial information and did not generalize his system. This is another reason why its fundamental and general application has not been realized. But its variations from the common forms of cataloguing do not alter its essentials, which may be more easily understood if it is explained more in the usual terms of dictionary cataloguing than in his own, except for Concrete and Process which have become fairly widely known.

His interest is wanted information wherever found, in whatever context it is found; he contrasts the indexing of information with the cataloguing of books, and is one of those who has tried to keep the word cataloguing to the cataloguing of whole books and even to cataloguing by title catchwords. He says, "we must try to dissociate INFORMATION from literature; we do not want books, we want information, and although this is contained in books, it should be looked on as quite different material". He indexes wanted information, however

brief, but he is not attempting universal or complete indexing or bibliography, as discussed in 1·8; he is being highly selective and therefore he can afford to be exhaustively analytical. He might not enter Lady Cust's book on the cat under cat at all, but supposing an excursion in it on catgut and its sterilizing for surgical purposes, he might enter the information under Catgut—Sterilizing, in the form of an abstract with a reference to the source. The heading and subheading, Catgut—Sterilizing, would then be his Concrete and Process.

Basically he regards all information as 'processes' or qualifications of 'concretes'; to give the heading Catgut—Sterilizing is to begin a piece of information on catgut continued in the abstract. An important point is his insistence on Concretes AND Processes; he then tried to reduce all subjects, whether real or imaginary, to concrete things, allowing only some forms of work or labour, such as engineering, to be either Concrete or Process. He also tried to reduce all compounds of Concrete and Process such as Agriculture, Bibliography, Bookbinding, Milk supply, to the heading-subheading form, and perhaps only in this did he confuse philosophic theory, which might now be called semantics, with true indexing theory and practice. He substituted Land—Cultivation for Agriculture, Books—Description for one sense of bibliography, even Children—Instruction for Education. He was insistent that a rule would not be a rule if there were exceptions; but one rule may be subject to another, and it is a rule or a fact that subjects are subjective; whatever the mind chooses to distinguish or compound as a subject is a subject; this might not affect indexing, but another rule or fact does. The known name in a known order must be the starting point in all indexing, as discussed in 2·4.

He saw that in communication we have only names to talk with and about, and this was one of the reasons why he distrusted classification, because it is always an attempt at a definition; yet he forgot that if we turn Agriculture into Land—Cultivation we must still make a reference, and hardly get any useful indexing or classification under Land, and that Milk supply is thought of as a subject distinct from Milk. But this insistence on Concrete and Process without exception is a minor blemish, and in many cases it is useful in indexing to drop such compound terms as Cartography and Apiculture, and substitute Maps with subheadings, and Beekeeping, if not Bees—Keeping, even Books—Binding, and Wallpaper—Hanging.

Kaiser is difficult reading, especially in the 1911 book, but in the final understanding he always makes sense, and very important sense, as so many of the classification theorists do not, with their superficially easy to read statements about evolution, consensus, fundamental facets, and so on. And most importantly he shows the importance in indexing of a distinction between the specification and the qualification of things in literature, which cannot be made as systematic or consistent as he tried to make it, but can be made much more so than it is at

present, to the great benefit of index compilation and consultation. His name should always be linked with Cutter's, or Cutter's with his, but it should not at the same time be forgotten that like Cutter he talked more sense about classification, and the fundamentals of all methods of indexing, than most of the classification enthusiasts, who still do not seem to realize that one of their difficulties is the continuing confusion in classifications of subject qualification in main class tables and in auxiliary tables, and in later years in over-categorized and cross-divided auxiliary tables.

Exercises

For general directions see 14·9. DC numbers given in answers are 14th edition numbers.

1. Rearrange the subjects in the following groups in alphabetical and in DC numbered classified order, side by side, and compare the effect of the two arrangements on grouping (see 1·5).

Algebra	Bacon—Cooking	Boy Scouts	Cotton—Growing
Geometry	Bacon—Curing	Girl Guides	Cotton—Spinning
	Pigs—Farming		Cotton—Trade

Grapes—Growing
Wine—Making

Sheep—Farming
Mutton—Freezing
Wool—Trade

2. To be attempted without reference to the DC tables or index. Write out the First summary of DC. Reason out why the classes are numbered 0-9 and not 1-10. Write each of the following more special subjects and books beside the class to which you think it belongs or to which it could be best fitted: Economics, Encyclopaedia Britannica, English Poetry, English Grammar, Electric Engineering, Ethics, Ecclesiastical History, Etchings, Evolution, European History, Journalism, Patriotism, Judaism, Socialism, Etymology, Geology, Physiology, Aesthetics, Poetics, Genealogy.

3. Give the form figures and the form represented in the following DC class numbers, explain how the decimal point is related to the form figures, say why the forms are called mnemonic, and try to distinguish three groups into which the forms might be divided (see 2·5, 9·2): 601, 630·2, 633·103, 633·1104, 605, 606, 607, 608, 609.

4. Think of 636·7 as representing a subject hierarchy as follows:

Useful arts	6
Agriculture	63
Domestic animals	636
Dogs	636·7

Think why a book on dogs would have this number on the shelves and in a classified catalogue and why in a dictionary catalogue according to Cutter's Rules it would be entered straight under Dogs in alphabetical order, and why this entry is called specific, and entry under 636·7 classified, although both 636·7 and the name Dogs specify dogs.

5. Give two or more examples of DC numbers in which the figures are not consistently representative of the hierarchy of the classification and say why this must be true of any classification and its notation, and whether or not it matters much.

6. Explain and illustrate subject subdivision in DC by form or qualification and by further specification of the subject.

7. Explain the difference between
   (*a*) 636·3;
   (*b*) Animal husbandry—Sheep;
   (*c*) Sheep farming
   as a heading for such a book as E. H. Pearse's Sheep farming and station management.

8. Give the DC class numbers of the following subjects on the left and numbers of other classes in which they might have been placed on the right, for example:

   383 Postage stamp collecting 76

   (Note that coin collecting is 737·4, not an extension of 332.)

   Boy Scouts; Military science; Domestic trade; Debating societies.

9. Write DC's numbers and order of the social sciences on the left and what you think a better order of the social sciences on the right.

10. Write shortly on the statement that subjects must have an order in a classification, but what matters is subject grouping not subject order.

11. Write a note on (*a*) what Panizzi meant when he said that an index to a catalogue would give information on the books on a particular subject, "as far as it can be obtained from a title page, which is all that can be expected in a catalogue" (3·4); (*b*) what Crestadoro meant by an index-catalogue (3·5); (*c*) what Billings meant by an index-catalogue (3·5).

12. Explain what is meant by modulation in classification and give examples from DC.

13. Give two class numbers in which

(1)	7	signifies	the United States	(11)	4	signifies	Europe
(2)	7	„	humour	(12)	4	„	synonyms
(3)	7	„	education	(13)	5	„	Italy
(4)	7	„	Latin	(14)	5	„	periodicals
(5)	3	„	a dictionary	(15)	5	„	Italian
(6)	3	„	German	(16)	5	„	grammar
(7)	3	„	fiction	(17)	1	„	American
(8)	3	„	Germany	(18)	1	„	poetry
(9)	4	„	essays	(19)	1	„	philosophy
(10)	4	„	French	(20)	1	„	Scotland

   and in each case add a third class number containing the given figure, in which it has a different meaning.

14. Assign class numbers for books with the following literal descriptions:

Dictionary of chemistry.....
Dictionary of English history.....
Dictionary of pure science.....
England in Tudor times.....
General Encyclopaedias.....
History of arithmetic.....
History of astronomy.....
Essays on engineering.....
How to study geology.....
Periodical on botany.....
A general periodical.....
Theory of education.....
History of New South Wales.....
History of World War I.....
Essays on journalism.....
Transactions of the Chemical Society.....
Periodical on European history.....
Local government in England.....
History of China under the Manchus.....
Essays on English poetry.....
The French Revolution.....
Agricultural gazette (a periodical).....
Essays on French essays.....
History of Oregon.....
History of Sussex.....
Geology museum.....
Art museum.....
Patents.....
History of philosophy.....
Philosophy of history.....
History of wireless.....
Essays on local government.....
Journal of the French Historical Society.....
An English dictionary.....
Dictionary of mining engineering.....
General societies.....
Dictionary of applied science.....
Encyclopaedia of agriculture.....
Encyclopaedia of field crops.....

15. Put the following DC numbers in numerical order with the corresponding subject names:

e.g. 100 Philosophy ..... 900 History

929·5; 121; 575; 942·67; 616·942; 621·32; 598·91; 265·65; 738·4; 330; 820; 412.

16. Without reference to the Index give DC class numbers for the following, and write a critical note on any three of the classifyings: Encyclopaedia Italiana; Anglo-Saxon literature; Criminology; Commerce; Business methods; Engineering materials and tests; Ballet dancing; Grand opera; English ballad poetry; Public libraries as the people's university; Museums; Photography; Mormon church; Town planning; Veterinary medicine; Steam locomotives; Machine engraving; Rugby football; Antarctic regions; Library cataloguing.

17. (1) Find the DC numbers for the following subjects: Constitutional law, Salvation, German etymology, Elections, Evangelistic writings, English dictionaries; state what the numbers have in common and say yes or no on whether what they have in common has any special significance in the notation or the classification of DC.

    (2) Write the names of the subjects or things represented by the following DC numbers: 032, 192, 283·42, 342·42, 422, 554·2, 630·942, 759·2, 822, 914·2; state what the numbers have in common and say yes or no on whether what they have in common has any special significance in the notation or classification of DC.

    (3) Dewey says that "Italy is always 5 but 5 is not always Italy"; give five DC numbers in which 5 is Italy and five in which it is not; say what Dewey called the use of the same figure with the same significance in different numbers, and say what would happen if the same figure were always used with the same sense.

18. (1) Explain the difference between:
    (*a*) 799·1731, (*b*) Sharks—Fishing, (*c*) Fishes and fishing—Sharks, (*d*) Wolves of the sea, for a book on shark fishing as a sport and called Hunting the wolves of the sea.

    (2) Explain how the DC number 799·1731 is built up.

19. (1) Explain the likeness and difference between DC 799·1731 for Shark fishing and UDC 799·1:597·33.

    (2) State how you would make a classified catalogue entry for a book under Sharks in Zoology as well as under Sharks in fishing for sport, using (*a*) DC, (*b*) UDC.

    (3) State a quality and defect of the DC number 799·1731 and an opposite quality and defect of the UDC number 799·1:597·33.

20. (1) Say whether DC, UDC and LC are subject classifications or book classifications, and why, as shortly as you can.

    (2) Say where and why there is classification by form instead of subject in DC.

21. Comment briefly on the statement that a classified arrangement for literature by subject must be worked out in advance, an alpha-

betical arrangement need not be, if you like with some reference to the classification of Library of Congress (LC) and the subject headings used in its dictionary catalogue and the published lists of these subject headings.

22. (1) Give DC class numbers for
    (*a*) A periodical on English history.....
    (*b*) Essays on the French Revolution.....
    (2) Criticize DC 620 to 620·9.
    (3) Give the DC number for
    (*a*) The botany of Australia.....
    (*b*) The zoology of Australia.....
    (4) (*a*) Give the DC number for the relation of economics to art.
    (*b*) Show how the same relation might be expressed with UDC numbers.
    (*c*) State at least one advantage of the UDC expression.
    (5) Give two DC numbers for counterfeiting; explain why there are two, and their indexing in the Relative index to DC.

23. (*a*) Cross out anything you consider may be ignored in determination of classification and subject entry in an alphabetical catalogue in the following titles, which you may assume to indicate the actual subject matter of the books named, and give class numbers.
    (1) Ski-ing for professionals
    (2) Saving: folly, fallacy or fulfilment
    (3) Fundamental physics
    (4) Wood carving
    (5) Home nursing
    (6) Parliamentary practice
    (7) Kite flying as a sport
    (8) The life history of the cicada
    (9) Pitman's Shorthand
    (10) Dressmakers in trousers
    (11) Chemistry for beginners
    (12) Beekeeper's vade mecum

24. Give DC numbers for the following:

    (1) Australian philosophers; (2) The history of geology in Great Britain; (3) Rabbits as a pest; (4) Skunks as fur bearing animals; (5) A dictionary of contemporary German slang; (6) Taxes on road use; (7) Taxes to maintain roads; (8) A census of Iceland; (9) Assimilation of migrants in Australia; (10) Jamaican immigrants in Great Britain; (11) Latin in the high school curriculum; (12) Commemorative holidays in Australia; (13) The theory of the popular ballad; (14) Mexican painting.

25. Explain the underlined parts of the following LC unit card entry:

Scott, Natalie Vivian, 1890-
200 years of New Orleans cooking [by]
Natalie V. Scott, decorations by William Spratling.
New York, J. Cape & H. Smith [1931]
xii, 238 p. front., illus., pl. 19½ cm.
I. Cookery, American-Louisiana. I. Title.
II. Title: New Orleans cooking.
TX715·S43 641·59763 31-33052 rev 2

26. Give a DC number and a specific entry dictionary catalogue heading for the following, for example, A dictionary of proverbs 398·903 Proverbs—Dictionaries.

(1) A life of Shakespeare. (2) Poker-work. (3) Pathological arson. (4) The school library, what it is and what it does. (5) Basic English. (6) Eclipses of the moon. (7) The royal and ancient game of tennis. (8) Quantity surveying. (9) The art of Charles Dickens. (10) Making hay while the sun shines.

27. Give one or more DC Relative index entries for the following DC numbers, and a corresponding specific dictionary catalogue heading for each, for example:

331·88 Unions Trade Economics; Trade unions

(1) 355·14; (2) 355·81; (3) 365·664; (4) 378·29; (5) 677·76; (6) 687·15; (7) 027·4; (8) 159·1; (9) 173·1; (10) 323·443; (11) 337·1--2; (12) 341·57.

28. Give specific dictionary catalogue subject headings and DC numbers for the following:

(1) English grammar. (2) German dictionary. (3) Gothic architecture. (4) French beans. (5) Siamese cats. (6) Irish bulls. (7) Papal bulls. (8) Italian slang. (9) Indian clubs. (10) Spanish Armada. (11) American football. (12) Afrikaans language.

29. The following are UDC numbers, given by the Science Museum, London, for the subjects or titles stated; give corresponding DC numbers:

(1) Bacteriology 576·8. (2) Steam locomotive design 625·282. (3) Introduction to mathematics 51. (4) Livestock improvement in relation to heredity and environment 636·082·4. (5) Practical shipbuilding 629·12. (6) New Zealand timbers and forest products 634·98(931). (7) Fundamentals of the beating process . . . in pulps of papermaking . . . 676·1·022·4. (8) A collection of letters illustrative of the progress of science in England from the reign of Queen Elizabeth to that of Charles II 5:93. (9) The martyrs of science, or the lives of Galileo, Tycho Brahe and Kepler 92:52. (10) Geology of . . . Mariana Islands 55(967).

30. Give DC shelf classification numbers for:

    (1) Samuel Johnson's novel Rasselas in a set of his works.
    (2) Samuel Johnson's essays on the English metaphysical poets published separately.
    (3) A collection of the Penguin or Everyman's library series donated on condition that they be kept together.
    (4) Euclid's Elements in the Everyman library.
    (5) Angus & Robertson's Australian encyclopaedia.
    (6) First folio edition of Shakespeare's works.
    (7) An early block book edition of the Dance of death.
    (8) Illustrated London News special number on the coronation of Edward VII treated as a separate.
    (9) Darwin's Voyage of the Beagle.
    (10) Scientific reports of Mawson's Antarctica expedition.

31. Explain the statement that books are mostly classified first by location, second by size, third by subject, fourth by author.

32. Write a note on:

    (*a*) 8vo as an indication of size classification; (*b*) parallel and broken order and alternate order or classification; (*c*) subject specification on the shelf; (*d*) "the thinner the book the longer the number".

33. (*a*) Explain the ambiguous use of the word class, and say what is meant by the arrangement of books within a class; (*b*) distinguish with one example of each, class number, book number and call number; (*c*) distinguish Cutter type numbers, Cutter numbers, and Cutter-Sanborn table numbers; (*d*) distinguish and compare time numbers and specific or serial book numbers; (*e*) give the general and/or a particular case in which a book could have (i) two Cutter type numbers, (ii) the same Cutter type number repeated.

34. Suppose the first issue of a periodical to consist of articles on the subjects listed below, give a specific heading and a class number for the periodical and specific headings and class numbers for each of the subjects:

    (1) Royal banquets; (2) Sponge cakes; (3) Food analysis; (4) Margarine manufacture; (5) Camp cookery; (6) Industrial canteens; (7) Stewing; (8) Breakfast; (9) Kosher cookery; (10) Soups; (11) Kitchen in the home; (12) Dinners for diabetics.

35. Write a critical note on the shelf classification and arrangement exemplified by the following:

    (1) 330Rob; (2) 330R631; (3) 330/42; (4) 330/1942; (5) 330.

36. Give one or more DC class numbers which could be considered in place of those given by BNB for the following books:

(1) 001 Pears' Cyclopaedia; (2) 001 Lehner, E.: Picture book of symbols (over 1,000 illustrations of symbols, signs and ideograms arranged by subject); (3) 104 Lewis, H. D., Editor: Contemporary British philosophy; personal statements; (4) 268·67 Housman, L.: Bethlehem: a nativity play; (5) 300 Palmer, G. B. C. and Armstrong, H. W.: In the public interest: a book of civics for secondary schools; (6) 301·15 Deas, J. P. and Rosen, A. A.: Manual of intergroup relations; (7) 325·34209667 Apter, D. E.: Gold coast in transition; (8) 325·34209669 Aluko, S. A.: The Problems of self government for Nigeria; (9) 329·942069 Walcott, R.: English politics in the early eighteenth century; (10) 329·942 Conservative and unionist party. Some principles of conservatism; (11) 330·1 Robinson, J.: The Accumulation of capital; (12) 331·152 Newman, J.: Co-responsibility in industry: social justice in labour management relations.

37. Give one or more DC class numbers which could be considered in place of those for the following subjects in Sears' List of subject headings (6th ed.):

(1) 541·2 Atomic bomb; (2) 617·8 Deaf; (3) 133 Demonology; (4) 553·2 Diamonds; (5) 394·8 Duelling; (6) 379 Education and crime; (7) 582;585 Evergreens; (8) 173;392 Family; (9) 391 Fans; (10) 173 Fathers; (11) 587·3 Ferns; (12) 391;685 Gloves.

38. Give two or more subject headings and DC class numbers for the following books, for example, Matthew, W. P. and Wilkins, T.: Heating and lighting of buildings.

Buildings—Heating 697
Lighting, Electric 621·32

(1) Rodenhuis, E.: Dry-battery receivers with miniature valves; (2) Organization for European Economic Cooperation: Air and water pollution; (3) Ritchie, G. S.: Challenger: the life of a survey ship; (4) Schwab, D. E.: The Story of lace and embroidery and handkerchiefs; (5) Wallace, C.: The Treasury of games and puzzles.

39. Give DC numbers which might be considered as alternatives for the BNB numbers for the following books:

(1) Martin, R. M.: Truth & denotation: a study in semantical theory, 164; (2) Clarke, C. H. D.: Christianity and Bertrand Russell; a critique of the essay "Why I am not a Christian" 200; (3) Heilbronner, R. L.: The quest of wealth: a study of acquisitive man 330·1; (4) Hadfield, S. J.: Law and ethics for doctors 340·6; (5) Tredgold, R. F.: Bridging the gap, from fear to understanding in mental illness 362·2; (6) Howard, D. L.: John Howard, prison reformer 365·7; (7) Martin, J. B.: The deep south says "Never"

371·974; 323·175; (8) Wickiser, R. L.: Introduction to art education 375·7; (9) Eyre, J. V.: Henry Edward Armstrong, 1848-1937: the doyen of English chemists and pioneer of technical education 378·9966; (10) Scorer, R. S.: Natural aerodynamics (International series of monographs on aeronautical sciences and space flight) 551·5.

40. Give possible DC 14th edition numbers for the following 15th edition numbers: (1) Population 301·32; (2) Country life 301·35; (3) Courtship behaviour and mate selection 301·425; (4) Divorce 301·428; (5) Philosophical systems 190; (6) Aesthetics 101; (7) Soul 218 and 233·5; (8) Medical ethics 610; (9) Drug addiction 301·46; (10) Theosophy 294·58.

41. Give alternative names or synonyms for the following subjects, and their DC 14th edition class numbers:

    (1) Corn; (2) Wireless; (3) Inheritance, Biological; (4) Lucerne; (5) Conundrums; (6) Corpulence; (7) Divine healing; (8) Morons; (9) Feelings; (10) Bashfulness.

42. Give an alternative heading and a class number for the following; for example:

    Apiculture Beekeeping 638·1

    (1) Sericulture; (2) Chirology; (3) Pediatrics; (4) Cartography; (5) Pedicure; (6) Infantile paralysis; (7) Geriatrics; (8) Aviculture; (9) Political economy; (10) Ping-pong.

43. Give a specific subject heading, or headings and a DC class number for the shelf for the following, for example:

    James, Edwin Oliver
    Prehistoric religion: a study in prehistoric archaeology
    1. Religions. 2. Archaeology, Prehistoric 571

    (1) Akerblom, Bengt: Standing and sitting posture with special reference to the construction of chairs; (2) Aalto, Pentti: Notes on methods of decipherment of unknown writings and languages; (3) Abbey, John Roland: Life in England in aquatint and lithography 1770-1860 . . . a bibliographical catalogue; (4) Abrahams, Gerald: The Chess mind; (5) Abrams, Meyer Howard: The Mirror and the lamp: romantic theory and the critical tradition; (6) Adams, Bess Porter: About books and children; historical survey of children's literature; (7) Ackoff, Russell Lincoln: The Design of social research; (8) Adams, Charlotte: Housekeeping after office hours; a homemaking guide for the working woman; (9) Adams, Raymond Delacy: Diseases of muscle: a study in pathology; (10) Adams, Samuel Hopkins: The Erie Canal.

44. Give DC numbers and specific entry subject headings and where necessary subheadings for the following:

(1) Library economy—General libraries—Subscription libraries; (2) Philosophy—Systems—Idealism; (3) Religion—Non-Christian—Buddhism; (4) Economics—Public finance—History; (5) English language—Grammar; (6) Mathematics—Trigonometry—Tables; (7) Mining, Coal—Dictionaries; (8) Art galleries; (9) English ballad poetry—Collections; (10) History, Scottish.

45. (1) The following is an entry from the Science Museum Library (London) List of accessions numbered 57/3431.

575·17:591:599
Grüneberg, Hans
Genes in mammalian development

The colon-joined UDC class numbers stand for Genes:Embryology, Animal:Mammals.

Show what it would be entered under in

(*a*) a UDC classified catalogue;
(*b*) a DC classified catalogue;
(*c*) an alphabetico-specific catalogue.

(2) The following is an entry 57/3399 from the same bibliography as in (1).

001·89(42)
Cardwell, Donald Stephen Lowell
Organization of science in England: a retrospect

Give a DC number for it.

(3) Given Science—Study and teaching—History—England as a dictionary catalogue heading for the book in (2), give a corresponding DC number, explain the correspondence, why the subject heading and subheading is not a breach of specific entry and why such a degree of correspondence is rare.

46. Suggest DC class numbers for consideration, alternative to those given which are from BNB and give a subject heading or headings for each.

(1) 320·10942073/81 and 171·5 Plamenatz, John: The English Utilitarians; (2) 338·1764 Bristol University: An Economic study of pig production; (3) 347 Hanbury, H. G.: The Vinerian chair and legal education; (4) 371·425:659·138[1] Wiggan, R. and Summers, H. J.: So you want to be a model; (5) 378·996 Cotgrove, S. F.: Technical education and social change; (6) 611·7:792·8 Sparger, C.: Ballet physique; with notes on stresses and injuries; (7) 631·9 Hutchinson, Sir J. B.: Genetics and the improvement of tropical crops; (8) 636·30896 Great Britain—Ministry of Agriculture: Diseases of sheep; (9) 001 Jupo, Frank: Read all about it, the story of news through the ages; (10) 020 Currie, C.: Be a librarian: a guide to careers in modern librarianship.

47. The following are UDC numbers in the recommended filing order:

Horses	636·1
Horses—document in English	636·1=20
Horses—Anecdotes	636·1(088·3)
Horses—Great Britain	636·1(42)
Horses in the 19th century	636·1"18"
Horses—Valuation	636·1·003·12
Horses—Feeding	636·1·084
Horses, Race	636·12

Anecdotes on the feeding of racehorses in Great Britain in the nineteenth century by labourers in England could have the number 636·12·084·007·4(42)"18"(088·3)=20.

Learn the two orders, the first as language, form, place, time, point of view, process and specification with the corresponding signs, and the second as specification and process, view point, place, time, form, language, with the corresponding signs.

Attempt an explanation of the differences in the order of extensions of 636·1 in the arrangement of different numbers and in one compound number.

48. Give subject heading(s), reference(s) thereto and class number(s) for books with the following titles, for example:

(1) Mulching

Mulching	631·79
refer from	Mulch see
	Gardening see also
	Soils see also

(2) A simple guide to shareholding and company accounts

Investment	332·6
refer from	Saving see also
	Shares, Company see also
	Speculation, Financial see also
Companies—	Accounting 657
refer from	Accountancy see also the subheading Accounting under Companies
	Business see also Companies
	Companies—Finance see also the subheading Accounting

(1) Cake decorating at home; (2) Australian aboriginal rock art; (3) Schedule for the retention and destruction of bank records; (4) Storage and preservation of motion-picture film; (5) Aluminium in packaging; (6) Geology: a survey-outline of the principles of physical and historical geology; (7) Bowls to suit everyone; (8) Soccer my way; (9) Solar energy; (10) Cannibalism and human sacrifice.

49. Give heading(s), reference(s) and class numbers as in Exercise 38 for the following. The descriptions are from the publishers' 'blurbs'.

(1) Binder, Pearl: The Peacock's tail

What is wrong with modern man that causes him to dress in drab, unbecoming garments? In this provocative and far-ranging book Miss Binder attempts to answer this question. Is this renunciation of the oldest and psychologically most important of all the arts, the art of dress, due to despair? If so, why? What effect did the Industrial Revolution, which made England so rich and so powerful, have on the Englishman's costume? What is the future for military uniforms, evening dress, sports clothes, and the Savile Row suit?

These fascinating questions are tackled by examining the whole purpose and meaning of male dress, from its biological roots in the animal kingdom, through the gorgeous barbarities of primitive and peasant male dress, to its present alarming eclipse. Not only is male dress itself analysed, but also every variety of its embellishment, including jewellery, tattooing, and feather ornaments. From hats to boots, each item of adult and juvenile male dress is reviewed. Hairdressing, the wearing of wigs, the use of cosmetics, padding, and shoe-heightening, all are given their rightful place in this illuminating history of male glamour.

(2) Huntington, Whitney Clark: Earth pressures and retaining walls

This book . . . bridges the gap between retaining wall design and that part of soil mechanics which deals with earth pressures and foundations. Using only principles and procedures with which the structural engineer is familiar, it covers all the common cases and most of the special conditions encountered in the design of retaining walls.

To give the reader a clear understanding of procedures, the book emphasizes principles and offers numerical solutions. It gives typical designs and tabulated computations, explaining the approximations and discussing the possible limitations. Each article is as self-contained as is reasonably possible, enabling the reader to consult the portion dealing with his specific problem.

The author gives special consideration to the design of counterfort walls, including simple design procedures to provide for the complex conditions which exist in such walls.

A noteworthy feature is the author's treatment of the 'trial wedge' method in computing earth pressures. He shows how to use this simple, largely nonmathematical technique, which

has the widest application of any method for earth pressure computation.

An abundance of superior illustrations are featured in Earth Pressures and Retaining Walls. These figures illustrate earth pressure, stability, and design computations under usual and special conditions.

(3) Cary, Joyce: Art and reality

Mr. Cary's Clark Lectures are a remarkably sustained meditation by a distinguished writer on the nature of art, the relationship with the outside world which it recreates in the mind, its function and its purpose. Mr. Cary was a novelist; he was also at one time an art-student, and he wrote with an inner knowledge of two arts. But his whole conception of art is hearteningly wide; any attempt to express an 'intuition' is of the nature of art. Hence there is no diminution of the status of art by making it a separate activity carried on by a few gifted people set aside from the business of living.

It is not easy to summarize the argument, which develops steadily throughout the book. One can best indicate its range by saying that it starts from the basic mental activity involved in the relationship between the individual and the world about him: the intuition of the nature of 'the other', the relationship between intuition, symbol and the necessary but deadening concept. It touches on child art, education, tradition in art, originality, the artist's obsessing theme, the moral effect of art, its action on the perceiver and its place in his life. All develops from the initial relationship between the self and the other, and the appreciation (itself a form of creation) and the production of works of art are both presented as dignifying occupations essentially concerned with living as 'a free moral agent in a world of dangerous vicissitudes'.

(4) Casey, Robert S.: Oral communication of technical information; effective help for science speakers . . .

Methods of effective speaking for almost all situations are assembled here in 'how-to' manner for technical men. Beginning with the bridges and barriers to effective communication, the book then takes up the actual problems involved and how they are solved. It covers organization of material, composition, delivery of formal and impromptu speeches, and the use of mechanical aids such as recordings and slides. How to preside at meetings, talk science to laymen, give technical legal testimony, and converse socially are covered in helpful detail. Emphasis is on the special needs of technical subject matter, but the techniques of organization and delivery apply to all speaking events. One valuable section reviews the most com-

mon errors in the speech-writing of chemists and engineers. It is doubtful that a more useful handbook for speakers in the technical field has ever been published.

(5) Calder, Nigel: Robots

In the twentieth century robots are with us in their thousands; they are becoming as much a part of our daily lives as the typewriter and the motor-car, yet still for many people the word 'robot' conjures up a picture of Frankenstein's monster. This book is written especially for young people to tell them what robots really are, how they work and what they can do.

Some of them are quite familiar—the thermostat which controls your refrigerator is one, the burglar alarm is another—but others are so complicated and highly developed that they can do sums in a few minutes which would take several men possibly years to work out by calculation.

So we read in this book of delicate and sensitive instruments like the controlling robots able to supervise machinery in factories and offices, the brainy robots, as the author calls the dozens of electronic computers already at work; described, too, are the deadly robots which control and detect guided missiles, and the lively robot which is built to behave like a living creature.

Although these robots may sometimes be better than humans at their appointed jobs, they must be devised, fed and controlled by human beings—opening up quite new and exciting careers for the science-minded boy and girl. Nigel Calder considers some of these and how they may be followed.

There are seventeen pages of exciting pictures and eight clear line diagrams.

(6) Berry, Francis: Poets' grammar: person, time and mood in poetry

In Poets' Grammar the author points the way to a new field of exploration for students of literature and language. In this pioneering work, the author takes two categories of Grammar —Pronoun and Verb—which reflect the structure of the mind and applies them to a study of some poems and plays ranging in period from the fifteenth century to the present day.

The author asks why Shakespeare uses 'Thou' in some sonnets and 'You' in others, why Donne is the supreme example of an 'I-Thou' poet, what are the relations between Indicative and Subjunctive in Macbeth or in an Ode by Keats. Is a changing conception of time, and of what is to be valued, reflected in the Tense and Mood of recent poetry? The author in pursuing these and kindred problems reaches some exciting conclusions. Finally, there is an enquiry into the role of the Preposition in

poetry and in its translation. Here the author draws examples from three languages and suggests a further area for exploration.

50. Give references for the following headings as in Congress or Sears' Subject headings list, for example:

Courage
see also Fear; Heroes; Morale
x Bravery; Heroism
xx Conduct of life; Ethics; Fear; Heroes.

(1) Automation; (2) Adobe houses; (3) Arms traffic; (4) Balance of power; (5) Balance of payments.

51. Reword and rearrange the following headings, for example:

Chemical analysis	Chemistry—Apparatus
Chemical apparatus	Chemistry—Experiments
Chemical experiments	Chemistry, Analytical
Physical chemistry	Chemistry, Physical

Artificial flowers; Floral clocks; Floral decoration; Floriculture; Florist shops; Flower arrangement; Flower diseases; Flower drawing; Flower language; Flower shows; National flowers; Wax flowers.

52. Rewrite those of the following phrases which you would invert:

A. Capital punishment; Copper coins; Cost accounting; Holy water; Paper money; Paper weights; Solar energy; Solar system; Underground railway; Vacuum tube.

B. Administrative law; Advertising laws; Aeroplane engines; Agricultural chemistry; Air conditioning; Amusement parks; Anatomical specimens; Animal fibres; Animal locomotion; Animal migration.

53. Give a subject heading and class number for each of the following, combined with the entry for the heading you would expect to find in a subject headings list such as Sears', for example:

Granger, A. M. Stories of your stamps
Stamps, Postage 383·2
See also Postal service—Rates
x Philately; Postage stamps
xx Collectors and collecting

NOTE. There need not be see also, x and xx in every case, and in actual cataloguing references are only made *to* the heading under which a book is entered, if these have not been made before. (1) Lewis, T. H.: Business correspondence; (2) Minshall, E.: Handbook of elocution; (3) Bartlett, J.: Quotations; (4) Campbell, A. B.: About horses.

54. Give subject heading(s) with class numbers, and references thereto for the following, for example:

Nichols, H. L.
Modern techniques of excavation
Excavation 721·12
xx Earthworks
Foundations
Tunnelling

(1) Symposium on the use and welding of aluminium in shipbuilding; (2) Casebrook, A. R.: Model boat radio control; (3) Hughes, A. J.: The Book of the sextant, with ancient and modern instruments; (4) Sava, George: Surgery and crime; (5) Great Britain—Home Office: Prisons and borstals: statement of policy and practice in the administration of prisons and borstals in England and Wales.

55. Give two or more DC class numbers and headings for the following, for example:

Explosives
Explosives—Manufacture 662·2
Explosives, Military 623·452

(1) Coal; (2) Beverages; (3) Duelling; (4) Shark fishing; (5) Mental capacity of women; (6) Cafeterias; (7) Forensic medicine; (8) Pottery; (9) Millinery.

56. Give heading(s) with references thereto and class number(s) for the following:

(1) Carroll, P.: Better wage incentives; (2) Hobson, P. D.: Industrial lubrication practice; (3) Whitehouse, J. A. and Metcalf, J. A.: Influence of lubricating oil viscosity on the power output and fuel consumption of [motor cars]; (4) Lilley, S.: Automation and social progress; (5) McDonald, M. J. H.: How to use classified advertising to sell more real estate.

57. Give ten subjects with two places in DC according to difference of aspect or process.

58. Give heading(s) with references thereto and class number(s) for the following:

(1) Older, J. C.: Learning metalwork with aluminium; (2) Fenley, T. P.: All about making camera supports; (3) Kerman, J.: Opera as drama; (4) James, Henry and Wells, Herbert George: Henry James and H. G. Wells: a record of their friendship, their debate on the art of fiction, and their quarrel; (5) Jones, H. M.: The Frontier in American fiction.

59. Give the following in the form and order of headings for a dictionary catalogue, with any see references you think desirable:

(1) Paper mulberry
Paper testing
Paper bibliography
Rice paper
Paper work
Cutting of paper
Paper cutting craft
Paper making
Paper
Paperweights

(2) Lighthouses
Light—Speed
Lightning
Light, William
Lighting
Light Brigade
Light
Electric lighting
Daylight saving

60. Give the following in the form and order of headings in a dictionary catalogue with any see references you think desirable:

(1) Dancing dolls
Ballet dancing
Dance of death
Dance macabre
Dance music
Folk dancing
Dancing games
St Vitus' dance
Folk songs

(2) Cartography
Geological maps
Map printing
History of maps
Maple syrup
Map reading
Map projection
Collection of maps
Projection of maps on screens
Drawing of maps
Map making
Military maps

1.

Algebra	Cotton—Trade	338·17351
Bacon—Cooking	Wool—Trade	338·1763
Bacon—Curing	Boy Scouts	369·42
Boy Scouts	Girl Guides	369·46
Cotton—Growing	Algebra	512
Cotton—Spinning	Geometry	513
Cotton—Trade	Cotton—Growing	633·51
Geometry	Grapes—Growing	634·8
Girl Guides	Sheep—Farming	636·3
Grapes—Growing	Pigs—Farming	636·4
Mutton—Freezing	Bacon—Cooking	641·664
Pigs—Farming	Wine—Making	663·2
Sheep—Farming	Bacon—Curing	664·9
Wine—Making	Mutton—Freezing	664·9
Wool—Trade	Cotton—Spinning	677·2122

The original grouping was by subject. Alphabetical rearrangement mixes the groups because the order becomes one by name instead of subject; and even some groups which might otherwise remain are broken up because of different names for the same thing in different forms. But some groups do remain unbroken; they are those consisting of the same thing in different aspects without any change of name. The classified DC order is entirely by subject and is unaffected by language, but the classification is largely based on subject aspects common to many things, so that some of the original groups are broken up, because they consist of the same thing in different aspects. Of the groups given one remains unbroken in the alphabetical order and two in the classified order; the number of things with different names for different forms, is higher than the general average; if it were in keeping with the general average then more grouping might be kept in alphabetical than in classified order, and the question then would be which is more commonly useful, alphabetical or classified.

2. 0-9 puts ten classes in order with a single figure each, and as the figures indicate order without quantity 0 can be used for the first of ten places numbered 0-9, and in any extensions for class subdivisions. Check the index to DC for the classification of the subjects given.

3. 01 Philosophy or Theory; 02 a textbook; 03 a dictionary or encyclopaedia; 04 Essays; 05 a periodical; 06 Societies and their publications; 07 Study and teaching; 08 Patents and inventions; 09 History.

In DC the decimal point comes only and always after the third figure so that it punctuates the form figures as it does any other, according to where they come in a number, and it is wrong to say the DC form numbers are ·01-09.

In most, though not in all class numbers the form figures have the same meaning so that this is remembered and so may be said to be mnemonic. Dewey emphasized this and introduced the term. 08 is the most variable and is not Patents and inventions even throughout 600.

Two of the 'forms', 01 and 09, are a form of treatment or an aspect of the subject; two, 07 and 08 in this case are closer to a process of the object or thing; the others are forms of the documents or literature. The loose use of the word form confuses these distinctions which are of some importance.

4. A book on dogs has this number if it is classified by DC on shelves or in a catalogue because the number is that for Dogs as a subclass in Domestic animals, of these as a subclass in Agriculture and animal husbandry, and of these as a subclass in Useful arts, and the purpose of classification is to put a subject such as Dogs with related subjects such as Cats, and so on; but this means extra indexing, to tell the catalogue user that the class number for books on Dogs is 636·7. The purpose of the dictionary catalogue according to Cutter's Rules is direct reference or self-indexing, so that the books are found directly under the commonly known name of the subject in the commonly known alphabetical order; commonly known and used names of things are particular or specific names which do not classify; the name Dogs, for example, does not classify as Domestic animals—Dogs does. This specifies Dogs as a subject, just as the hierarchy numbered 636·7 does, but Cutter established the term specific entry as meaning entry directly under particular or specific names without any subordination or classification of species in genera or classes; his dictionary catalogue rules do, however, as they must, allow subordination of forms or qualifications, as in Domestic animals—Dictionaries, and Domestic animals—Diseases, in which the subheadings do not name species of Domestic animals.

5. In the classification as shown typographically 829 Anglo-Saxon literature is co-ordinate with English literature 82, but from the notation it would appear to be a subdivision of English literature; in HISTORY 930—990 is history by place, but 91 is Geography, and 92 is Biography of persons; numerically 669 Metallurgy appears to be a subdivision 660 Chemic technology, but typographically it is a co-ordinate class.

   DC has been influential in suggesting that a matching of subdivision in a classification and its notation is desirable, and though

it has been criticized for its apparent "procrustean bed of the decimal ten" in subject subdivision it has also been criticized for not being completely true to it. Subjects do not subdivide by tens and twenty-sixes, that is by figures and/or letters, with regularity, so that there cannot be a match of classification and notation in hierarchical or progressive subdivision, and nothing really useful or possible seems to be served by such a match, except possibly some form of simplified chain procedure indexing. (This is discussed in Appendices E, F, G.)

6. What are usually known as forms in DC come before specification of a class or genus, and the use of 01-09 for them ensures this, through the established arithmetical order of the figures; these form numbers are not used because they are general, they are used because the forms are general to a subject, before it is further specified. For example in 632 Hindrances Protection in Agriculture 632·01 Theory and so on to 632·09 History comes before 632·1–8, kinds or species of hindrances. But not all qualifications are expressed by form numbers, and in some places some form numbers are used for specification.

7. (*a*) 636·3 is the DC class number for the hierarchy Useful arts—Agriculture and Animal husbandry—Animal husbandry—Sheep; (*b*) Animal husbandry—Sheep is an alphabetico-classed heading for Sheep; the heading being a class or genus and the subheading a species or subclass in it; (*c*) Sheep farming is an alphabetico-specific heading for Sheep with a qualification extension which could be given as a subheading, Sheep—Farming. It happens to coincide with the title of the book; this is quite common and not against any rule; all the rule of specific entry requires is that the thing the book is about must be named specifically without any subordination, and that the name chosen must be used for all books irrespective of their titles. Compare Exercise 4.

8.

369·43	Boy Scouts	79	355	Military science	9
381	Domestic trade	33 or 65	374·2	Debating societies	808

9.

300	General	General
310	Statistics	Statistics
320	Political science	Political science
330	Economics	Law
340	Law	Administration
350	Administration	Social welfare
360	Social welfare	Education
370	Education	Customs
380	Commerce	Economics
390	Customs	Commerce

(Think why Dewey put Economics or Political economy with Political science and separated Commerce from Business in 650. Think about the separation of two branches of psychology in 100 and attempt a rearrangement.)

10. Classifying is putting things together, not necessarily in order, for example, sea animals, air animals, land animals, without any fixed order of these three classes or of subclasses in them. Some classes are derived from an order, for example, the classes of animals now used in Zoology from an evolutionary order, but the classes such as vertebrates, invertebrates, mammals need not be kept in their order of evolution.

    In bibliographical classification some order is a practical necessity because it is used for things which have to be found and can only be found by being in an order to which reference can be made, usually by a numbering system or notation. But subjects are classified to get books or catalogue entries for them together, according to subject relations or associations, and provided goats, sheep, horses, cows, for example, are together the order in which they are together doesn't matter. Usually general books, for example, books on domestic animals are put before books on particular animals, and on the whole this may be most useful, for one thing it allows us to use a general number such as 636 as a covering number and as the number for general books; but there is no law or logic in classification requiring this, and the general books could come last.

11. (*a*) For Panizzi and his contemporaries a catalogue was a list of books which might be in accession or author-alphabetical order, or classed, that is either alphabetico-classed by subject or thoroughly classified by subject, but any indexing was of and by the catalogue descriptions of the books, taken from their title pages, therefore even if the catalogue had an index it could only be a subject index insofar as subjects were named on title pages.

    (*b*) Crestadoro accepted contemporary ideas of what could be expected of a catalogue by way of subject indexing, but he also thought of combining author cataloguing and subject indexing by title words in one arrangement on "the principle of a Dictionary", and he called this an index-catalogue; it is the later dictionary catalogue in the sense of a combined arrangement, but he rejected independent subject headings on which Cutter insisted.

    (*c*) Billings included indexing or analysis of periodicals in his Cataloguing of the U.S. Surgeon-General's library. By contemporary definitions of cataloguing as the cataloguing of whole books or works this was not cataloguing; users of the

catalogue in manuscript called it an index-catalogue and when it was printed and published Billings used this name for it, meaning a catalogue of whole works and an index of periodicals combined. As he included author and subject entries in one arrangement it was also a dictionary catalogue, and one with independent subject headings, which were specific, so that whereas Crestadoro only anticipated the dictionary catalogue in what he called an index-catalogue, Billings anticipated Cutter's Rules for a dictionary catalogue in what he called an index-catalogue.

NOTE. The student should have plenty of practice in writing short definitive notes of this kind; even when students have the required knowledge they are often unskilled in expressing themselves on it briefly and clearly.

12. In library and bibliographical classification, subjects have to be in one line so that except by cross reference they cannot be shown in crisscross relationship, and the same thing in the same aspect should not be in more than one class. Two or more classes coming one after the other may be related, for example Philosophy followed by Religion in DC, but sooner or later there is a complete or almost complete break as in DC between Religion and Social science, Social science and Language, Language and Physical science. There are however possibilities of placing between two co-ordinate classes another which has more in common with the one before and the one after than they have with each other, and of ending one co-ordinate class with a subclass closely related with a subclass beginning the next co-ordinate class. An example of the former in DC is Geology 550 Palaentology 560 Biology 570, and of the latter Building 690, in Useful arts 600 and 710-20 Town planning and Architecture in Fine arts 700. This is modulation, and its possibilities are limited because the class order must be linear, so that whereas four or more subjects may be in crisscross relation only two or three can be together in line.

Modular or modulating classes may be notationally subordinate and typographically co-ordinate, for example in DC the modulation of Chemistry 540 into Geology 550 through Crystallography 548 and Mineralogy 549 appears to be through subordinate classes, but Chemistry, Crystallography and Mineralogy are typographically co-ordinate. (See also Exercise 5 and answer.)

13. (1) 7 signifies the United States in 973 and 917·3 but not in 627.
(2) 7 signifies humour in 827 and 817 but not in 337.
(3) 7 signifies education in 370 and 607 but not in 427.
(4) 7 signifies Latin in 870 and 470 but not in 907.
(5) 3 signifies a dictionary in 423 and 433 but not in 300.
(6) 3 signifies German in 830 and 430 but not in 130.
(7) 3 signifies fiction in 823 and 813 but not in 230.

(8) 3 signifies Germany in 943 and 554·3 but not in 730.
(9) 4 signifies essays in 824 and 820·4 but not in 400.
(10) 4 signifies French in 840 and 440 but not in 942.
(11) 4 signifies Europe in 940 and 314 but not in 504.
(12) 4 signifies synonyms in 424 and 464 but not in 740.
(13) 5 signifies Italy in 945 and 370·945 but not in 350.
(14) 5 signifies periodicals in 050 and 550·5 but not in 150.
(15) 5 signifies Italian in 450 and 850 but not in 950.
(16) 5 signifies grammar in 425 and 455 but not in 650.
(17) 1 signifies American in 810 and 811 but not in 100.
(18) 1 signifies poetry in 821 and 831 but not in 621.
(19) 1 signifies philosophy in 120 and 370·4 but not in 641.
(20) 1 signifies Scotland in 941 and 914·1 but not in 951.

14.

Dictionary of chemistry	540·3	History of World War I	940·3
Dictionary of English history	942·003	Essays on journalism	070·04
Dictionary of pure science	503	Transactions of the Chemical Society	540·6
England in Tudor times	942·05	Periodical on European history	940·05
General encyclopaedias	030	Local government in England	352·042
History of arithmetic	511·09	History of China under the Manchus	951·03
History of astronomy	520·9	Essays on English poetry	821·004
Essays on engineering	620·4	The French Revolution	944·04
How to study geology	550·7	Agricultural gazette (a periodical)	630·5
Periodical on botany	580·5	Essays on French essays	844·04
A general periodical	050	Journal of the French Historical Society	944·006
Theory of education	370·1	An English dictionary	423
History of New South Wales	994·4	Dictionary of mining engineering	622·03
History of Oregon	979·5	General societies	060
History of Sussex	942·25	Dictionary of applied science	603
Geology museum	550·7	Encyclopaedia of agriculture	630·3
Science museum	507	Encyclopaedia of field crops	633·03
Art museum	708		
Patents	608		
History of philosophy	109		
History of wireless	621·38409		
Philosophy of history	901		
Essays on local government	352·0004		

15. 121 Epistemology; 265·65 Excommunication; 330 Economics; 412 Etymology; 575 Evolution; 598·91 Eagles; 616·942 Erysipelas; 621·32 Electric lighting; 738·4 Enamels; 820 English literature; 929·5 Epitaphs; 942·67 Essex.

16. Check numbers in the Index. Commerce 380, and Business methods 650, are widely separated from Economics 330, although the three subjects are closely related.

Steam locomotives 621·13 is widely separated from Trains and accessories 625·2.

This probably happened because no other kind of engine or locomotive for railways was thought of as even a possibility. In the 15th edition provision is made at 625·26 for steam, electric and diesel locomotives.

Veterinary medicine is more usefully classified at 636 and in the 15th edition 636·089 is recommended for it.

Engineering materials and tests 620·1 is a late insertion in the tables, one of the form numbers is used for what is really a subject, with the result that subjects come before as well as after the regular form numbers. Compare the use of the 070 form subdivisions for journalism, and of 612·01 for general physiology, and of 821·01-07 for forms of English poetry.

Machine engraving 768 is a branch of printing widely separated from printing at 655.

Rugby football 796·33 is not distinguished from other kinds of football, and Rugby Union is not distinguished from Rugby League football.

17. (1) 342; 234; 432; 324; 243; 423. All six numbers have the same three figures, in different orders. This has no special significance in either the classification or notation of DC; its notation is the common decimal numbering system of arithmetic in which all numbers are permutations of the figures 0-9. So there are six class numbers made up of the figures 2, 3, 4, as there would be six house numbers made up of the same figures in a street with numbers running up to 432.

(2) English encyclopaedias; English philosophy; English Anglican church; British constitution; English etymology; British geology; British agriculture; English painting; English drama; Great Britain description and travel. All the numbers have the figure 2 in them standing for English, or England or British or Great Britain. This has special significance in the notation and classification of DC because the figure 2 is constantly or mnemonically used for English, England, British and Great Britain though not exclusively, and since the classes are in numerical order this means that England or Great Britain usually comes second in a subdivision in which 1 may be used for a subject generally as in 410, or for America as 810, or for Scotland and Ireland taken separately from Great Britain.

(3) 035, 195, 450, 850, 945, in which 5 is Italy; 025, 125, 415, 815, 915 in which 5 is not Italy. Dewey called this constant or common but not invariable use of a figure with the same sense mnemonic because it aided memorizing, recollecting and recognizing the class numbers. If any figure 0-9 were used invariably for the same thing then the notation would only allow nine subjects numbered 0-9.

18. (1) (*a*) is a class number for shark fishing as a sport in a classified shelf arrangement or in a classified catalogue;
(*b*) is an alphabetico-specific entry heading for Shark fishing as in a dictionary catalogue; the entry would be under the specific subject Sharks in alphabetical order; the subheading represents a qualification or limitation of the subject sharks, not a further specification of sharks;
(*c*) is an alphabetico-classed heading with further specification;
(*d*) is a title catchword entry heading; wolves of the sea is not a name for sharks in common use.

(2) 799·1731 is 799·17 for fishing for special kinds of fish as sport 'subdivided like 597' which is the Zoology number for fishes in which 597·31 covers Sharks. This building up of a number in DC can only be done according to directions given in the tables.

19. (1) The two numbers are from two closely related 'decimal' classifications, DC and UDC, and both numbers are built-up numbers. DC 799·1731 although built up from two numbers, 799·17 and 597·31 is a simple number arranged as both 799·17 and 597·31 would be. UDC 799·1:597·33 is a compound of two numbers each in full, with a special sign of relation to show that it is not the simple number 799·159733 which would be written 799·159·733 in UDC, and special filing rules are needed in UDC to distinguish compound from simple numbers. DC does not need such special filing rules because however a number is made up it is always a simple number for filing with only one punctuation mark, the 'decimal' point after the first three figures if there are more than three.

(2) (*a*) Entry would be under 597·31 as well as under 799·1731.
(*b*) Entry would be under 597·33 as well as 799·1 or under 597·33:799·1 as well as under 799·1:597·33.

(3) By comparison DC 799·1731 is a short number but it is one fixed in the classification tables, and although a built-up number no 'synthesis' is allowed to the classifier as distinct from the classification maker. By comparison UDC 799·1: 597·33 is a long number consisting of the whole of each of two simple numbers and the compounding or synthesis is not by direction given in the tables but at the discretion of the

classifier. At 639 in DC for commercial fishing subdivision is also as at 597; but at 639 in UDC there is a special subdivision which does not follow 597 and does not leave discretion to the classifier.

20. (1) Classifications, for example Francis Bacon's, which are of philosophic interest, have been made of all knowledge or subjects; greatly extended and provided with a notation they could be used for books, but this is not their original purpose. DC, UDC, and LC were intended for books and have the necessary detail and notation; they are classifications of or for books by subject and form, that is, they are intended to be used not for the classification of subjects or objects corresponding to subjects, as the object furniture corresponds to the subject furniture but for the classification of books by subject. Books are also classified or divided by size and by author.

(2) There is some classification by form in DC's general class, for example of general newspapers and general encyclopaedias; this is because these are general and polytopical so that they cannot be classified by specific subject, and because they are asked for by form, that is as newspapers and encyclopaedias. There is also classification by form in DC's class for imaginative literature, which is first divided by country and then by such forms as poetry and drama. This is because interest is primarily in imaginative literature by country and then by literary form rather than by subjects or themes, such as ambition, as in Shakespeare's Macbeth.

21. A classified arrangement doesn't follow any natural or scientific order; it is determined by a purpose and by a choice of groupings of subjects so that there are many different classifications and at least the main outline of each has to be fixed in advance; for example, there must be a Philosophy, a Religion and a Social sciences class, in some order and grouping with others, History may be in or next to the Social sciences, and Statistics, Hobbies, Customs, Heraldry must each be put in one major class or another in advance or there isn't a classification. LC was made up to fit the Congress collection, but it was not made up 'as they went along' except for comparatively minor subjects. An alphabetical arrangement is one basically of words in alphabetical order and any word can be put at any time in its exact place in an alphabetical order; for example 'cybernetics' in a dictionary or in a dictionary catalogue, and its subject headings such as those of Congress which are not part of its classification.

22. (1) (*a*) 942·005; (*b*) 944·04204.

(2) By using form numbers for subjects of general application in engineering but not provided for originally at the beginning

of 620, 621 being used for Mechanical engineering, form and subject have become mixed, dictionaries, essays, periodicals, history, coming after testing and strength of materials.

It is commonly said that a subject can be inserted at any point in the classification by an extension of the notation at the appropriate point, but this cannot be done right at the beginning of subject subdivision and immediately after form subdivision if the whole of 0 is already used for form and 1 for another subject; and with differences in notation this will be true with any classification and any notation. In Bliss's BC form numbers have been used for subject subdivision at the beginning of its Art class. This is why Dewey was forced in later editions to encroach on his form numbers for subjects.

(3) (*a*) 581·994; (*b*) 591·994.

(4) (*a*) 330·197; (*b*) 33:7.

(*c*) The number can be reversed for a classified catalogue entry under either 33:7 or 7:33, and in this case the compound number is shorter than the simple DC number.

(5) 343; 332·9.

The numbers are for different aspects or relations of counterfeiting, and the index distinguishes the different aspects or relations. Although Dewey used "Relative index" to mean one giving the relative location of class numbers for subjects and not fixed page numbers as earlier indexes did and most indexes to books do, the term is now taken to mean one distinguishing the relation or aspect or standpoint by which a subject or thing is classified.

23.

(1) Ski-ing	796·93
(2) Saving:	339·43 or 331·84
(3) Physics	530
(4) Wood carving	736·4
(5) Home nursing	649·8
(6) Parliamentary practice	328·37
(7) Kite flying as a sport	796·15
(8) The cicada	595·7531
(9) Pitman's Shorthand	653·7531
(10) Dressmakers	920 or 926·871
(11) Chemistry	540
(12) Beekeeper's	638·1

24. (1) 199·94; (2) 554·209; (3) 632·6932; (4) 636·9; (5) 437·09; (6) 336·278656; (7) 336·279656; (8) 314·91; (9) 325·94; (10) 325·272920942; (11) 375·47; (12) 394·26994; (13) 808·104; (14) 759·972.

25. The first underlined part is the collation showing
(1) number of pages, with roman and arabic numbering;
(2) illustrations, distinguishing a frontispiece and plates;
(3) height of binding in centimetres.
The second is a subject tracing note.
The third is a title tracing note.
The fourth is a catchtitle tracing note, the catchtitle heading being used in place of a further subdivision of the subject heading or as another subject heading.
The fifth is an LC class number for the shelf.
The sixth is a DC class number for the shelf.
The seventh is the serial number identifying the card for order purposes.

26. (1) 920 or 928·2233 Shakespeare, William. (2) 736·46 Poker-work. (3) 132·64 Pyromania. (4) 371·64 School libraries, or Libraries, School. (5) 408·9 Basic English. (6) 523·38 Moon—Eclipses. (7) 796·34 Tennis, or Royal tennis or Tennis, Royal. (8) 692·5 Quantity surveying, or Building—Estimates. (9) 823·83 Dickens, Charles John Huffam. (10) 631·553 Hay making, or Hay—Making.

27.

(1) 355·14	Uniforms military science	Uniforms, Military
(2) 355·81	Uniforms military equipment	Uniforms, Military
(3) 365·664	Uniforms prisons	Uniforms, Prison
(4) 378·29	Uniforms academic Univ. & Col. Academic costume Univ. & Col.	Academic dress or Universities and colleges—Costume
(5) 677·76	Uniforms trimmings for mfg.	Uniforms—Trimmings
(6) 687·15	Uniforms manufactures	Uniforms—Manufacture
(7) 027·4	Free public libraries	Public libraries, or Libraries, Public
(8) 159·1	Freedom of will psychology	Free will—Psychology
(9) 173·1	Free love ethics	Free love
(10) 323·443	Free speech polit. science	Free speech, or Freedom of thought and expression
(11) 337·1--2	Free trade tariff	Free trade, or Free trade and Protection
(12) 341·57	Freedom of the seas int'l law	Freedom of the seas

28. (1) English language—Grammar 425; (2) German language—Dictionaries 433; (3) Gothic architecture, or Architecture, Gothic 723·5; (4) Beans, French 635·652; (5) Cats, Siamese 636·81; (6) Irish bulls 827; (7) Bulls, Papal 262·8; (8) Italian language—Slang 457; (9) Indian club swinging 796·41; (10) Spanish Armada 942·05; (11) 796·33 American football, or Football, American; (12) Afrikaans language 439·36.

29. (1) 616·01; (2) 621·13; (3) 510; (4) 636·0842; (5) 623·8; (6) 634·909931; (7) 676; (8) 509·42; (9) 925 or 509·2; (10) 559·67.

30. (1) 824·63; (2) 821·404; (3) 082·1; (4) 513; (5) 919·4; (6) 822·33; (7) 092; (8) 394·43; (9) 508·3; (10) 508·99.

31. When we speak of classification and classifying we usually mean by subject, and according to the tables and with the subject class numbers of a general classification such as DC. But a division of books by size, or by open and closed access, is classification.
In libraries there may be two divisions or classes, one of books on open shelves or in 'open access' and one of books in closed access usually in a store called a stack, and this division is then the basic classification of the library in the general sense of classification. Then in each of these there are usually subdivisions or subclassifications by size such as books up to about 10″ high commonly called octavos, those from about 10″ to about 13″ commonly called quartos, those over about 13″ commonly called folios.
In each size in each basic division books are then arranged by subject, and books in the same basic division, say open access, of the same size, say octavo, on the same subject, say economics, may be arranged by author, and all these are classification in the general sense of the word. But in adding books to a library it is usual to classify them by subject using the class numbers of the general subject classification adopted such as DC, then to mark them by letters or with 'Cutter numbers' to indicate author order, then to allocate them to closed or open access, and then according to size, using a letter such as S for stack or closed access octavos, and SQ for stack or closed access quartos.

32. (*a*) Octavo, written as 8vo, originally meant a book with sections each made of a sheet of paper folded eight times, but the sheets folded this way were usually of a size which came down to a page about 9″ high and 8vo was often used in the bibliographical description of books, in their collations, without any check of their sections and of the size of the sheet from which they were made. Now height is usually given bibliographically in centimetres as on LC cards, but for shelving purposes books about 9″ high are still commonly referred to as octavos, books from about 10″ to about 14″ as quartos, and books over 14″ high as folios.

(*b*) Books separated as open access and stack or according to size but with the same classification, are said to be in parallel order. A library can have books on the same subject and with the same class number in six or more arrangements, usually distinguished by such extra marks as S for stack, Q for quartos, SQ for stack quartos and so on. Order is said to be broken when books on subjects which are not together in the numbered order are brought together without altering the notation, for example books on economics, commerce and business marked with the DC numbers 330, 380 and 650 might be brought together without altering the numbers. The provision of alternative places and numbers for the same subject is alternate order or classification. The same thing in different aspects such as rabbits as rodents in Zoology, as pests in Agriculture and as animals bred for fur or kept as pets, is not the same subject, so that there is not as much alternate order or classification in DC as is sometimes said.

(*c*) Subject specification on the shelf is determined by the classification or extensions of it as indicated by the notation, and generally this specification is not as fine or as flexible as specification by subject names in an alphabetico-specific catalogue. It can be as fine as specification in a classified catalogue by class numbers, but is not always taken as far.

(*d*) A thin book is often though not always more specialized in subject than a fat one; its subject is then likely to have a longer number than the subject of the fat one, although there is less room for it on the spine of the book.

33. (*a*) The word class is used for any subject division however general or however specific. Cutter meant by class entry the entry of a book under the name of a subject more general than its particular subject, for example a book on rats under rodents, or rodents under animals. With reference to a classification such as DC, class is often used for the basic co-ordinate classes, such as Philosophy 1, Religion 2. The arrangement of books within a class means their arrangement within a subject or form group however general or specific if this group is not further subdivided by subject; for example all books on fishing might be arranged alphabetically by author, so that there would be no further subject subdivision of fishing as line or rod, or fresh water or sea fishing.

(*b*) 332 is a class number for books on money; R632 is a book number for a book by Robbins within a subject class, which is also an author number; 332/R632 would be a call number distinguishing a book on money by Robbins from all other books, if it were the only book by anyone called Robbins in the class;

if it were not then the call number would have to be altered or extended to make it exclusive of all other numbers.

(*c*) Any alphabetico-numerical number consisting of an initial letter or letters of a word and figures is a Cutter type number; strictly a Cutter number is one from an alphabetico-numerical table for personal names first worked out by Cutter, but any number of this type and especially one from the Cutter-Sanborn tables may be called a Cutter number; Kate Sanborn worked out alphabetico-numerical tables for personal names more detailed than Cutter's original table, and her tables, commonly called Cutter numbers, were named Cutter-Sanborn tables, although they are not an extension of Cutter's original table.

(*d*) A time number is a book number representing a date, usually of publication. Books within a class may be given running or serial numbers from 1 on; these may be called specific numbers and may be according to acquisition and so give a chronological order; but as they do not represent actual dates they are not time numbers. Biscoe worked out a table of time numbers which is given in later editions of DC up to the 13th. It is not in the 14th though still mentioned in the Introduction as if it were.

(*e*) Cutter type numbers may be used for alphabetical subject subdivision and are so used extensively in LC, and these may then be author numbers. QE566·G7C53 is an LC number in which ·G7 is a Cutter type number for the Great Barrier Reef, and C53 a Cutter number for Clarke as the name of the author of a book on the Great Barrier Reef. A book on a person could have a Cutter type number for the person as subject, and if the author had the same name the same number could be an additional author number; for example a book on a Churchill by a Churchill could have the number 92/C563/C563, the number C563 being from the Cutter-Sanborn tables and used for Churchill as both author and subject.

34. Cookery—Periodicals 641·506
(1) Banquets, Royal 394·1 or 642·45; (2) Cakes, Sponge 641·631; (3) Food—Analysis 543·1; (4) Margarine—Manufacture 664·3; (5) Cookery, Camp 641·578; (6) Canteens, Industrial 331·835; (7) Stewing 641·74; (8) Breakfast 641·52; (9) Cookery, Kosher 641·567; (10) Soups 641·73; (11) Kitchens, Domestic 643·3; (12) Cookery, Diabetic 641·563.

35. (1) 330Rob exemplifies the arrangement of books within a subject class, economics, by authors alphabetically distinguished to the third letter of their surnames. This is satisfactory for small general collections, up to about 30,000 volumes; but there could be general works on economics by Robb, Roberts, Robin,

Robinson, which would not be distinguished. The number suggests that advantage has not been taken of the 01 and 02 extensions at least; but this may be justified in practice by the fact that in economics more than some other subjects it is not easy to say which are original theoretical works and which mere textbooks.

(2) 330R631 exemplifies alphabetical author arrangement within a subject using Cutter-Sanborn numbers: these whilst more distinctive than three letters do not always result in exclusive call numbers. But the Cutter-Sanborn author numbers have proved satisfactory for shelf arrangement in very large libraries.

(3) 330/42 exemplifies arrangement within a subject by serial or specific numbers; these are usually allotted in order of acquisition and result in a more or less chronological order. But the re-use of numbers from lost or discarded books may throw this out and the order is not a good finding order as author alphabetical is, without a number taken from the catalogue.

(4) 330/1942 apparently exemplifies chronological arrangement within a subject by actual dates, though in a large-sized reference library there could be up to 2,000 general books on economics serially numbered as in (3) above. There are also special 'time numbers' such as Biscoe's. This, like serial numbering, does not give a good finding order without a number first found in the catalogue, and there are problems of deciding whether the first or a later publication date of a work should be used, and of distinguishing editions, for example all those of Adam Smith's Wealth of nations, first published in 1776.

(5) 330 seems to exemplify no subarrangement of any kind. This is bad even for the only book on a subject in a small library, because if there is one book there are likely to be others, and most large libraries have grown from small ones.

36. (1) 032; (2) 419; (3) 192·9; (4) 822·91 or 792·1; (5) 320; (6) 323·3; (7) 966·7; (8) 966·9 or 342·669; (9) 942·069; (10) 320; (11) 339·24; (12) 658·3152.

37. (1) 623·45113; (2) 362·4; (3) 291·216; 398·4; (4) 736·2; (5) 179·7; (6) 364; (7) 635·9764; (8) 321·1; 323·45; (9) 697·9; (10) 392·3; (11) 635·97532; (12) 646·48.

38. (1) Wireless—Receiving apparatus 621·3841366; Vacuum tubes 621·384132. (2) Air—Pollution 628·5; Water—Pollution 628·5. (3) Challenger, Ship 623·828; Hydrography 526·99. (4) Lace 746·2; Embroidery 746·44; Handkerchiefs 646·48. (5) Games, Party 793; Puzzles 793·73.

39. (1) 412; (2) 230; (3) 339·24; (4) 174·2; (5) 616·8; (6) 920; (7) 326·8; (8) 707; (9) 375·6; 607; 920; 540·9; 540·92; (10) 533·6; 629·1323.

40. (1) 312; (2) 630·1; 323·354; (3) 392; (4) 173·1; 347·6; (5) 140; (6) 701; (7) 128; (8) 174·2; (9) 178·8; (10) 149·3 or 212.

41. (1) Maize 633·15; (2) Radio 621·384; (3) Heredity 575·1; (4) Alfalfa 633·31; (5) Riddles 793·73; (6) Obesity 616·4; 616·39; 612·3977; (7) Faith cure 615·852; (8) Feeble-minded 362·3; 132·2424; 371·922; (9) Emotions 157; (10) Shyness 157·3S; 179·9.

42. (1) Silkworms 638·2; (2) Palmistry 133·6; (3) Children—Medical care 618·92; (4) Mapmaking or map-making 526·8; (5) Feet—Care and treatment 617·58; 646·7; (6) Poliomyelitis 616·83; (7) Old people—Medical care 618·97; 362·61; (8) Birds—Keeping 636·6; (9) Economics 330; (10) Tennis, Table 794·7.

43. (1) Chairs; Posture, Physical 684 (Note Congress gives Chairs 749·31); (2) Language; Palaeography 417; (3) Aquatints—Catalogues; Lithographs—Catalogues; England—Description and travel 763; (4) Chess 794·1; (5) Romanticism 801; (6) Children's literature —History 028·5; (7) Social science—Research 307; (8) Housekeeping 640; (9) Muscles—Diseases 616·74; (10) Erie Canal 626·9.

44. (1) 027·3 Subscription libraries; or Libraries, Subscription; (2) 141 Idealism; (3) 294·3 Buddhism; (4) 336·09 Public finance—History; (5) 425 English language—Grammar; (6) 514·08 Trigonometry—Tables; (7) 622·3303 Coal mining—Dictionaries; or Mining, Coal—Dictionaries; (8) 708 Art galleries; or Art—Galleries; (9) 821·0408 English ballad poetry—Collections; (10) 941 Scotland—History.

45. (1) (*a*) 575·17:591·3:599; 591·3:575·17:599; 599:575·17:591·3.
(*b*) 575·1; 591·3; 599.
(*c*) Genes; Embryology, Animal; Mammals.
(2) 507·0942.
(3) The DC number is 507·0942 corresponding as follows:

5 Science
07 Study and teaching
09 History
42 England

The correspondence of the heading and subheadings with a class number is not a breach of specific entry, because the hierarchy of subdivision is entirely by form or aspect, and whilst specific entry excludes, for example, Science—Mathematics which is alphabetico-classed, it does not exclude Science—Study and teaching and so on because the subheadings do not represent subclasses or species in the class or genus science.

46. (1) 144 or 192 Utilitarianism; (2) 636·4081 Pigs—Farming; (3) 340·7 Law—Study and Teaching; (4) 659·138 Modelling, Advertising; (5) 607 Technical education; (6) 792·8 Ballet dancing; (7) 631·0913 Tropical agriculture; (8) 619·3 Sheep—Diseases; (9) Journalism—History 070·9; (10) 023 Librarianship—Careers.

47. The different numbers in order are numbers for different entries. Each extension from =20 to "18" is a subdivision of the literature of the subject horses without any effect on, or anything done to limit the subject itself, by something done to or about horses. The next step is a 'process' of horses and the number for it ·003·12 is a decimal extension of the main class number 636·1 coming arithmetically before the next one ·084 which is a further process. Finally there is a specification of horses themselves as racehorses. There may be some anomalies and contradictions but the order is essentially the basic one, from general literature, subdivided by form to literature of further specifications of the subject itself.

    The horizontal compound number for one document and one entry must specify its subject first but thereafter the order of the elements is roughly the reverse of their vertical order in a series of numbers. The order of different numbers is one in which there is progression from the least to the greatest limitation or specification of the subject in itself; the order of elements in the same number is one from the specification of the subject in itself through to the least limitation of this and the merely formal distinction of the literature.

48. (1) Cakes—Decoration 641·631
    refer from Cake Decoration see
    Confectionery see also

    (2) Australian Aborigines—Art 572·994 or 709·94
    refer from Australian Aboriginal Art see
    Art, Australian Aboriginal see
    Art, Primitive see also the subheading Art under names of primitive races
    Carvings, Rock 732·2
    refer from Rock carvings see Carvings,
    Stone see also
    Cave Drawings see also
    Sculpture see also
    Rock Paintings 751·73
    refer from Painting, Fine Art see also
    Cave Drawings see also
    Murals see also

    (3) Office Records, Banking—Disposal 651·5
    refer from Archives see also Office Records

    (4) Film, Moving Picture—Preservation 778·58
    Film, Moving Picture—Storage 778·58
    refer from Moving Pictures see also Film, Moving Picture

(5) Packaging—Materials, Aluminium 658·78845
refer from Aluminium—Uses—Packaging see

(6) Geology, Physical 551
refer from Physical Geology see
Earth see also
Geology, Historical 551·7
refer from Historical Geology see
Earth—History see

(7) Bowls, Lawn 796·31
refer from Bowls see Bowls, Alley; Bowls, Lawn
Sport see also

(8) Football, Association 796·33
refer from Soccer Football see
Sport see also Football

(9) Solar Energy 621·47
refer from Sun see also
Power, Mechanical—Sources see also

(10) Cannibalism 599
refer from Anthropology see also under names of customs, e.g. Cannibalism
Sacrifice, Human 291·3
refer from Religion, Primitive—Rites & Ceremonies see also
Human Sacrifice see
Anthropology see also under the names of customs, e.g. Sacrifice, Human

49. (1) Costume, Male 391·1
r.f. Clothing, Men's see also
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Fashion, Male see
Sex—Psychology see also
Costume—Great Britain 391·0942
r.f. Dress see Costume
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(2) Walls, Retaining 721·291
r.f. Earthworks see also
Foundations see also
Soil—Mechanics see also

(3) Art—Theory 701
r.f. Aesthetics see also
Art—Philosophy see
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(4) Speaking, Public 808·5
r.f. Oratory
Speech making (s)

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(5) Automation 621·8
r.f. Automata see also
Control equipment, Automatic see also
Cybernetics see also
Mechanization see also
Servomechanisms see also

(6) Poetry—Theory 808·1
Language—Theory 401

50. (1) Automation see also Automata; Control equipment, Automatic; Cybernetics; Mechanization; Servomechanisms; and the subheading Automation under the names of industries xx Automata; Control equipment, Automatic; Cybernetics; Mechanization; Servomechanisms. (2) Adobe houses x Pisé houses xx Houses—Materials. (3) Arms traffic see also Armaments; Arms and armour—Trade; Disarmament; Peace; War—Causes xx Armaments; Arms and armour—Trade; Disarmament; Peace; War—Causes. (4) Balance of power see also Europe—History; International relations; Peace x Power, Balance of xx Europe—History; International relations; Peace. (5) Balance of payments see also Balance of trade; Foreign exchange xx Balance of trade; Foreign exchange.

51. Clocks, Floral
Floral decoration
Flowers—Arrangement
—Diseases
—Drawing
—Growing
Flowers—Shows
—Trade, Retail
Flowers, Artificial
Flowers, National
Flowers, Wax
Language, Flower

52. A. Punishment, Capital
Coins, Copper
Money, Paper
Energy, Solar
Railway, Underground

B. Advertising—Laws
Aeroplanes—Engines
Agriculture—Chemistry
Anatomy—Specimens
Animals—Locomotion
Animals—Migration

53. (1) Letter writing, Commercial 651·7 see also Advertising, Mail x Correspondence, Commercial; Correspondence, Business; Commercial correspondence; Business correspondence xx Advertising, Mail. (2) Elocution 808·5 see also Oratory; Speaking, Public; Voice—Production x Reciting xx Oratory; Speaking, Public; Voice—Production. (3) Quotations 808·8 see also Epigrams; Proverbs; Toasts xx Epigrams; Proverbs; Toasts. (4) Horses 636·1 see also Mules x Equus caballus xx Domestic animals; Equidae; Mules.

54. (1) Shipbuilding—Materials 623·8 xx Naval architecture for shipbuilding; Aluminium—Welding 671; xx Metals see also particular metals Welding see also the subheading Welding under the names of metals. (2) Boats—Models—Control, Radio 623·8 xx Models see also the subheading Models under Aeroplanes, Boats, etc. Control, Radio see also the subheading Control, Radio under Boats, etc. (3) Sextant 522·41 x Instruments see under the names of instruments e.g. Sextants, Theodolites, Violins and the subheading Instruments under Music; Navigation, etc. xx Astronomy—Instruments Navigation—Instruments 527 x Instruments see under the names of instruments, e.g. Sextants, Theodolites, Violins and the x subheading Instruments under Music, Navigation, etc. xx Astronomy —Instruments. (4) Surgery, Plastic 617·95 x Plastic surgery. Crime and criminals 364·242 x Criminals Criminology. (5) Prisons—Great Britain 365·942 x Gaols Jails xx Crime and criminals Punishment. Borstals—Great Britain 365·42 xx Juvenile delinquency Prisons. (Note that 42 in 365·42 is not a subdivision of 365 by country.)

55. (1) Coal—Geology 553·2; Coal as fuel 662·6. (2) Beverages—Hygiene 613·3; Beverages—Manufacture, Domestic 641·87; Beverages—Manufacture, Wholesale 663. (3) Duelling—Ethics 179·7; Duelling—Customs 394·8. (4) Shark fishing, Amateur 799·1731; Shark fishing, Professional 639·3731. (5) Women—Intelligence 136·1; Women—Intelligence 376·2; Women 396. (6) Cafeterias, Industrial 331·835; Cooking, Cafeteria 641·572; Cafeterias—Management 647·95. (7) Forensic medicine 340·6; Forensic medicine 614·23. (8) Pottery, Trade 666·6; Pottery, Arts and Crafts 738·3. (9) Millinery, Amateur 646·5; Millinery, Trade 687·4.

56. (1) Incentives in industry 658·322 or 331·22 x Employee incentives; Labour incentives xx Personnel management; Wages and salaries. (2) Lubrication 621·89 x Greasing; Oiling xx Friction; Machinery. (3) Motor cars—Lubrication 629·255 xx Lubrication see also the subheading Lubrication under Motor cars, etc. (4) Lilley, S. Automation—Social aspects 621·8 xx Technology—see also Automation. (5) Real estate—Advertising, Classified 333·33 xx Advertising see also the subheading Advertising under subjects.

57. (1) Rabbits—Breeding 636·9—Extermination 632·6932. (2) Wool—Growing 636·3—Trade 338·1763. (3) Coal—Geology 553·2—Mining 622·33. (4) Timber—Growing 634·9—Preservation 691·1. (5) Houses—Building 690—Designing 728. (6) Lobsters—Smoking 664·9 —Trapping 639·5. (7) Foxes—Hunting 639·1; 799·27742—Farming 636·9. (8) Tea—Growing 633·72—Manufacture 663·9. (9) Card games—Rules 795·4—Ethics 175·5. (10) Matter—Philosophy 117—Physics 530·1.

58. (1) Metalwork, Aluminium 739·57 r.f. Arts and Crafts (see also Metalwork) Metals (see also Metalwork) Aluminium—Working

671 r.f. Metals (see also under the names of metals) Metalworking (see also the subheading Working under the names of metals). (2) Cameras, Photographic–Stands 771·34 r.f. Photography see also Cameras, Photographic. (3) Opera 782 r.f. Drama see also Music see also Theatre see also. (4) Fiction 808·3 r.f. Novels see Literature see also Prose see also Short stories see also James, Henry 813·46 Wells, Herbert George 823·91. (5) Jones, H. M. The Frontier in American fiction. Frontier and pioneer life–U.S. 917 r.f. Pioneers see Frontier and pioneer life. Adventure and adventurers, see also Frontier and pioneer life. American fiction 813 r.f. Fiction see also American fiction and so on. American literature see also American fiction and so on.

59. (1) Mulberry, Paper
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Paper–Cutting
Paper–Testing
Paper, Rice
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Paper making
Paper mulberry see Mulberry, Paper
Paper work
Paperweights
Rice paper see Paper, Rice

(2) Daylight saving
Electric lighting
Light, William
Light
Light–Speed
Light Brigade
Lighthouses
Lighting
Lighting, Electric see Electric lighting
Lightning

60. (1) Ballet dancing
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Dance macabre see Dance of death
Dance music see Dancing–Music
Dance of death
Dancing–Music
Dancing, Ballet see Ballet dancing
Dancing, Folk see Folk dancing
Dancing dolls see Dolls, Dancing

Dancing games see Games, Dancing
Folk dancing
Folk songs
Games, Dancing
St Vitus' dance

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Geology—Maps
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