Knowledge Organisation I – (Classification Theory)

Knowledge Organisation I – (Classification Theory)

Unit-1: Library Classification

Meaning, Need and purpose of classification.- Normative Principles Five Laws of Library Science – Implications. Formation, Structure and Development of Subjects:

Unit-2: Species of Classification Schemes :

Enumerative Classification: Almost enumerative Classification: Almost Faceted Classification - Rigidly Faceted Classification - Freely Faceted Classification - Brief study of major schemes viz: Decimal Classification - Universal Decimal Classification - Library of Congress Classification - and Colon Classification

Unit-3: General Theory of Classification.

Ranganathan's contribution. Main Class – Canonical Class and Basic Class. Five Fundamental Categories : PMEST. Isolate -- Auxiliary Schedules. Facet Analysis -- Postulates pertaining to Fundamental Categories. Phase Analysis – Phase, Intra-facet & Intra-array relations.

Unit-4: Principles of Facet Sequence

Wall-Picture Principle, Whole-Organ Principle, Cow-Calf Principle, Act and Action – Actor – Tool Principle. Principles of Helpful Sequence -Different devices - Chronological Devices - Telescoping of array.

Unit-5: Notation

Definition, Development, Types, Structure, Quality and functions. Canons for Classification Idea plane - Canons for characteristics; Canons for succession of characteristics; Canons of Array; Canons - Call Number -- Class Number, Book Number – Types of Book Numbers, Collection Number. Trends in Library Classification

References:

Gopinath, M.A , Ranganathan S R. Prolegomena to Library Classification Ess Ess Publication

Ranganathan, S R. Colon Classification Basic Classification - Ranganathan Series in Library Science 4: Madras Library Association Publication 26.

Ranganathan, S R. Philosophy of Library Classification.Ess Ess Publication

Ranganathan, S R Classification and Communication Ess Ess Publication

Ranganathan, S R Elements of Library Classification South Asia Books

Course material prepared by

Dr. P Balasubramanian

University Librarian & Head.

Manonmaniam sunaranar University

Tirunelveli-627012.

UNIT – 1

LIBRARY CLASSIFICATION

Objectives:

- ❖ To learn the meaning and purpose of classification.
- ❖ To understand the laws of library science
- ❖ To get knowledge on implications of library
- ❖ To learn more about the structure and formation of subjects

Introduction:

We are aware that libraries keep various types of documents. At the outset, it is necessary to know that libraries hold multiple collections like printed books, journals, manuscripts, maps, charts, micro-documents, CD-ROMs, video and audio cassettes etc. All these collections should necessarily be arranged systematically. There are three possible ways in which a reader may demand library material. He may ask by the name of the author whose works he wishes to read or by the title of the book. The third situation is that he may need a book(s) on a particular subject. This last one is known as the subject approach. In short, the subject process is the means of securing unknown items from the collection and classification facilitating it.

Library classification yields a subject-wise arrangement of library materials in which documents are arranged by subject, and each topic is followed by another related matter, e.g., physics following mathematics. This is known as systematic arrangement. The other essential activities in a library, such as book selection, circulation and reference services, are somewhat indirectly dependent upon library classification. It is thus no wonder that classification is widely regarded as the foundation of librarianship.

Classification can ensure the Need and Purpose of Library Classification, full exploitation of library material, and strengthen other services in a library. The need for classification is all the more significant in modern libraries, as they store different types of documents requiring diverse storage media. In other words, papers on the same subject(s) get scattered throughout the collection because of their varied physical forms. Classification, however, is the means of bringing books on the shelves and their entries in a catalogue or index in one place. Let us,

therefore, acquaint ourselves with these different types of documents that modern libraries acquire and store.

Meaning of classification:

Systematic grouping of entities (both abstract and concrete) to meet one's requirement is known as classification. Classification lies at the root of all human activities. Our daily life is very much dependent on the process of type; however, elementary this process may appear. You can undoubtedly recall several activities around you where classification plays its part. Take, for example, the arrangement of contents in a railway timetable, the display of goods in a grocery shop, the structure of modules in a departmental store to facilitate the selection of goods by customers, the seating arrangement in a theatre or stadium, the assignment of registration numbers to various motor vehicles by a state transport authority, or the sorting of letters by letter carriers first by the city, then by the street and lastly by the house numbers for quick delivery of post. These are simple examples of how we use classification in our activities.

The word classification was derived from the Latin word classes which meant order or rank of mobility in Roman society based upon birth and wealth. Classification is a mental process by which we group or separate things based on common characteristics. For example, items are grouped based on a common factor like writing material. In other words, classification attempts to identify a class for like things. We succeed in our attempt by applying a characteristic and isolating it all like something from, unlike things. Classification, in essence, means dividing into groups, grouping, sorting, arranging, ordering, ranking and relating one entity to the others.

In his Prolegomena to Library Classification (1967), S.R. Ranganathan elaborately discusses the meaning of classification. In the case of physical objects, division and assortment are the two results of classification. According to Ranganathan, while division implies sorting objects into two or more groups, assortment additionally denotes the arrangement of these groups in a predetermined sequence. Further, in library classification, the series of things, i.e., documents, is so mechanised by the use of notation that it is reflected in the note when a copy is withdrawn or added.

Thus, one can see that the term `classification' is a homonym. Therefore, Ranganathan tried to resolve the homonym by examining the various ways the time has been used: Classification in Sense 1 is DIVISION.

Classification in Sense 2 is ASSORTMENT.

Classification in Sense 3 is CLASSIFICATION IN SENSE 2 plus representing each entity by an ordinal number taken out of a system of ordinal numbers, designed to mechanise the maintenance of the sequence,

Classification in Sense 4 is CLASSIFICATION IN SENSE 3 when a complete assortment is made of an amplified universe. - That is when the entities and pseudo-entities arising in the successive assortment are arranged in one filiatory sequence.

Sense 5 is CLASSIFICATION IN SENSE 4, with all the entities removed but only the pseudo-entities or classes retained.

It is classification in Sense 5 that is used:

- o Either when the universe is classified as infinite,
- o When some of the entities are unknown and unknowable at any moment, even though the universe classified is finite.

It is a classification in Sense 5 practised by the library profession. The primary concern of libraries is establishing the most helpful document arrangement. Library classification, therefore, presupposes the use of notation, i.e., a brief symbol for the names of subjects. In this sense, the word classification is used in this and other units.

Definition of Library Classification:

Having understood the meaning of classification in library science, let us go through a few well-known definitions of library classification. Both the classificationists and the critics have defined library classification, all necessarily underlying its practical aspect. According to Margaret Mann, classification is "the arranging of things according to likeness and unlikeness. It is the sorting and grouping of things. Still, in addition, classification of books is a knowledge classification with adjustments made necessary by the physical form of books". W.C.Berwick Sayers defines it as the arrangement of books on shelves or description of them in the manner which is most helpful to those who read". Arthur Maltby revises Sayer's definition as "the systematic arrangement of books and other material on shelves or catalogue and index entries in the manner most useful to those who read or seek a definite piece of information". Ranganathan is more elaborate in his definition. We will study his report, therefore, in detail. According to Ranganathan, "it is the translation of the name of the subject

of a book into the preferred artificial language of ordinal numbers, and the individualisation of several books dealing with the same specific subject using a further set of ordinal numbers which represent some features of the book other than their thought content".

In this definition, we find three critical phrases, viz.

i) Artificial language,

ii) Ordinal numbers, and

iii) Specific subject.

These three phrases need some explanation.

Artificial Language:

In library classification, we use symbols to denote subjects. The names of issues are in ordinary language and understandable to an average person. Therefore, we call it the natural language that comes naturally to the human living in a society. On the other hand, the symbols that we may use to denote a subject, say B, or 510, or QA for mathematics, are artificial because the ordinary person will not ordinarily understand the meaning of these symbols. Hence these are artificial and intelligible to a specifically trained class of professionals. Their value is only ordinal, which means that these symbols have no quantitative or qualitative value; they only determine the sequence/order of documents on the shelves. These symbols also preserve the chosen sequence as the books will be replaced at their proper place after being them out for reading or lending. These symbols do not indicate anything except the series of these documents on the shelves.

Ordinal Numbers:

These are used not to count but to order and mechanise the arrangement of things. For example, participants in a conference can be listed in the desired sequence based on some cooperative principle. Then, this sequence can be mechanised with the help of ordinal numbers. Melvil Dewey (1851-1931), the father of modern library classification, was the first classificationist to use simple Indo-Arabic numerals (0-9) as ordinal numbers for the systematic listing of subjects, both broader and narrower, in his Decimal Classification first published in Need and Purpose of Library Classification1876 (see Unit 4, Unit 10 and Unit 11 of this Course and Blocks 2 of BLJ&03Pto, and I know more about Dewey Decimal Classification). Since then, the system of ordinal numbers-notation, called library

classification, has been the principal element in the design and use of library classification schemes.

Specific Subject:

The contents of a document may deal with some field of knowledge. It is a prerequisite for a classifier to know what subject matter the document exactly contains. After ascertaining the exact subject, or specific subject, the classifier translates that particular subject into the artificial language or ordinal numbers of the classification scheme used. To know the specific issue of the document, the classifier has to examine its title, contents page, preface and introduction, scan through some chapters, and, if necessary, go through the entire book. There may be certain occasions where a classifier has to consult an expert to ascertain the specific subject of a document.

Ranganathan defines the specific subject of a document as "that division of knowledge whose extension and intension are equal to those of its thought content". The extension means the scope (if the subject treatment and intension mean the depth of the subject treated in a given document.

Palmer and Wells define it as "that division of knowledge which exactly comprehends all the major factors that go in its making".

Let us take an example and perform an analysis to ascertain the specific subject.

A.L. Srivastava: A Short History of Akbar the Great (1542-1605). Agra, Shivlal Aggarwal, 1957.

It is possible to interpret the contents of this book as `Mstory' or `History of India' or 'History of India during the Mughal Period.

All these possible subjects are not specific enough and are too broad to convey the actual thought content of the book. It is, therefore, necessary to add one more phrase to the above analysis to make it complete, and that phrase is `Reign of Akbar'. All these aspects should now be brought into the class number. If you omit any of these aspects, the extension and intention will not be equal to the thought content of the book.

The specific subject of the book can be arrived at as follows History

Indian History

Mughal Period

Akbar

Reign

When you analyse the thought content of the document on the above lines, the extension (scope) decreases, and the intention (depth) increases with every successive division, as seen above. This sort of subject ordering is called "general to specific".Ranganathan's definition of classification, quoted above, refers to two objectives: Translating the subject into an ordinal number and individualising a given document in the total order of records in a libr4ry. The issue of the journal is translated into a class number with the help of a notation. But, several documents are likely to bear the same class number, and the problem of individualisation arises. The class number is, therefore, not enough. It has to be supplemented by one, or if necessary, by two, additional elements. These other elements are (i) book number and - (ii) collection number. Class number, book number and collection number constitute the call number of a document. Only the call number individualises a given copy in a library.

DESCRIPTIVE THEORY OF LIBRARY CLASSIFICATION:

In the beginning, there was no theory; only practice was followed. Practice gave rise to descriptive theory. Thus, the descriptive approach was the first stage in the development of library classification. This theory was able .to to meet the requirements of the universe of subjects (the totality of issues comprising knowledge) as it existed at that time. The descriptive theory was based on the practices in vogue based on different schemes of classification then available. The descriptive theory, distilled out of contemporary- methods, held its sway until the early 1950s. The systems designed before the 1950s were based on `the flair or natural gift of the designers and not on any objectively worked out theory of library classification. Their methods were empirical. The development of the descriptive theory is attributed to several stalwarts like Brown, Richardson, Hulme, Sayers, Bliss and Ranganathan. The period between 1898 and1937 witnessed the genesis and development of this theory. Through their schemes and writings, these stalwarts enunciated certain principles of library classification, which significantly contributed to the development of a General Theory of Library Classification. These principles and contributions of the personalities are briefly outlined in the following sub-sections.

J.D. Brown (1862-1914)

J.D. Brown was an English librarian whose contribution to the General Theory_ of Library Classification was small but significant. He brought out three different schemes of classification. The first of these three was developed in 1894 jointly with J.H. Quinn and was known as Guinn-Brown Scheme. This scheme did not make much impact. In 1897, Brown independently brought out another scheme and called it Adjustable Classification three years later. This scheme also proved inadequate even in those days. In 1906, Brown published the first edition of his Subject Classification, the system he is known for. Its second edition was brought out in 1914and the -third, edited by J.D. Stewart; in 1939. Brown's Subject Classification was founded on the principle that every science and art springs from some definite source.

There were first two factors in the order of things, viz., matter and force. These, in turn, gave me a place to live. In the course of time, life led to the mind, which in turn gave birth to records. In addition to the shove principle, Brown also advocated -two other guides. The first of these two was his one-place theory. According to this principle, each subject has only one place in the scheme concerning its aspects and numerous manifestations. For example, the issue of roses may be viewed from botany, horticulture, history, geography, decoration, - bibliography, etc. The subject of rose, according to Brown, is concrete, while the various viewpoints represent its aspects. He believed that the scholar's interest in `rose' is constant, unlike that of the bibliographer, whose interest is only occasional. He, therefore, preferred to place the rose under one concrete or specific heading. It means that his arrangement of books was not the discipline (as in the Dewey Decimal Classification (DDC) or Library of Congress, (LC); but by topic. It was an experiment which failed. The other principle advocated by Brown was the science and its applications theory. According to this principle, he places each subject as nearer as possible to the science from which it has sprung. Thus, rose is placed under botany, libraries under library economy, coal under mineralogy, and persons under biography. Theory and practice are collocated. As a result of this principle, Brown dispensed with "conventions, distinctions and groupings, which are arbitrary rather than scientific". For example, the distinction between Pure and Applied Sciences, Fine Arts and Useful Arts, Currency and Numismatics, Architecture and Building and Costume and Press was not made. He faithfully followed these principles in his Subject Classification.

E.C Richardson (1860-9939)

E.C. Richardson was the first librarian of Hartford Theological Seminary, USA, and later took over as the Princeton University Library librarian. Richardson is regarded as the first classificationist to systematically attempt to set down a library classification theory. In 1910, he published his book Classification, Theoretical and Practical. It was the first textbook on variety, which later influenced W.C.B. Sayers. In the introduction to this work, he enumerated basic laws and principles meant to guide the work of designing a scheme of classification. These principles, called Criteria of Classification, are as follows: Classification should follow the order of things; classes should be arranged in historical sequence.

1) Division of classes should be minute.

2) Arrange things according to likeness and unlikeness.

3) Books are collected and administered for use; hence, the benefit is the motive behind the classification.

4) A scheme of classification should be provided with a notation. The notation should be amenable to indefinite subdivisions, preferably using a mixed symbol with a decimal base and mnemonic features.

Richardson asserted that "things: nature are already classified, and roan has to trace only the order -of the classification and record it."

E.W Hulme (9659-1954)

Hulme was the librarian of the Patent Office Library, London. In 1911-1912, he published his book Principles of Book Classification in the Library Association Record. Have principles influenced the later theories of book classification? In the words of W.C.B.Sayers, the contribution of Hulme was "A valuable lead up to the more complete and satisfactory theories today". According to Hulme, all classifications could be arranged into two groups- (categories), viz., •Mechanical and-•Philosophical According to this categorisation, book classification is mechanical Hulme's principles of book classification are as follows:

1) Book classification is the plotting of areas pre-existing in literature, and coincidence with a philosophical order is no guarantee of accuracy.

2) Book classification is the mechanical assembly of material into classes.

3) The division and coordination of classes in literature are determined mainly upon formal and no philosophical lines.

4) Classification should be based on a literary warrant.

Hulme states that mechanical classifications are left uncoordinated. But in book classification, systematic coordination of classes is introduced. His theory of literary warrant immensely attracted the attention of later classificationists. E.A. Savage (1877-1966) revived the term. Hulme regards books as "concrete aggregates of facts selected from the common stock of knowledge". Hulme meant by concrete aggregates that if there are books on electricity and magnetism, there is a literary warrant for providing a number for such a class named "electricity and magnetism". A literary warranty means that a subject cannot be listed in the scheme unless some literature has already appeared on it. The existing literature on a topic only justifies the inclusion of that subject in the system. Hulme's principle of literary warrant greatly influenced the Library of Congress Classification (LC). Ranganathan also used this principle, but not precisely in a sense. Hulme made use of it. According to Ranganathan, when the literature on a particular subject grows in size, there may arise a need for providing a separate class for it in the scheme. Ranganathan's principle of literary warrant states that "the subjects in an array of subjects or the isolates in an array of isolates may be arranged in the sequence of decreasing quantity of the documents published or anticipated to be published on them, except when any other overwhelming consideration rules it out." Hence, it requires that the various aspects of such a new subject should be so listed as to bring those aspects first on which more literature has appeared.

W.C.B. Sayers (1881-1960)

William Charles Berwick Sayers, an English librarian and teacher of S.R. Ranganathan, made a remarkable contribution to developing the classification theory. He is referred to as the first grammarian of library classification. He is responsible for interpreting and systematising the ideas of other theoreticians. He never designed any classification scheme, though, through his theory, he has shown the way for others to create classification schemes. His view of book classification first appeared in 1915 under the title "Canons of Classification". He expanded the outline of the theory contained in this book in three other books, viz., Grammar of Classification (Ed.2, 1915; Ed.4, 1935), Introduction to Library Classification (Ed.1, 1918; Ed.9, 1958) and Manual of Library Classification (ed. l, 1926; Ed.3, 1955; Ed.4, 1967 and Ed.5, 1975, revised by Arthur Maltby). It has now been edited by Rita Marcella and Robert Newton in 1994. Sayers Canons of Classification: Sayers simplified his classification theory

by stating 29 principles. He called them canons, meaning rules, regulations, standard tests or criteria of classification.

The 29-canoris can be grouped under six categories as follows:

Canons of definition (6)

Canons of divisions (7)

Canons of terms (4)

Canons of book classification (4)

Canons of notation (4)

Canons of book classification (5) schemes

These are discussed below:

Definition: Classification is a mental process by which things or ideas are grouped according to their likeness. The likeness that exists in the universe of things and ideas is called characteristic in classification. A characteristic is a basis for the division or grouping of classes. Classes are arranged in a systematic order in a classification scheme. The order is based on the theory of knowledge.

Division: Assembling things according to their degree of likeness and separating them according to their degree of unlikeness is the division process. The chosen resemblance or characteristic used to 'divide the given things may be natural or artificial. A natural aspect is a thing's inherent quality and is responsible for its existence. A group of things may possess an artificial characteristic. For example, the colour of clothes is an artificial characteristic. The division should proceed from more excellent extension and more little intentions to minor extension and more significant intentions. The process of division should be gradual, moving from general to specific. The characteristic used must be consistent at each stage of division.

Terms: A classification scheme is a statement of knowledge using verbal terms. A time is a name for a class. It may be a word or a phrase. The duration should be unambiguous and unique with the same meaning whenever they are used in a classification scheme. In a system of classification, the terms used should always be non-critical. Book Classification: A book classification is a device for arranging books by subject or form in a logical order. It must be

capable of admitting any new subject without dislocating the class of subjects already drawn. Book classification schemes must be equipped with

1. A generalia class;

2. Form classes like poetry, fiction, drama, etc.

3. Forms in which subjects are presented like theory, history, dictionary, etc.

4. A notation; and

5. An index.

Notation: A notation consists of signs representing the class names in a classification scheme. A memo should be brief, simple, flexible, and have a mnemonic value. Book Classification Schemes: A scheme of classification should provide columnar schedules in the order of precedence of subjects. It is necessary to explain how to use the system. There should be a piece of machinery to revise the scheme to keep it up to date, accommodating new developments in the knowledge.

H.E. Bliss (1870-1955)

Henry Evelyn Bliss devoted his entire active life to the intensive study of the art and science of classification. In addition to the articles, he contributed to library journals, his theories and principles of classification were expanded in his first work, titled Organisation of Knowledge and the System of Science (1929). He formulated scientific, philosophical and logical grounds for studying bibliographic classification in this work. This work is regarded as one of the basic texts on the knowledge organisation theory. He laid the foundation for a relatively stable, scientifically acceptable and consistent classification scheme. He also published another basic work on the theory of library classification titled Organisation of Knowledge in Libraries and the Subject Approach to Books (1933, 2nd ed. 1939). His work helped establish librarianship as a scholarly discipline. These two basic works convey to us the fundamental principles of classification, which Bliss later tried to apply in his System of Bibliographic Classification (BC), whose outline was first published in1935. The basic concepts of classification as expounded by Bliss may broadly be categorised as:

1) Consensus 2) Subordination 3) Collocation 4) Alternative locations 5) Notation

These concepts are briefly discussed below;

Consensus: Bliss viewed book classification as basically knowledge classification. He felt that considerable agreement existed among the experts on arranging various branches of human knowledge. He termed this a scientific and educational consensus. Science and education bring about the growth, organisation and development of human knowledge. The word consensus refers to a relative agreement on the significant classes of knowledge, their scope, order of arrangement and the essential relation between them. He believed that the natural order of main courses was close to this consensual order. Bliss felt that the more closely a library classification reflected this consensus, the more stable, durable, flexible and efficient it would be. His order of main classes is based on this consensus.

Subordination: Bliss theorised that a classification scheme should observe two types of subordination, viz., 1) Subordination of the special to the general, and 2) Gradation by speciality. Subordination of the special to the general. This is also referred to as the principle of decreasing extension. A scheme of classification should arrange subjects in the order of decreasing extension so that a general subject is followed by a special subject. The order of subjects in a scheme of classification should reflect the sequence from general to specific. Gradation by speciality: This concept is based on the philosophical notion of gradation by speciality. Gradation principle is employed for organising a series of topics of equal rank into a rational sequence. The principle is that some subject depend for their very existence on the works or findings of others, and those that so dependant should follow the disciplines upon which they rely. This is also known as the principle of dependency. For example, among the natural sciences, physics comes first because it deals with the fundamentals of natural phenomena. Chemical phenomena depend to some extent on the findings of the physicists and, therefore, chemistry follows physics. Bliss claims that "gradation by speciality is no mere arbitrary basis for classification but is a principle essential to the very process". Thus, the order of classes will be: General treated generally. General treated specially. Special treated generally Special treated specially.

Collocation: It is a by-product of the above two principles. By collocation, Bliss means "bringing together in proximity subjects which are most closely related". Ranganathan termed this as filiatory sequence. The principles of subordination and gradation by speciality help to decide the sequence of broad subject fields or disciplines and, within each subject, the principle of decreasing extension and various orders in any array determine the sequence of the subject. It is also necessary for bringing together similar subjects, which are most closely related. Therefore, Bliss, in his Bibliographic Classification, collocated language with

literature, because of their very close affinity with each other. Similarly, education is collocated with psychology, and chemical technology with chemistry. Collocation generally refers to coordinate classes. But, it may also refer to subordinate classes. Bliss subordinated sociology to anthropology and anthropology to biology.

Alternative locations: A scheme of classification should meet the different needs and requirements of a special collection. Therefore, libraries may wish to- alter the order established by logical sequence. A scheme, if it is to be of maximum usefulness, should therefore provide for the adaptation of logical sequence to practical convenience in order to meet different views. Bliss did not believe in the rigid and unadaptable view of the order of knowledge. To meet this principle of practical convenience, provision has been made deliberately for alternative locations and treatments in his unique scheme, though it is somewhat contrary to the principle of consensus. Provision has been made in notation for moving certain topics to other locations. For example, moving theology from the main class P religion to class AJ following philosophy; technologies like aeronautics or ship building from applied physics to useful arts and subordinating international law to political science or to law; and economic history to general history. This principle provides flexibility needed to solve certain problems in classification faced by all classifiers of all systems. But it also proves that there is no absolute consensus on the order of subjects.

Notation: Bliss recognised three important qualities of a good notation, these are

•It should be correlative and subsidiary.

•It should be simple and brief, i.e., a notation should remain reasonably simple. He even suggested an economic limit of three to four digits in a class number.

•It should use synthetic features. This is to achieve economy in the printing and display of schedules resulting in the simplicity of structure and convenience in use. Bliss achieved this by the provision of general and special systematic schedules for construction of coextensive class numbers.

S.R. Ranganathan (1892-1972)

Right from 1924, S.R. Ranganathan had been developing his theory of library classification. In the first edition of Prolegomena to Library Classification (1937), he provided an integrated theory, mainly descriptive and comparative, of the practices in classification then in vogue. Ranganathan went ahead of those classificationists, mentioned in the preceding sub-sections,

by extending the principles put forward by them. He also provided the largest list of normative principles named by -him as Fundamental Laws, Postulates, Principles and Canons and evolved a special terminology, which is evident from the first edition of Prolegomena. These rightly belong to stage-2 in the development of the General Theory of Library Classification. His theory is now synonymous with the General Theory of Library Classification.

Need for library classification:

Definition of library classification according to JS Mills – **Book classification is a mechanized act of saving time in the search of knowledge in literature.**

Classification in a library is very important because without it the work of the library is not able to run smoothly. Following is the requirement of library classification.

1. Unlimited expansion of books - In the modern era, the number of books is numerous and it is increasing daily and classification is necessary to control it.

2. Subject complexity - Currently, the complexity of subjects is increasing and classification becomes necessary to organize the subject with the subject concerned.

3. For the purpose of the library - Classification is necessary to fulfill the purpose of the library. Because all the work in it becomes simple.

4. To increase the use of books - Classification is necessary for the use of books in the library. The reader easily reaches the book by classification. Hence classification is helpful in book usage.

5. For the configuration in auxiliary order - Classification is necessary to place the book in auxiliary order i.e. near the related book, Ranganathan has said - "To configure books in auxiliary order" is the main objective of classification.

6. Saving time - In today's time, the reader lacks time, so the reader wants to reach the relevant book in minimum time and this classification becomes necessary. In the absence of classification, it may take the reader a long time to reach the book.

Purpose and Function of library classification:

The following are the main purposes of library classification:

Helpful Sequence:

Classification helps in organizing the documents in a method most convenient to the users and to the library staff. The documents should be systematically arranged in classes based on the mutual relationship between them which would bring together all closely related classes. The basic idea is to bring the like classes together and separate these from unlike classes. The arrangement should be such that the user should be able to retrieve the required document as aresult it will make a helpful sequence.

Correct Replacement:

Documents whenever taken out from shelf should be replaced in their proper places. It is essential that library classification should enable the correct replacement of documents after they have been returned from use. This would require a mechanized arrangement so that arrangement remains permanent.

Mechanized Arrangement:

It means to adopt a particular arrangement suitable for the library so that the arrangement remains permanent. The sequence should be determined once for all, so that one does not have to pre-determine the sequence of documents once again when these are returned after being borrowed.

Addition of New Document:

Library would acquire new documents from time to time therefore library classification should help in finding the most helpful place for each of those among the existing collection of the library. There are two possibilities in this regard. The new books may be or a subject already provided forin the scheme of library classification, or it may be or a newly emerging subject that may not have been provided in the existing scheme.

Withdrawal of Document from Stock:

In this case, the need arises to withdraw a document from the library collection for some reason, and then library classification should facilitate such a withdrawal.

Book Display:

Display is adopted for a special exhibition of books and other materials on a given topic. The term is used to indicate that the collection in an open access library is well presented and guided. Library classification should be helpful in the organization of book displays.

Other Purposes:

Compilation of bibliographies catalogues and union catalogues.

Classification of information.

Classification of reference queries.

Classification of suggestions received from the users.

Filing of non-book materials such as photographs, films, etc.

We would now do well to see what exactly is achieved by classifying documents and arranging them in a systematic way in a library. In the era of the information revolution, the role of libraries in acquiring and organising various types of documents hardly needs any emphasis-Libraries as service institutions acquire documents for use. These acquisitions should systematically be arranged so as to meet the ever growing needs of readers precisely, exhaustively and expeditiously.

We are witness to the information revolution. Documents are published in various languages in various disciplines in diverse forms. Libraries have always been acquiring books and adding them to their collections. Therefore, the collection of an active library continues to grow year after year. Ranganathan compares active and effective libraries with growing organisms, in an unclassified library, when the collection grows steadily into thousands and lakhs of volumes, it t would be difficult for the library staff to lay hands on a particular document required by a reader. To meet the subject approach of readers the collection must necessarily be classified by subject. In libraries where the collection is arranged by accession number, or author or title, and not by subject, books on the same subject will be scattered throughout the collection. Even if the books are arranged alphabetically -by subject, the resultant sequence will not be helpful, as unrelated material will come together. See the following example:

Adult education

Agriculture

Algebra

Alloys

American history

Anthropology

Applied mechanics

Arithmetic

Astronomy

Atomic energy

Australian history

This type of sequence of subjects surely is far less useful and will fail to meet the requirements of readers. Alphabetical sequence leads to alphabetical scattering of logically related subjects; as shown in the above example. It is through systematic arrangement that a filiatory sequence or collection of closely related subjects can be achieved. For this we require a scheme of library classification. Here is an example of arranging documents on the basis of Dewey decimal classification which brings documents dealing with different aspects of economics systematically one after another at one place in a collection.

330 Economics explained by R.L. Heibroner

331 The economics of work and pay by Albert Reas

332 Essentials of finance by R.G. Jones

333 The economics of natural resources by R. Leconber

334 Cooperative housing by M. Digby

335 Socialism without the state by E.Lurd

336 The fiscal system of HongKong by H.C.Y. Ho

337 Building Europe: Britain'

s parterns in EEC by K.J. Twitchett

338 Production economics by M. Fuss

339 Macroeconomics by J.B. Beare

Within each class the arrangement is carried out finally and minutely, e.g.,

300 Social sciences

330 Economics

332 Financial economics

332.1 Banks and banking

332.11 Central banks

331.110 954 Reserve Bank of India

Libraries stock various types of documents for different purposes. Classification helps achieve a 'systematic arrangement of different types of documents. In big libraries, the collection is segregated in different sections or departments. This is done for the efficient and effective use of library collections and for the convenience of different Elements of Library Classification types of readers. In each department, the collection requires a classified arrangement. A Classification unclassified collection, even though equipped with necessary guides, would be of no use as the readers feel lost in the ocean of books wasting their valuable time to find documents. It has rightly been said that to locate a book in an unclassified library is as difficult as to locate a needle in a haystack.

On the other hand, a systematic arrangement helps readers to get documents without loss of time. Thus the time saved by the library staff can be utilised for rendering personalized reference service for the benefit of readers. A systematic arrangement of documents creates order out of chaos. It provides a panoramic view of documents available in a library on a given subject along with those on closely related subjects. This filiatory sequence of subjects facilitates readers not only in getting his/her documents, but also helps them know the strength and weakness of the collection.

The second, third and fourth Laws of Library Science, viz., Every reader his/her document, Every document its reader and Save the time of the reader, as expounded by Ranganathan, can be practised by libraries through the systematic arrangement of documents. The First and Fifth Laws, i.e., Books are for use and A library is a growing organism also advocate a systematic classification of books in libraries. The arrangement of documents on the shelves is in a progressive order of complexity, i.e., from the general to the specific. Colon

Classification is able to arrange documents in an APUPA pattern. Such an arrangement is in pedagogical order, i.e., it is self-educative and reflects the progress of that subject in an evolutionary order. In the light of the discussion in this subsection, the functions of library classification can be summarised as follows:

i) Library classification helps to arrange documents in a systematic order, which is most convenient to the reader and the library staff. It brings related subjects in close proximity, called collocation by Henry Bliss.

ii) It helps the identification and location of a document on a given subject wanted by a reader whatever may be the size of the library collection. Documents can be quickly retrieved from and replaced to their original positions. The location, lending and replacement of documents are completed mechanically in libraries.

iii) It helps to arrange documents into organised groups, like pigeonholes; and when anew document is added to the collection, classification finds an appropriate place for the newly added documents among the other documents on the same subject.

iv) The universe of knowledge is dynamic, continuous, infinite and ever growing. New areas or subjects are being continuously added to the sum total of human knowledge, When the first document on a new subject is added to the library collection, it finds itself at the appropriate place among the already existing related subjects, i.e., among its kith and kin and according to the level of its relationship to them.

The functions stated in (ii), (iii), and (iv) are also known as mechanisation of the arrangement.

v) It helps to organise book displays and exhibitions. It facilitates withdrawal of certain documents from the main collection for special purposes and occasions such as book talks, seminars, symposia, conferences and special exhibitions, on a given topic.

vi) It helps in recording the daily issue and return of documents on various subjects at the circulation counter of a library. This facilitates the compilation of statistics on issues, which reflect the pattern of use and demand of documents on different subjects. The feedback helps in the allocation of funds to various subjects and guides the book selection policy of the library. The statistics so collected can be included in the annual report of the library.

vii) Stock verification is a very important aspect of library administration. Library classification, through the medium of shelf lists, facilitates an efficient and thorough stock verification of the library's holdings.

viii) It helps in the compilation of reading lists. This facilitates facet analysis of the reference queries on various aspects and 'indirectly helps in an efficient reference service.

ix) It helps in the compilation of subject union catalogues and bibliographies of books and other reading material. The union catalogues are very important tools for resource 'sharing and cooperation among libraries.

x) Classified catalogues are only possible with a classification scheme. In a research library classified catalogues are preferred over dictionary catalogues.

xi) It assists in systematically deriving subject entries. It also aids the cataloguer to use the alphabetical list of subject headings for deriving specific subject headings through class numbers, i.e., by the chain procedure.

xii) Classificatory principles are used in subject headings and thesaurus construction.

xiii) It helps the library staff, especially the classifiers, to be aware of and comprehend the complexities in the development of the universe of knowledge, which is the basis for a systematic arrangement of documents in libraries.

xiv) Nowadays classification finds immense uses in OPACs (i.e., online public access catalogues). In a computerised catalogue, the class number field can be used in combination with other fields such as language, date or even subject heading and can be used with logical operators such as AND/OR/NOT or the Boolean logical operators. Class numbers can be used to broaden or narrow the searches. Class number searches in combination with other fields increase the efficiency (recall and precision ratios) of the information retrieval system, of which classification is a tool.

xv) It is the basis for the organisation of knowledge emb6died in documents for maximum use. It is the basis for efficient bibliographic control and retrieval of documents. It is a great time saving device for the reader and the library staff. As Hulme puts it, "it is a mechanical time saving device for the discovery of knowledge in books".

Normative Principles:

The normative principles of classification have been recognised for a long time, and have proved to be highly useful. These have provided a scientific basis to the field of classification. The framers of classification scheme and classifiers have been making their use in varying degrees. These principles can serve many purposes, as stated below:

1) These can serve as the basis of a scheme for classification, leading to a scientific approach. As such a scheme should be designed keeping in view the guidelines provided by normative principles. These principles are also useful for a remodelling of the existing scheme.

2) Critical study of a given scheme can be carried out with the help of these principles.

3) The principles can be very helpful for the purpose of comparing different schemes of classification.

4) Interpretation of the rules and schedules of a scheme can be done with their help.

5) These can provide guidance to a classifier in the day to day work of classification.

6) These are helpful in developing a theory, and also provide a scientific basis to theory.

Ranganathan adopted a convention regarding the use of words like laws, canons and principles. These are all normative principles used in particular context. He has postulated these for working different levels, as given below.

Levels	Name of Normative Principles
Basic process of thinking	Basic Laws
Library Science	Fundamental Laws
Classification	Canons
Helpful Sequence in array	Principles
Work of classifying	Postulates and principles for facet sequence

The term 'basic law' is used at the level of a basic process of thinking. 'Fundamental law' is applied at the level of library science as a discipline. 'Canon' is used in the context of divisions of the first order of the discipline of library science, such as classification, cataloguing, book selection and so on. The term 'principle' is applied in the context of divisions of the second or later order of library science, such as helpful sequence in array and facet sequence.

Ranganathan has recognized the following basic laws;

1) Law of interpretation

2) Law of impartiality

3) Law of symmetry

4) Law of parsimony

5) Law of local variation

6) Law of osmosis

1) Law of interpretation – Ranganathan refers to 1008 principles of interpretation, listed in the Nyaya-Kosa. These principles are applicable in interpreting legal texts. The canons, principles, postulates and rules of classification taken together can be considered a legal document. Therefore, we should interpret various sections just like a legal text. In case of a conflict, the conflict should be resolved with the aid of the laws of interpretation. If necessary, the rules, principles and canons should also be modified to solve the conflicts. It has been suggested by Ranganathan that colon classification should be scrutinized from the angle of these laws. This will help in determining many of its weakness. CC could be revised to overcome these weakness. Similarly, the laws of interpretation can be applied in the study of other schemes also.

2) Law of impartiality – The law directs that between two or more claimants (e.g., for the first position among two facets of a subject or the choice to be made among the needs of different categories of users) preference should be made only on sufficient grounds, and not arbitrarily.

Example: The law of impartiality insists that the sequence of facets in different subjects should not be determined in an arbitrary manner in each subject. The sequence should be based on some guiding principles of a general nature, equally applicable to all subjects. That is why Ranganathan has suggested the application of a wall-picture principles for facet sequence.

3) Law of symmetry – The law prescribes that of two entities or situation which admit of being regarded as symmetrical counterparts of each other, if one entity or situation is given weight in any particular context, the other entity or situation should also be given a corresponding weight.

Example: In CC, Ranganathan allocated greater ordinal value to Roman caps than Indo-Arabic numerals. Later Roman small letters were used to represent posterior zing common isolates. These were given lesser ordinal value than Indo-Arabic numerals, which led to the satisfaction of the law of symmetry.

4) Law of parsimony – The law directs that between two or more possible alternatives bearing on a particular phenomenon the one leading to overall economy of manpower, material, money and time, considered together with proper weightage, is to be preferred. A faceted scheme consists of a set of schedules instead of a single schedule for all subjects in an enumerative classification. Our experience shows that the length of schedules gets reduced in the first one, thereby satisfying the law of parsimony.

Example: In case a collection is to be reclassified the law of parsimony would suggest that only that part of the collection be classified which is known to be in much use, and also those documents which are returned by the users after being taken out by them from the collection.

5) Law of local variation - The law of local variation says 'that in any discipline and technique there should be provision for the users of them to secure, for strictly local use, results alternative to those for general use'. Therefore, the law directs towards the formation of special collections of documents separate from the general collection. The word 'local' should be interpreted broadly to refer to a geographical area, irrespective of the size such as European interests, interests of developing countries, Indian interests, Rajasthani interests and so on. One can go on to interest's peculiar to a village or of a particular library. However, special interests are largely confined the national level.

6) Law of Osmosis – The principles says that owing to the canon of context, a change in the catalogue code or the scheme of classification becomes essential; then, from a particular date, the following work should be carried out.

A) 1) Catalogue and classify all newly accessioned material according to new code and new scheme.

2) Re-catalogue and re-classify that old collection which is known to be in much use.

3) Re-catalogue and re-classify, on return by readers, any book taken out by a reader from the old collection.

B) Maintain two catalogue (old catalogue and new catalogue) and two sequence on the shelf.

C) Attention of readers should be directed by the reference librarian to the two sequence on a shelf and to two catalogues. If a library decides to re-catalogue and re-classify the entire collection, then in most cases the cost would be enormous. Often, the necessary finance is made available for the purpose at the cost of active service of book funds. As the cost of re-cataloguing and re-classification can be very high, most of the libraries avoid it.

However, the approach suggested by Ranganathan reduces the cost and makes it possible for most of the libraries to go in for re-cataloguing and re-classification, if found essential due to the direction from the canon of context. The approach not only reduces the cost but is a practicable one, without affecting the service of the library thus satisfying the canons of context and the law of parsimony. The basis of the method is that the old documents, which are used rarely, need not bere-catalogued and re-classified. In the beginning there would be a great deal of extra work to be done. Therefore extra staff would be required in the initial stage. But later on, the quantum of extra work would be reduced and become less and less. The active collection would be smaller, as also its catalogue. The users would find it more convenient and helpful to use an active collection.

Fundamental Laws:

The 5 Laws of Library Science is a theory proposed by S. R. Ranganathan in 1931, detailing the principles of operating a library system. Five laws of library science are called the set of norms, precepts, and guides to good practice in librarianship. Many librarians worldwide accept them as the foundations of their philosophy. Dr S.R.Ranganathan conceived the Five Laws of Library Science in 1924. The statements embodying these laws were formulated in 1928. These laws were first published in Ranganathan's classic book entitled Five Laws of Library Science in 1931. These laws are:

1) Books are for use

2) Every reader his/her book

3) Every book its reader

4) Save the time of the reader

5) Library is a growing organism

These laws of Library Science are the "fundamental laws" of Library Science. These are applicable to any problem in the areas of library science, library service, and library practice.

These laws are like pot containing oceans. Prior to their enunciation, the subject of Library Science had no philosophy. These laws gave a philosophical base, guaranteeing an everlasting future to the subject of library science, the profession of librarianship, and the use of libraries. These laws have provided a scientific approach to the subject of library science. Even though S.R. Ranganathan proposed the Five Laws of Library Science before the advent of the digital age, they are still valid and equally relevant today.

Canons:

Canons means a rule, regulation or law. It can also be defined as a principle, model, standard or criterion hence various models, principles, test used for the working and efficiency of different schemes of classification are called canons of classification. Ranganathan recognised three plane of work to explain the design and application of work, he provided a specific norms for designing a scheme of classification and classify the documents according to it. In designing a scheme for classification , it has to deal with dynamics, infinite and multidimensional universe knowledge which need to be clearly and thoroughly analysed thereafter it is required to be transformed into an artificial language for smooth and convenient use of the scheme as well as systematic and helpful arrangement of documents. To make this complicated system smooth Ranganathan has formulated a separate set of canons for work into three plane, they are

1) Idea plane,

2) Verbal plane, and

3) Notational plane

1) Canons for the Idea plane – In idea plane all aspects of the universe of knowledge are analysed by its structure, dimensions, qualities, characteristics, kind of relationship and bond of strength among each item of knowledge. A scheme for classification assumes the prior concept of a scheme of classes. A scheme of classification involves five inherent concepts, they are

a) Canons for characteristics,

b) Canons for succession of characteristics,

c) Canons for array,

d) Canons for chain, and

e) Canons for filiatory sequence.

2) Canons for the verbal plane – Verbal plane helps to decide the type of terminology to be used in the scheme of classification. Natural language is imperfect, there is a vagueness in the meaning of ordinary words used in everyday conversation. There are also the incidence of homonyms and synonyms. New terms appear from time to time and these may be used to express new ideas, the meaning of a new term often keeps changing from time to time unless it is accepted in the concerned subject. Classifier are concerned with the application of schemes, they may find this useful in interpreting the terms in the schedule at the time of classifying documents. These canons must be followed by those engaged in the designing and construction of the schedules of a scheme. Ranganathan has formulated the following canons of work at the verbal plane, they area) Canons of context,

b) Canons of enumeration,

c) Canons of currency, and

d) Canons of reticence.

3) Canons for notational plane – It has the responsibility of implementing the findings of of the idea plane. While designing the scheme of classification the idea plane decides the necessary characteristics to be used for the arrangement of the universe of subjects in the filiatory sequence. The notational plane therefore has to provide the mechanism in the form of the notational system for the helpful and systematic arrangement for the existing as well as for future unknown subjects in a scheme for classification. The canons for notational plane are,

a) Canon of synonym,

b) Canon of homonym,

c) Canon of relativity and canon of uniformity,

d) Canon of hierarchy and canon of non-hierarchy,

e) Canon of mixed notation and canon of pure notation,

d) Canon of faceted notatio and canon of non-faceted notation, and

f) Canon of co-extensiveness and canon of under-extensiveness.

The notational system for a growing universe should satisfy canons for hospitality in array and chain. They are

a) Canon of extrapolation in array,

b) Canon of interpolation in array,

c) Canon of extrapolation in chain,

d) Canon of interpolation in chain.

Helpful sequence in array:

According to the canon of helpful sequence, 'The sequence of the classes in an array of classes, and of the ranked isolates in an array of ranked isolates, should be helpful to the purpose of those for whom it is intended'. An array is essentially a systematically ranked and arranged group of equal entities. There are many ways the members of a group may be arranged. Librarians have to choose their sequence which is helpful to the majority of the users and also logical. Entities in an array maybe arranged in a chronological or historical sequence as per the need of time and demand. Even within a small field, there can be various helpful sequence. What may be found to be the most helpful sequence to one category of users may turn out to be less than helpful to another category. Under this circumstances, the practical solution is to take care of the majority point of view. Most users are not able to pinpoint the specific subject of their interest in such cases helpful sequence may help to find out the subject so that a user approaching the sequence from a broader or narrower angles are led by the sequence itself to the specific subject. In order to achieve a helpful sequence in array, we can use the principles of a helpful sequence.

1) Time sequence

a) Principles of later-in-time

b) Principles of earlier-in-time

2) Evolutionary sequence

a) Principles of later-in-evolution

b) Principles of earlier-in-evolution

3) Spatial sequence

a) Principles of spatial contiguity

4) Quantitive measure sequence

a) Principles of increasing quantity

b) Principles of decreasing quantity

5) Complexity sequence

a) Principles of increasing complexity, or principle of decreasing simplicity

b) Principles of decreasing complexity, or principle of increasing simplicity

6) Traditional or Canonical sequence

a) Principles of traditional or canonical sequence

7) Literary-warrant sequence

a) Principles of decreasing literary warrant

b) Principles of increasing literary warrant

8) Alphabetical sequence

a) Principles of alphabetical sequence

Postulates and principles for facet sequence:

Postulates and principles for facet sequence are used in the practical classification of subjects. They guide the work of classifying, the postulates are also used in the design of a scheme for classification. In library classification, our problem is to choose what should be kept invariant in the classifications of subjects. While mapping a subjects there can be a different factors to see under which the subject lie, the most used method is to see its immediate neighbourhood relation but sometimes the mapping becomes extremely complicated. Different schemes have provided different solution to this problem. The problem of mapping has been solved by Ranganathan by means of postulational approach. The seminal ideas have been postulated and work is carried out with these. Nothing can be asserted about them being true or false. A postulate is a statement about which we cannot use either 'right 'or 'wrong'. We can only speak about the set of postulates as 'helpful' or'unhelpful'.The formation of postulates is guided more by intuition and logical inference at the unconscious level. It is not easy to verify this physically by means of a direct approach to our sense but instead it is very

important to determine before head. The postulational approach in library classification brings the objectivity in the study and practice of this discipline. It also puts the study and practice of library classification on a scientific basis. As a result of such an approach, practical classification has become easier and more interesting. The postulates given by Ranganathan are,

a) Postulates for freely faceted classification

b) Postulates for fundamental categories

c) Postulates of basic facet

d) Postulates of isolate facet

e) Postulates of rounds and levels

f) Postulates of rounds for energy

g) Postulates for facet sequence

Principle for Facet Sequence:

The postulates are helpful in determining the sequence of isolate ideas in a compound subject where each isolate is the presentation of different fundamental categories but in determining the sequence of two personality isolates or two matter isolates or two energy isolate or two space isolates or two time isolates, postulates may not be sufficient to define or to help us. Therefore there is a need for guiding principles which could provide a solution to these problems. The principles are,

a) Wall-picture principles

b) Whole-organ principles

c) Cow-calf principles

d) Commodity raw material transformation principles

e) Act and-Action-Actor-Tool Principle

Implications of the laws:

FIRST LAW: BOOKS ARE FOR USE

A book is a guide, a friend, and a philosopher. A writer writes a book to communicate his thoughts. The primary purpose of writing, therefore, is that the thought it contains should be communicated. To do so it is necessary to put the books for use. The first law, therefore, truly demands that all efforts should be made to ensure that all the books kept in the library are used because it is created for use. The first law "Books are for use" places emphasis on the use of books rather than storage. Books were once kept in closed access in order to prevent theft, but this discouraged free use and prevented loaning. The first law of library science "books are for use" means that books in libraries are not meant to be shut away from its users.

The first law constitutes the basis for library services. Dr. Ranganathan observed that books were often chained to prevent their removal and that the emphasis was on storage and preservation rather than use. He did not reject the notion that preservation and storage were important, but he asserted that the purpose of such activities was to promote use. Without user access to materials, there is little value in these items. By emphasizing use, Dr. Ranganathan refocused the attention of the field to access-related issues, such as the library's location, loan policies, hours and days of operation, as well as the quality of staffing and mundane matters like library furniture, temperature control, and lighting.

First Law - Books are for Use is the ones of the Five Laws of Library Science that Ranganathan remarked as 'trivial truism' in his writing "Library Science and Scientific Method."[7] Trivial Truism refers to a statement of little value or importance that is obviously true and says nothing new or interesting. So here Dr. S. R. Rangangathan means to say that the First Law - Books are for Use is obviously true and understood. Ranganathan says in this work:

 Before dealing with these factors, a word should be said about the remark that the First Law - Books are for Use - is a trivial truism. The first law of most of the science is equally so. For example, Newton's first law of motion reads, "Everybody preserves in its state of rest unless it is compelled to change that state by impressed forces." Is this not a truism?

Implications:

Open Access - Open access of books enhance their use. In this system, every reader is allowed to go to the shelves and choose the book of his interest. In case he does not find the desired book of his interest, he can choose some other from the shelves.

Location - A library should be situated near the central place. If it as an institutional library, then it should be situated near the centre of the institutional complex. If it is a public library then it should be in the centre of the city.

Library Hours - The first law demands that a library should be kept open for long hours, and during the hours which suits to its patrons most.

Library Building and Furniture - There should be a functional library building with pleasant, natural, and electrical light, soothing interior, good looking furniture, comfortable chairs, etc.

Book Selection Policy - Books should be purchased which are relevant to the needs of the readers. Books should be attractive such as it fills the reader with pleasure.

Library Techniques - Proper cataloguing and classification of books are essential for promoting the use of books.

Publicity - The First Law demands wide publicity of each and every book of the library. For example, the librarian can bring out the list of new additions and latest arrivals through the Current Awareness Service (CAS) or Selective Dissemination of Information Services (SDI).

Library Staff - A library cannot come up to the expectation of the first law unless its staff is attentive and cheerful, and cares for the books and readers. Readers should be looked upon as customers. Some readers are shy and are not informed about the complex library techniques. The library staff should help such users to find their desired book. It will not only satisfy readers but also enhance library's use.

Reference Service - Reference service aims to establish the right contact between the right reader and right book at the right time. A collection of library resources would not be used fully unless the reference librarian makes effort to help the users to exploit the resources of the library. This personal service will lead to the greater use of books.

SECOND LAW: EVERY READER HIS / HER BOOK

The second law of library science is "Every Reader His / Her Book". This law implies that the "books are for use of all" or "books for all." The Second Law stressed on the democratization of the library where every reader has the equal right to get the book of his / her interest. The second law fixed some responsibilities or obligations of the state, the library authority, the library staff, and the readers. A library should serve all patrons, no matter their age, race, or economic status.

This law suggests that every member of the community should be able to obtain materials needed. Dr. Ranganathan felt that all individuals from all social environments were entitled to library service and that the basis of library use was education, to which all were entitled. These entitlements were not without some important obligations for both libraries/librarians and library patrons. Librarians should have excellent first-hand knowledge of the people to be served. Collections should meet the special interests of the community, and libraries should promote and advertise their services extensively to attract a wide range of readers.

The second law of library science "every reader his/her book" means that librarians serve a wide collection of patrons, acquire literature to fit a vast collection of needs, do not judge what specific patrons choose to read. Everyone has different tastes and differences and we should respect that.

The possible absence of a physical knowledge storage object doesn't dilute the power of Ranganathan's second principle; it is certainly relevant to media in all forms including the Internet.

Implications / Obligations:

Obligations of the State - When we say "Every Reader His / Her Book" or "Books for All", the state or government automatically comes in picture. The state has a certain obligation to its citizens and one of these is to provide equal opportunity to read. Ranganathan has discussed obligations of the state under three head. (i) Finance--providing finance by giving grants and by levying library cess (Ranganathan's choice), (ii) Legislation--enacting library legislation, and (iii) Coordination--of activities to ensure "Books for All"

Obligations of the Library Authority - The second law has something to say to library authorities in respect to the selection of books and staff. A library has limited finance. It is therefore desirable to know the requirements of the readers before selecting the books. Similarly, library authority should select staff for their library with professional competence and missionary zeal.

Obligations of Library Staff - Library staff should be cooperative and service minded. Library staff should form a bridge between readers and books, only then every reader will have his/her book. When a reader enters a library, the library staff should approach him with a helping hand. Second Law strongly advocates user education program in libraries.

Obligations of the Reader - The Second Law expects the readers also to discharge some responsibilities. Readers should be disciplined and follow rules and regulations. Readers should restrain from cutting pages from books, keeping books beyond the due date, etc. All such acts amount to keeping other readers away from their books.

THIRD LAW: EVERY BOOK ITS READER:

The Third Law prescribes Every Book its Reader. The emphasis is on the book. This law desires that every book in a library must find its reader. It implies that there should be maximum use of books by their users.

This principle is closely related to the second law, but it focuses on the item itself, suggesting that each item in a library has an individual or individuals who would find that item useful. Dr. Ranganathan argued that the library could devise many methods to ensure that each item finds its appropriate reader. One method involved the basic rules for access to the collection, most notably the need for open shelving.

The third law of library science "every book its reader" means a library's books have a place in the library even if a smaller demographic might choose to read it.

It is, therefore, necessary to adopt measures to ensure successful implementation of the demand of the Third Law. The factors that may be kept in view in this regard have been discussed below:

Implications:

Open Access - It is one of the most effective ways to ensure that the maximum number of books are seen by the readers. It also happens sometimes that the reader to the shelves in search of a book and in the process of search select many more books.

Book Selection - Give full weightage to the tastes and requirements of the clientele of the library. Difficulties of the Third Law can be minimized by adopting a well-balanced book selection policy. If the right books are selected it will definitely find its readers

Shelf Arrangement - If the books are arranged so that the subjects get arranged according to the degree of mutual relationship, then each book would have a higher probability of getting its readers.

Easy Accessibility - Books should be placed within easy reach of the readers. It has been observed that the books within the comfortable reach of the readers are most frequently used. For easy accessibility, shelves should not be higher than 6.5 ft.

Cataloging - Proper cataloging of books is very important as even though there may be well planned and arranged books on the shelves but they are incapable merely by itself. Series entry and cross-reference entries are highly useful in drawing the attention of the readers. Analytical entries increase the chance of a composite book getting its reader.

Reference Service - A reference librarian should know about the world of books and try to find out a reader for every one of these. The reference librarian should act as a canvassing agent for each book.

Publicity - Publicity is a very powerful weapon to attract readers to the library and thereby to increase the chances of every book to find its reader. For example, the arrival of new books may be brought to the notice of the readers by displaying them, near the entrance of the library, or by communicating the readers through an e-newsletter or broadcasting information about them through the Twitter handle of the library.

Extension Service - The library attract readers by converting itself into a cultural and social center. A library does this by organizing exhibitions, musical concerts, a magic show, celebration of local and national festivals, etc. Once the people come to these functions, then the library can make an attempt to bring books and readers together.

FOURTH LAW: SAVE THE TIME OF THE READER

The Fourth Law says "Save the Time of the Reader." A library user must be assumed a busy person. It is essential to keep the reader satisfied and a reader is satisfied most if his/her time is saved, i.e., if he gets the needed service in minimum possible time.

This law is a recognition that part of the excellence of library service is its ability to meet the needs of the library user efficiently. To this end, Dr. S.R. Ranganathan recommended the use of appropriate business methods to improve library management. He observed that centralizing the library collection in one location provided distinct advantages. He also noted that excellent staff would not only include those who possess strong reference skills, but also strong technical skills in cataloging, cross-referencing, ordering, accessioning, and the circulation of materials.

The fourth law of library science "save the time of the user" means that all patrons should be able to easily locate the material they desire quickly and efficiently.

Implications:

Open Access - In a closed access of books time is wasted unnecessarily. In open access, the time of the readers is saved. If open access is not there then the reader has to make the choice of the books through the searching of the library catalog. Then the reader requests the library staff the book which he has searched in the catalog. The staff searches the required book and if the staff is not able to trace the book, then the reader again needs to search the catalog. These problems can be avoided if open access is provided where the readers can themselves go to the shelves to search their book.

Location - The location of the library is of great importance. It must be centrally located so that it is conveniently accessible to the community served. For an institutional library, it should be in the center of the institution, for a public library it should be in the center of the city. Centrally located library saves the times of the users in visiting it.

Shelf Arrangement, Classification, and Cataloging - Proper classification schemes should be used in the library. Books should be arranged on shelves according to the classification number. Regular shelf rectification is also essential. In order to save the time of the readers, the library catalog should aim to provide different approaches to the users. It should include analytical entries for composite books.

Stack-Room Guides - To save the time of the reader, the library should provide an efficient system of stack room guides. It may be quite useful to keep it at the entrance of the stack room, the whole plan of the room indicating the position of the book racks and classes of books in them.

Issue and Return - Most readers want to read the book at home. For this, the library has to issue the books to the readers. Time-saving techniques for circulation to books should be used so that the user has not to spend more time in getting the book issued (or returned).

Reference Service - The reference staff establishes a contact between the book and the reader by providing Reference Service and Long Range Reference Services, thereby saving the time of the reader.

Documentation Service - A substantial time of readers is wasted in the literature search. The library should, therefore, undertake comprehensive or selective, as needed be, documentation services including SDI service to save the time of the reader.

Library Staff - Library staff should be cooperative. They should help the readers to find their document keeping in mind the message of the Fourth Law, i.e., to Save the Time of the Reader.

FIFTH LAW: THE LIBRARY IS A GROWING ORGANISM

The Fifth Law is "The Library is a Growing Organism." A library is a social institution and it will keep growing like an organism. A library will grow in terms of documents, readers, and staff. The nature of organic growth can be either growth as a body of a child or growth as of the body of an adult. The growth of a new library will correspond to that of a child growing in all aspects. In case of a service library, once its growth has reached the adult stage, the growth would be in terms of replacing old books by new books and new users will continuously replace old users.

This law focused more on the need for internal change than on changes in the environment itself. Dr. Ranganathan argued that library organizations must accommodate growth in staff, the physical collection, and patron use. This involved allowing for growth in the physical building, reading areas, shelving, and in space for the catalog.

The fifth law of library science "the library is a growing organism" means that a library should be a continually changing institution, never static in its outlook. Books, methods, and the physical library should be updated over time.

Implications:

Balanced Growth - The collection should grow in all the areas of subjects keeping in view the needs and requirements of all the readers, as far as possible.

Casting Off the Old (Obsolete) and Preserving Valuable Books - Weed out old, obsolete, and unused books in order to provide space for new additions. However, librarians should take necessary steps to preserve valuable materials.

Choice of a Classification Scheme - We should use a scheme of classification, which is able to meet the onslaught of knowledge reasonably well.

Choice of a Catalog Code - We should use a catalog code which is able to provide treatment to all kinds of library materials yet acquired as well as new materials likely to be acquired in future.

Modernization - Libraries may have to think of computerization of the various housekeeping jobs like the acquisition, circulation, cataloging, etc.

Staff - When a library grows, the sanctioned staff at some stage become inadequate. So at that time an increase of staff should be considered. Any standard for staffing should be accepted by the libraries, then the library would be able to get the requisite staff.

Library Building -- Provision for Future - While planning and designing a library building, there should be a provision for the expansion of the building, both horizontally as well as vertically. The library should provide adequate space for the present as well as the future.

Safeguards - As the number of readers increase, the problem of theft of books from the library becomes acute, especially in the open access system. So, it necessitates some safeguards, such as entrance and exit should be from one gate, windows should be grilled, and all readers should be checked before leaving.

Formation, structure and development of subjects:

In order to give unique co-extensive representation to each subject in the UoS, the classificationist has to ascertain the various attributes - infinite, turbulently dynamic, continuum, manifold multidimensional quality, different modes of formation of subjects, etc., in the UoS that affect library classification. While many of the above mentioned attributes are self-explanatory, the attribute "modes of formation of subjects" is complex and hence a detailed discussion is provided in this section.

The modes of formation of subjects that have been recognised are.

- Lamination
- Loose Assemblage
- Fission
- Fusion
- Distillation
- Clustering
- Agglomeration

Details regarding each of the modes are discussed, in the succeeding sub-sections.

Lamination:

Lamination is construction by an over layering facet, just as one makes a sandwich by layering a vegetable over a layer of bread. According to Ranganathan "when the basic layer is a basic subject and the other layers are isolate ideas, a compound subject is formed". Lamination is of two types:

Lamination 1: In this mode, one or more isolate facets are laminated over a basic facet. This results in compound subjects.

Examples:

1) Anatomy of the human body

Basic facet Medicine

Isolate facets = Human body, Anatomy

         (P)   (MP)

2) Treatment of diseases of plant

Basic facets = Botany

Isolate facets = Plants, Diseases, Treatment

         (P)   (MP)   (E)

Plants, Diseases, Treatment (P) (MP) (E)

Lamination 2: In this mode two or more sub-facets of a compound facet are laminated over one another. Such subjects were called earlier as non-main basic subjects, the components of which were host main subject. The latter had the canonical/special/ environment/system component.

For example, the ayurvedic system of medicine is a non-main basic subjects. In this example medicine is the host-main subject and the ayurvedic system is the system component.

The following table gives the revised terminology:

Original Terminology	Revised Terminology
Non-Main Basic Subjects or	Non-Primary Basic Subjects (BS)

Basic Subjects (BS)	Secondary BS
Canonical BS	Compound BS
Compound BS	

Other Examples:

Medicine = Host-main subject

Child = Special component

Mathematics = Host-main subject

Geometry = Canonical component

The sequence among the non-main components is System Environment - Special

Loose Assemblage:

Loose assemblage is assembling together of two or more of:

a) Subjects (basic or compound)

b) Isolate ideas (in one and the same facet, or isolate ideas in one and the same array)

Assembling is done to express one or the other of possible relations, between the components of the assembly. The result is a complex subject, or a complex isolate idea, or a complex array isolate idea, as the case may be. Loose assemblage may be of three kinds.

They are: Loose Assemblage of Kind-1, Kind-2 and Kind-3.Loose Assemblage of Kind-1 - Two or more subjects - simple or compound - are studied in their mutual relationship. It is called "inter subject phase relation" and can be one of the following five types:

General; Bias; Comparison; Difference and Influencing. Loose assemblage results in complex subjects. Here are examples of complex subjects: Learning about Subjects

1) General relation between political science and economics

2) Statistics for librarians

3) Influence of geography on history

Loose Assemblage of Kind-2: Two or more isolates taken from one and the same schedule are brought into a mutual relationship. This is called an "intro facet phase relation" and results in a complex isolate.

Examples:

1) Influence of Buddhism on Christianity

2) Difference between Lemuroidea and Anthropoidea

Loose Assemblage of Kind-3 - Two or more isolates taken from one and the same array of an order higher than I in one and the same schedule are brought into mutual relation. This is called an "intra array phase relation" and results in a complex array isolate. Canonical Basic Subject: This denotes a traditional division of a main subject. The traditional division is denoted by the term "canonical constituent".

Examples:

C3 Sound

C4 Heat

C5 Radiation

Special Basic Subject: This denotes a division of a main subject (MS), in which the subject of the study is restricted in some special manner, not amounting to any of the anteriorising common isolates or any other isolate ideas. This special division is denoted by the term "special constituent" of the MS. Generally, the class number fora special BS is got by the enumeration device.

Examples:

L-9C Child medicine

L-917 Geriatrics

L-9H Female medicine

Environmental Basic Subject : This denotes a division of a MS, in which the entity of the study of the MS is within an extra normal environment, such as those enumerated in the schedule of environment divisions.

Examples:

D-9Uk2 Desert engineering

D-9Um7 Mountain engineering

D-9V4 War engineering

System Basic Subject: This denotes a division of a MS or a non-main BS expounded according to a specific system, or School of Thought, other than what is currently popular.

Examples:

B2-N Boolean algebra

L-B Ayurvedic system of medicine

S-N Gestalt psychology

When all non-main constituents occur in a compound basic subject, the sequence among them should be system constituent, environment constituent, special constituent, and canonical constituent.

Example:

Medicine ayurvedic system - tropical environment – child

Fission:

The initial set of primary basic subjects (PBS) included in a scheme for library classification results from a division/fission of the UoS in a manner similar to the division of the UoS by scholars among themselves as convenient fields of specialisation. It may not be possible to discern a specific characteristic used in this initial division. Theory and Development of Fission is the process of division or splitting or breaking up into parts. This process has, until recently, been denoted by the term "dissection". However, dissection usually implies the splitting, breaking up, etc., of an entity into parts by an outside agency. On the other hand, fission is an internal process of division without the involvement of an outside agency.

Example:

In CC, the initial schedule of traditional Primary Basic Subject (PBS) was derived by a direct' fission of the UoS and the following broad groups may be noted:

Primary BS covering natural sciences

Primary BS covering useful arts

Primary BS covering humanities

Primary BS covering social sciences

The term "dissection" is used to denote fission when we consider an array of divisions of an isolate or of a basic subject, resulting from fission (see figure).On the other hand, the term `denudation' is used to denote fission when we consider one and only one of the subdivisions of an isolate or of a BS, resulting from fission. Prolegomena defines as "Denudation is the progressive decrease of the extension and the increase of the intension (or the depth) of a BS or an isolate idea, even as we scoop out the flesh of a soft-fruit from deeper and deeper layers or as we excavate the well". In the words of J.H. Shera, denudation is "the exposure of a new area ofknowledge by erosion or divestment through research or enquiry".

Fusion:

One result of interdisciplinary research, which is characteristic of present day organisation and conduct of research programmes, is the emergence of new ideas and new subjects of an interdisciplinary character. Often, an interdisciplinary subject maybe deemed to go with more than one of the existing primary basic subjects (PBS).The subjects going with this PBS will usually contain the core entity whose attributes are examined by the research team. Let us call .this host PBS 1. The subjects' going with another PBS - that is, host PBS 2 may be related to the subjects going with the host PBS1 in a variety of ways, e.g., phase relation (i.e., application of statistics to biology). In due course, as the field develops, there may be a number of new ideas arising out of the interdisciplinary research, such that -

a) The classificationist may find that they cannot be conveniently and helpfully deemed to go with the host PBSI selected earlier;

b) These new ideas attract for themselves a group of specialists; and

c) A new field of specialisation concretises with normative principles / theory of its own, in addition to using the normative principles / theory of the subjects going with the host PBS 1 and 2.

At this stage, the classificationist may find it helpful to deem the new field of specialisation to go' with a new PBS - which is not already enumerated in the schedule of PBS in the scheme of classification concerned. Subjects going with this new PBS may contain isolate ideas drawn from the schedules of the host PBS 1 and 2as well as ideas special to the new discipline. The new PBS may be considered, for convenience, as a combination of the host PB S 1 and 2.This mode of formation is called fusion.

Astrophysics Bio linguists

Astrochemistry Sociolinguists

Bio-physics Educatory Medical

Jurisprudence Socio-cybernetics, etc.

In other words, in this mode, two or more PBS are fused together in such a way that each of them loses its individuality with respect to the schedule of isolates needed to form the compound subjects going with it. This mode may be taken to be equivalent to what Boulding describes as "hybrid discipline".

Distillation:

In this mode, a pure discipline is evolved as a PBS from its appearance-in-action iii diverse compound subjects going with either different BS or one and the same BS. It gives rise to PBS by distillation. This mode may be taken to be equivalent to what Boulding describes as "Multi-hybrid with common methodology". Thus, distillation may be of 2 kinds (Kind 1 and Kind 2. In Kind 1, the new PBS essentially accommodates the theory of discipline emerging 'or distilled out of an idea(s) occurring as a practice - in-action in subjects going with diverse BS. However, it should be remembered that, even after the formulation of anew pure discipline, the appearance of the idea as a practice-in-action will continue and should be treated as such - that is, it should be placed as an isolate idea in the subject concerned.

Examples:

In CC

Management

(PBS) 8

Management of University Library

On the other hand, in distillation of Kind-2, the idea occurs in subjects going with a particular BS only and there may be a trend towards the formulation of a new discipline with recognisable literary warrant, and, perhaps, some principles and postulates for guiding its development.

Examples: Statistical calculus, Microbiology, Anaesthesiology, International relations, Ergonomics, Forestry.

Clustering:

In the past, in the Universe of Documents, the general trend has been to narrow the extension of a subject embodied in -a document taken as a whole. Therefore, there has been a general tendency not to bring into one and the same document, compound subjects going with the different basic subjects, except in the case of complex subjects involving phase relation and the subjects involving the use of subject device in forming or sharpening isolate facets. In recent years "however, interdisciplinary team research has often, for practical convenience, necessitated bringing together in one and the same document two or more compound subjects going with different BS. Theory and Development of38Library Classification For example, for the convenience of organising research, the preliminary results and data obtained in work falling in different subject fields involved in the study of one phenomenon or entity may be brought together in one and the same document and treated disjunctively -7 that is, without any substantial integral treatment. Subsequent elaboration of the work falling in different subject fields may be by specialists in the respective subjects and the results may be published separately. The document in which the preliminary results are brought together just as in a collection, taken as a whole, presents a subject field in which there is a core entity of study with inputs or viewpoints or work on it coming from specialists in subjects going with diverse BS. This feature is something like clustering around a nodal idea - that is, forming a group of similar entities, because of their relationship with each other, or their simultaneity of occurrence or for convenience in treatment or discussion.

Examples:

1) Area study, in which geographical area forms the focus of the cluster, like Sinology (Chinese studies), Nippinology (Japanese studies).

2) Generalia person study, in which a multi-faceted personality forms the focus of a cluster Gandhiana.

3) Study of entity or phenomena forming the focus of a cluster Soil science, Surface science.

Agglomeration:

Agglomeration (earlier called partial comprehension) is the process of collecting together of entities into larger masses without cohesion among the components. An agglomerate can be a BS, or it can also be an isolate idea. Agglomeration may be made up of consecutive constituents or even non-consecutive constituents with respect to a classification scheme.

Examples in CC: Natural sciences, humanities, social sciences

Review questions:

1. Define library classification.

2. Write a brief note on the purpose of classification.

3. What are ordinal numbers?

4. What are normative principles?

5. Write a note on the five laws of library sciences. What are their implications?

Reference:

Bhattacharya, Ganesh; Ranganathan, S R (1974), Wojciechowski, Jerzy A. (ed.), From knowledge classification to library classification, Ottawa Conference on the Conceptual Basis of the Classification of Knowledge, 1971, Munich: Verlag Dokumentation

Lois Mai Chan (September 28, 2007), Cataloging and classification (Cataloging and Classification ed.), The Scarecrow Press, ISBN 9780810859449, 0810859440

Mlinar, Courtney (September 1, 2021). "Library Classification System: What is the Library Classification System?". Austin Community College. Retrieved October 18, 2021.

Satija, M P (2015). "Features, Functions and Components of a Library Classification System in the LIS tradition for the e-Environment". Information Science Theory and Practice. 3 (4): 62–77

UNIT – 2

SPECIES OF CLASSIFICATION SCHEMES

Objectives:

- ❖ To know about more detailed classifications
- ❖ To study more about major schemes
- ❖ Some of them are decimal classification and colon classification

Introduction:

Everything can be classified by various ways according to its characteristics. For example, an apple can be classified according to its size, taste, weight or place of origin. Ever since man started to record knowledge, he has tried to arrange the recorded knowledge or documents in a manner that is helpful for those who want to retrieve it. In a modern library, documents (books and other reading materials) are arranged by subject for an easy location. Arranging similar things in some order according to some principle unites and controls information from various sources. This is possible with the help of library classification. Library classification is thus a system of arrangement adopted by a library to enable users to find its materials quickly and easily.

In simple words, library classification aims at arranging the books in a helpful sequence. It also mechanizes the correct replacing of books returned after use by the users. Besides, it fixes the most helpful place for a newly procured and added book among the already existing collection. A common method of arranging books is by the names of their authors. This sequence is helpful to users who want books by a particular author. But it has been experienced in libraries that most readers ask for books on a particular subject rather than for books by a particular author. Therefore, if the sequence of the books is to be helpful, it should be determined by the subject of the book. Library classification is thus the translation of the name of the subject of a book into a preferred artificial language of ordinal numbers. The individualization of books dealing with the same specific subject is possible by means of a further set of ordinal numbers which represent some features of the book other than their thought content.

The first of these ordinal numbers is called the Class number of the book. The second ordinal number is called its Book Number. The Class Number and Book Number are separated by a space. There are many universally known 'Schemes of Classification'. Some of these are: Dewey decimal classification, Library of Congress Classification, Universal Decimal Classification and Colon Classification. Here, we will learn about two classification systems, namely, Colon Classification and Dewey decimal classification system.

Enumerative classification:

The literal meaning of "Enumeration" is to list or count. An enumerative Library classification scheme is a scheme where all the possible classes are enumerated according to certain characteristics. There is a top down approach whereby a series of subordinate classes are produced and where both simple and complex subjects are listed. The advantage of this

scheme is that the structure of the scheme is shown by the notation as far as practicable. Users can easily find the coordinate and subordinate classes and can make a map of the subject. The disadvantage is that it is difficult to accommodate new subjects and frequent revisions may be required. An enumerative classification scheme, in some cases, displays hierarchical structures of notation. The basic tenet of this scheme is that all the possible subjects and topics are listed along with a predefined class number, and therefore the classifier does not have to create any class number such as Dewey decimal classification. "An enumerative scheme for classification consists essentially of a single schedule enumerating all subjects - of the past, the present and the anticipatable future". It means that the class numbers for different subjects are enumerated in the schedules. There are no separate supplementary schedules of common isolates to construct a number. A good example of this species of classification is the Library of Congress Classification (LC). It is along schedule of 11300 pages in 45 volumes. There is no provision for synthesis of numbers.

For example, in LC:

HA Statistics HB Economic theory

HA1 Statistics periodicals HB9 Periodicals

HA9 Statistics conferences HB21 Conferences

Another member of this species is Rider's International Classification (RIC) (1961). It is a long schedule and enumerates about 18000 subjects each represented by three digits namely, Roman Capital Alphabets. There is no possibility of number building here. Consequently, it is not possible to represent new subjects. Hence, one is forced to give the same. Class Number for several subjects. This is liable to produce "Chaos-in little" among the books carrying that single number for representing several subjects. Therefore, the resilience of RIC is very limited.

Almost enumerative classification:

An almost-enumerative scheme for classification consists of a large schedule enumerating most of the subjects of the past, the present and the foreseeable future, and in addition, a few schedules of common isolates. A majority of the documents gets ready-made class numbers, while in some cases a preliminary synthesis is possible with the help of supplementary schedules, the example of such a species of classification is Subject Classification (SC) (1906) by 7, D. Brown (1862-1914) of England. It consists of a main schedule of subjects,

mainly compound subjects 'denoted by alphabets further divided by numerals. Brown also appended a table of commonly used subdivisions, which he called Categorical Table. It lists forms and other divisions used with any class in the schedules, thus providing a limited notational synthesis.

These are:

0 Generally

.00 Catalogues, Lists

.1 Bibliography

.2 Encyclopaedia

.10 History

Main and supplementary schedules are fairly long though not as long as those of L Cor RIC. The DDC is also an almost-enumerative classification though, in addition to schedules, it provides two tables of standard subdivisions, and an area table. A limited synthesis is also possible within the schedules through "Divide 'like" instructions. The class number is monolithic in spite of the provision for isolate facets. This is because the connecting digits for the isolate facets are of the same species as the semantically rich digits in the class numbers. However, some relief is given to the eye by the space left after every three digits in a class number. Further, there is ample evidence that DDC Ed.17 has felt concerned about the onslaught of newly emerging subjects finding their way into "general libraries". It therefore adopted an oblique approach to faceted classification. Such schemes are not able to withstand the pressure of the turbulently growing universe of knowledge in all directions. Brown's Subject Classification is now a dead system; while the DDC has greatly enhanced its number building capacity by increasing the auxiliary tables to seven since the 18th edition (1971). Ranganathan feels that it is an oblique approach to faceted classification. "But it cannot, go the whole hog". Such schemes are now outdated.

Almost-Faceted Classification:

Obviously in the line of evolution, the almost-faceted classification lies between the almost enumerative classifications to fully faceted classification. Such a species has a long schedule of basic, compound and even complex subjects of the past, the present, and the anticipatable future, and in addition, a few schedules of common isolates and also some schedules of

special isolates. There are some indicator digits/connecting symbols to attach the common and special isolates with the number from the main schedules, which are different from the semantically rich digits used in the -schedules. Examples are' LTDC (1905-1994+) and the 1st edition of Bibliographic Classification BC 1 (1940-1953). Most of the numbers are still available readymade, yet many more can be synthesized with the help of auxiliary tables. Readymade class numbers are polylithic and their structure is bit more transparent. Schedules are comparatively small, though main schedules are still lengthy. There are many additional tables to supplement the schedules and thus increasing many times the capacity to synthesise class numbers. Being polylithic the facets can be expanded internally. "The use of several isolate facets and the prescription to combine two class numbers by: (colon) and other symbols whenever the result cannot be got with the aid of the schedules of isolates, enable UDC to be sufficiently resilient to meet the pressure of the emergence of new subjects". Similarly, the resilience of Bibliographic Classification is comparable to that of UDC.

Fully Faceted Classification:

A faceted classification scheme is on the other extreme of the scale since instead of listing of all the classes and the corresponding numbers, it lists the various facets of every subject or main class and provides a set of rules for constructing class numbers through facet analysis. The concept of facet analysis was proposed by Dr. S. R. Ranganathan and was used in his faceted classification scheme called Colon Classification. The basic idea was that any component or facet of a subject can fit into five fundamental categories: Personality, Matter, Energy, Space and Time which became the major focus of classification research from 1930 onwards resulting in to the Colon Classification.

A faceted classification consists of schedules of basic classes; special isolates and common isolates only. In addition, there are some devices for sharpening existing isolates and/or constructing new isolates. Schedules are brief. No compound or complex subjects are enumerated. Class numbers for such subjects are not available readymade. They have to be synthesised every time according to specified rules (grammar) of the schemes concerned. Thus, the class numbers of such subjects synthesised are polylithic and their structure with facets is transparent. In the evolution of classification systems, the faceted systems are quite recent and are better equipped to meet the onslaught of knowledge revolution. These are of two types:

- o Rigidly-Faceted Classification

   ○ Freely Faceted Classification

Rigidly-Faceted Classification:

It is the first stage in the development of faceted classifications. In a rigidly'-faceted classification, the facets and their citation order are fixed and their facet formula is predetermined. No -facet can be omitted. The first three editions (Le, of 1931 1939 and 1950respectively) of the Colon Classification (CC) are considered rigidly-faceted as they have provided a facet formula for each basic class. In the class number, there is cluttering of facets, and it was a bit difficult to recognise the category to which a given facet belonged. The problem arose; as there was only one connecting digit colon If an intermediate facet was absent, there was a necessity –to insert the connecting digit even for absent facets

For example:

D66: 121::4 Design of Electrical Generator In this subject the Part Facet is alone absent. It occurs in the middle of the facet formula Therefore; the connecting digit colon needed for it has been inserted immediately after the secondary Work Number and just before colon preceding the Engineering Problem Number. Thus, two consecutive colon appears in this class number. This makes the class number look a bit awkward and inelegant. It means the use of facet was predetermined. It also makes the addition of new facets a bit cumbersome.

Freely Faceted Classification:

This is the last stage in the evolution of library classification. A freely faceted classification is based on postulates and principles and "there is no rigid, predetermined facet formula for the compound subjects going with a Basic Subject". Since such a scheme is based on analysis and synthesis, so each subject determines its own facet formula. The facet formula is open. Since the work involves analysis and synthesis of facets and the sequence of facets is guided by postulates and principles, another name for this kind of classification is Analytico-Synthetic Classification. Edition 4 (1952) to Edition 6 (460 of the Colon Classification are examples of a freely faceted classification. Another example of such a species is Bibliographic Classification Edition 2 (BC-2) (1977-) revised by J. Mills. Resilience of such a species is virtually infinite. The class numbers are-co-extensive, brief and elegant. However, some view these as almost-freely faceted classification schemes wherein use of different indicator digits for diverse kind of facets and the concept of Rounds and Levels

removed, the severe rigidity in the number and sequence of facets that can occur in a compound subject. Nevertheless, some rigidity linked in respect of levels of facet within a round exists. But, with the help of Sector Notation, the rigidity in the number of levels of facets and their sequence in a round lurking up to CC Ed. 6 has been removed in CC Ed. 7, as it recognises that faces belong to compound subjects and not to a basic subject. Hence, predetermination of the facets for all compound subjects likely to go with any basic subject is ruled out. It has, therefore, been described as fully Freely Faceted Scheme of Classification. Ranganathan's Colon Classification, thus, is an excellent example of a Freely Faceted Analytico-Synthetic Classification guided by postulates and principles.

Analytico-Synthetic Classification Scheme:

Analytico-Synthetic Library classification schemes resolve some of the problems of enumerative classification schemes. The concept behind this scheme is that the subject of a given document will be divided into its UD Cconstituent elements and then the classification scheme will be used to find notations for each element, which will then be combined according to the prescribed rules to prepare the final class number. This scheme overcomes the two major problems of enumerative classification schemes as, by providing various tables, specific notational symbols and rules, they avoid the necessity for a long list of classes, and thus produce a smaller classification scheme in size; they also provide flexibility to users as specific numbers can be built and the classifier is not restricted by the availability of a specific subject. Nevertheless, it makes classifiers job complex since they have to construct the class numbers as opposed to just selecting one from a list like Universal Decimal Classification.

Comparative Study of Enumerative and Faceted Classifications:

Enumerative	Faceted
It is more or less a systematic list of basic, compound and a few complex subjects of	No class number is available readymade for compound and complex subjects. It is a list

the past, present and foreseeable future. It means all the class numbers are available readymade.	of basic subjects and their special isolates and a few schedules 'of common isolates.
It is the first species of classification in the line of evolution. Library of Congress Classifi6ation is the best prototype of this species.	It is the latest stage in the evolution of classification systems. Ranganathan's Colon Classification is the best example of this species.
It is a classification of the past and is unable to meet the challenges of the present revolution in information processing and organization. Class numbers are not coextensive.	It is a classification of we present and of the near future and is fully equipped to meet the challenges of information revolution. Their class numbers are co-extensive.
Enumerative systems usually do not have ' any explicit theory and guiding norms Therefore, they are not able to accommodate new subjects. The structure is rigid, and soon becomes outmoded and outdated.	These are based on an explicit theory guided by postulates and principles. By virtue of these guiding principles these are able to accommodate new subjects. These are very resilient, and, thus, enduring and can be easily kept up-to-date.
Notation is simple, class numbers are monolithic.	Notation is mixed and seems complex at times. Class numbers are polylithic.
Schedules are lengthy; system is difficult to design but easy to use.	Schedules are short, so easy to design, comparatively complex to use.
Index is indispensable.	Schedules being slim. The index is less used.

SOME MAJOR CLASSIFICATION SYSTEMS:

There has been a rapid growth of general and special classification systems especially since 1876. A general classification system is designed for the entire domain of knowledge. Examples are the Dewey decimal classification, C.A. Cutter's Expansive Classification, Ranganathan's Colon Classification. On the other, hand, a special classification system is a very detailed, minutely divided classification, developed for a smaller area of knowledge, say for Social Science, or Economics, or even for Banking. There are numerous such special classification systems. In this Unit, we will study a few classification systems in brief. Some-

of these classification systems will be described and discussed in Block 4 of this Course (BLIS=03.

Dewey decimal classification (DDC):

DDC was conceptualised by Melvil Dewey and was first published in 1876. It is now in its 21st edition. Its author Melvil Dewey (1851-1931) is veritably acknowledged as the father of modern, librarianship. It is the first discipline-oriented classification -and uses decimal numbers Basic Terminology to divide the entire knowledge into ten main classes. Divisions of main classes are hierarchical and minute. In Edition 21, there are seven auxiliary tables to supplement and the main schedules 001/999 in volume 2. Its bibliographical details are: Dewey Melvil: Decimal Classification and Relative Index: Ed. 21 edited by Joan S. Mitchell. Albany, MY Forest Press/OCLC, 1996. 4 Volumes. For small libraries, abridged edition of DDC is brought out. The present abridged edition in one volume is the 13th edition (1997).Most of the class numbers are enumerated, and many more numbers can now be extended through add-to instructions and seven auxiliary tables. It is the most popular classification scheme being used in about 2,00,000 libraries in135 countries and has been translated in 35 languages. It is also used in Cataloguing in-Publication (CIP) data and MARC records.

The impact of information technology on DDC can be seen in that on 29 July 1988, a computer tape containing substantially all of the text of DDC was delivered to a firm in Massachusetts to begin production of the twentieth edition. Thus, as DDC enters the online age, the Editorial Policy Committee will continue to monitor future developments of the classification, and recommend policies that will help it to become more adoptable and amenable to online information storage and retrieval. It is already available in CD-ROM (Dewey for Windows, 1996).

The Dewey Decimal Classification (DDC) was developed by Melvil Dewey in the year 1873 to arrange the documents of Amherst College Library. The first edition entitled, "A Classification and subject index for cataloguing and arranging the books and pamphlets of a library" was published in 1876. It appeared in the form of small book of 44 pages. Dewey decimal classification continued to be modified and revised with many alterations and additions. The DDC is presently being published by OCLC - Online Computer Library Center, Inc. The DDC is published in full and abridged editions in print and electronic versions. The latest edition is available in 3 formats,

i) Four Volumes Print Edition

ii) The Electronic version Web Dewey,

iii) Abridged Edition for small libraries.

The 20th Edition of DDC is in four volumes. First Volume contains the introduction and various tables. Second and Third Volumes are Schedules. Second Volume covers class numbers from 000 to 599 and Third Volume covers class numbers from 600 to 999. Fourth Volume provides Relative Index to the Schedules and a Manual. DDC is an enumerative scheme of classification. An enumerative classification system is a system that lists all the specific subject classes, as opposed to, for example, an analytico-synthetic classification where subjects are divided intofacets (aspects), and class numbers are synthesized from the classification schedule. It means that the classifier does not have to construct numbers as the numbers are readymade and can be picked up from the classification schedules. Notation is the system of symbols used to represent the classes in a classification system. Notation gives both the unique meaning of the class and its relation to the other classes. Following symbols and digits are used in DDC:

Arabic Numerals 0-9

Dot (.) Decimal Point

Roman Alphabets A to Z

Arabic numerals are used to represent each class in DDC. Each base number in DDC has minimum of three digits and further divisions follow a decimal (.) or a dot. Thus the name Dewey decimal classification scheme. The first digit in each three-digit number represents the Main class. The second digit in each three-digit number indicates the Division and the third digit in each three-digit number indicates the Section. For example, 500 is used for general works on the sciences and mathematics. Notation 510 is used for mathematic, 520 for astronomy, 530 for physics and 540 for chemistry. The third digit in each three digit number indicates the section. Thus, 540 is used for general works on chemistry, 541 for physical chemistry, 543 for analytical chemistry, 546 for inorganic chemistry and 547 for organic chemistry. The Roman alphabets are used for expressing concepts which are not enumerated in the Schedules.

Introduction and tables:

Volume one presents the Editor's introduction of DDC. It is an important and useful part of the system in all respects. Introduction provides:

1. History and current use of DDC

2. Overview of DDC including basic plan

3. A practical Guide to the use of classification

Besides, there is a Glossary, a valuable feature, explaining all the technical terms, used in Editor's Introduction. It also provides rules to further synthesize (extend) a number either from the Schedule or from any of the Auxiliary Tables.

Tables:

The second part of Volume 1 contains seven numbered Tables. Tables provide notation that can be added to the class numbers in the Schedules to provide greater subject specificity. Following are the seven Tables:

Table 1: Standard Subdivisions

Table 2: Geographic Areas, Historical Periods, Persons

Table 3: Subdivisions for individual Literatures, for Specific Literary Format

Tables 3-A: Subdivisions for Works by or about Individual Authors.

Table 3-B: Subdivisions for Works by or about More than One Author

Table 3-C: Notations to be added where Instructed in Table 3-B and in 808-809

Table 4: Subdivisions of Individual Languages

Table 5: Racial, Ethnic, National Groups

Table 6: Languages

Table 7: Groups of Persons

In the end of Volume 1 are the Lists which compare Edition 19 and 20:

Relocations and reductions, Comparative Tables for Music and British

Columbia, and Equivalence Tables for Music and British Columbia.

Schedules:

In Schedules, Knowledge is organized from 001 to 999. Volume 2 covers class numbers from 000 to 599 and Volume 3 covers class numbers from 600 to 999.

Summaries:

Summaries of the Schedules provide an overview of the intellectual and notational structure of classes. The summaries of the schedules as a whole are found at the front of the Volume 2.

First Summary:

Dewey divided the whole universe of knowledge into 10 Main classes. This is first practical step to learn the system for the beginner. The first summary contains the 10 main classes. The first digit in each three digit number represents the main class. For example 600 represent technology.

The Ten Main Classes:

000 Generalities

100 Philosophy & psychology

200 Religion

300 Social sciences

400 Language

500 Natural sciences and mathematics

600 Technology (Applied sciences)

700 The arts

800 Literature & rhetoric

900 Geography & History

Second Summary:

In Second Summary, the 10 Main classes are again subdivided into 10 Divisions resulting into 100 Divisions on the whole. The second digit in each three digit number indicates the division. For example, 600 is used for general works on technology, 610 for medicine and health, 620 for engineering, 630 for agriculture, etc. It is better to remember this Summary also. The entire Second Summary is reproduced for your reference.

The Hundred Divisions

000 Generalities

010 Bibliography

020 Library & information sciences

030 General encyclopaedic works

040 [Unassigned]

050 General serials and their indexes

Third Summary:

The Third Summary contains 1000 sections. The third digit in each three digit number indicates the section. For example, 610 is used for general works on medicine and health, 611 for human anatomy, 612 for human physiology, 613for personal health and safety, etc. Each of the 100 Divisions is further divided into 100 Sections resulting into 1000 Sections. The Thousand Sections the Third Summary, taken from the Schedules of DDC 22nd ed., is reproduced in the subsequent pages.

Third Summary:

The Thousand Sections:

Generalities:

000 Generalities

001 Knowledge

002 The Book

003 Systems

004 Data processing Computer science

*Consult schedules for complete and exact headings

Universal Decimal Classification (UDC):

The UDC was developed in 1895 by Paul Otlet and Henri Fontaine taking the DDC as its base. Their efforts resulted in the publication of a scheme called Manuel repertoire Universal

Bibliographies, an almost-faceted scheme which involved adopting the almost-enumerative classification into one which allows synthesis. It is a bibliographic classification available in three versions: Full edition 2, 2 1,000 terms Medium edition. 70,000 (30% of the full edition) Abridged edition 20,000 (10% of the full edition) English edition is published by the British Standards Institution as BS: 1000.Now, the UDC is owned', by a consortium (having members from England, Spain, Belgium, Japan, France and the FID itself). It is constantly revised and revisions are announced in its annual bulletin: Extensions and Corrections to UDC. At present, the UDC is being restructured to a fully faceted system.

Library of Congress Classification (LC):

The LC is a purely enumerative classification. It consists of 21 classes in 29 parts and45 volumes and is the bulkiest of all the classification systems. It is based upon literary warrant. Main classes are denoted by alphabets:

A Generalia	N Fine arts
B Philosophy and Religion	P Languages and Literature
C/F History	Q Science
G Geography	R Medicine
H Social Sciences	S Agriculture
J Political Science	T Technology
K Law	U Military Science
L Education	V Naval Science
M Music	Z Library Science &

The alphabets 1, 0, W, X, Y are still vacant. Further divisions are again denoted by alphabets:

Q Science	QC Physics
QA Mathematics	QD Chemistry
QB Astronomy	

Further subdivisions are by numerals:

QD

71-142 Analytical Chemistry

156-197 Inorganic Chemistry

241-44 Organic Chemistry

It makes frequent use of alphabetical mnemonics for further subdivisions:

QD171 Metals

QD172 By group A/2

QD172.M4 Magnesium Group

QD172.P8 Platinum Group

QD 182.R2 Rare Earth Metals

The alphabets and numerals M4, P8 and R2 have come from the simplified Cutter Table for author marks. Sometimes the year of publication is also included in the class numbers: The economic way of thinking by Paul T Helyne HB 171.5.H46 1990Class numbers, which are call numbers, are lengthy.

Problems:

It is a bulky scheme and suitable for shelf arrangement only. It is a mark and park system. Being enumerative, it is difficult to accommodate .new subjects at proper places. Only device used by the scheme is the gap device for hospitality.

Use:

It is one of the big three classification systems - the other two being the DDC and UDC and is being used in the largest library of the World - the Library of Congress (USA) which has 10 crore documents. 60% of the research libraries, and 50% of the college libraries are using this system in 1JSAA. It is also used in some big libraries in Africa, Asia and Europe. LC class numbers are available on CIP data, MARC record, and are used by other centralised agencies. It is also being used in online catalogues. Due to its strong institutional backing it has an assured future.

Bibliographic Classification (BC):

Bibliographic Classification (BC) was designed during 1940-53 by H.E. Bliss (1870-1955), Librarian of City College, New York. He devoted all his life to the study of classification.

When, published finally in 1953, it had many commendable features, but it was not used much. The second edition known as BC-2 prepared in IJIC by J.Mills is one of be most scientific general classification schernes and a good model –of a faceted classification. Mills, J. (et al). (1977). Bliss Bibliographic Classification. 2nd ed. London: Butterworth

Colon Classification (CC):

Colon classification (CC) is a classification scheme devised by Dr S. R.Ranganathan. The first edition of the scheme was brought out in 1933 and the seventh edition is the latest edition. The 7th edition is not much in use and the 6th edition is widely used. For this reason, here we will use the 6th edition of CC, which was first published in 1960. It is a freely faceted classification conforming to the General Theory of Classification and guided by postulates and principles. The major structure of the scheme ' is in its basic subject schedules and the schedule of isolates belonging to the five fundamental categories: Personality, Matter, Energy, Space and Time. With the identification of three planes of work - Idea, Verbal and Notational Plane, work of classification has become objective. It is still a best and sound example of ananalytico- synthetic classification.

The Colon Classification is now in its seventh edition (1987). The scheme though a trend setter is not a highly used classification. It is used in some special and academic libraries in India. Its complex mixed notation is a barrier, in its use and popularity. But its methods and theory have had an impact on other schemes, such as, DDC, andBC-2, UDC in their revision, and in the designing of new systems such as Broad System of Ordering (BSO). CRG members have used its methods to design many special classification systems. The Colon Classification (CC), 6th edition is a one –volumed book of about430 pages. The book has been divided into 3 parts:

Part 1: Rules

Part 2: Schedules

Part 3: Classics and sacred books

The First part briefly describes the important principles, concepts and canons of classification on which the classification system is based. It is also used with the rules and examples for constructing the class numbers. The second part has all the subject schedules. At the end of Part 2, an index is given for all the isolates listed in various schedules. The Part 3 comprises the schedules of classical works and sacred books.

Notation:

Notation refers to the symbols and numbers which have been used in the scheme of classification for various classes. CC has used mixed notation as several kinds of symbols have been used. They are as follows.

1. Indo Arabic Numerals (1-9) 09

2. Roman Alphabets (A to Z) 26

3. Roman alphabets (a-z, excluding i, l, o) 23

4. Greek letters [Δ (delta) and (sigma)] 02

5. Parenthesis () 02

6. Punctuation marks as indicator digits 06

   Inverted comma (')

   Dot (.)Colon (:)

   Semi colon (;)

   Comma (,)

   Hyphen (-)

7. Zero as an indicator digit 01

8. Arrows 02

   Forward arrows→

   Backward arrows←

Review questions:

1. Name a few types of classifications.

2. Define enumerative classification.

3. Write a short note on faceted classifications.

4. Give five differences between enumerative and faceted classifications.

5. Define Dewey decimal classification.

6. What do you know about Colon classification?

Reference:

Marcella, Rita and Newton, Robert (1996). A New Manual of Classification. New Delhi: Jaico Publishing.

Mills, J. (1996). A Modern Outline of Library Classification. Bombay: Asia Publishing

Ohedar, A.K. and B. Sengupta (1977). Library Classification. 2nd rev. ed. Calcutta: World Press.

Ranganathan, S. R. (1987). Colon Classification. 7th ed. Edited by M.A. Gopinath. Bangalore: Sarada Ranganathan Endowment for Library Science.

UNIT – 3

GENERAL THEORY OF CLASSIFICATION

Objectives:

- ❖ To gain knowledge about the contribution of Dr Ranganathan
- ❖ To learn about the three classes

❖ Detailed study of the five fundamental categories

❖ To know about the postulates pertaining to fundamental categories

Introduction:

S.R. Ranganathan, in full Shiyali Ramamrita Ranganathan, (born August 9, 1892, Shiyali, Madras, India—died September 27, 1972, Bangalore, Mysore), Indian librarian and educator who was considered the father of library science in India and whose contributions had worldwide influence.

Ranganathan was educated at the Hindu High School in Shiyali, at Madras Christian College (where he took B.A. and M.A. degrees in mathematics in 1913 and 1916), and at Teachers College, Saidapet. In 1917 he joined the faculty of Government College, Mangalore. He subsequently taught at Government College, Coimbatore, in 1920 and at Presidency College, University of Madras, in 1921–23. In 1924 he was appointed first librarian of the University of Madras, and in order to fit himself for the post he travelled to England to study at University College, London. He took up the job at Madras in earnest in 1925 and held it until 1944. From 1945 to 1947 he served as librarian and as professor of library science at Hindu University in Varanasi (Banaras), and from 1947 to 1954 he taught at the University of Delhi. During 1954–57 he was engaged in research and writing in Zürich. He returned to India in the latter year and served as visiting professor at Vikram University, Ujjain, until 1959. In 1962 he founded and became head of the Documentation Research and Training Centre in Bangalore, with which he remained associated for the rest of his life, and in 1965 he was honoured by the Indian government with the title of national research professor in library science.

Ranganathan's chief technical contributions to library science were in classification and indexing theory. His Colon Classification (1933) introduced a system that is widely used in research libraries around the world and that has affected the evolution of such older systems as the Dewey decimal classification. Later he devised the technique of "chain indexing" for deriving subject-index entries. Other works of his included Classified Catalogue Code (1934), Prolegomena to Library Classification (1937), Theory of the Library Catalogue (1938), Elements of Library Classification (1945), Classification and International Documentation (1948), Classification and Communication (1951), and Headings and Canons (1955). His Five Laws of Library Science (1931) was widely accepted as a definitive statement of the ideal of library service. He also drafted plans for a national and several state

library systems, founded and edited several journals, and was active in numerous professional associations.

Contributions of S.R. Ranganathan:

As a newly appointed librarian Ranganathan travelled to London's School of Librarianship and toured over one hundred libraries in the U.K. While in England, Dr. SR Ranganathan saw that the Dewey Decimal Classification (DDC) was the most popular system in use. His analytical mind quickly discovered its fundamental deficiency and its inability to express all the aspects of a specific subject of a document. He also thought that a classification system should allow for future subjects to be combined in unexpected or unplanned ways. In his mind DDC was neither prepared nor adequate to provide for the future situations. Whether people are looking for resource books to help them with literature courses, electronic courses on Mobile Phones, interior decoration or language study they should be able to find a wide variety of appropriate reading material quickly and easily.

The DDC is not necessarily the quickest or easiest; to keep in mind he decided to devise a system of his own. Shortly afterward he began work on his classification scheme which he called the Colon Classification (CC).Ranganathan started a Library Science School in Madras in 1929 where he taught both DDC and CC. Over his lifetime, he wrote over 2000 research papers, 60 books and founded and edited five periodical publications. Ranganathan's chief technical contributions to library science were in classification and indexing theory. His Colon Classification (1933) introduced a system that is widely used in research libraries around the world and that has affected the evolution of such older systems as the Dewey decimal classification. Later he devised the technique of chain indexing for deriving subject-index entries. His Five Laws of Library Science (1931) was widely accepted as a definitive statement of the ideal of library service. He also drafted plans for a national and several state library systems, founded and edited several journals, and was active in numerous professional associations.

Colon Classification is the system of library organization developed by Ranganathan in 1933. It is general rather than specific in nature, and it can create complex or new categories through the use of facets, or colons. In it, there are 108 main classes and 10 generalized classes (broadly divided between the humanities and sciences), which are represented by a mixed notation of Arabic numerals and Roman and Greek letters. Each main class comprises five fundamental facets, or groups: personality,

Ranganathan's main contribution to classification was the notion of these fundamental facets, or categories. Instead of schedules of numbers for each topic, Colon Classification uses series of short tables from which component numbers are chosen and linked by colons to form a whole. The book number is an integral part of the call number, a departure from Dewey or Library of Congress systems. Each main class has its appropriate facets and focuses; e.g., literature has language and form. In addition, there are four floating tables that correspond to subdivisions -- e.g., form, geography, time, and language. Further expansion of the tables is allowed through colon addition or omission (if the subject cannot be expanded).

The collection of the University Of Madras, India, was utilized in the creation of Colon Classification.

Poised at the threshold of the twenty-first century, the library world can look back and reflect on the achievements of the profession gained during the past century. We have seen much closer interfacing of library users and their libraries. Libraries today are touching their lives and in their library pursuits. Making of this worldwide giant stride has been possible because of the tireless devotion, hard work and ceaseless quest of a band of zealous librarians and their philosophical thinking. They have through the years put their energies toward the enhancement of the primary functions of libraries, viz .acquiring, organizing and delivering information to the information seekers.

Dr Shiyali Ramamrita Ranganathan (1892-1972), of India, is one of these towering library leaders. He was an inventor, an educator, a librarian, and a philosopher, and has made a great contribution to the library profession. His legacy is a message to the profession on a global plane. In his own homeland, Ranganathan's contribution to the library profession has been enormous and all encompassing. He was a prime mover and has put India permanently on the world library map.1Ranganathan has made two fundamental contributions to world library and information profession. These are, first, The Five Laws of Library Science (1931) and the second is the Colon Classification (CC). He has been acclaimed universally for these contributions during his lifetime and continues to be acclaimed over these years. From the middle of the nineteenth century, librarians in the West felt the need and started emphasizing the importance of enhanced services to library patrons. Formulation of the Five Laws of Library Science at long last, provided a solid and lasting foundation in this direction. The Laws provided essential guidelines for librarians with the potential for planning and providing patron services in all types of libraries. Over the years, library professionals have

continued to focus on the implications of the Five Laws in the fast changing and expanding libraries in all the countries. Efforts for efficient, faster, effective, and patron-friendly service became their credo. Following his Laws, efforts were being made to bring services to every library patron's doorstep in a library. Librarians in all types of libraries tried to incorporate in spirit, action, and practice, the Five Laws:

Books are for use.

Every book its reader.

Every reader his book.

Save the time of the reader.

A library is a growing organism.

Looking through the library literature one can clearly see the evidence of the librarian's efforts in this regard. The reader of the Five Laws is the user today and the book can be identified as all the formats of information sources. The bottom line today is save the time of the reader user. In 1975, a resourceful librarian expanded the Five Laws to provide the American interpretation of Ranganathans Five Laws of Library Science. This expansion clearly reflects the impact of the Five Laws in the library world:

He has focused on the validity of the Five Laws. In that context he has suggested some newer focus for each of Ranganathan s Five Laws of Library Science as a follow up to Ranganathans Five Laws. He has suggested five new laws as an expansion of the first Five Laws. He expects that these new Laws would reflect the fundamental aim of the library services as conceptualized by Ranganthan in the original Five Laws. The new laws are expected to meet the challenges of fast paced social and cultural changes affecting library users and the rapid proliferation of technology in the library operations.

Libraries serve humanity

Respect all forms by which knowledge is communicated

Use technology intelligently to enhance service

Protect free access to knowledge

Honour the past and create the future.

In a recent review article, Kuronen and Pekkarinen have analysed the Five Laws of Ranganathan and have felt that there is a need of some supplementary laws to the original Five Laws in the context of technological advances of today.4The authors of the article are convinced that the under-lying philosophy of Rangnathans Five Laws is fundamental. However, in this age of global information network, it is necessary to have supplementary laws to be able to cope with the growth in user demand in the libraries. The authors say: The new supplementary laws relate to Rangnathan s Five Laws the very essence of the virtual library: the library configured by the individual reader. The virtual library makes it possible for the reader to make his/her documents and writings publicly available and part of the global collection.

As such the authors have suggested two supplementary (6th and 7th) laws to Ranganathans Five Laws:

6. Every reader his library.

7. Every writer his contribution to library.

Considering deep impact of Ranganathan s Five Laws of Library Science and Colon Classification, an entire issue of Libri was devoted to Ranganathan. Several Indian and western authors have analysed and discussed Ranganthans professional work from many angles in their papers.

The authors have drawn the attention of the library professionals and focused on Ranganthans many faceted influence to service philosophy and subject classification. Such continued focus on Ranganathan and his work is a fair testimony that he is a universal librarian. Ranganathans second major contribution to the library profession is his formulation of Colon Classification (CC). He had studied Dewey's Decimal Classification (DDC) in his library education. From his experience with DDC he felt that DDC did not provide the flexibility to cover all the different facets of a subject. He was a mathematician and naturally thought about the mathematical configuration of all the facets of a subject. This made the way for formulation of Colon Classification. In their same review article, Kuronen and Pekkarinen have observed that the Colon Classification had not become as popular as it might have deserved. It is also observed that the theory of faceted analysis implies ideas which are still to be explored to be fully utilized in the electronic environment. Perhaps Ranganathan had developed his CC faceted classification too early. It is expected that wider benefit would be gained from CC as a structured domain language as used in Artificial Intelligence.7It is however, appropriate to

acknowledge the increased application of Ranganathans principles of Colon Classification in indexing, in the creation of electronic databases, and in the development of integrated systems. He has given us the instrument for the accurate analysis of knowledge and its re-synthesis in a linear sequence, while the computer has now become the means for dis-playing the resultant sequence."

The formulation of Colon Classification drew the immediate attention of the library world to this innovative classification scheme. Ranganathans own teacher, Berwick Sayers, himself a classification authority, said of the Colon Classification: Nearly every scheme has not only its main tables worked out remuneratively, it has systematic mnemonic schedules which develop and qualify all or some of the subjects in those tables. Ranganathan devised a set of independent tables for subjects, for relations, terms and other classification factors, each of which could be used in combination with the other tables to subdivide. These tables were, in Colon Language, like the parts of a meccano set which by the use of nuts and bolts can be used for many different constructions. In appearance, the numbers are like the classification complex. One result of this method is the very full tables which all other schemes possess are unnecessary. A series of relative short tables can be used to mark the widest range of subject.

Jesse H. Shera realized the potential of Colon Classification and drew the attention of American librarians to the flexibility of the Colon scheme.10Garfield notes from a study of Science Citation Index and Social Sciences Citation Index that Ranganathans works were cited more than 400 times over a 20-year period. He states that this is indeed remarkable because coverage in those citation sources for materials in the field of library science was selective and limited.11Ranganathan had a great impact on library education in England. Mr.Derek Langridge, Principal Lecturer of North Western Polytechnic in England, visited India in November and December of 1969. In his comments of Ranganathans Colon Classification, he stressed that, I regard the Colon Classification the best scheme to teach the principles. He also talked about then changing perspective of the teaching of classification in North Western Polytechnic. He said that between 1951 and 1961, teaching of classification at the Polytechnic was based on PMEST (Personality, Matter, Energy, and Space. Time-postulates for hierarchical design in classification) and the theory propounded by Dr Ranganathan.

Incorporation and use of Colon Classification continued in the Polytechnic curriculum. In 1954, practical classification was based on Facet Analysis. In 1953, Chain Indexing was

introduced and in 1964, Colon Classification was accepted for practical classification. He observed that at the time 50 percent of the schools in the United Kingdom were teaching Colon Classification and, after 1966, the library school in Maryland, USA, introduced the comparative study of Universal Decimal Classification and Colon Classification.13The understanding of the scope of Ranganathan s Colon Classification for computer application and the influence of Ranganathans ideas on the Western Reserve University system have been described this way:

Hierarchical subject classification and reorganizing stored information are possible only with the Freely Faceted Analytico-synthetic Classification. The only well-known general scheme of its kind for bibliographic classification is the Colon Classification of Ranganathan. Based on faceted structure as in the Colon Classification, over twenty special schemes have been described and applied particularly in British libraries. Many of these are not freely faceted though they are faceted. Only Freely Faceted Analytico-synthetic scheme for Bibliographic Classification can meet the requirements of computer technology in its application to the retrieval of information embedded in documents.

The other known system that has overcome the rigidity of conventional hierarchy is the Encoded Telegraphic Abstracts of the Western Reserve University (WRU). The devisers of the WRU system admit that the sys-tem has been influenced and even guided in its development by the Colon Classification. Jessica Melton made a comparison between the Colon Classification and the mechanical sorting system of the WRU and concluded that of the twenty-five basic ideas, in nineteen cases the systems are imperfect agreement, and in two in partial agreement; four cases where no correlation existed were due to the omission on the part of the WRU classifier of aspects included in the Colon Classification. These are sufficient proof that classifiers using a Freely Faceted/Analytico-synthetic Scheme for Bibliographic Classification are on par with engineers.

In conclusion, it now seems a certainty that the Age of Ranganthan will continue to be with the library world for years to come and continue to provide a base for the realization of the concept of total library service.15Michael Gorman has very appropriately called Ranganathan a Renaissance Man.

He said: Shiyali Ramamrita Ranganathan (1892-1972) of India is the unquestioned giant of 20th-century library science. He tackled all aspects of the profession of librarianship and always added his own individualistic, and sometimes, quirky perception of the subject. He

revolutionized the theory and practice of classification. Though his own classification scheme was never widely adopted, its influence can be seen throughout the practice of information retrieval, in the modern revisions of the Dewey decimal classification scheme, and in such pioneering attempts as the PRECIS (Preserved Context Subject Indexing System) subject heading system. If for nothing else, he deserves to be long remembered for his five laws of Library Science. The laws are the best summary of what libraries are, or should be about...... There is not facet of the practice of librarianship to which those laws cannot be applied. They represent a lifetime of thought on our profession distilled into universalisms.

Main class:

The library classification of a document consists of two steps. First, the "aboutness" of the material is ascertained, and second, a class number, based on the classification scheme, which is used in a particular library, is assigned to the material using the notation of the system. In library classification systems, each document can be placed only under one class, referred to as the main class. This is done for shelving purposes because a book can have only one physical place. Dr Ranganathan (1967) defined the Main Class as "the fairly homogenous conventional regions of knowledge, which together form the first order array of classes which are mutually exclusive and totally exhaustive of the field of knowledge". The main classes in all the schemes of classification may not be the same. The classes which appear as the major divisions of the universe of knowledge are the main classes in that classified scheme. Once the knowledge is organized into a number of main classes, the next step is to mark the facets of each main class, derived from the main classes. These reflect the specific component of a subject.

Main classes and their order:

Knowledge is the librarian's merchandise; his stock-in-trade. Understanding its nature and manner of growth is as vital to a classificationist as is the study of anatomy to a surgeon. Ranganathan's research in social epistemology has been lauded as an everlasting "intellectual contribution to the underlying philosophy of librarianship" by the late Jesse H. Shera (1903-1982) (Shera 1970, 106). Ranganathan made pioneering studies of the mode of growth of subjects, mostly to attune his system to the growing universe of knowledge. He laid great emphasis on the order of knowledge and consequently on the arrangement of basic subjects in his CC. For him, the essence of library classification lay first in systematic arrangement, then in a helpful sequence of subjects and documents. A classification must depict the structure of

knowledge. The first division of knowledge in CC is into traditional disciplines, which he arranges in the order of their evolution as academic studies, namely:

> Science and technology

> Humanities

> Social sciences

The social sciences are the most recent academic disciplines to emerge; science and technology, however, were studies (of curiosity) of even primitive and cave dwelling humans. The disciplines are further divided into sub-disciplines, namely:

B*Z Maths and physical sciences

G*Z Biosciences

K*Z Animal sciences

L*Z Medical sciences

MZ*Z Humanities and social sciences

MZ*ZZ Humanities

S*Z Behavioural sciences

T*Z Social sciences

Within each discipline CC has an order of main classes meticulously based on objectively stated principles. An overview of main classes in the CC is as follows:

A/B Science/Mathematics

C/D Physics/Engineering

E/F Chemistry/Chemical technology

G/H Biology/Geology

I/J Botany/Agriculture

K/L Zoology/Medicine

M Useful arts

Δ Spiritual experience & Mysticism

N/O/P Fine arts/Literature/Language

Q/R Religion/Philosophy

S/T Psychology/Education

U/V Geography/History

W/X Political Science/Economics

Y/Z Sociology/Law

These main classes are in fact preceded by Generalia and Form classes a/z, and newly emerging classes 1/9, e.g.

a Bibliography

k General encyclopaedias

m General periodicals

p Conference proceedings

w Biographies

z Generalia classes

1 Universe of knowledge

2 Library science

3 Book science

4 Mass communication

8 Management science

Sciences (including technologies) in classes A-M have been arranged in order of their increasing concreteness: B Mathematics is the most abstract of the sciences, while MA/M, theory and practice alternate: theory always precedes practice or its applications. For example, B Mathematics precedes C Physics, which in turn precedes D Engineering. E Chemistry precedes F Chemical technology. Similarly, I Botany is followed by J Agriculture. This internal arrangement is based on the principle of dependency, first promulgated by

Auguste Comte (1798-1857). Unlike Dewey, Ranganathan preferred to collocate the theory with the practice of a subject. Indeed the Library of Congress Classification (1899/1940+) followed this principle prior to Ranganathan.

In the humanities, which are spread over main classes N-S, the arrangement is in order of increasing richness of subject content. The order of social sciences, in main classes T-Z, is of increasing artificiality of their laws: Z Laws, being legislative and subject to frequent modifications, is considered the most artificial of the social sciences. One may fault this arrangement. For example, economic and social laws are not artificial but are based on long observed human nature and thus should not come so far down in the order of classes.

In an article published prior to the release of CC, R.S. Parkhi (1933, 87) commended and explained its arrangement of main classes as logical and evolutionary. Elucidating his viewpoint, he described the Generalia class as the complete miniaturized view of knowledge that precedes the entire universe of knowledge. B Mathematics pervades every science, indeed the queen of sciences. Physical sciences C-F study the matter and forces that constitute this universe. G Biology is vital science. Classes H-K are in evolutionary order of life on our planet. Classes L-P are application subjects for the well-being and prosperity of humankind. Classes from Q Religion to T Education are for the moral and social development of individuals, which in fact depend upon the correct application of classes L-P, which in turn depend on classes A-K. Classes U-Z study the geographical and social sciences, the latest areas of knowledge to engage academicians. Here W Politics (and Government) precedes the creation and distribution of wealth in X Economics, while Y Sociology and Z Law keep society internally safe, intact and sustainable.

Facets of a Main Class:

Facet is a generic term used to denote the components of a basic subject, i.e., basic facet or an isolate facet of a compound subject. An isolate is any idea or idea complex to form a component of a subject, but not deemed singularly to be a subject. Isolates are of two kinds – common isolates and special isolates. When we divide the universe of knowledge up to the stage of the Main Class, facets do not appear. But when we have to divide a Main Class, the concept of facets appears in the case of some main classes. The purpose of facets is to divide a main class into its possible divisional aspects. As the Main Class contains a number of smaller units of ideas or entities within it, one method of their division is to group them all

into one consecutive sequence. Another possible method for the division of a main class is to divide it first into its possible facets. The process can be termed as recognition of categories under a class. Therefore, any class enumerated in the first order array of a scheme of classification of the universe of knowledge is categorised as a main class.

Canons of classification:

Meaning of Canon: Canon of Classification an established general law, rule, principle, or criterion by which something is judged of the classification.

The first use of "Canons of library classification" by W C B Sayers. Then many library science professionals tried to develop Canons of library classification such as E C Richardson, H E Bliss, etc. Dr S. R. Ranganathan in his book "Prolegomena to Library Classification" in the year 1937 has presented this Canon as a classification method. Dr S. R. Ranganathan has given three levels in order to give scientific and systematic form to the subjects.

Ideal Plane:

It is a thinking, policy, and decision-making phase; a paramount plane which is both a map and foundation of the system's design. The quality of work done here genetically determines the quality of the ultimate product. Here intellectual analysis of the subject is done; characteristics are selected to break down the subject of the document into facets, and ultimately into isolates, arranged discretely and systematically into arrays and chains. An isolate is the smallest unit of knowledge in CC; whereas a facet is a group of isolates, denoted by an umbrella term, obtained by the application of a single characteristic to a set of entities. The types and quality of characteristics, and the order in which these are to be applied, are determined by the seven Canons of Characteristics. These canons mandate that characteristics chosen as the basis of division should be able to divide, and be relevant to the ultimate purpose of classification, objective, and permanent; characteristics should be applied in order of general to specific and one by one in proximate steps.

Once facets and their isolates are formed by the application of characteristics, the function of the next set of canons is to arrange terms in arrays and chains. An array is a set of cognate entities of equal rank arranged in some systematic and predictable order. For this, Ranganathan formulated rules for formation of arrays of entities. These are: Canon of Exhaustiveness that an array should be inclusive of all the classes. Canon of Exclusiveness

lays down that an entity should belong to one and only one array — it will avoid cross classification. This is only required for shelf classification as for classifying databases and designing Online Public Access Catalogues (OPACs), cross classification is a boon. Cross classification allows a virtual document to be kept at more than one place. Helpful Sequence canon means that facets and isolates of an array should be arranged in a predetermined logical or utilitarian sequence, or the one which is expected by the majority of the users. Historical events should be arranged chronologically, while UN member states can be in an alphabetical order; living species may be arrayed in the order of their evolution (Principle of increasing complexity); chemical elements can be arranged by their atomic numbers. Coins can be arranged by their face value. Geographical entities can be arranged by the principle of spatial contiguity, as in a map. Ranganathan discovered eight options to arrange entities in a helpful order. A chain is a sequence of entities in a constantly decreasing order of their extension. For example, World—Asia—South Asia—India—North India—Delhi is a chain of classes. The Canon of Decreasing Extension means a chain should move from broader to narrower or from general to specific classes; and the Canon of Modulation means no link in the chain should be missed. Division of a universe should be gradual, proximate and finely calibrated. In the above chain, we should not jump from India to Delhi omitting North India. At the end of the work here we have a finely woven and exhaustive systematic network of all concepts with nodes and links. But still all is nebulous, and in an intangible and amorphous form.

Verbal Plane:

Then the theatre moves to the verbal plane — to articulate the findings of the idea plane in unambiguous language. Language is the dress of thought, aptly said Dr. Samuel Johnson (1709-1784). Ranganathan (1962, Sec. A1) believed this and always exhorted librarians to learn and use technical terminology for effective communication. Terms used to express a science, or a phenomenon, should be current and free of homonyms and synonyms. Ranganathan vehemently laid down that terms used for a classification system should be made free of homonyms and synonyms; that is a term must be unique to the concept, and should be expressed and read in context. He also said that the terms should mostly be neutral, not opinionated or critical, meaning that a classification term should not be value-ridden. As an example, classification systems should not use the terms major/minor authors to categorize them, as DDC did in its 14th edition (1942). Ironically, the terminology in the CC is now

quite dated, which poses problems in chain indexing — a famous system invented by Ranganathan to derive subject headings from class numbers.

Notational Plane:

Of the three planes, the notational plane is the most visible, so much so that many people mistake it for the classification per se. Ranganathan expected much from a notational system in terms of its capacity and sophisticated multitasking to represent complex ideas. He vainly aspired that the notation should faithfully and comprehensively translate the subject of a document into a language of ordinal symbols. For him, classification was also a sort of translation. He overloaded his notation with onerous work and expected it to be very powerful, but relegated it to be the servant of the idea plane. In fact it is the faithful executor of the idea plane. However, he laid down that notation in a class number should be brief, simple and easy to write, remember (for a short time), and pronounce. These are optional qualities, not present in his system. More essentially, it should be expressive of subject structure (both hierarchical and faceted), and above all it should be hospitable to new subjects. This latter quality in Ranganathan's notation is in abundance — achieved at the high price of being unwieldy and complex. Considered a high-water mark in the development of library classification notations, his notation is highly mixed and uses decimal, sector, and group notation. It is rigorously hierarchical, extremely hospitable and depicts the facets and categories in a transparent manner. His notation is highly mnemonic even down to the seminal level — e.g., unity, God, world are always denoted by 1; diseases and mechanical breakdown will get the same number, as will medical cures and mechanical repairs in their different main classes. As another example, G; 3, I; 3, K; 3, and L; 3 represent general, plant, animal, and human physiology, respectively. Similarly, fuel/energy (machines), feed (animals), and food (humans) may get the same number wherever they occur in different schedules. Ultimately the notational plane is frighteningly complex and was much ahead of its time for shelf classification. Nevertheless, it is quite suited to computerized databases where the notational complexity does not matter.

Division of knowledge in CC:

The CC presumes the entire body of knowledge woven into a system, and considers there to be an evolutionary unity in it. All knowledge is one, Ranganathan learnt from the Vedas (1700-500 BCE). The structure that ultimately emerges from CC is both traditional and revolutionary at once. But in the end it is not Vedic or Eastern in its appearance or working.

The fact that Ranganathan recognizes and uses the existence of time-honored main and canonical classes, makes his scheme look steeped in the Western disciplinary tradition going back to Francis Bacon (1561-1626). Ranganathan identified three types of subjects in the universe of knowledge: basic, compound and complex, analogous to chemical substances. Basic subjects are unitary subjects, such as physics, thermodynamics, economics, Marxian economics, Homeopathy medicine, music, law, and library science. Compound subjects are basic subjects with subdivisions or additional facets, e.g., velocity of light, transport economics, guitar music, law of marriage, and libraries in India. Compound subjects of varying degree are virtually infinite in number. Complex subjects are mostly interdisciplinary in nature, e.g., mathematics for engineers, geophysics, medical geography, or comparative physiology. Ranganathan postulated that every subject, be it of any type or level, has a basic subject that forms the first, or the base, facet in constructing a class number. CC further divides basic subjects into:

- Main basic subjects
- Non-main basic subjects

And further divides them into 10 species. On the basis of their modes of formation the following 10 types of basic subjects have been identified (Satija et al. 2014):

Main basic subjects

Traditional (Law, Physics)

Newly emerging (Library & Information Science)

Fused (Biotechnology)

Distilled (Research methodology)

Subject bundles (Ocean sciences)

Agglomerates (Social sciences)

Non-main basic subjects

Canonical classes (Algebra, Geometry)

System constituents (Marxian economy)

Environment constituents (Desert farming)

Special constituents (Gerontology)

Canon of ideal plane:

Canon for characteristic:

The classification is arranging according to their likeness or dislike-ness. The different principles that recommended certain characteristics to be selected for the process of classification are called "canons for characteristics". Ranganathan has given the following four canons of characteristics:

- ❖ Canon of Differentiation
- ❖ Canon of Relevance
- ❖ Canon of Ascertain ability
- ❖ Canon of Permanence
- ❖ Canon of Consistency
- ❖ Canon of Relevant Sequence

Canon of Differentiation

In the classroom, the student may be divided into two distinct groups that are boy and girl on the basis of sex but we cannot divide the class on the basis of such attributes and students on possession of face, because all the individuals of the class share the attributes.

Canon of Relevance

The Canon of relevance stipulates that a characteristic to the term used as the basis for classification of the universe should be relevant to the purpose of the classification.

For example, in the selection of Sportsman in the playfield, the color beauty would be irrelevant but physical strength and physical fitness are relevant characteristics.

For taking the universe of the book, it suits the need of the library, reader, subject matter, language, Date of Publication and the author is relevant. The Size, Pages, print, and format are irrelevant.

Canon of Ascertain ability

According to the Canon of ascertainability a characteristic used and the basis for the classification of the Universe should be definite and ascertainable.

The classification must have an attribute that is fixed.

Canon of Permanence

The Canon Permanence state that characteristic used as the basis for the classification of Universe should continue to be unchanged, so long as there is no change in the purpose of classification.

Like we would classify a rat by its species but not on the basis of color.

Canon of Consistency

In the scheme should be the use some permanent characteristics according to their sequence.

Canon of Relevant Sequence

In this type of sub-formula, the ordering of the characteristics existing in the classification system of the world of knowledge should be in accordance with the objectives of the classification.

Canons of Verbal Plane (Canon of Terminology):

- ❖ Canon of Context
- ❖ Canon of Currency
- ❖ Canon of Enumeration
- ❖ Canon of Reticence

Canon of Context

According to the canon, the name or meaning of each word in a classification system should be determined by the same name used for the class in question, with reference to different classes of the same initial link.

Canon of Currency

The term used in a scheme of classification must be the one currently in usage among the Expert/ Users.

Canon of Enumeration

To understand or determine the meaning of a word in this canon, that categorical single or class (the hierarchical singles/sub-class has been enumerated)

They should be explained well and on their basis, that word should be used. That is, the arrangement of each term in classification systems should be determined by enumeration from classes into categories and series.

Canon of Reticence

The term used in a scheme of classification should not be critical.

Canon of Succession of Characteristic:

According to Dr S. R. Ranganathan, there can be two or more hidden features to classify the universe of knowledge which can be used sequentially. Three canons have been used to determine the order of this characteristic.

- ❖ Canon of Concomitance
- ❖ Conon of relevant succession
- ❖ Conon of consistent succession

Canon of Concomitance

For the purposes of classification, whichever attribute we have selected for classification, the same result should not be obtained, both the attributes should be different. As the basis of age and date of birth will be the same, then it should not be used due to being the same.

Conon of relevant succession

Characteristics suitable for classification should be commensurate with their objectives. When more than one attribute is used for classification, their order should be determined.

For example, the decimal classification has chosen 'Geographical area' and period' as the required characteristics in the main class history. The users of decimal classification should follow the same characteristics in the same succession.

Conon of Consistent Succession

In any classification method, the sequence of characteristics prescribed should be followed so long as there is no change in the objectives of the classification. Maintains uniformity in classification method.

Five fundamental categories:

Time:

According to Mills, the fundamental category, Time "is usually embodied in periods". According to Dr Ranganathan, "The fundamental category time occurs in every subject forming a local description of local history of any subject". Time indicates that the entities under different subjects must change in its structure, meaning, history development, with the progress of times.

Example: History of the 18 century is different from that of the 15 century.

Space:

According to Dr Ranganathan, "the surface of the earth is a manifestation of the category 'Space'. It occurs in every subject forming a local description or local history of any subject. "Most of the subjects, if not all, get manifested in relation with continents, countries and their subdivisions. In CC (Colon Classification), there is a schedule of Geographical Divisions which can be attached to a subject. In DDC (Dewey decimal classification), there is a space facet applicable under the class History, and throughout the scheme the facet is available under the direction divide, like 940-999.

Example: In the following examples, the term denoting space is given in brackets.

i. Agriculture in (India) brought up to 1990

ii. History of education in (India)

Energy:

According to Mills, the fundamental category, Energy is, "a category of facets which characterize the exercise of energy, i.e., activities, operations, processes, problems, etc. Palmer and Wells feel that Energy "usually presents itself as a problem to be solved, or a mode of work or approach." Dr Ranganathan, in his Colon Classification, calls the facet

based on the characteristic Energy, the problem facet. Thus, the fundamental Energy covers the problems, action including methods, functioning, and etc. aspects of a main class. Many main classes will have certain units which deal with the problems in the subject. These problems are generally applicable to all the organs of the class. In the class Agriculture, certain processes and actions like sowing and harvesting also come under Botany; units like physiology, and pathology are noticed in Zoology and Medicine, which deal with functioning. Isolates, which make the category Energy, are generally important actions in the subject and commend a greater influence on the subject from two directions. One is when they are in general reference to the class and the second when they refer to the organs of the subject individually.

Dr Ranganathan postulates that the energy aspect in a main class may manifest itself indifferent rounds of energy, that is, 2E= second round of energy after 1E; 3E= third round of energy after 2E and so on. In Agriculture, the energy focus 'manuring' needs to be followed by another energy facet consisting of foci (facet) such as collection, grading and application. Another example is from Medicine. Pathology or disease is a problem and therefore it is [1E] of the subject treatment and surgery, etc. are for actions on diseases themselves, and therefore, they are the [2E] of the subject.

Matter:

Dr Ranganathan postulates matter as a fundamental category capable of manifesting itself as the 'constituent of a whole'. However, Mills argues, "Matter is the category of facets which reflect substances, materials, etc. It is manifested clearly in most technologies and in many of the natural sciences; and it is generally absent from theoretical disciplines like Law, Economics, Literature, etc." Vikery feels that "Matter comprises constituent materials of all kinds.

"The Matter facet is inherent in many subjects falling within a main subject. The onset enumerated in CC are: Library Science, Engineering, Sculpture, Painting and Music. The 7 edition of the Colon Classification has given large scope to the Matter facet. There are three groups of "Matter" viz. Matter Material, Matter Property and Matter Method.

For Example: In the Main class of Library Science, Matter figures as the reading material. In the class Painting, Matter figures as the materials used for painting. In the class Music, Matter figures as the musical instruments, and so on. Dr Ranganathan was convinced that the facet

"Matter" should be expended into three groups and many isolates from the facet "Energy" be shunted to "Matter Property".

The three groups of Matter are:

1. Matter Property [MP]

Ex.   Main Subject   MP

        Biology   Morphology

                         Physiology

        Education   Thinking

                         Reasoning

2. Matter Method [MM]

Ex.   Main Subject   MP

        Chemistry   Physical Method

                         Fluid Method

3. Matter Material [MM]

Ex.   Main Subject   MP

        Technology   Product

        Biology   Substance

Personality:

The fundamental category 'Personality' is most concrete and the category 'Time' is the most abstract or the least concrete sector. The Personality facet indicates the core point of the subject at hand. According to Palmer and Wells, 'the term personality is used for the wholeness of any subject. Personality inheres in the subject itself and gives colour to the other fundamental concepts transforming them into concrete things. The Personality facet is of prime importance in many subjects, belonging to different classes, and it is the most recognizable facet for the specialists of a class. Personality is the first facet in many subjects and it is often experienced that the other facets work as attributes of personality for its further subdivision. Matter, Energy, Space, and Time are often required in relation with the

personality facet. The other facets are required in lesser degree in relation to the main class. Without Personality there can be no organ, constituent, attribute, action, etc. According to Dr Ranganathan, if a concept cannot easily fit into the other four categories then it is probably a Personality facet. He further adds that Personality is only recognizable by elimination. After separating out the manifestation of Time, Space, Energy and Matter in the subject, the residue often turns out to be a personality facet. This may be called the Principle of Residue. Within the Personality facet, we find a number of levels into which the whole personality is spread. These are known as levels of personality facet, P1, P2, P3, P4 and so on. The different levels are arranged with the help of the principles of helpful sequence.

Example, Personality facet

Main class P1 P2 P3 P4

Literature Language Form Author work

The following example enumerates how the fundamental category, personality, is used in

DDC and CC respectively:

Main class Personality facet DDC CC

Psychology Abnormal psychology 137 S6

Zoology Vertebrate 596 K9

The fundamental category and the connecting symbols used to distinguish them in a class number are as indicated below:

Personality: The connecting symbol is comma (,)

Matter: The connecting symbol is semi-colon (;)

Energy: The connecting symbol is colon (:)

Space: The connecting symbol is period (.)

Time: The connecting symbol is inverted comma (')

Concept of PMEST:

The Colon Classification scheme contains both, the basic subjects and their facets (which contain isolates). A basic subject can stand alone but in contrast an isolate is a term that

mediates a basic subject. To create a class number, the basic subject is named first. The isolates follow, entered according to a facet formula. This formula states that every isolate in every facet is a manifestation of one of the five fundamental categories -- personality, matter, energy, space, and time. Personality is the distinguishing characteristic of a subject. Matter is the physical material of which a subject may be composed. Energy is any action that occurs with respect to the subject. Space is the geographic component of the location of a subject. And time is the period associated with a subject. As mentioned above, there are five fundamental categories into which a subject or main class is divided. These are the five aspects of a subject. Dr Ranganathan named the five fundamental categories as PMEST, which is, Personality, Matter, Energy, Space and Time. A subject may have a Personality aspect, a Matter aspect, an Energy aspect, a Space aspect, and a Time aspect.

Isolates:

Several families of isolates can be recognised within the universe of isolates as sub universes. These include families of geographic isolates, featured time isolates, physiographical isolates, action isolates in general, property isolates in general, etc. Institution isolates can form components of several compound subjects going with each of all or almost all of the basic subjects. Each isolate in each such family is called a Common Isolate (CI). Schedules for each of the families of common isolates are given as a set by themselves in practically every scheme of classification, except LC and RIC, without any particular basic subject as the context.

Meaning of Common Isolates and their Need:

Ranganathan defines common isolates as "an isolate idea denoted by the same isolate term and represented by the same isolate number, quite irrespective of the compound subject in which it occurs, or the basic subject with which the compound subject goes". In DDC, it has been explained as "a special kind of patterned repetition. Any subject can be presented in several forms. It could be in the form of outline, history, theory or dictionary. It could also be in the form of a periodical or a handbook. It could as well be a presentation of how to study or teach that subject. These common forms and modes of presentation are called standard subdivisions. It has been found that certain kinds of concepts keep recurring and may be found in many subjects, e.g., proceedings, periodical, dictionary or encyclopaedia. These are all referred to as forms of presentation. Publications like Journal of Economics,

Encyclopaedia of Philosophy and Proceedings of All India Library Conference have their own subjects. All these subjects, however, are presented in particular forms. The forms involved here such as journal, encyclopaedia and conference proceedings are commonly referred to as outer forms. There are inner forms also, i.e., forms of approach to the subject. For example, theory, study and teaching, history and biography are various approaches to the subject and they are known as inner forms. We also find that subjects are treated in the historical and geographical contexts, which are usually called by the terms time and space respectively. Thus, inner and outer forms of presentation and historical and geographical treatment are features common to all or most subjects. They, therefore, recur throughout the scheme of classification. In library classification, such recurring concepts are standardised. This standardisation results in economy of size, as it restricts the length of the schedules in a scheme by listing these common features only once. Incidentally, standardisation also lends mnemonic value to the recurring concepts, as they are consistently expressed by the same set of symbols. Hence, in a scheme of classification, separate tables are provided for common isolates and directions are given for their application.

History of Common Isolates:

There are several things which go to the credit of Melvil Dewey. The concept of common isolates is one of them. In the beginning he called them form divisions. They were first introduced in the second edition of DDC brought out in 1885. Since then they have undergone several changes. The name form divisions continued up to the twelfth edition of DDC published in 1922. This name was changed to common subdivisions in the thirteenth edition appearing in 1932. These common subdivisions were listed under three different categories, viz., miscellaneous common subdivisions, viewpoints and form divisions. This whole set reappeared as just form divisions in the fifteenth and sixteenth editions and was renamed as standard subdivisions in the seventeenth edition. The seventeenth edition also identified space and time isolates as common isolates and listed them as such. Until the publication of the seventeenth edition, the history schedule had been used for space isolates. In UDC, common isolates are called auxiliary subdivisions. Broadly, there are twotypes of auxiliaries in use in UDC: common and special. Auxiliaries of form in UDC are like the standard subdivisions of DDC. Space and time isolates are treated as common auxiliaries and listed separately. The use of auxiliaries in UDC is an important aspect in number building. In the first edition of CC, there were three different schedules for common subdivisions of which space and time were two. The number of common subdivisions was small initially. It

was only in the fourth edition of CC that these were recognised as anteriorising and posteriorising common subdivisions. In the fifth edition, they were named as common isolates. After several changes through successive editions an exhaustive list of common isolates has emerged in the seventh edition of CC.

Kinds of common isolates:

According to the definition of the term " Common Isolate Idea" the different kinds of common isolates include language isolate ideas, time isolate ideas, space isolate ideas and anteriorising common isolate ideas. There can also be common personality isolate ideas, common matter isolate ideas, and common energy isolate ideas. It may be noted that among the manifestations of the Fundamental Categories Energy, and Matter, some will be special isolate ideas and some others will be common isolate ideas. The matter common isolate ideas consist of properties and values and not of materials. However, these common property isolates and energy common isolate ideas too need enumeration. Further, it is found that energy common isolate term and matter common isolate terms are often found coalesced into a single term in the documents; one has to separate them. Also, one and the same common isolate idea is not always denoted by the same term at all times; their reduction to a single term is time-consuming.

Auxiliary Tables and Devices:

The DDC started as a purely enumerative classification scheme listing all known basic and compound subjects. Gradually provisions for synthesis of Class Numbers were introduced to cope with the turbulently expanding universe of knowledge throwing forth extremely complex and compound subjects. One provision is to extend any number from any whole or part number from the Schedules by the add-to device. The other provision is to extend a number from the Schedules to form a number from separate Tables now given in Volume 1. Table 1 was introduced in the 2nd edition (1885). Table2 "Areas" was separately listed in the 17th edition (1965), and the last five Tables were introduced for the first time in the 18th edition (1971). These are Auxiliary Tables. It means, these are peripheral or non-essential Tables required only for depth classification. In other words, these are supplementary to the Schedules. These numbers are never used alone. For small libraries desiring broader Class Numbers these may not be used. Their use is optional.

Facet analysis:

Facet analysis as developed by Ranganathan is at the core of CC philosophy and methods. Class numbers for compound or complex subjects are not listed readymade. These have to be synthesized, or tailor-made, on the basis of the specific subject of the document. Ranganathan has given eight standard and interlocking steps to turn a raw title (as it appears on the document) into a coextensive class number based on the subject content and form of the document (Ranganathan 1987, 14-18). First of all, the specific subject of a document has to be determined. Ranganathan (1967a, 174) defines the specific subject of a document as the one whose extension and intension are square with its subject content, but does not outline practical procedure for its determination. Ranganathan calls it an intuitive or trial-and-error act for which there can be no specific rules. Indeed, it requires flair, and is learned continuously from experience. Nevertheless, a specific subject is to be determined from the title, subtitle, preface, table of contents, or even by reading the text, as when applying other knowledge organization systems (Koford 2017, 10). The raw title may be augmented by key words or phrases, if necessary, to fully indicate the specific subject of the document.

Next, the subject proper must be separated from the common isolates, which represent the tangible bibliographic elements of the document, or viewpoint of the author. Then the main class in which the specific subject falls is determined. Main classes and other basic classes are postulated by the system — these are the givens, not to be challenged by a classifier. Ranganathan postulates that every subject belongs to one and only one basic subject, which forms the first facet (Ranganathan 1960, Sec. 12, p. 1.42). Then starts the facet analysis per se into PMEST categories. The system suggests identification and separation of the categories in a subject in the order from [T] to [P], moving from the easiest category to the most elusive one. Broader categories are further resolved into specific facets.

Categories tend to evade definition. Their nature is somewhat elusive, though not metaphysical. These are still postulated and require much experience and flair to recognize them. For example, the personality category occurs in all the main classes, yet it is difficult to say what in general it is. The nature or constituents of categories vary from main class to main class. Their deceptive nature is clear from the fact that what had been the energy category in the fourth to sixth editions became, all of a sudden, the matter category in the seventh edition. At times it is utterly confusing to categorize an entity clearly. For example, in the class music, musical instruments such as guitar, drum, flute, etc., are designated as matter category, so are books and other documents in library science. Therefore, if something puzzles us, the only solace seems to acquiesce in the way desired by Ranganathan. The

Postulate of Impersonation of categories adds to the confusion—that is, a category may masquerade as some other category, e.g., a country is [P] in N Fine arts, V History and Z Law, but [S] in other social sciences. Also the context changes the category: Gold is [M] in numismatics but [P] in E Chemistry and HZ Mineralogy. In practical classification we start with identifying [T] and come down to [P] via [S], [E] and [M]. Time indicated by the apostrophe, is chronological, diurnal, or seasonal. Its examples are twentieth century, medieval period, summer season, or morning time, etc. Space indicated by a dot is the manifestation of geographical and political areas or population clusters, for example, Asia, London, French speaking countries, NATO, G8, hilly or desert areas, Iberian Peninsula, or Colorado valley. Energy, indicated by a colon, manifests actions, activities, processes, and problems. For example, treatment, storage, diseases, teaching, management, or grammar etc. are instances of energy. Earlier [M] was confined to the material of the entity, such as wooden chairs, marble sculpture, or gold coins. In the latest edition Ranganathan has widened the scope of matter by recognizing three variants of this category:

Matter-Property [M-P]

Matter-Method [M-M]

Matter-Material [M-Mt]

For all three the indicator symbol is ; semicolon. Of all the fundamental categories, personality [P] is the most concrete, but, paradoxically, the most difficult to recognize. Like human personality it is a complex entity and thus elusive. Ranganathan recommended the Residual Method to spot it in the facet analysis of a subject. It means that after identifying [T], [S], [E], and [M], categories, if anything still remains in the residue, then it might be personality — as a corollary of the "five and only five fundamental categories". But this method does not work all the time, especially when there are more facets than categories. M.A. Gopinath (1985) later maintained that the residual method was no longer necessary for this purpose. Personality is incarnate in persons (individuals or groups), communities, institutions, animal and plant families, body organs, chemical elements, agricultural products, languages, religions, art styles, political systems or ideologies, laws and the like. It is indicated by a comma.

Postulate pertaining to the Fundamental Categories:

According to this postulate "There are five and only five fundamental categories -viz., Time, Space, Energy, Matter and Personality." Explaining these, Ranganathan emphasises that these terms and the ideas denoted by them belong strictly to the context of the discipline concerned. Their significance, in our context, can be seen only in the context of the discipline concerned. This set of FC is, for brevity, denoted by the initionym PMEST. After identifying basic subjects, the analysis of isolate ideas going with basic classes has also to be done in a systematic and logical way to produce the desired result. An examination of subjects will reveal that every subject has its different aspects and together all these present a coherent account of the subject. For example, consider the following six terms in the subject of chemistry:

1. Alcohol 1. Substance

2. Liquid 2. State

3. Volatility 3. Property

4. combustion 4. Reaction

5. Analysis 5. Operation

6. Burette 6. Device for

It can be seen that each of the isolate terms in the left column belongs to a corresponding category in the right column. Here, substance means all substances and state mean all states. It, therefore, follows that each of the above terms is a category of ideas and can be regarded as a facet of the subject chemistry. Indeed we can discern this type of organisation of ideas in any subject. Table 1 illustrates this. This table lists some basic subjects and the type of facets that go with each of them respectively. While designing Colon Classification, Ranganathan discerned that although different subjects have facets special to them, there is an underlying unity of ideas when these facets are examined in depth. In each one of the subjects, there is a core set of ideas that are central to every aspect of the study of that subject. This underlying of ideas led Ranganathan to postulate the Fundamental Categories.

Phase relation:

A phase relation is the assembling together of two or more of

- ➢ Subjects (Basic or Compound)
- ➢ Isolate ideas (iii one and the same facet, or isolate ideas in one and the same array).

Assembling is done to express one or the other of possible relations between the components of the assembly. The result is a complex subject, complex isolate idea, or a complex array isolate idea, as the case may be. Each component in the assembly, in its turn, is called a "phase". They are called "phase 1" and "phase 2" as determined by their sequence in the assemblage.

Types of Phase Relation:

There are three types of phase relation. The relation may be between

i) Two or more subjects, known as Inter-Subject Phase Relation;

ii) Two or more isolates within one and-die same schedule of facet isolates, known as Intra-Facet Phase Relation;

iii) Two or more isolates within one and the same array of isolates, known as Intra Array" Phase Relation.

Inter-Subject Phase Relation:

In inter-subject phase relation, we notice an interaction between two subjects. Consider, for example, the following titles:

Sociology for economists

Statistical analysis in library management

Weather forecasting for the cultivation of the rice crop

In the first example, two main classes are involved; ~ sociology and economics. The specific: subject of this title is sociology, expounded to suit the special needs of economists. In the second example, the statistical analysis is a tool subject used in managing libraries. Here, the two subjects involved are library science and statistics. 'The two compound subjects in the third example are weather forecasting from meteorology and rice cultivation from agriculture.

Intra-Facet Phase Relation:

In intra-facet phase relation, we see two isolate ideas of the same facet interact to form, a complex subject,

For example:

Comparative study of Buddhism and Jainism

Difference between democracy and oligarchy

Influence of aristocracy on rural folks

In the first example, the comparative study, is between two religious faiths belonging to the facet religion. In the second, the study is between two isolates of the same facet type of state in political science. In the third example, what is studied is the influence of aristocracy on rural people.

Both these isolates belong to the same facet social groups in sociology.

Intra-Array Phase Relation:

In intra-array phase relation isolate ideas belonging to the same array of a facet are ina relation with each other. Complex subjects of this type are illustrated below.

1) Comparison of rural and, urban life

2) Difference between laws relating to dacoit and theft

3) The relationship between politically handicapped and socially handicapped persons in psychology

Review questions:

1. What do you know about the contributions of Dr Ranganathan?

2. What are the five fundamental categories?

3. Define PMEST.

4. What are the types of phase relations?

5. Write a short note on intra-array relations.

Reference:

Krishan Kumar. Theory of classification. New Delhi: Vikas publishing House, 1979.

Ranganathan, S.R. (1967). Prolegomena to Library Classification. 3rd ed. Bangalore: Sarada Ranganathan Endowment for Library Science.

Satija, M.P. and Agrawal, S.P. (1996). Book Number- Some Indian Methods. 2nd.ed. New Delhi: Reliance Publishing

Srivatsava, AP - Theory of knowledge classification in libraries, New Delhi, Lakshmi Book Store, 1964

UNIT – 4

PRINCIPLES OF FACET SEQUENCE

Objectives:

- ❖ To know about a several principles
- ❖ To expand the knowledge on different devices
- ❖ Learning about chronological devices and telescoping of array

Introduction:

A facet sequence is the order of the isolate facets in a compound subject. A subject may have more than one isolate facets, then there arises the conflict of their place facet sequence. For example, if a subject has Personality, Matter and Time facets. Then which facet should be the first facet? Should it be Time facet or Matter facet or Personality facet? Every facet seems to be equally important, then how to resolve the problem relating to their order? It in view of this the devisor of a classification scheme should define the order of the facets. Ranganathan prescribed certain postulates and principles for facet sequence in the following sections we will learn about these postulates and principles.

Wall-picture principle:

If two facets A and B of a subject are such that the concept behind B will not be operative unless the concept behind A is conceded, even as a mural picture is not possible unless the wall exists to draw upon, then the facet A should preceded the facet B.

1. In "Cure of Disease" the concept behind the term 'Cure' is not operative unless the concept behind the term 'Disease' is conceded. Therefore, when expressed in transformed skeleton form, we shall have 'Disease. Cure'. In this case, the application of the Wall-Picture Principle has determined that the Round to which the concept 'Disease' should be assigned as the one preceding the Energy Facet 'Cure'.

2. In "Prevention of Disease" also, the concept behind the term 'Prevention' is not operative unless the concept behind the term 'Disease' is conceded. Therefore, when expressed in transformed skeleton form, we shall have 'Disease. Prevention'. Thus, the application of the Wall-Picture Principle has determined that the Round to which the concept 'Disease 'should be assigned as the one preceding the Energy Facet 'Prevention'.

3. A comparison of examples 1 and 2 leads to an important warning in applying the Wall Picture Principle. In example 1, 'Disease' actually comes in before 'Cure' begins. But in example 2, 'Disease' does not come in at all. Indeed, 'Prevention' is to secure that it does not come. In the former the concept as well as what is conceived are conceded before 'Cure' begins. In the latter, the concept 'Disease' alone is conceded, but not 'Disease 'itself, before 'Prevention' begins. Thus, in applying the Wall Picture Principle it is only the concept that should be conceded, but not the correlate of the concept existing outside the mind.

4. In "President of India", the concept behind the term 'President' is not operative unless the concept behind the term 'India' is conceded. Therefore, when expressed in transformed skeleton form, we shall have 'India. President'. In this case, the application of the Wall picture Principle has determined the respective Levels to which the concepts 'India' and 'President' should be assigned.

5. Consider "Release of Contract in India". The concept behind the term 'Release' is not operative unless the concept behind the term 'Contract' is conceded. Further, the concept behind the term 'Contract' is not operative unless the concept behind the term 'India' is conceded. Therefore, when expressed in a transformed skeleton form, we shall have 'India. Contract Release'. In this case, the application of the Wall-Picture Principle has determined the respective Levels to which the concepts 'India', 'Contract' and Release 'should be assigned.

6. Consider "Hamlet by Shakespeare, the English Dramatist". The concept behind the term 'Hamlet' is not operative unless the concept behind the term 'Shakespeare' is conceded. Again, the concept behind the term 'Shakespeare' is not operative, unless the concept behind the term 'Drama' is conceded. So also, the concept behind the term 'Drama' is not operative unless the concept behind the term 'English' is conceded. Therefore, when expressed in transformed skeleton form, we shall have 'English. Drama. Shakespeare. Hamlet'. In this case, the application of the Wall-Picture Principle has determined the respective Levels to which the concepts 'English', 'Drama', 'Shakespeare', and 'Hamlet 'should be assigned.

7. Supplementary to Postulates. The Wall-Picture Principle and the Postulates for Facet Sequence will produce the same result wherever they are both applicable. In those cases, we need not invoke the aid of the Wall-Picture Principle. But in the examples given above, the Postulates by themselves cannot determine the Round and the Levels indicated. Thus, the use of the Wall-Picture Principle is supplementary to the use of the Postulates. The former is more versatile than the latter.

Whole-Organ Principle:

If, in a subject, facet B is an organ of facet A, then A should precede Consider "The Public Accounts Committee of the Parliament of India". The Facet 'Public Accounts Committee' is an organ of the facet 'Parliament'. The facet 'Parliament 'itself is an organ of 'India', when expressed in a transformed skeleton form, we shall have 'India. Parliament. Public Accounts Committee'. This sequence of Levels can also be inferred directly from the Wall-Picture Principle. However, the Levels shown for a subject in Law, and the Levels shown for a subject in Literature, are not in the relation of 'Whole' and 'Organ'. Therefore, those Levels can be inferred only by directly invoking the Wall-Picture Principle.

Examples:

1. Roots of Creepers. In this subject, Creeper are the plants (the Whole) and Roots are their parts (the Organs). Now, how can we concede the concept behind Roots without conceding the concept behind the 8Creepers9? When we arrange them we shall have Creepers (Roots).

2. Lungs of birds. In this subject, Birds are the Whole and Lungs are their parts (the Organs). Now, how can we concede the concept behind 8 Lungs without conceding the concept behind the Birds? When we arrange them we shall have birds (Lungs).

Cow-Calf Principle:

If a facet A and another facet B belonging to the same subject are not to be separated though they are distinct from each other and thus separable, A and B should be kept together in the same Round, even as a milk cow and its unweaned calf are not separately sold out though they are distinct entities and thus separable, but are kept together in possession of the same owner. Consider "Enforcement of the Functions of the President of India". Here, the three facets 'India', 'President', and 'Functions' are not to be separated and put into different Rounds, although they are separable. They should all be put together in Round 1 that is, before the Energy Facet, 'Enforcement' or after it. We cannot put any one of them in Round1 and the other two in Round 2. The Cow-Calf Principle determines only that all the three facets should be put in one and the same Round. To decide which Round it should be, we should invoke the direct aid of Wall-Picture Principle. This Principle would definitely assign them to Round 1. Therefore, when expressed in transformed skeleton form, we shall have 'India. President. Function. Enforcement'. We can also get the same result by repeated application of the Wall-Picture Principle.

Act and-Action-Actor-Tool Principle:

If, in a subject, facet B denotes action on facet A by facet C, with facet D as the tool, then the four facets should be arranged in the sequence A, B, C, Consider "Charkha Cotton Spinning by Girls". (Charkha is a simple spinning instrument revived and brought into great prominence by Mahatma Gandhi during the days of Freedom Movement.) Here, the Action is 'Spinning'; the Act and is 'Cotton'; the Actor is 'Girls'; and the Tool is 'Charkha'. Therefore, when expressed in transformed skeleton form, we shall have 'Cotton. Spinning. Girls. Charkha'. This result can also be got by the repeated application of the Wall-Picture Principle.

Detection of Fallacy 1

Even before the Dorking Period, it had been recognised that a class formed of some whole entities of a universe should be distinguished from a class formed of some organs of remove 1 of a typical whole entity of the universe. It was further recognised that these two should be treated as successive levels of facets within a Round. Experience with this concept has been largely confined to Personality Facet. It is improper to treat different isolates formed of whole entities on the basis of different First Characteristics as belonging to different levels. However, in some cases they were treated as if they belonged to two different levels. This happened-particularly when the isolates in array of order 1 of a facet were Quasi Isolates-that

is characteristics on the basis of which the entities are to be classified. For example, the Systems and the Specials in Medicine have been treated as different levels of Personality Facet. This is evidenced from the fact that the connecting symbol comma (,) has been prescribed for insertion between the System Isolate Number and the Specials Isolate Number. This error was detected in a discussion in the DRTC class in November 1963. The correct connecting symbol should be hyphen (-). In the Idea Plane, this means that it is a case of superimposition of two isolates in one and the same facet.

Detection of Fallacy 2

Matter as an attribute of a Personality-say of a commodity-should be treated only as a characteristic for forming classes of the Commodity. In other words, in this context Matter will be a first Quasi Isolate used in deriving classes of Whole Commodities. It is not proper to regard Matter as a matter Facet in this context. It can be treated as Matter Facet if and only if the subject of study is the Matter of which the commodity is made and not the commodity itself. But this difference was recognised only in November 1963.It was in a DRTC class. Prior to that the fallacy involved in this has been persisting all along. For example, the number for "Plastic DuPont Tube' [4] has been given as 2D; F52.To put it in another way, 'Plastic is only a qualifier in this context-a qualifier of the Personality Isolate Tube-and not Matter qua Matter.

Combination of the Two Fallacies

The above-mentioned two fallacies have also been occurring together in the past.

Concept of Integrative Levels

Some thought has been turned on the usefulness of the concept of Integrative Levels. The incidence of this concept is evident in the schedule of the main classes of CC. It is my feeling that this concept may not be of much help in a deeper level.

Achievements in Notational Plane:

Non-Structural Notation:

"Non-structural notation' and "Non-hierarchical Notation" have been experimented upon to a considerable extent in UK. Such a notation is based on a theory not accepting the Canon of Expressiveness though accepting the Canon of Coexistensiveness. Perhaps, the time has come to evaluate this concept critically.7.6.2 Interpolation within an Array Till now we had

no method of interpolating a co-ordinate isolate number within an array except by the method of gaps which is a very weak method. The concept of Emptying Digit postulated in 1962 has provided a neat solution. One example: Consider the following three foci in the array of Order 1.

K Zoology

 KX Animal husbandry

 L Medicine

This is no doubt a helpful sequence. Originally, only the first and the third foci were scheduled. The second focus needs to be interpolated between them. It has been interpolated. The focal number is the digit-pair KX. Here X has Emptying Value-that is it empties the semantic richness of the preceding digit K but allows it to retain its ordinal value. This concept has added to the versatility of the notation of CC.

 Sector Analysis

A systematic study of zone analysis and of the different sectors falling within each zone was begun in 1963 at DRTC and completed in 1964. The sector notation has equipped CC with the power to implement the findings of the Idea Plane in respect of the Isolates of a Personality Facet likely to arise in subjects going with a Basic Class and-to demand classification on the basis of several characteristics-even as many as twenty. This was first sensed in 1963, but was brought into systematic use only in 1964

Design of Depth Classification:

LC and UDC:

The design of LC may be described as an ad hoc one made to suit the organisation of the collection in the Library of Congress. It was developed by a Committee. That means it was largely a product of collective intellection. It is not known whether the Committee had left any record of the principles by which it was guided either in fixing the sequence of classes in the Idea Plane or in implementing it in the Notational Plane. As already stated in Sec 4, the main contribution of UDC to design work is the grafting of three kinds of facets to the DC core. This should have been largely a matter of intuition. But the modification in the DC core itself, beginning with the PE notes and ending with the final result are entrusted to several Committees. Their work has to be largely an intellectual affair. The Committees are no doubt

guided by some principles. But they are mostly principles of procedure. They too are intellectual in; their nature. The' Starvation Principle' is an extreme example. According to it a digit left without literary warrant for a long time is used to represent some other new array-isolate-idea with a considerable literary warrant. This is equivalent to totally giving no weight whatever to the helpful sequence found in the Idea Plane. However devoid of the touch of intuition, such principles are necessary if work is to be done by several Committees. A fairly exhaustive account of these principles was given by Donker Duyvis during the Dorking Period in a series of papers entitled Policy of revision of the Universal Decimal Classification

DC, SC, and CC:

On the other hand the design of Dc, SC, and CC may be said to have drawn to an appreciable degree from intuition, though the work of giving the finish has been largely intellectual.

Scientific Method:

During the First Century of the Classification Era, a good number of schemes have come out. Their comparative study has enabled us to realise that the design of classification has entered the Spiral of Scientific Method. Each cycle in this spiral is made of work pertaining to the one quadrant of intuition and to the three quadrants of intellection. The work based on intuition gives the Canons of Classification, the Postulates for Classification, and the Principles for Facet Sequence and Isolate Sequence in an array. Work in the other three quadrants gives a methodology for the systematic design work to be done by intellection. This work can be done by a team of workers. After a struggle of over two decades, the discussion with the members of the DRTC in November 1963 broke through a barrier, as it were. This result has given a systematic methodology for the design of Schedules for Depth Classification. This break-through has opened the flood gates. Trial designs have been start.

Achievement in Schedule Building:

Demonstration Work:

Based on the above Methodology, for the Design of Depth Classification, tentative Schemes for the Classification of Production Engineering in respect of Screw, Nut, Bearings, Reciprocating Internal Combustion Engine, Gas Turbine Engine, Transistors, and Radar, and for the classification of Book Science and of the Pharmacology and Technology of Drugs, have been worked out so far. We have naturally to begin with easy-to-grasp subjects. Work

on the design of depth classification of each subject reveals some new guidance likely to be of use in more complex subjects.

Projects in Schedule Building:

Even before the Methodology was laid down, Schedules for the Faceted Classification have been built during the Dorking Period for a few subjects.

Telescoping:

Some experiments have been made during the period in building schedules with telescoped arrays and facets. A critical study of these experimental schedules may disclose some valuable principles for schedule building.7.8.4 Rider's International Classification. A new general classification produced in the Dorking Period is Rider's International Classification. But it is avowedly a scheme improvised for the classification of books in generalist collection with about 100,000 volumes, and not intended for the depth classification of micro-documents. Therefore, it makes no mark in the March of Classification in the first century of the Classification Era.

General versus Special Classification:

During the Dorking Period the theme "General versus Special Classification" has been kept alive in UK and USA. My feeling is that this antithesis is traceable to the absence of a good theory of classification during most of the first century of the Classification Era. During the last few years a theory has been taking shape. But due to lack of effective communication its deeper import has not yet permeated sufficiently. There still persist different ways of understanding the concepts, such as Fundamental Categories, Levels of Facets, Dimensions, and Parameters as used in the Schemes of Classification. The full potentiality of the concept of Phase Relation has not yet been explored. A reliable criterion about what should be recognised as a Basic Class has not yet been found out. The controversy about "General versus Special Classification "will disappear only when the theory of classification is fully developed and widely understood and accepted. The difficulty due to nebulousness about some of the basic concepts mentioned above is most pronounced in Sociology and in some of the other social sciences. Another factor contributing to the difficulty in this field stems from the looseness of the terminology current in the subjects concerned.

Achievement in Machinery for Search:

A considerable work is in progress for document retrieval by machinery in USSR, and perhaps in other countries. India has not done any work in this field. As stated in Sec72 work of electronic engineers and that of classificationists appear to have just begun to influence each other. The nearer they come, the more appreciative they become of each other's needs and difficulties, the more helpful will be the March of Classification. Elsinore Period: 1965-1975 The Elsinore Period covers the last eleven years of the First Century of the Classification Era. It lies entirely in the future. It is hazardous to assert anything about the probable happenings in the future in respect of any human activity whatever. The March of Classification is no exception to it. And yet, we may with some confidence peep into the immediate future of the next decade, subject to the risk of a highly improbable sudden mutation taking place in the social factors and in the mode of thinking of humanity, we can get a glimpse into the immediate future by projecting the achievements of the past. At any rate, we can say what we wish should happen. We can enumerate the work waiting to be done. We can outline a programme of work. Here is a programme under three heads:

1. Fundamental research;

2. Routine research; and

3. Organization

Postulational and systems approach:

Subject Representation:

Subject representation is the principal foundation on which fact organizations retrieve fact. The subject or idea content of the document can be represented since subject heading index word, class numbers, data buildings and other types of surrogates. This is to give access to fact in the fact organization. This representation of subjects is done through the procedure of analysis of the subject of document into its constituent units and assembling them in a preferred sequence or order. This procedure is equivalent to transforming the n-dimensional configuration of the subject into a linear configuration. In other languages, it is the procedure through which the dynamic, multi-dimensional and multifaceted knowledge since embodied in a document is s/ represented in a linear sequence. Obviously, this would involve the arrangement of that units of each subject belonging to a subject field and all subjects belonging subject meadows in the middle of themselves in a sequence helpful to the majority of users, keeping unvarying every immediate neighbourhood relation, in the middle of all the

subject while transforming or mapping the n dimensional configuration of subjects into a row. His representation is primarily concerned with analysing, identifying and on behalf of relation flanked by the components of the subject of a document. While Ranganathans style to the structuring of subjects is based on what the postulational style/way, there was another style based on the organization.

Postulational Style:

In arranging books on the shelves of a library, convenience needs that they should be arranged aloft a linear sequence. Since books trade with subjects, it follows that the physical limitation enforcing a linear arrangement of books enforces also a linear arrangement of subject but this creates troubles as subjects belong to a dynamic, ever-rising, multi-dimensional universe. In effect, it would mean that classification of subjects for arrangement in library amounts to mapping or transforming the organization of points marked out in multidimensional legroom into an organization of points beside a row. That is, the multidimensional legroom should be mapped beside one-dimensional legroom, a row for instance. Therefore, in library classification, the problem is to choose what should be kept unvarying in the classification of subjects. The question then is since to which of the subjects can have its immediate neighbourhood relation kept unvarying in the mapping, as an indefinitely big immediate neighbourhood dealings is possible. Therefore, mapping is a very matter. Dissimilar schemes have provided dissimilar solutions to this problem. The problem of mapping has been solved through Ranganathan through means of sure guidelines. This, he described since postulational style style to library classification, in which a set of postulates (guidelines) can be for offering an operational methodology in a given field. While this kind of postulational style was adopted in mathematical studies and other subjects like philosophy, Ranganathan used the postulations style extremely effectively in library and bibliographical classification. According to him a postulate is a report in relation to which we cannot exploit either of the epithets right or `wrong. We can only speak of a set of postulates since `helpful or `unhelpful. Therefore, postulates are sure assumptions, which are helpful in carrying out the procedure of classification of documents. The postulational style in library classification brings objectivity to the revise and practice of this discipline. It puts the revise and practice of library classification on a scientific foundation. Since a result of this style, the discipline of classification has become both simple and motivating. In information, Ranganathan calls practical classification based on postulates since classification without tears. On the other hand, classifications who designs and develops schemes of classification should foundation

his job on such a style to avoid pitfalls, this style also helps a classifier to avoid the hit-or-miss style to classification. Since a matter of information, the postulates of this style are helpful and useful for a comparison of the efficiency and. effectiveness of dissimilar schemes of classification.

Advantages:

Specifically speaking, the application of postulates in content analysis is extremely useful for arriving at a helpful order of the resulting thoughts. Few of the advantages in adopting the postulational style are: Application of postulates results in a constant sequence of thoughts which conform to a single recognizable pattern, Postulates give a matrix for the analysis of contents of documents and to a sure degree help mechanize the process, The framework resulting out of this matrix (arrangement of thoughts in lines and columns) gives flexibility to accommodate new concepts without disturbing the existing building of subject, i.e., it facilitates interpolation and extrapolation of thoughts/concepts appropriately, and Practical classification becomes methodical, bringing in a greater amount of consistency in classificatory process, although dissimilar persons may be involved in the job.

Application of Postulational Style:

Another precious characteristic of the postulational style is that it helps to clear fallacies likely to happen. In this way, one is not bound through any preconceived metaphysical or other thoughts and not even through factual experiences. Sure postulates are assumed and all the implications are worked out. Through varying the postulates, one can get dissimilar models. In other languages, this style sets up many models with many organizations of postulates since the foundation, quite unmindful of the models subsistence or otherwise within the realm of experience or facts. Then, one can choose the scrupulous model whose postulates are helpful in that universe. So, Ran and concludes through saying that classification too will gain in this efficiency if the postulational way is adopted. While charting the universe of knowledge, dissimilar schemes have followed dissimilar ways and styles. Ranganathan, on the foundation of sure assumptions, i.e., postulates, has preceded step through step to chart the universe of subjects methodically and scientifically.

Demonstration in Practical Classification:

The Common theory of classification guided through the postulates and principles enables the classifier to do practical classification easily without any difficulty. Essentially, practical

classification involves the identification of the specific subject embodied in the document and translating it into the class number. In other languages, the procedure of translation takes it from natural language into a classificatory language – that is, a language of ordinal numbers. Ranganathan felt that it is convenient to carry out the translation in eight successive steps and to verify the result in the final step through reverse translation. These steps are:

Step 0; RAW TITLE: The more or less expressive title of a-document either establishes on the title page or provided through the classifier in the case of a fanciful title.

Step 1: EXPRESSIVE TITLE: An expressive title which is also described full title is. one expressing all the facets/characteristics of a subject sheltered in the document.

Step 2: KERNEL TITLE: The title resulting from the expressive title through removing all the tools languages and changing each kernel word to its nominative singular form.

Step 3: EXAMINED TITLE: The title in kernel conditions with the respective symbols denoting the nature of its manifestation, i.e., each kernel word with the indication of the fundamental category to which it belongs.

Step. 4: TRANSFORMED TITLE: The title resulting from the examined title through rearranging the kernel conditions on the foundation of the postulates and principles governing their sequence.

Step 5: TITLE AVERAGE CONDITIONS: The title derived from the transformed title through replacing each average kernel word with its average word or equivalent average word since given in the Scheme for Classification.

Step 6: TITLE IN FOCAL NUMBERS: The title derived from the title in average conditions through replacing each average (kernel) word with the vital class number or isolate number, since the case may be, since given in the schedules of the preferred scheme for classification.

Step 7: CLASS NUMBER: The ordinal number derived from the title in focal number through replacing the symbol after each focal number through connecting the digit suitable to the succeeding regional number since prescribed in the rules of the preferred scheme for classification.

Step 8: VERIFICATION: The name of the subject arrived from the title at through translating the class number and checking for its equivalence with the raw/ expressive title.

Organizations Style:

While Ranganathans style to the structuring of subjects is based on the postulational style, Foskett and Heinalata Iyer individually have examined organizations style to subject structuring. Iyer argues that Ranganathans absolute syntax which gives a building is based on the categorization of concepts and that there are three methods of establishing relationships in the middle of them—reason-effect; probabilistic; and the third and mainly recent being organizations style which is concerned with the interaction of the organization with the habitation. This way of understanding is an analytico-synthetic one. It seems at the overall purpose governing the design and functions of an organization in order to explain its behaviour. The organizations style is hierarchic in nature and moves from the scrupulous to the common and also vice versa. Although synthesis cannot be separated from analysis and causality, it is dissimilar in its style. The purpose and its fulfilment are its primary concern. Obviously, then priorities in the fulfilment of its purpose becomes essential, Therefore, the representation of a organization according to its purposes, its environmental constraints, its actors, their objectives, the functions of the organization, and the sections that perform these functions take on a hierarchic form. A same row of thinking can be seen in Fosketts thoughts derived from Bertalanffys Common Organization Theory. The thought of an organization is any entity whose features are recognized since the nature of its sections and the dealings flanked by them can be seen in the contribution of Bertalanffy, Kenneth Moulding and Ervin Laszlo. For instance, a bicycle is more than a heap of bits of metal, rubber, plastic and thus on; the relationships set up flanked by these sections changes the heap into the feature appearance of a bicycle and enables it to perform the feature function of bicycle through converting the rotary motion of the pedals into the horizontal motion of the bicycle and the passenger beside the road. A committee is more than a collection of single individuals. Further, an organization may also be a constituent section of another organization of a higher order of organization. Therefore, a word is an organization of letters organized in a sure method. A sentence is an organization of languages organized in a scrupulous sequence, and a paragraph is an organization of sentences. A book is an organization of paragraphs and a library is an organization of books. Therefore, we have in the real world, which gives the subjects for documentation, an organization of organizations in an order of rising complexity of sections and dealings. Applying this concept to schemes of classification will produce on ordered organization which strongly resembles the scheme produced in outline through Dhalberg. Foskett, based on his research, believes that there is plenty of proof to illustrate that we cover the whole knowledge through relating subject analysis, or classification, to a common theory of organizations.

Organizations Style to Fundamental Categories:

In a common classification for documentation any organization can be named since a vital subject, in DRTC conditions, because organizations also can be examined through facet analysis. The organization itself, measured since a whole, becomes the Personality. Its constituent sections and the dealings flanked by them become the Matter and Power, which Foskett calls Power A. The dealings of the organization with its habitation are all procedures, which he calls Power B. The other organizations in the habitation, which react with the original organization, are mediators or, in Ranganathans own conditions, Second Round Personality of course, one require not accept Ranganathans conditions. But, this has been done in order to show how appropriately the organizations theory fits the scheme of the greatest contributor to classification as Bliss and Dewey. Likewise, Iyer believes that any organization can be looked at in conditions of sections and units. She defines Personality in conditions of its unique regular and specified responses to its habitation, and these responses involve the properties of an individual. The properties transform or are made to transform due to external action in conditions of legroom and time; hence, the thought of property, action, legroom and time. The specific connotations of these embedded categories may he delineated further.

Practical Implications of Organizations Style:

The main purpose of any scheme of classification is to organize documents in a method that creates sense to specialists in each field. This requires not necessarily be a useful order, as one and the similar specialist may style the literature differently each time. Though, the order arrived at necessity create sense, i.e., the specialist necessity be able to recognize the foundation of the order. In other languages, while specialists seem at knowledge from the point of view of their own subject, librarians and fact professionals seem at classification from the perspectives of the whole universe of knowledge. Therefore the scheme for documentary classification, necessity is more than merely a collection of specialized schemes: this would not be an organization in itself, it would be no more than a heap of unrelated sections. The organizations theory, internal dealings flanked by the sections are essential if these sections are to have the organization of an entity capable of subsistence since an integral whole in a scrupulous habitation. In our context the habitation is the library, its documents and services. The aim of the librarian in classifying is to reflect and

demonstrate the order and harmony existing in the real world, the universe of nature, including the world of man.

Principles of helpful sequence:

To achieve a helpful sequence of entities in an array, Ranganathan formulated eight Principles of Helpful Sequence.

They are

- Principle of Later-in-Time
- Principle of Later-in-Development
- Principle of Spatial Contiguity
- Principles for Entities beside a Vertical Row:
- Principle of Bottom Upwards
- Principle of Top Downwards
- Principles for Entities beside a Horizontal Row:
- Principle of Left to Right
- Principle of Right to Left
- Principles of Entities beside a Circular Row:
- Principle of Clockwise Direction
- Principle of Counter-Clockwise Direction
- Principles for Entities beside extensive a Radial Row:
- Principle of Centre to Margin
- Principle of Margin to Centre
- Principle of Absent-from-Location
- Principles for Quantitative Measure
- Principle of Rising Quantity
- Principle of Decreasing Quantity
- Principle of Rising Complexity
- Principle of Canonical Sequence
- Principle of Literary Warrant
- Principle of Alphabetical Sequence

The Principles for Helpful Sequence are shown in the third level of the Normative Principles that deal with the details of the arrangement of the isolates in the schedules to be created by the division of subjects into sub-disciplines. These principles suggest that there should be

some guiding principle to implement the "Canon of Helpful Sequence. "The 12 main Principles for Helpful Sequence with their manifestations as described by Ranganathan (1967) and Parkhi (1972) are given in Table 2. One and more Principles can be applied to a Discipline or to Sub-disciplines. For example, in Botany the Principle of Later-in- Evolution is applied for deriving the species of plant kingdom (Taxonomy) and then taking a Plant as an entity; to arrange parts of a Plant, the Principle of Bottom-Upwards is applied. A parallel example is also found for the Agriculture Subject Schedule (J- Agriculture) in Colon Classification for the arrangement of parts of a Plant as a parallel to Utility Array. Similarly in Medicine, for the parts of the Human Body the Principle of Top-Downwards is used and for the Organs the Principle of Centre to Periphery is used. Principles go in consonance with domain specific and logical ideas, which has facilitated the arrangement of groups of entities in a discipline and helped in bringing chaos to order along a natural and logical thinking process as part of "Basic Laws of Thinking from the first level of Normative Principles (See Table1). It would also be presumed that without the guidance from the Principles for Helpful Sequence the arrangement of sub-disciplines in disciplines would have been too complex and tedious. Table 2 gives a set of such principles pronounced by Ranganathan in his theory with subject examples.

Name of the Principle	Subject Example
Principles for Chronology and Evolution a) Principle of Later in Time b) Principle of Later-in-Evolution	Religion Botany
Principles of Spatial Contiguity a) Principle of Spatial Contiguity b) Principle of Away from Position	Geography Astronomy - Planets
Principles for Entities along a Vertical Line a) Principle of Bottom-Upwards b) Principle of Top-Downward	Botany - Parts of a Plant (From Root to Fruit) Medicine- Parts of Human body (Starting from Head
Principles for Entities along a Horizontal Line a) Principle of Left-to-Right	Transportation – Highway Transportation – Highway

b) Principle of Right-to-Left	
Principles Involving "Front" and "Back" a) Principle of Front-to-Back b) Principle of Back-to-Front	Railway Train Time isolates - earliest to recent
Principles along the Circular Line a) Principle of Clockwise Direction b) Principle of Counter-Clockwise	Zodiacal Signs No. specific example at present. If warranted the Principle will be used
Principles for Entities along a Radial Line a) Principle of Periphery-to-Centre b) Principle of Centre-to-Periphery	Layers of Earth Medicine - Organs (Bone to Hair)
Principles Involving Quantity a) Principle of Increasing Quantity b) Principle of Decreasing Quantity	Mathematics – Geometry Library Science - Libraries
Principle of Increasing Complexity	Linguistics - Alphabet to Sentence
Principle of Canonical Sequence	Mathematics - Basic divisions of Mathematics
Principle of Literary Warrant	Agriculture: Arrangement of Crops
Principle of Alphabetical Sequence	Automobiles- Car Brands

Table 2

Observations:

Colon Classification is backed through a theoretical foundation for fixing the facet building of its schedules. While this theoretical foundation may be subjected to criticism, it is essential to have a theoretical foundation without which the order of arrangement of classes would suffer. Framing ad hoc rules for by facet analysis and synthesis, both DDC and UDC are not able to get a mainly desirable filiatory sequence of classes, The policy of DDC, while recognizing its weak building, is not to introduce any vital structural transforms which might endanger its exploit through many thousands of libraries throughout the world, but meet the problem through providing rules for facet analysis wherever necessary. UDC, having a greater facility for facet analysis and synthesis, suffers from its version of DDCs building which restricts its scope of the exploit of the facet principles of analysis and synthesis. In recent times there urbanized a generation gap in the middle of the three classification organizations. With DDC or UDC, it is not possible to create any drastic transform to meet the expanding demands of bibliographic classification. Future classification organizations

would benefit from Ranganathans contribution to theoretical base to library and bibliographic classification.

Vital Compound and Intricate Subjects:

It is useful to begin with the definitions of Vital Subject (BS), Compound Subject (CdS), and Intricate Subject (CxS) in order to get a clear notion of stage analysis. A Vital Subject is a subject which:

- Is enumerated in the schedule of BS;
- Cannot be expressed since the Compound Subject of any of the existing BS, i.e., a subject
- without any isolate thought since a component;
- Is evolved through one full cycle of the spiral of scientific way since propounded through
- Dr. S. R. Ranganathan. They also exhibit dissimilar manners of formation of subjects;
- Calls for schedules of special personality, matter and power isolates;
- Has little specialization-academic and/or professional segmentation.

The indicators for this are:

- o Subsistence of professional societies
- o Degree course
- o Periodical publications
- o Whole books on the subject

Primary Vital Subjects are the core frame for all other types of BS. Compound Subject (CdS) is a subject with a BS and one or more isolate thought (Isl) since components. e.g., Chemistry of alcohol-chemistry (BS),

- o Alcohol (IsI)
- o Morphology of flowering plants-botany (BS),
- o Flowering plants (IsI), and
- o Morphology (IsI).

Intricate Subject (CxS) is a subject shaped through a combination of two or more subjects—vital or compound.

e.g.

- o Common relation flanked by economics and sociology
- o Economics for statisticians
- o Economics convinced through political factors

Stage Relation:

A stage relation is the assembling jointly of two or more ofSubjects (Vital or Compound)Isolate thoughtsOne and the similar facet, or isolate thoughts in one and the similar array).Assembling is done to express one or the other of possible dealings flanked by the components ofthe assembly. The result is an intricate subject, intricate isolate thought, or an intricate arrayisolate thought, since the case may be.Each component in the assembly, in its turn, is described a stage. They are describedstage 1 and stage 2 since determined through their sequence in the assemblage.

Kinds of Stage Relation:

There are three kinds of stage relation. The relation may be flanked by two or more subjects, recognized since Inter-Subject Stage Relation; or Two or more isolates within one and-die similar schedule of facet isolates, recognized since Intra-Facet Stage Relation; or Two or more isolates within one and the similar array of isolates, recognized since Intra A Stage Relation. Inter-Subject Stage Relation In inter-subject stage relation, we notice an interaction flanked by two subjects. Believe, for instance, the following titles:

- o Sociology for economists
- o Statistical analysis in library management
- o Weather forecasting for the farming of the rice crop

In the first instance, two main classes are involved; sociology and economics. The specific: subject of this title is sociology, expounded to suit the special requires of economists. In the second instance, the statistical analysis is a tool subject used in managing libraries. Here, the two subjects involved are library science and statistics. The two compound subjects in the third instance are weather forecasting from meteorology and rice farming from agriculture.

Intra-Facet Stage Relation:

In intra-facet stage relation, we see two isolate thoughts of the similar facet interact to form, an intricate subject, For instance:

- o Relative revise of Buddhism and Jainism

- o Variation flanked by democracy and oligarchy
- o Power of aristocracy on rural folks

In the first instance, the relative revise is flanked by two religious faiths belonging to the facet religion. In the second, the revise is flanked by two isolates of the similar facet kind of state in political science.

In the third instance, what is studied is the power of aristocracy on rural people. Both these isolates belong to the similar facet social clusters in sociology.

Types of Stage Relation:

In colon Classification six types of Stage dealings have been recognized since given below with their indicator digits.

- o Common
- o Bias
- o Comparison
- o Variation
- o Tool
- o Power

Common Stage:

Common Stage Relation denotes a more or less complete relation flanked by the primary and secondary stages, viz., inter-subject, intra-facet or intra-array. The sequence of the stages is determined on the foundation of the sequence of classes given in the classification schedules of any of the schemes of classification. The sequence of the two stages is given according to Colon Classification. Relation flanked by Religion and Philosophy (Inter-subject) Religion—Philosophy (Sequence in CC) Q&a Relation flanked by anatomy and physiology.,(Intra-facet) According to CC, Anatomy would precede Physiology; hence the sequence of the two stages is since follows: Medicine, Anatomy, Physiology L;2&j3Relation flanked by Audio and Visual studying in Education. Here again, according to CC, Audio would precede Visual and hence, the sequence of the two stages is Education, Studying, Audio, Visual T;416&t7

Bias Stage:

The Bias Relation flanked by two subjects designates that the exposition of one subject (Stage 1) is biased towards another subject specialist (Stage 2). This means that the

exposition of a subject is specially attuned through the selection, arrangement, choice of illustrations, etc., of the topics since per requires of a specialist. Here, Stage 1 is recognized since Biased Stage and Stage 2Statistics for librarians: BT&b2Statistics for Engineers: BT&bD Statistics for Biologists: BT&bG

The sequence of the three subjects of the Biasing Stage is in accord with the CC. Thereseems to be no literary warrant to provide examples of intra-facet and intra-array dealings.Dewey Decimal Classification, for the first time in the 18th edition made provision for theexploit of stage relation. It is done through the Average Subdivision -024. The numbers for theabove subjects in DDC will be

Statistics for librarians: 310.24092

Statistics for engineers: 310.2462

Statistics for biologists: 310.24574

In UDC the connecting symbol for stage relation is colon though UDC does not create any variation flanked by stages of stage relation. For all kinds of relation there is only one connecting symbol. The numbers for the subject will be:

Statistics for librarians: 31:02

Statistics for Engineers: 31:62

Statistics for Biologists: 31:573

The sequence of the three subjects of the Biasing stage is in accord with the CC. Thereseems to be no literary warrant to provide examples of intra –facet and intra-array dealings.Comparison StageThis Stage Relation denotes cases where two subjects are compared. Believe thefollowing examples:

Comparison flanked by plants and animals (Inter-subject): Botany—Zoology (Sequencein CC) I&cKComparison flanked by morphology and physiology (Intra-facet): I;2&m3Relative psychology of man and woman (Intra-array): Psychology, Man, Woman(Sequence in CC) S,55&v6

Variation Stage:

This Stage Relation denotes cases of documents where the variation flanked by twosubjects is expounded. For instance:Variation flanked by political science and history (Inter-subject):

History—PoliticalScience (Since in CC) V&dWPsychological variation flanked by sick and abnormal persons (Intra-facet): Psychology,Sick, Abnormal (Since in CC) S, 4&m6Variation flanked by meditation and worship (Intra-array): Religion, Worship, Meditation(Since in CC) Q;413&w4

Tool Stage

This Stage Relation trades with cases of documents where one subject is used since a tool to expound the other. For instance: Literature Through Art: A New Style to French Literature (Inter-subject): O, 122&eNClassification since a tool to revise circulation service (Intra-facet): 2;8&p5Rural sociology since a tool to revise urban sociology (Intra-array): Y,342&x1This stage Relation has been recognized since one of the stage dealings to classify documents which display such dealings. This device, though calls for further investigation to assess its full implications. It is also referred to since Exposition Stage. Power of nourishment on education (Inter-subject): T&gL; 573Power of intellectuals on ruling classes (Intra-facet): Y, 417&r53Power of direct tax on indirect tax (Intra-array): X 72,01 &y2The sequence of the two stages in the two stages in the three examples is:

1. Education Nourishment
2. Ruling Classes Intellectuals
3. Indirect Tax Direct tax

The subject that is convinced is in the First Stage through the subject that influences. Thus distant, six types of stage dealings have been recognized. It is quite possible that some more may be encountered. The noteworthy point is that a way has already been provided, since in Colon Classification, which may be helpful for handling intricate subjects of the future. Such elaborate devices exist only in CC. UDC and DDC have not made provision to distinguish dissimilar kinds of dealings. Through UDC has provided a single connecting symbol for all kinds of relation, though, some in DDC we can recognize intra-facet relation like:

Foreign dealings flanked by India and UK = 327.54Q41

In this case India (54) and UK (41) are from the similar facet and hence can be stated since intra facet relation since suggested, create a relative revise of the Stage Relation in all the three schemes.

Knowledge Organization Systems:

The practical Library Classification schemes are the traditional and also most durable systems of KO. Bliss, in the titles of his two books, probably was the first to use the phrase "Knowledge Organisation" in relation to bibliographic classification. The lists of Knowledge Organization Systems (KOS) vary to some extent from author to author. The paper by Lei Zeng (2008) is used here as a basis for the enumeration of KOS. The types of KOS according to the complexity of their structures and major functions can be grouped and listed below:

✱ Term Lists

　· Lists (pick lists)

　· Dictionaries

　· Glossaries

　· Synonym Rings

　· Word Net

✱ Metadata-like Models

　· Authority Files

　· Directories

　· Gazetteers

✱ Classification and Categorization

　· Subject Headings

　· Classification and Categorization Schemes

　· Taxonomies

✱ Relationship Models

　· Thesauri

　· Semantic Networks/Maps

・Ontologies

Deducing KOS from Principles:

The application of the dynamic theory of library classification evolved by Ranganathan has been reflected in the study of Faceted Classification models and categories. This paper has ventured to use another normative principle of the theory "Principles for Helpful Sequence" to demonstrate their applications in the tools and components of KO viz. KOS. The core object of this paper therefore is to demonstrate how the Principles for Helpful Sequence can be employed to derive a helpful order in the tools for KOS such as Ontologies, Gazetteers, Taxonomies, Term Lists, and so on. This is probably a first attempt in this direction and has provided a superficial indication of their applications for further exploration.

a) On Ontologies

Among the above KOS tools the LIS is quite familiar with the majority of them and has been applying them effectively in the traditional and web-based knowledge organization of bibliographic records in libraries (Catalogue, OPAC) and in bibliographic databases (Bibliographies), Online databases, and in other sources of bibliographic records such as Abstracting and Indexing Services, and today even in the databases of electronic information resources. So the term Ontologies is somewhat unfamiliar and un-comprehended inits application in KOS. Therefore the term is explained in its nouveau context: "In philosophy ontology is a theory about the nature of (things) existence; of what type of things exist; Ontology as a discipline studies such theories. Artificial Intelligence (AI) and Web researchers have co-opted the term for their own jargon and for them Ontology is a document or a file that formally defines the relation among the terms. The most typical kind of ontology for the web has taxonomy (Web-pages) and a set of inference rules (In Expert Systems/AI)".For instance, Expert Systems which are by-products of AI consist of an inference engine which is built on a set of ontologies (inferring relationship among terms).It is obvious that most of the Principles for Helpful Sequence are built on relationships among different terms and concepts. A body of knowledge is based on conceptualization and the object concepts and other entities that are assumed to exist together inherently are in relationships among them that hold them together. Two examples in this context would illustrate the above intricate summations on the role of ontology in KOS. In the subject Medicine (in CC) the human body is divided into its component parts and is arranged on the "Principle of Top - Downwards" from head to toe. Here the terms and concepts are arranged

according to their inherent relations and to hold them together to conceive a body (Physical Appearance).Another example in the same subjects where the diseases are ordered follows as per the schema shown below:

Illustration - 1:

Disease> Organ (affected) Facet> Incident of Disease (Kind) > General/ Infection /Parasite /Poison/ Functional disorder/ Nutrition/ Structural/Foreign Matter/ Other

Here the body of knowledge of "Diseases" is presumably categorised based on the "Principle of Increasing Complexity" and also the "Principle of Literary Warrant.

" In other words, these principles would be under consideration for the future incidence of organizing diseases. The relationships between the Organ (Affected) and the kind of incidence of disease are nothing but ontologies. This can be illustrated by the example of a Disease like "Typhoid":

Illustration -II

TYPHOID >Intestine (organ affected) > (Incidence1) Infection>Bacterial (Incidence-2> Number of cases (Literary Warrant)

Taxonomies

Genealogy is a part of Taxonomies, and Genealogy is of ideas and objects. The best example in this context is the use of the "Principle of Later in Time." The first vacuum tube, the predecessor of the microprocessor, was invented by John Ambrose Fleming in 1904 and later it proceeded to the development of the Microprocessor. The genealogy of Vacuum Tube to Microprocessor with dates is presented in the following table.

Idea	Product	Person(s)	Year
Photoelectric Effect	Electric/Vacuum Tube	John Fleming	1904
Solid State or Semi-conductor	Triodes and Diodes	Bardeen, Brattain and Shockley	1947

device or / Silicon Chips			
Integrated Circuit	IC Chip	Kilby and Noyce	1958
Microprocessor (Intel- 4004)	Single Micro Chip	Intel (Faggin, Hoff and Mazor	1971

Gazetteers:

Gazetteers as the formal sources of geographic information have been in the list form and in a form giving a descriptive account of place names, their locations, latitudes and longitudes, and other related features. They also provide information on rivers, mountains, oceans, and other geophysical entities and concepts. Every Library Classification scheme since the time of DDC has a separate and exclusive scheme of classes for Geographical Isolates (as in CC) and Areas (as in DDC). So they have been an integral part of KOS and in particular of Library Classification Schemes. The maps, atlases, and encyclopaedias have been sources of Gazetteers apart from the independent Gazetteers of nations, like the Gazetteer of India. The scope of gazetteers ranges from the smallest geographical are as to international levels. In recent years Gazetteers have been regarded as indispensable tools with the advent of Geographical Information Systems (GIS) and the Global Positional System (GPS). There are new courses instituted under and designated as Geoinformatics. This shows the importance of Gazetteers as KOS. The utility of Gazetteers in Georeferencing is well documented and substantially highlighted by Buchel and Hill (2010).The "Principle of Spatial Contiguity" specifies the mode of developing a helpful order for Geographical entities and concepts. The Principle states "If the isolates (Subdivisions) in a schedule occur continuously in space— roughly along a unidirectional (North South, East-West) line or radial line or a circle they should be arranged in a parallel spatial sequence, except for when any other overwhelming consideration rules it out.

Lists, Authority Files, Subject Headings:

This category of KOS consists of quite a large number of tools which are mainly the vocabulary tools of languages. In this group the authority files need some special attention as building authority files is a continuous and never ending process. The authority files may be for terms, concepts, names of places, or names of persons, and they are the tools used both in KO and in KM in particular in Content Management Systems. The metadata is one of the

authority files which are used in KM and CMS. Two Principles, "Principle of Literary Warrant and Principle of Alphabetical Sequence" are the ones which provide guidance for the compilation and consolidation of term lists by gathering new terms to update tools like glossaries and dictionaries. It is stated that the alphabetical sequence eliminates all ambiguities in ordering the concepts and terms. The Authority Files are associated with the vocabularies to update them. When new terms are identified, old terms are replaced with new terms giving more comprehensive scope and coverage.

For example, Ecology and Environment, Genetics — Microbiology and Biotechnology are terms with inclusive meaning and definitions of old concepts. So the principle of literary warrant governs the socialization of such new terms. Normally the arrangement of Authority files follows the alphabetical sequence and the Principle of Alphabetical Sequence is applied here for the arrangement of terms, particularly in Subject Headings.

Other KOS Tools and Principles:

Among the given Principles the utility of the majority of them is presented with suitable examples from KOS and some illustrations too. The other KOS systems like Thesaurus, Subject Headings, Semantic networks, and Classification and Categorization schemes have been formally well articulated with their long term use in the organization, representation, and search and retrieval process. In fact the Classification schemes have a very basic foundation of knowledge organization and have demonstrated their predominance in them too. A Thesaurus for example shows some very concrete relations among terms — equivalent, associative, and hierarchical. These relationships have been part of organizing vocabularies in the Vocabulary Control Devices per se the Thesaurus, which is one of the predominantly researched areas in Semantic Web. A beginning is made to venture on a new application of a dynamic theory of library classification and attempts by researchers may be made to carry out further explorations in this direction.

Devices in idea and notational plane:

Facet Device (Idea Plane) - Device for sharpening a host focus in the form of a class by the addition of new facet(s).

Facet Device (Notational Plane) - Device of prefixing a connecting symbol to an isolate number within a class number in order to implement the facet device of the idea plane.

Phase Device (Idea Plane) -Device for sharpening a host focus by the addition of a focus of the same species as a second phase (as an additional phase).

Phase Device (Notational Plane) - Device of prefixing a connecting symbol to a digit representing a phase relation in the idea plane.

Inter-Class Phase Device (Idea Plane) - Device for sharpening a host class by the addition of another ~.:ass as an additional phase.

Inter-Class Phase Device (Notational Plane) - Device of prefixing a connecting symbol to a digit representing a phase relation in the idea plane.

Example: In CC, in the class number VOW (=geopolitics= history influenced by geographical factors), V is first phase, 0 is the connecting symbol for phase, g is the phase relation known as 'influencing' and W is the second phase.

Intra-Facet Phase Device (Idea Plane) -Device for sharpening a host isolate by the addition of another isolate in the same facet as additional phase.

Intra-Facet Phase Device (Notational Plane) - Device of prefixing a connecting symbol to a digit representing intra-facet phase relation in the idea plane.

Example:: In CC, in the class number X: 5*2Oj73 (=commercial relation between India and USA), in the space facet 2 is the first phase, 0 is connecting symbol, j is the phase relation known as 'general' and 73 is the second phase.

Intra-Array Phase Device (Idea Plane) -Device for sharpening an array-isolate by the addition of another array isolate in the same array as additional phase.

Intra-Array Phase Device (Notational Plant) –Device of prefixing a connecting symbol to a digit representing intra array phase relation in the idea plane.

Example: In CC, in the class number Y310t5 (=comparison of rural and urban people), Y is the first phase, 0 is the connecting symbol, t is the phase relation known as 'comparison' and 5 is the second phase.

Chronological Device (Idea Plane) - Device for forming an isolate or sharpening a host focus in the form of an isolate or an array-isolate with the help of chronological characteristic.

NOTE - Chronological characteristic with the time expressed in accordance with international current usage may be, such as, the epoch of birth or origin or first investigation or initiation, or commencement or occurrence or any other relevant event.

Chronological Device (Notational Plane) - Device of using a chronological number as an isolate number or adding to a host isolate number a chronological number to implement the chronological device of the idea plane.

Geographical Device (Idea Plane) - Device for forming an isolate or sharpening a host focus in the form of an isolate or an array-isolate with the help of geographical characteristic.

NOTE - Geographical characteristic may be, such as, place of origin or habitation or prevalence or any other relevant geographical association.

Geographical Device (Notational Plane) - Device of using geographical number or adding to a host isolate number a geographical number to implement the geographical device of the idea plane. (CC, s 684).

Subject Device (Idea Plane) - Device for forming an isolate or sharpening a host focus in the form of an isolate or an array-isolate with the help of subject characteristic.

Subject Device (Notational Plane) - Device of using class number as an isolate number or adding to a host isolate number, a class number to implement the subject device of the idea plane. The class number used in implementing subject device should be taken as fused and treated as if it were a single digit by enclosing it within brackets or using any equivalent device.

Packet Device - Notational mechanism used in subject device so that the subject number concerned can be taken as fused and treated as if it were a single digit.

Alphabetical Device (Idea Plane)-Device for forming an isolate or sharpening a host focus in the form of an isolate or array-isolate with the help of the name characteristic.

NOTE - The name used should be one in international usage.

Alphabetical Device (Notational Plane) - Device of using the first or the first two, or the first three, etc, initial letters of the international name of an isolate term or adding similarly to a host number, to implement the alphabetical device of the idea plane. Alphabetical part should be taken as fused and treated as if it were a single digit.

Enumeration Device (Idea Plane) - Device for forming the classes or the isolates in a facet or the array-isolates in an array by directly enumerating them.

Enumeration Device (Notational Plane) -Device of using successive digits for forming the classes or the isolates in a facet or the array-isolate in an array by directly enumerating them.

Super-Imposition Device (Idea Plane) - Device for sharpening a focus in the form of an isolate by restricting its extension to the portion of it falling within another isolate of the same facet.

Alternate Term

Auto-Bias Device - (Obsolete.)

Super-Imposition Device (Notational Plane) - Device of prefixing a connecting symbol between the isolate numbers representing the isolates involved in the super-imposition device in the idea plane. In CC the connecting digit for super-imposition device is a hyphen (-).

Gap Device - Device of leaving a finite gap between the numbers representing two array-isolate ideas appearing to be consecutive at the time of the enumeration, in order to accommodate new isolates, as and when they arise, claiming their filiatory pIaces within that gap.

NOTE -In LC, this device is extensively used.

Interpolation Device - Device of interpolating between two consecutive digits of one species a digit of another species and defining its ordinal value accordingly.

Example: CC uses this device sparingly for this purpose. Sector Device-Device of using a sectorising digit, that is, to form another sector or stretch of co-ordinate digits by adding to it the successive digits of the species and deeming the resulting double-digit numbers as if fused into a single digit, and repeating this process to form successive sectors.

NOTE -CC had adopted this de-vice from the beginning consciously. It has now been adopted by FID or UDC.

Group Notation Device - Device of using ordinal decimal fraction numbers of two or more digits (but the same number of significant digits) to represent a number of co-ordinate isolates or array-isolates, when they are too many to be represented economically by sector device alone.

NOTE -CC has begun to employ this device consciously since it was studied in 1954..

Capacity- The capacity of a notation is the number of classes that can be individualized.

NOTE 1 -The capacity of a notation is determined by the length of its base, the upper limit arbitrarily fixed for the number of digits in a class number, or in an isolate number by providing a distinctive set of connecting symbols between isolate numbers, such as the punctuation marks used by CC such that the number of digits in an isolate number is within = single sweep of the eye and ia capable of being retained in memory for a short while. The capacity of a notation can be increased considerably.

NOTE 2 -By sharpening on the basis of an additional characteristic, ,we get a sharpened isolate as well as sharpened isolate but we do not get a sharpened array-isolate   because the result of sharpening is not an array-isolate according to our definition and because it involves the characteristics.

Decimal Fraction Device-Device of taking the place value of each digit in a number as in a pure decimal fraction, though the decimal point or its equivalent mark is not actually put in front of the number.

Devices in library classification:

Devices in library classification may be termed since components used for forming or sharpening Based on the feature used for this purpose, they are described since chronological device, geographical device, etc. These devices are used through classification organizations wherever helpful and possible and are applicable both in the thought plane since well since in the notational plane. Usually speaking, the advantages of the devices are that they: Avoid enumeration and thereby shorten an array in a schedule, and therefore, the schedule itself; Provide autonomy to the classifier; and Close automatic conventionality to the canons of constant sequence, helpful sequence, Mnemonics, hospitality in array, and hospitality in chain. On the question of preference of a device, if two or more devices are accessible in a scrupulous lay, the earliest one accessible should be used, unless any other more significant consideration points to the contrary. Though, in few cases it may be required to exploit two or more devices at a time. For instance, in few cases, such since, special component for a language, or approach for fine arts, the components used should be arranged in the middle of themselves in a helpful sequence and the totality of the components should be enclosed in circular brackets.

Devices in Exploit in Classification Organizations:

Devices in CC:

CC exploits the help of all the devices wherever helpful and possible. The following examples show the exploit of several devices in Colon Classification: Chronological Device: It is used for the individualization of,

- Authors in literature
- Artificial words
- Religious sects
- Diverse organizations in vital classes, such since, physics, medicine psychology,
- education and economics
- Styles in fine arts, etc.
- CC has elaborate rules on the exploit of this device.
- Geographical Device: It is used for individualization of :
- Society in history and law
- Dialect and jargon of a language
- Approach in fine arts
- Many of the anteriorising general isolates, etc.
- Subject Device: It is used in the individualization of :
- Few substances in organic chemistry
- Few structures in architecture
- Few subjects in sculpture
- Special views in metaphysics
- Subjects in teaching techniques, and
- Industries in economics
- Alphabetical Device: It is used for the individualization of :
- Jobs of literary and classical authors
- Brands of a machine
- Strains bf cultivars, viruses and bacteria
- Enumeration Device: In the Rigidly-Faceted, Approximately-Freely-Faceted and Freely Faceted versions of CC, enumeration device have been used, but less often than in the other
- Schemes of classification.

Devices in DDC:

Usually speaking, DDC does not exploit the chronological device. While DDC uses the subject device quite often, it uses the geographical device where it is inescapable and the alphabetical device extremely sparingly. The geographical device is used to sharpen a class number in an enumerative classification like DDC. It uses the geographical device in forming the foci in the society facet of a subject going with history and also in a same manner in law. In other subjects requiring regional treatment, the geographical number is added since a legroom facet. Though, this is not a case of geographical device. In DDC, though, there are fifty subjects directed to be divided like 001-999. These are also cases of the subject device. Since regards the alphabetical device, it was induced in the 17th Edition (1965); it allows it to be used more freely. On the other hand, enumeration device is used mainly widely in mainly of the arrays. Even where the geographical device or subject device is used, each of them presupposes the enumeration device having been used earlier.

Devices in UDC:

Like DDC, UDC does not exploit the chronological device, but uses the geographical device where it is inescapable and the alphabetical device extremely sparingly though it uses more than DDC. In regard to the enumeration device, UDC like mainly of the schemes for classification uses it mainly widely in mainly of the arrays.

Kinds of Devices:

The following devices have been in exploit in classification organizations for forming or sharpening a facet or a subject;

- Chronological Device (CD)
- Geographical Device (GD)
- Subject Device (SD)
- Alphabetical Device (AD)
- Enumeration Device (ED)
- Devices for Hospitality in Arrays and Chains
- Other devices, such since, Facet Device, Stage Device, Super—Imposition Device,
- Mnemonic Device.

Chronological Device:

The purpose of this device is to sharpen a facet number. It can sharpen an. isolate or form a new isolate. This is done by employing a chronological number from the schedule of time isolates. All numbers for authors in the class Literature are derived through this device. It is impracticable to enumerate all authors. The chronological device has, however, taken care of such a contingency. To give an example, the number for Rabindranath Tagore is 0,157,1M61. Here, M61'stands for 1861, the year of birth of Rabindranath Tagore. This device has been used in several main classes like library science, mathematics, medicine, fine arts, psychology, education, economics, etc. This device can be used wherever warranted. The basic class of systems is derived through the chronological device.

Geographical Device:

The purpose of all -these devices, as stated earlier, 2 to form or to sharpen an isolate number in a schedule. Employing a geographical number from the schedule of space isolates is another mechanism of doing this. It has been used in library science, fine arts, religion, linguistics, history and in several other classes. The formation of an isolate using this device is as follows:

152 = d4437 means Rajasthani Hindi, where

152 is Hindi

= is the connecting symbol

d is the symbol for dialect

4437 is Rajasthan from the schedule of space isolates.

Another' example of the geographical device'

Early Egyptian religion for which the number is Q, 8677.

Here, Q, 8 is other religions, and

677 is Egypt from the schedule of space isolates.

Subject Device:

Subject device is used to form or sharpen a facet by adding to it (facet) another class number from elsewhere in the scheme. This device has been used in several train classes. The part of the number derived by the subject device should be enclosed in parenthesis (circular brackets).

For example,

Medical college library is 2, J3 (L)

In the above example, in library science, 2, J3 represents college libraries to which is added (L) from the main class L Medicine` to derive medical college library by subject device.

Let us take another example of subject device. Hindu Law is Z, (Q, 2) where Z is law, and (Q, 2) is Hindu religion from the main class Q Religion.

Alphabetical Device:

Alphabetical device is also used to form or sharpen an isolate number. The device issued taking the first or the first two or three letters of the names of persons, or objects, or products widely accepted as such. The device can be used wherever warranted. The following are some examples where the device is used:

0, 157, 3M61, G Gora, a novel by Rabindranath Tagore

Here, G stands for Gora

0, 157, 3M61, H+W Home and the world, a novel by Tagore.

Here, the initial letters of the two words in the title are connected, using the plus sign (+).

(H for Home and W for World)

D93CM Maruti motor car. D93C is for motor cars and M stands for Maruti

J, 381B Basmati rice, where J, 381 is rice' and B is-for Basmati.

There are several other devices used in CC.

Telescoping of array:

In general sense the word telescope is a device to observe the far of things coordinated   at one place. Telescoping facet   denotes   the same meaning where various categories of facet belonging to same round but in different level within a same   fundamental category belonging to a particular main class   where   various isolate ideas are coordinated at notational plane.(Kishan kumar 1988)This means that schedules belonging to different facet in the idea plane appears to be telescoped into a single schedule in the notational plane this is called telescoping facet . One added advantage of this kind of device is that if higher levels of facet is present and lower level of facet is absent, then lower level of

facet is occupied by higher level. It is just like a line of person where every one of them is assigned a relative position and not a fixed position. If the first person of line is missing the next person in the line is treated as number one and third person who is absent the fourth person takes his place and so on. Telescoping of array are also applicable to system and special facet.

Review questions:

1. Name a few principles of facet sequence.

2. Explain in detail about watt-picture principle.

3. Write a short note on cow-calf principle.

4. Define chronological devices.

5. Name a few principles of helpful sequence.

Reference:

Melvil Dewey, Dewey Decimal Classification and Relative Index, Edition 22, edited by Joan S. Mitchell, et al. (Dublin, OH: OCLC, 2003); Abridged Dewey Decimal Classification and Relative Index, Edition 14, edited by Joan S. Mitchell, et al. (Dublin, OH: OCLC, 2004). DDC, Dewey, Dewey decimal classification, and WebDewey are registered trademarks of OCLC

Raju, A.A.N. Decimal, Universal Decimal and Colon Classification : A Study in Comparison. Delhi : Ajanta Publications, 1984.

Ranganathan, S.R. Colon Classification. 6th ed. Bombay : Asia, 1960. Ranganathan, S.R. Elements of Library Classification. 3th ed. Bombay : Asia, 1962.

UNIT – 5

NOTATION

Objectives:

- ❖ To get more clarity on notations
- ❖ To get to know about call number, class number etc.

❖ To learn more about canons of classification
❖ To gain knowledge in trends in library classification

Introduction:

Notations are systems of written symbols that can be combined according to some set of syntactical rules to represent various meanings in a specialized domain. Familiar examples include mathematical or logical formulas using numbers, variables and operators; formulas denoting chemical compounds by the kind, number and bonds of their atoms; and successions of notes forming a musical score. Such systems can be understood as special languages, that is languages for special purposes, and as artificial languages (Sammet and Tabory 1968). They are typically alternative to the expression of equivalent contents in words, which was more common in former literature; occasionally, words themselves may be used as in the "verbal notation" for music (Word Event 2011).

Several more specialized domains, including → knowledge organization, have also developed their own notations. For example, the Pfafstetter Coding System allows for ordering of river basins and their branches by a decimal positional notation (Verdin and Verdin 1999); the International Phonetic Alphabet allows for precise representation of phonemes and their sequences in any natural language; programming languages for computers use various symbols for instructions and variables; the Laban notation is used to represent successions of movements of the human body in physical activity or in dance; chess matches are recorded by an algebraic notation indicating pieces and coordinates in the game board; pace notes are recorded by special symbols in a notebook then read to rally drivers in order to anticipate the coming bends, junctions and optimal gears.

Bawden (2017) considers "the extent to which information representation and communication [of molecular structures by notation] has gone hand-in-hand with the development of concepts and theories in chemistry, so that it is difficult to tell where the one ends, and the other begins". He echoes Grolier (1991, 99-100) where he observed that "historians of science repeatedly assert that progress in such sciences as logics, mathematics and chemistry was largely conditioned by important innovations in notation (symbolization). The same judgment could be valid for classification".

→ Bibliographic classification systems are indeed another important domain where notation is applied. This article discusses notation in classification systems and, more generally, → knowledge organization systems (KOS).

Definition:

Notation is a term which is used in classification schedule. Notation is a series of symbols, which is used to representing a subject, and it is a very important features of book classification in a library.

E.C. Richardson defines notation as 'a shorthand sign.' This is a conventional definition, which is not adequate. Bliss has given an-other definition. According to him, "A notation is a symbol of marks or symbols in some order, denoting terms or members of a series or system of things." This is a general definition of notation. Ranganathan has defined the term in the context of classification. He says that notation is "a number forming a member of a notational sys-tem." Further, he adds that the notational system is a "system of ordinal numbers used to represent the classes in a scheme for classification"

Harrods Librarian Glossary (Tenth ed.) "The symbols which stand for the divisions in a scheme of classification."

Harrods Librarian Glossary "A Notation is the ordered, series or symbol that stand for the ordered, series or terms in the classification schedule."

W. Howard Phileps "A book notation is a series of symbols in which stand for the name of a class or any division or subdivision of a class and forms of a convenient means of reference to the arrangement of a classification."

H.E Bliss "Notation as a system of marks and symbols in some order, denoting terms or member of a series or system of things."

A book notation is a series of symbols which stands for the name of a class or any division or subdivision of a class, and forms a convenient means of reference to the arrangement of a classification. The notation is an important addition to a classification scheduled; it has in no way determined its logic, its scope, or its sequence of development. It furnishes a convenient reference to the arrangement of a classification; the symbol is not assigned until after the schedule has been worked out. It has no more bearing on the preparation of the logic of a classification outline than the chapter numbers of a book have in fixing the themes of those chapters.

In most book classifications the notation is a symbol that stands for either the subject of the book, or the style of writing. Since the notation is a sign translation of the classification, it

usually ensures, when it is added to the backs of books, a book arrangement which represents the order of the schedules. A notation then, is essential for the practical application of book classification; without notation it would be impossible to apply classification to books. As classification is the "foundation of librarianship" it can be said that "notation is the basis of practical book classification".

Historical precedents:

Although detailed notational systems for knowledge organization have been developing especially since the 19th century, various precedents may be found in the earlier history of culture that must have been influential for at least the very idea of representing and organizing concepts according to numerical or literal symbols. Only a very short mention of some of them is given here. The ancient Judaic tradition of Kabbalah already associated concepts to letters, words and numbers mentioned in the Bible. This may have influenced such folk traditions as the Southern Italian association between objects or persons dreamed and the numbers 1 to 90 to be taken out in the lotto gambling. In an oral tradition of Naples, the meanings of numbers taken out progressively in the game can in turn be combined by a gay man (femminiello) to create and develop a story. Association between numbers and concepts is also reflected in nursery rhymes listing relevant phenomena (one is the Sun, two are the eyes...) that can be seen as classifications ante litteram. French scholar Richart de Fournival (1201-1260) already organized his personal library by a simple notation representing subject with single letters, colours and different calligraphic forms (→ Dousa 2018, section 2.4.2). Some late medieval monasteries (14th-15th century) used alphanumeric notation in their catalogs; in 1595, Latin, Greek and Hebrew letters were used in P. Bert's early printed library catalogue in Leiden (Kervégant 1962, 65).

Medieval systems of knowledge organization used some forms of notation also for purposes of mnemotechnics and learning of wisdom (Rossi 2000; Laporte 2018, → section 3.1). Ramon Llull's Arbre de filosofia desiderat (1290) described a tree of knowledge including nine "flower" categories represented by letters B to K: e.g. B "goodness, difference, power", C "magnitude, concordance, object", D "duration, contrariness, memory", etc. By rotating a wheel where such categories are written (Fig. 1), these can be combined with nine more "branch" categories represented by letters L to U to give such combinations as DP "memory: unity or plurality" and DS "memory: similarity or dissimilarity". Such tools for artificial memory and representation were cultivated again by Giordano Bruno (1548-1600) then by

Johann Heinrich Bisterfeld (1661), who developed a "philosophical alphabet" associated to tables of terms and concepts of all sciences, including general categories and a "tabula primitiva" of what we would call today common auxiliaries. In Cave Beck's Universal Character (1657) the terms of language were listed and notated by digits 0 to 9 and combinations of them, to produce a "numeric dictionary" and an "alphabetical dictionary" each referring to the other much like in the relative index of a modern classification scheme. John Wilkins's Real Character (1668) famously used letters to identify elementary concepts listed in the hierarchical schedules of his "philosophical language", briefly described in a famous essay by J.L. Borges (1952) and discussed the next year by information scientist Brian Vickery (1953). A similar classification system with a literal notation that made it a true artificial language was George Dalgarno's Ars Signorum (1661):

Skam   grace

Skan   happiness

Skaf   to worship

Skab   to judge

Skad   to pray

G.W. Leibniz's Dissertatio de arte combinatoria (1666), influenced by Bisterfeld (Loemeker 1961), suggested to associate numbers to elementary concepts (1 point, 2 space, 3 between, 4 contiguous...) and to combine them into an algebra of all possible subjects, the Characteristica Universalis, although he did not develop it into a full system (Laporte 2018, → section 3.2). Leibniz's ideas have been studied by logician and linguist Louis Couturat (1868-1914) who also developed Ido, an international auxiliary language.

Notation in modern knowledge organization systems:

In the context of modern knowledge organization, notations are systems of symbols that identify the concepts of a KOS (Vickery 1952-1959; Daily 1956; 1976, 194 ff.; Grolier 1956; Coates 1957; Dobrowolski 1962; Mills 1967; A.C. Foskett 1996). Bliss (1940) described notation as "a system of symbols for maintaining the structural order of a classification and for locating terms, or subjects, in the classification", and Ranganathan (1945) as "an artificial language of ordinal numbers for the specific purpose of mechanizing arrangement". Ranganathan also makes a clear distinction between:

the idea plane, that is the concepts and relationships in a KOS,

the verbal plane, that is their expression in terms of some natural language, and

the notational plane, that is their translation into the symbols of some notation:

Along with the capacity to create ideas, came also the capacity to develop an articulate language as medium for communication. [...] But, language is more lethargic than idea. Homonyms and Synonyms, therefore, grow like weeds. Undertones and overtones grow in abundance. Therefore, attemps are continually in progress to make a language precise — at least among those creating ideas in a specific discipline. It is so at least for newly created ideas. Further, words are often replaced by symbols pregnant with precise meaning. When arrangement is found necessary, ordinal numbers are used as helpful symbols. A distinctive contribution of classification, as found and as being cultivated in the field of Library Science, is the Notational Plane. Uniqueness of the idea represented by an ordinal number and the total absence of homonyms and synonyms are the distinctive features of the notational plane, when compared to the verbal plane. (Ranganathan 1967, 327-8)

Notation is typical of classification schemes, while in such verbal KOSs as subject heading lists, → thesauri, taxonomies and ontologies concepts are primarily identified on the verbal plane through controlled terms formed with one or more words. However, notations can sometimes be used as well to represent concepts that are also identified by terms, for example as language-neutral identifiers in multilingual thesauri, or as record identifiers: e.g., in Medical Subject Headings (MeSH) the term retina can also be represented by its notation A09.371.729, a subdivision of A09.371 which represents the broader term eye.

Homonymy and synonymy can also be managed on the verbal plane (unlike the quote above appears to suggest) in thesauri; but terms representing concepts do not include information on their ordinal and hierarchical position in the structure of the system. Indeed, in verbal systems terms are usually presented in alphabetical order, which makes them easy to be searched only when the appropriate term is known in advance. On the other hand, as users do not always know an appropriate term by which their information need is expressed, a systematic arrangement according to some principle can also be useful to guide them across the collection of available documents. For some kinds of concepts, systematic arrangement is even required by common sense, as it would be unconvenient to list e.g. Friday, Monday, Sathurday, Sunday, Thursday, Tuesday, Wednesday, or divorce, engagement, marriage, separation in alphabetical order only.

In classification schemes, a systematic order is the preferred way of displaying concepts, while an alphabetical index (commonly known as the Relative Index in the Dewey Decimal Classification, DDC) is only an auxiliary tool for finding the place of a concept in the systematic schedules. In order to control the systematic sorting of items indexed by a classification scheme, some notation is required (Ranganathan 1967, chapter HA). This feature may even be seen as the most typical to distinguish classification schemes from such other KOS types as taxonomies (where concepts also form hierarchical trees, but sibling branches are listed alphabetically) or thesauri (where concepts are primarily listed alphabetically and hierarchical trees can only be inferred through series or BT/NT relationships). Unlike one may believe at first sight, the most important function of notation (see section 3) is not to represent the corresponding concepts in a short form, but to record the appropriate sequence in which they are presented, both in the schedules and in any set of information resources. This makes the notational system adopted in a KOS, with its peculiar properties, less trivial than the bare use of any set of abbreviations.

Representing notation:

Within a document, numerical notations (see section 3) such as those of the DDC or the Universal Decimal Classification (UDC) can usually be distinguished from bulk text as they consist (mostly) of numerals rather than letters. However, ambiguities may occur as numerals can also be used to represent quantities, document sections or other information. This is even more the case with notations that mainly use letters, such as that of Bliss Bibliographic Classification (BC).

To avoid ambiguity and express the nature of notation, then, this can be represented in a font different from bulk text. In some card catalogues subject-related headings were written in red, a heritage of rubrication (from Latin rubrum "red") of emphasized parts of old manuscripts. In modern digital-based printing and visualization on screen, no standard use has spread yet. Easy options are italics or bold (as used for subject headings in the documentation about Nuovo Soggettario) as opposed to regular font. We recommend use of a monospaced font (such as Courier), as commonly adopted for representing code in computer science literature and for rendering the content of the <code> HTML element. This choice expresses the fact that notation is a special technical language other than natural language which forms the bulk of a text. An example of this use follows:

the facet mqvtn2 "whales, in area" is seen as both a subclass of mqvtn "whales" and a subclass of 2 "in place". [...] Also notice that the facet name, "area", has been recorded here as an alternative label. An alternative approach for facets could be the use of skos:collection classes.

We adopt this use in the present article and the whole ISKO Encyclopaedia of Knowledge Organization; the same style is adopted throughout ISKO 2010 proceedings (Gnoli and Mazzocchi 2010). In controlled vocabularies the function of identifying concepts is played by controlled terms, so these can also be represented in a monospaced font. For the verbal captions that illustrate the meaning of a class notation, no standard use has spread either. To avoid ambiguity, these should also be distinguished from bulk text in some way. Vickery (1956) uses small capitals; brackets or quotation marks, as in the example above, are other easy options.

Notational bases:

In principle, any set of written symbols may be adopted as a notation. A binary system, for example, may adopt only 0 and 1, or a red dot and a blue dot, or ▬ and ▬▬ like in the I Ching classic Chinese text. However, only letters and numerals have conventional orders that are widely known, which has obvious advantages for the ordering function often played by notation.

As many important modern classifications have been developed in Western culture, Roman letters or Hindu-Arabic numerals are the most common choices. Roman numbers have also been common since the 12th century to mark shelves and books contained in them. Additional symbols like punctuation marks are sometimes added, especially since the development of UDC and → Colon Classification (CC), although their standard sequence is less obvious and needs to be defined explicitly by developers then learned by users.

In general, exceedingly complex notational bases are considered to be a hindrance to users, as parodied in the character of Sariette, a family librarian from a tale by Anatole France (1914) who devised so complex shelfmarks that they could only be understood by himself (Gnoli 2006).

Positional notation:

DDC took its very name from the adoption of Hindu-Arabic numerals 0 to 9. They make it a "decimal" system not just in the sense that classes are subdivided into arrays of ten

subclasses; but especially in the sense that the resulting numbers must be read and interpreted in the same way as decimal numbers, according to the positional notation used in mathematics (as opposed to sign-value notation like in Roman numerals) extended to the radix fractions that can follow the decimal point. That is, despite 123 is greater than 14, 0.123 precedes 0.14 because 2 precedes 4.

This practice opens the room for indefinite expansion of notation and of classification schedules themselves, as more characters specify more detailed → subdivisions of a field of knowledge (Visintin 2005). Positionality allowing for indefinite expansion of subjects can be considered to be a major technical innovation in the history of bibliographic classification.

Every day, in libraries throughout the world, cataloguers perform a feat of dazzling intellectual audacity. They classify books and other materials. In other words, they reduce the infinite dimensions of knowledge to a straight line from 000 to 999 or A to Z. There is an old cartoon of a gamekeeper and a fisherman. The first says "You can't fish here" to which the fisherman replies "I am fishing here". Classification, the thing that cannot be done, is done all the time by librarians. The amazing thing is that it works — classification numbers, those dots on the straight line, enable library users to locate materials and groups of materials with great ease and are used more and more in online systems to provide sophisticated subject access. (Gorman 1998, 106)

The positional principle is usually adopted already for notating the main classes of a scheme and their immediate subdivisions, although DDC requires that a class number has at least three digits, with the digit characteristic of every main class followed by 00 (e.g. 300 rather than just 3 for "social sciences") and the two digits of their hundred subdivisions followed by 0 (e.g. 380 rather than just 38 for "commerce"); however, this horror vacui is only a graphic convention with no effect on the system structure, and has indeed been successfully abolished in UDC. If more than three degrees of subdivision are expressed, the first three digits are followed by a dot, then by further digits in any number according to the subject specificity:

300   Social sciences

380   Commerce, communication, transportation

386   Inland waterway & ferry transportation

386.4   Canal transportation

386.40	[Special subdivisions of canal transportation]
386.404	Special subjects in canal transportation
386.4042	Activities and services [in canal trasportation]
386.40424	Freight services [in canal trasportation]

Such further digits used to be written in DDC by groups of three separated by a blank space for the sake of readability (386.404 24), but in the digital environment blank spaces tend to be abandoned (386.40424).

DDC was also an application of the principle of relative location, as shelf marks were now assigned to books themselves rather than to shelves (Figure 2). A book could now be assigned a shelf mark according to its subject, and keep it regardless of its material position in shelves and rooms. This makes it possible interpolation of shelf marks expressing more specific subjects, indefinite addition of new books by moving the adjacent books to the next shelf, or even move of a whole collection to a new place without changing its shelf marks. Class marks can also be detached from the shelving function, to denote the subject of a book in an abstract sense, be it used to define its position in a shelf or not, for example in a catalogue or a bibliography; importantly, this also means that the same class marks can be reused by several libraries (Green 2009). Unlike commonly believed, relative location was not invented by Dewey himself, but was common in German libraries during the 19th Century, e.g. at the Ducal Library of Hessia-Darmstadt which used Andreas Schleiermacher's Bibliographisches System, also featuring common auxiliaries.

the notational base of DDC was also adopted by UDC, which was originally created as a special version of DDC. UDC additionally introduced punctuation marks to specify common auxiliaries such as places, time periods, languages, forms of the document etc. Thus a pure notation of digits evolved into a mixed notation of digits and punctuation marks. While pure notations use only one kind of symbols, mixed ones use several of them, e.g. both literals and numerals.

Apart from possible ambiguities in the filing order of punctuation marks, the notational base of DDC and UDC is regarded as optimal, because Hindu-Arabic numerals are more widely known across the world than Roman letters, which are exclusive of some alphabets. Indeed numerals are also adopted by the → Korean Decimal Classification (KDC, see Oh 2012) and the Nippon Decimal Classification (NDC), which are derived from DDC, and the → Library-

Bibliographical Classification (LBC or BBK) changed its Cyrillic letters to numerals for the sake of internationalization (Sukiasyan 2017, section 2.5.6). UDC numeral notation is widely used as a common language in the libraries of many Eastern European countries, where national alphabetical subject headings would be less effective as the local languages are spoken by a relatively low number of users, making the development and maintenance of subject heading lists economically disadvantageous. A pure numeral notation representing a completely different ordering of knowledge is adopted in Dahlberg's Information Coding Classification (ICC) (Dahlberg 2008).

The main alternative to numerals are letters of the Roman alphabet, in the filing order A to Z. Letters identified main classes already in Medieval cloister libraries, then in Frederik Rostgaard's Projet d'une nouvelle méthode pour dresser le catalogue d'une bibliothèque selon les matières published in 1697 (Stevenson 1978, 7). This base is adopted for the main classes of Charles Ammi Cutter's Expansive Classification (EC) and for the first two divisions of the Library of Congress Classification (LCC) derived from EC. In both these systems letters are followed by numerals for further subdivisions, although LCC numerals occupy a fixed length of four digits rather than having a positional function:

L   education (general)

LB   theory and practice of education

LB1705-2286   education and training of teachers and administrators

LB1771-1773   certification of teachers

Other important general classifications using letters for their first subdivisions are Bliss BC, where capital letters form the majority of class marks with only some numerals used to indicate common auxiliaries; and Ranganathan's CC, where main classes are expressed by capital Roman letters and combined with small case letters, Greek letters, numerals and punctuation marks to produce very expressive but complex class marks. The developing → Integrative Levels Classification (ILC) uses lower-case letters for main classes and their subdivisions, capital letters for deictic and numerals for facet indicators.

Pronounceable notations:

Being designed for the prior purpose of controlling class order, in most cases notation is unsuitable for direct pronounciation, even when letters are used as the resulting sequences

often include many adjacent consonants. Still, a pronounceable notation can be useful for oral communication of subjects and easier memorization (Cordonnier 1944; 1951, 27-29; Grolier 1953; 1956; Vickery 1956, 78-79). Pronounceable notations have sometimes been suggested, already in the last years of the 19th century by Verner (1897) and by Ricci (1898; cf. Kervégant 1962, 75-76; Dobrowolski 1964, 140-143), reminding of the philosophical languages of the past. D.J. Foskett and J. Foskett (1974) designed a special faceted classification for education where consonants and vowels always alternate, so that notation can directly be pronounced:

L   teaching method

Lim   direct method

M-P   curriculum

Men   French

R-S   educands and schools

Rid   secondary modern school

Rid Men Lim direct method, French, secondary modern school

However, this requires a notational base only consisting of letters and tends to produce long class marks that are only reasonable in simple, domain-specific schemes. The alternative solution is to establish rules by which symbols, even including numerals and punctuation marks, can be pronounced. Dobrowolski (1964, 141) proposes that the same digit is pronounced differently according to its position, so that sequences of consonants followed by vowels are always produced; clearly this requires users to learn the rules. Recently, ILC has adopted pronunciations rules as a secondary feature not influencing the sequence of digits in notation itself

Importance:

Notation is used in everyday life for the sake of convenience. It is used in different subjects for a variety of purposes. In an ordinary composition, punctuation marks (such as. : , ;) indicate the long or short pauses. In mathematics, figures and symbols indicate terms, quantity and measures. Similarly, in chemistry, symbols are used for a variety of purposes. They may he employed to indicate different chemicals, chemical reactions and so on. In library classification, notation is essential for the classification of documents. Here notation

serves as a symbol for terms. It is certainly important in the context of library classification, but not more important than the terms themselves. A study of literature on library classification shows that since 1876, classificationists and classifiers have paid too much attention to notation. There have been too many controversies about notational systems of different schemes, to the extent that it would seem as if notation was the only area of study which mattered in the field of classification. Therefore, bliss has rightly pointed out that "librarians have been so accustomed to seeing. notation come first in three schedules and on catalogue-cards that they are prone to think of notation as the thing of first importance; but the truth is that the classification is the main thing, and that the notation, however real its service, does not make the classification through it may peril." Due to the above reasons, the basic questions concerning the theory of library classification were not paid enough attention, which thus impeded the growth and development of library classification.

Need:

According to Ranganathan, notation is "a number forming a member of a notational system." We are interested in the universe of subjects, and we want to arrange it in a helpful filiatory sequence on the basis of a scheme of successive characteristics. There is also need to mechanize the arrangement. This can be achieved with the help of a notational system. However, alphabetical sequence is unhelpful for this purpose. The alphabetical sequence is unhelpful for the following reasons:

(i) It leads to an unhelpful sequence, resulting in the alphabetical scattering of documents on related subjects:

(ii) The names of subjects are unstable;

(iii) The names of subjects are not unique due to synonyms and homonyms, and

(iv) The names of subjects are different in different languages. These give different sequences in different languages.

Species of Digits:

The following species o digits that can be employed in a notational system:

(i) Arabic numerals,

(ii) Roman caps, Roman smalls,

(iii) Greek letters, Sanskrit alphabets etc.

(iv) Punctuation marks,

(v) Mathematical symbols.

DDC uses the following species of digits:

Arabic numerals, dot (Roman alphabets are allowed to be used, if desired).

CC employs the following species of digits:

Arabic numerals

Roman caps and Roman smalls

Greek alphabets (these have been given up completely in CC7)

Punctuation marks

Mathematical symbols

Arrows UDC uses the following species of digits:

Arabic numerals

Roman caps and Roman smalls

Punctuation marks Mathematical symbols

Qualities:

Ranganathan suggested that notation should have the following qualities:

Uniqueness: It means that a class number should represent one and only one meaning. This is essential because occurrence of synonyms and homonyms is harmful to classificatory language.

Expressiveness: It means that a class number should represent relevant and essential characteristics of the subject being classified. For instance, KZ311 (class number for cow, according to CC6) stands for the first favoured animal, whose primary product is food of primary use to human beings.

Later, Ranganathan (Prolegomena, pp. 228-31) enumerated the following qualities of notation: Brevity of class number, speed of writing., pronouncibility (optional) block

formation (dividing of a long class number into blocks of digits by means of a digit of different species, or by space); facet formation (indicator digit can be used to represent the character of the ideas of the succeeding facet or to merely serve as a signpost).Ranganathan was not very rigid about the qualities of notation. Therefore, he added that "qualities necessary and desirable" would depend upon the temporary or permanent use and kinds of users.

Brevity and Simplicity: The easy to read, pronounce, write and type are important qualities. It is generally agreed that notation should be as short as feasible. Experience shows that a long notation is rather difficult to retain in mind. It may also lead to mistakes in writing or typing the call number. This might thus cause inefficiency in work. Brevity is necessary for classification of books, but not for the work of documentation. The question of brevity is connected to the size of the base of a given scheme. It is desirable that a class number should be as brief as possible. The shorter the base, the longer the class numbers. Therefore, a broad base has a great advantage. Brevity is also related to the amount of details provided (attempt towards the co-extensiveness of a class number with the specific subject lengthens the class number), strict hierarchical structure of the scheme (an attempt to display the hierarchical pattern consistently lengthens the class number), and careless allocation of notation (adding to the length of the numbers).The allocation of notation should be done after careful thought, keeping in view the way the universe of subjects is likely to grow.

Types of notation:

Pure Notation: A notational system in which no class number contains more than one species of digits is called a pure notation.

e.g., 341, ALM, cpe, etc.

Mixed Notation: A notational system in which a class number may have two or more species of digits is called a mixed notation.

e.g., V, 44: 255 and P, 1 1 lv.

Faceted Notation: Multipartite notation (linear, horizontal, right-handed notation, with digits separating into blocks of three to six digits by space or by a semantically poor digit, usually a dot), with the blocks of digits connected by meaningful indicator digits, analogous to punctuation marks, with each indicator digit indicating the interrelation between two

component ideas of a subject, is called a faceted notation. (This definition is based on Ranganathan's original definition).

Example from CC7: S. 25; 52: g 7. 73', N6

There are six facets involved in the above example. The facet number "S" represents psychology, the basic facet; Facet number 25 represents adolescent girls; Facet number52 stands for emotions; Facet number g7 for development; Facet number 73 represents USA; Facet number N6 represents 1960s. 'We can see that the indicator digits, ; : . And 'have been used to connect blocks of digits.

Example from UDC: 622. 002 (540) "19"

There are four facets. Facet number 622 represents mining; 2 stands for production and technique problems; Facet number 540 re-presents India; Facet number 19 stands for the20th century. In the above example .00 ( ) " " have been employed as indicator digits, which have been used to connect blocks of digits. Non-Faceted Notation: It is an alternative name for unipartite notation. A unipartite notation consists of linear, horizontal, right-handed notation with all the digits written closely, so as to form one block.

Example from LC:

GC271 Current in Atlantic

QC454 Raman Effect

NA2940 Structural frame in a building

The above examples show that the class numbers given above form one block each. But in a multipartite notation, the number is separated into blocks by means of space or a semantically poor (not meaningful) digit.

Functions of a Notation:

1) It stands in place of terms used in the scheme of classification, so that whenever the term is to be represented it may be represented by a class mark only. For example: The terms Mathematics, Chemistry, & Physics are referred to by the notation (In DDC) 510, 530 and 540 respectively

2) It shows the sequence of schedules and subordination of subjects. That means it not only stands in place of terms but also acts as a guide to locate the position of them in the schedules.

For example: Let's take some terms used in DDC. The terms Mathematics, Astronomy, and Physics do not convey any one of these places in the schedules, but anyone can easily understand when we say:

a. 510 - Mathematics.

b. 520 - Astronomy.

c. 530 - Physics.

3) It searches to connect alphabetical order or index with the systematic order of schedules. That means consulting the number attach to the index entry, one can easily find out the place of subject in the classification schedules.

4) It searches to connect the catalogue with the shelves. The symbol written in the spine of the book are also written on the cards of the individuals books, hence by consulting the catalogue one can find out the exact location of a book or books on the shelves.

5) It helps in maintenance of systematic order on the shelves. The arrangement of books on the shelves should follow the systematic order shown on the classification scheme. I.e. main class past, then division, sub-division and so on.

6) Notation assists in the efficient guiding of a library.

7) Its mnemonic qualities help a Librarian to remember the sequence of division within a class.

8) It helps to insert new topic in classification without changing the classification number.

9) It helps to divided a broader subject into various smaller division and then to arrange them in a convenient form.

Characteristics:

Classification at best is a paradoxical process. We divide to regroup, analyse to synthesize, and separate the constituents to reunite. The work of dividing entities is done into categories and facets with the help of "characteristics"; and ranking is done in arrays and chains with the

help of principles and postulates. The whole process falls under the purview of the Idea Plane and is carried out with the help of four sets of Canons:

1. Canons of Characteristics (Four)

2. Canons of Succession of Characteristics (Three)

3. Canons of Array (Four)

4. Canons of Chain (Three)

The canons of characteristics are concerned with the inherent qualities of the characteristics to be used as the basis of division. A characteristic is a hammer to break a mass of knowledge into smaller pieces. In other words it is the criterion or basis of division.

Definition of Characteristics:

Ranganathan defines a "characteristic "as "An attribute, quality, basis with which a group may be divided into groups at least two". Further he uses the term "Division characteristics".

Canons of Ascertain-ability and Permanence:

Both these canons address themselves to the inherent qualities of the characteristics to be applied. The Canon of Ascertain-ability asserts that the characteristic itself should be tangible and objective. It should be perceptible to any of the five senses. The characteristic should not be illusory, mythical or controvertible. It should be concrete, at best. For example, one's previous birth may be a differentiating, or even a relevant, characteristic to divide human beings, but certainly it is not ascertainable conclusively. Hence, it should not be used as the characteristic of division. Characteristics should not be subjective. Secondly, but less rigorously, a group of teachers should not be divided on the basis of being brilliant or dull, nor literary authors could be classed as major or minor. Not because these qualities do not exist objectively. It is rather mostly due to the fact that these characteristics are very much subjective. These depend upon the perceptions and opinions of the observer. A teacher who is dull for one group of students may be a source of inspiration for some other, and vice versa. Such a characteristic also violates the Canon of Reticence of Terminology in the verbal plane. Hence such controversial and subjective characteristics lead only to confusion and controversy, not to any acceptable classification. Such an attribute is technically not fit to be a characteristics.

Canon of Permanence:

It states that the characteristic though relevant and differentiating should itself Work in the Idea Plane: Canons of characteristics not be in a flux. It should be intrinsically permanent and of stable nature. For example "fame" should not be used as a criterion for classifying literary authors. Fame is not anything permanent. History of any literature clearly shows that fame or obscurity is transitory and always changing shape like a cloud. (Shakespeare and Milton were not reputed authors in their lifetimes). On the other hand, many men famous when alive are forgotten the moment they die. Persons may not be divided on the basis of the colour of clothes they are wearing. It is changeable. They may be divided on the basis of their skin colour or height, which are permanent. Natural characteristics are more reliable. Ranganathan satirically cites the example that Indian politicians, who more often than not change party affiliations to grab power, cannot be divided permanently on the basis of their political ideology they subscribe to. If such a fluctuating characteristic is used as the basis, the members of the various groups will become inter-migratory"ayaram-Gaya-rams". And as a result, we will get only a chaotic classification -- a classification in a flux: groups which are intermixing, not the segregated ones. However, "permanently fluctuating" nature of an entity can itself become a characteristic. If it is their permanent feature, it itself is a good basis of classification. "Migratory birds" can become a distinct group of birds on the basis of their changing habitat. It is not the changing characteristic but the "changing nature of entities" which can be used as the basis of division. Individual chameleons cannot be classified on the basis of their colour; but the chameleons as a group can be identified on the basis of their ever changing skin colour.

Canons of Succession of Characteristics:

To arrive at the desired grouping, or for individualization of entities, we have to apply a number of characteristics one after the other. The next set of canons is concerned with the sequence in which the various characteristics (qualifying the canons of characteristics) are to be applied. These are:

(1) Canon of Concomitance

(2) Canon of Relevant Succession

(3) Cannon of Consistent Succession.

The Canon of Concomitance:

It states that the two characteristics should not be concomitant i.e. the two characteristics applied successively should not result in the same grouping each Work in the Idea Plane: Canons of characteristics time. Such a situation may occur if the two characteristics are synonymous. For example, a teacher may at first divide a class in 2014 on the basis of the students being less or above 20 years of age. It will result into two groups. If the next characteristic is chosen as the year of birth being after or before 1994, it will not produce any further grouping as both the characteristics mean the same thing. A group divided on the basis of male/female cannot be further divided on the basis of being men/women. Tautology should be avoided.

Broader to narrower succession:

The successive characteristics should be applied from boarder to narrower. A group of females can be further divided into women, girls and children. A stalemate in further division can occur if the two characteristics are not applied in the order of their decreasing extension or increasing specificity i.e. in the order of general to specific. For example, a group of scientists may be divided on the basis of their being biologists and non-biologists. But to apply the characteristic of being scientist to the biologists will result in no classification, as all biologists are scientists first. Indians cannot be further divided on the basis of being Asians. It will also violate the canon of differentiation. Though Ranganathan has not stated this explicitly, but this principle is implied in his entire theory of classification. It is a principle of logic first on which the classification at best is based. Many other classificationists such as H.E.Bliss (1870-1955) and Sayers have stated this canon explicitly. Ranganathan implies it as he thinks it to be too obvious to be mentioned.

Canon of Relevant Succession:

To divide a group minutely or rank every member uniquely we have to apply a number of characteristics. These may be all differentiating, permanent, ascertainable and respect the canon of concomitance, yet it may be a formidable problem to decide the order in which the various characteristics are to be applied one after the other.

Apply characteristics one by one:

One important caution is not to apply two or more characteristics simultaneously, otherwise it will result in cross classification. For example, in the following array four characteristics of clan, language spoken, caste, and profession have been applied simultaneously:

Punjabis

Brahmins

Army men

Rajputs

Therefore above group is motely, not coherent.In fact isno group in the classification sense. It is not an array as it has no common genus. One could bea Punajbi, Brahimin/Rajput and Army man at the same time.

Order of applications:

As the name implies the Canon of Relevant Succession of Characteristics depends upon the purpose of classification. There is nothing right or wrong in the order of succession of characteristics (subject to the observing the canons of concomitance and increasing specificity). At best, two different sets in succession maybe termed as helpful or unhelpful; more helpful or less helpful to the majority of the library users. "There are of course", to quote Arthur Maltby, "several useful arrangements in some fields, but the object is to offer the best of these".

Dividing Literature:

For example, division of the class literature (useful to the majority of the readers) as prescribed in the DDC and the CC is successively by language, form period and title of the work. This is relevant as the majority of readers, being monolingual, are interested in the literature of only one language. Further, within a given library the majority is interested in one form of the literature, viz, either in drama, or novel, or poetry. Therefore, in such cases the relevant succession of characteristics is Language, Form, Author and Work. The order of these characteristics though popular is not an absolute one. A special classification having a different set of users may change this order of succession of these characteristics. For example, if a library is interested in the history of world poetry irrespective of the language, then the relevant succession of the above four characteristics will be

(Literature): (Form: Poetry): (Period): (Language)

As another example, if a library specializes in Nineteenth Century, World literature, it may prefer the following order of characteristics:

(Literature): (Period): (Language): (Form)

Facet sequence in UDC is flexible, especially in case of auxiliaries, which can be altered to suit local requirements.

No order is universal:

No sequence is perfect or serves all needs. A classificationist is like the proverbial Work in the Idea Plane: Canons of characteristics father having two daughters, one married to a potter and another to a farmer. Farmer's wife is urging her father to pray for rain to have bumper crops, while potter's wife asks his father to pray for sunshine for her pots to dry soon. One obvious problem with this facet sequence is that an author, like Rabindranath Tagore, who writes indifferent forms then the works of such an author will scatter by form. In the DDC and the CC the plays, fiction and poetry of Tagore are filed separately. The UDC on the other hand brings together works of a single author at one place.

Facet Sequence:

But this succession of characteristics is subject to the logical principle of facet sequence, viz, wall-picture principle, the cow-calf principle, and the rest of them. For example, in the case of literature to separate the work facet from author facet by an intervening facet will be sheer absurdity. To some extent, the problem of the relevant succession is the problem of the relevant characteristic. The various chosen characteristics are to be applied in the decreasing order of their relevance or usefulness. The PMEST formula for sequence of categories is in the decreasing order of their concreteness.

The Canon of Consistent Succession:

This canon is to ascertain the uniformity and consistency of classification. It purports to be a bulwark against the changing tides of fashion, to remain firmly unmoved by the whims and caprices of the person who classifies. In simple words, this canon means that the order of succession of characteristics once fixed should always remain the same.

Call Number:

The Call Number is the number that distinctly identifies a book in a library. There are thousands or even more books in a library. The call number is used to identify one particular book in that collection. It also helps in finding the relative location of that book in the whole collection.

Thus, if you know the general sequence of arrangement of books in a library, the call number of a book will guide you to the area and to the exact place where the book is kept.

Call Number = Class Number + Book Number + Collection Number.

Books and scores in the UCB Music Library are organized on the shelves according to Library of Congress (LC) Classification. LC Classification was originally designed to sort books at the Library of Congress and developed specifically with reference to the published literature in each subject area in that collection. Today it is used widely to organize collections in American academic and research libraries.

The basic outline of LC classification divides the entire field of knowledge into main classes that correspond largely to academic disciplines or areas of study. Main classes are denoted by single capital letters:

A   generalities   M   music

B   phil., psych., religion N   fine arts

C   auxiliary sciences of history P   philology and literature

D   history, general/old world   Q   science

E-F   history, America   R   medicine

G   geography, anthropology   S   agriculture

H   social sciences T   technology

J   political science   U   military science

K   law   V   naval science

L   education   Z   bibliography, library science

The main classes are in turn divided into subclasses, designated by double or triple capital letters, representing branches of the major disciplines. The outline of the individual classes have been developed separately for each subject area. Class M, Music, for example, was first published in 1902 and consists of three principal parts: M Music, ML Literature on Music, and MT Musical Instruction and Study, largely the work of Oscar G. Sonneck, Chief of the Division of Music at the Library of Congress. Nevertheless, the various classes are unified by

a number of principles, most notably in the patterned structure of the notation, or call numbers, used to identify each class and the individual items within each class.

Elements of a Call Number:

Each book or score in the Music Library is uniquely identified by a set of letters and numerals known as a call number (sometimes also called a shelf mark). Call numbers generally consist of two or three elements: an LC class number followed by a tag known as the Cutter number (or book number) and often a date.

The class number begins with one or more capital letters representing a branch of a subject classification in LC, the broad neighborhood of items related by subject, discussed above. Within each main class or subclass, the integers 1-9999 (some with decimal extensions) are added to identify further subject subdivisions, defining the subject matter of the item more finely. The same combination of letter(s) and numerals is given to all individual items in the same subject class area.

After the first combination of letter(s) and numerals identifying the subject class another combination follows, known as the Cutter number. Named after Charles A. Cutter, who developed an alphanumeric code that forms the basis of the number, this second letter/number combination places an individual item in alphabetical order within its LC subject class (usually by the first letter of an author's last name, though it may sometimes also represent some other information about a work such as a further subject subdivision). In order to assure the Cutter number is unique a date often follows. Thus, the two parts of the call number serve two very different functions: the first part (class number) organizes knowledge by subject and the second part (Cutter number[s] + date) acts as a shelving device for arranging individual items within subject classes.

For example, the following item from the Music Library:

Moroney, Davitt. Bach: An Extraordinary Life. (London: Associated Board of the Royal Schools of Music, 2000). has been assigned the call number ML410.B1.M67 2000, where ML410 is the LC class number and .B1.M67 are the Cutter numbers.

Call number = ML410   class number +

.B1 .M67   Cutter number(s) +

2000   date

The meaning of the LC call number can be analysed part by part:

ML410 is the classification for composer biographies: ML represents Music Literature, a subclass of class M Music. The number 410, which is added to ML, represents Biography (by composer last name), itself a subdivision of the group of numbers representing History and Criticism under Music Literature. The remainder of the notation, .B1 .M67 2000, is added to the class number in order to distinguish the specific item by Davitt Moroney from all other items within the class of items at ML410. In this case, .B1 .M67 is a "double cutter," where .B1 may be seen to form part of the class number, or an extension of it, because it is a subdivision of Biography referring to books on J.S. Bach. Since all biographies of J.S. Bach are given the number ML410.B1, a second Cutter, .M67, is added to refer specifically to Moroney's biography of Bach. Together, the class number and the book number form a unique call number—an address that communicates information about the subject of an item and where a specific item may be found within (an alphabetical list of similar items in) its subject class.

In using a call number to locate a book on the shelf, consider each component of the call number in turn before moving on to the next segment. Each element of the call number is read is a different manner—the class letters alphabetically, the class number as a whole number (with possible decimal extension), and the Cutter as a decimal.

The Call Number has three parts:

(a) Class Number

(b) Book number

(c) Collection number

Class Number:

Classification Number is a number (numbers or a combination of letters and numbers) that represents the subject or form of an item being cataloged, selected from a classification schedule or classification system. Classification Number is also called class number or class mark. It is the first part of a call number which is used to classify library resources by subject area.

In a Relative location, Classification Number also shows the place of the item on the shelves and in relation to other subjects. It translates the name of its specific subject into the artificial

language of the notation of the scheme of classification. The use of classification number enables library users to browse on shelves to find its materials and also additional items on the same or related subjects, and, to find out what documents the library has on a certain subject.

Library Classification or Classification or Book Classification or Bibliographic Classification is the process of arranging, grouping, coding, and organizing books and other library materials (e.g. serials, sound recordings, moving images, cartographic materials, manuscripts, computer files, e-resources etc.) on shelves or entries of a catalog, bibliography, and index according to their subject in a systematic, logical, and helpful order by way of assigning them call numbers using a library classification system, so that users can find them as quickly and easily as possible. The call number serves a dual purpose: it determines the place of a book on the shelf

Classification is more than finding the right notation or category; it is about relationships. It provides a logical arrangement of topics and subtopics from the general to the specific that can be translated into a linear arrangement for materials in a library. Classification traditionally provides formal, orderly access to the shelves, but it is also a mechanism by which to collocate materials in the catalog. It's what makes browsing possible.

The class number of a document is an ordinal number representing the position of a class in a scheme of classification used in a library and also represents the subject matter of the document. The purpose of classification is to bring related items together in a helpful sequence from the general to the specific. There are several schemes of library classification available. The one used most widely in the libraries is the Dewey Decimal Classification (DDC). A classification scheme of Indian origin, is the Colon Classification.

Class number of a book represents its subject. As you know, a classification scheme organizes all the subjects in a systematic order and uses an artificial scheme of numbers, alphabets, and symbols called notation, for each subject.

The notation used for a particular subject in a classification scheme is called it's class number.

Examples: The class number of Library Science is 2 and the class number of Mathematics is B. All the classification schemes use notation to represent different subjects.

Thus, the class number of Library Science in CC is 2 whereas in DDC it is 020. Similarly, the class number of Mathematics in CC and DDC is B and 510 respectively.

Book Number:

You have understood the class number which is assigned to different books on the basis of their subject. Books of different subjects will have different class numbers.

We need some method to distinguish all the books having the same class number so that these books can be arranged in some order and finds their unique place on the shelf. Books of the same class can be arranged according to book number.

According to Dr. S R Ranganathan ", the book number of a book is a symbol used to fix its position relative to the other books having the same ultimate class". So, different books on the same subject will have the same class number but different book numbers.

Book numbers are parts of call numbers, together with collection numbers and class numbers. Book numbers come at the end, and arrange books about the same subject so that they can be given useful order on the shelf and a unique location in the collection. The collection number, if used, indicates a major grouping within a library or library system, e.g. REF for reference or J for the juvenile collection. The class number of a book tells what it is about, but many books can be about the same thing and share the same class number. Book numbers are different for each book having the same class number and will make the full call number completely individual.1 Just as different classification schemes lead to different class numbers, so do the different book number systems lead to incompatible book numbers. The library of the Faculty of Information Studies at the University of Toronto (at which copies of all the books in the bibliography can be found) uses the Dewey Decimal Classification (DDC).2 Their policy for making book numbers is to make an author number from the main entry, 3 then add a title mark equal to the first letter of the title (personal conversation with Joseph Cox, 1 February 2003). For example, Satija and Comaromi (1992) has the call number 025.428 S2523B MC. MC is the collection number, indicating in which of the many campus libraries it can be found. (The name has since changed, which is confusing.) 025.428 is the class number, indicating the subject is shelf listing. There are many books in the library about shelf listing. How to tell them apart? With a book number: for this book, S2523B. S2523 is from Satija, and B is from Book Numbers. A Library of Congress (LC) example is a copy of David Copperfield by Charles Dickens, found in the main University of Toronto library at PR 4558.A1 1947 ROBA 1. PR 4558 is class number, and stands for for David Copperfield,

while A1 indicates that copies are arranged in chronological order and 1947 is the year of this particular edition. The library has appended its own collection mark (ROBA) and a copy number. S.R. Ranganathan devised his own, very detailed, faceted book number system, and in Colon Classification (1964), he helpfully includes a complete call number on the copyright page: 2:51N3 qN60. 2:51N3 is the class number (2 for Library Science, 51 for Generalia Bibliography/Technical Treatment/Classification, N3 for Colon Classification), and qN60 is the book number (q to show the form is "Code," N for 1900-1999, 60 to make the year 1960).

"Book number" means slightly different things to different people. Comaromi (1981) says a book number is a "combination of author numbers, Cutter numbers, author letters, and any other shelflisting device." Chan (1994) defines item number as "[t]hat part of a call number which designates a specific individual item within its class." Sartap and Comaromi (1992) say, "Class numbers alone produce groupings whose size depends upon the depth of the library classification and the closeness with which the classification used is applied. To organize or provide order within a class grouping, documents are given a further notation called a book number." Ranganathan (1964) said the book number "of a book is a symbol used to fix position relatively to the other books having the same Ultimate Class.... The Book Number of a book individualises it among the books sharing the same class number."

Book numbers do not usually reflect the subject of a book, but instead are based on external attributes such as author name or year of publication. Satija and Comaromi (1992) say that book numbers "may be based on one or a combination of some of the attributes of the document, such as author, title, language, year or place of publication, physical size, and physical make-up." (Book numbers may sometimes reflect a subject-related aspect of a book, such as when it is a volume of criticism. Ranganathan used a g at end of the call number for that, and that the Library of Congress system uses its own indicators in some cases. This brings together on the shelf books and their criticism, a very helpful collocation.) Ranganathan (1964) said the book number "may consist of one or more the following successive Facets: Language Number; Form Number; Year Number; Accession Part of Book Number; Volume Number; Supplement Number; Copy Number; Criticism Number; and Accession Part of Criticism Number."

In general, book number = author number + title (or work) mark + edition mark + date of publication + volume number + copy number + anything else library policy dictates. Call number = class number + book number, with the collection number at the start or end.

Need of book numbers:

Book numbers give a unique shelf location to each book in a collection. They bring a defined and consistent order to all books on a given topic, an order that may apply more generally to all subject groupings in the library. Depending on the size of the collection and the depth of classification, it may happen that very rarely do two books collide and share a class number, so book numbers are not thought necessary. Satija and Agriwal (1990) forcefully object to such imprecision:

For a rigorously fine arrangement of books, book numbers are indispensable. Yet their value is debated if not totally doubted. A sizeable number of librarians do not value them highly in shelf arrangement, no wonder then if these are meted out a step-motherly treatment in some libraries. Literature on them is thin and rare. Even those who use book numbers think of them as merely and adjunct--a tool of the perfectionist only. Yet their value in impeccable shelf classification cannot be underestimated. In close access libraries these have comparatively more value in pinpointing the location of books. And for collocation of host and associated books, and to bring together a book and its sequels, the book numbers are quite indispensable. Their utility and importance becomes more pronounced libraries using broad classification such as Rider's International Classification or even the DDC. It is not to suggest that in use with depth classification systems these are less desired. Whatever be the size of the library and the kind of classification used, book numbers add [the] last touch to the ultimate shelf arrangement.

In 1937 Bertha Barden listed six important reasons for using book numbers (though bar codes have made numbers four and six less relevant now):

Book numbers in addition to class numbers are needed:

1. To arrange books in order on the shelves.
2. To provide a brief and accurate call number for each book.
3. To locate a particular book on the shelf.
4. To provide a symbol for charging books to borrowers.
5. To facilitate the return of books to the shelves.
6. To assist in quick identification of a book when inventories are taken.

Broad classifications will make many books share the same class number. Deep classifications will mean fewer do. Some libraries, such as in elementary schools, may use

very broad classifications, perhaps Dewey to the tens. What happens when books collide? Ordering the books alphabetically by author's last name (the most basic of book numbers, though perhaps an invisible one if the name is only on the book cover and not on the spine label) seems obvious. For some collections this is enough. It will not be enough in large or specialized libraries or any library where precision and detail are valued, in order that the needs of both the librarian who organizes material, and the user who searches for it, are best served.

Cutter and Sanborn:

Making rules for book numbers was a busy field in the late nineteenth century (Lehnus 1980, Comaromi 1981). Several schemes were devised, some using author names and some publication date. One man's work has survived: Charles Cutter's. The two- and three-figure Cutter tables and the Cutter-Sanborn table are the basis for modern author numbers, and "to cutter" is a common expression when cataloguing. Cutter began turning author names into letter-number combinations in 1879, first published about it in 1880, and by the mid-1880s, after several editions and with Dewey's imprimatur, his system had become common (Satija and Comaromi 1992). A copy of the two-figure author table is attached (it is long out of copyright, but updated versions are still in print). The rules are neatly specified: "Use one letter for words beginning with consonants (except S), two for words beginning with vowels or with S, three for words beginning with Sc" (Cutter n.d.). For example, to turn Denton into an author number, go to the fragment on the table that precedes it alphabetically: "Deno 43." If there are no other names in the Deno-Dent range already, then Denton would become D43. If Denovich had already claimed D43, Denton could become D435, leaving room for 431-434 to be used for other nearby names. The numbers are to be treated as decimal fractions, as in the DDC. Bruce Sterling would become St4, Albert Einstein Ei6, and Joseph Schumpeter Sch8. The three-figure table, which published in 1901 after Kate Sanborn's work, is an extension of compatible with the two-figure table, and is suitable for larger libraries (Comaromi 1981).

Kate Sanborn (later Jones) was asked by Cutter to revise the two-figure table but ended up making a new table that was incompatible. Author numbers would be one letter plus one to three letters. The distribution of numbers through the letters of the alphabet was different from Cutter's original work. Her table of name fragments and numbers was large, with more than 12,000 numbers, but Cutter's later three-figure table was larger still, with more than

20,000 (Lehnus 1980). Cutter also included instructions for complete book numbers: one could add title marks based on the first one or two letters of the title to distinguish different books by the same writer; copy numbers could be indicated with a 2 or 3; translations could be marked with the initial letter of the language of origin; biographies would be filed by subject but with an additional letter to show the writer; commentaries would add a -Y; dictionaries and concordances would add a -Z (Cutter and Jones n.d.)

The Cutter and Cutter-Sanborn tables are still popular, but though the detail may help with the distribution as names are turned into numbers, constantly referring to lookup tables is tiresome. Various other marks are still used with DDC much as Cutter set out: title marks being the first letter of the title; biographies indicated by inserting a "z" between the Cutter number and work mark; commentaries done the same way but with a capital "Z;"edition marks shown with edition numbers or year of publication; copy and volume numbers shown with a "c" or "v" (Chan 1994).

Chronological Ordering:

All of the book number systems seen so far (except for Dewey's first attempt, using accession numbers) arrange books within a topic by author's last name. This is an obvious and sensible method of ordering. It will bring together all the books by one writer on the same topic, a helpful arrangement. However, the chronological ordering will be completely disrupted. Books on evolution by Charles Darwin will be followed by those by Richard Dawkins (metaphorically apt, since he is an important Darwinist). What of the 150 years between them? There is little room for names between Darwin and Dawkins, but they span the entire history of thought on evolution. A chronological ordering would put Darwin first (or near it), and moving across the shelf would show how the science progressed up to the latest work in the field.

Satija and Comaromi outline the arguments for and against chronological book numbers. In their favour, they are simple; there is no confusion when the same writer gets different Cutter numbers in different classes; when a book has multiple authors, one is not favoured over the others; the development of a subject can be they are an aid to weeding out of date books; there are no problems making Cutter numbers for non-European names. Against them, they note there is no well-developed system for using chronological numbers; that the arrangement is more helpful for organization than retrieval; that it separates different editions of the same book; and most importantly, that people remember names, not years. Chronological book

numbers are as old as author numbers. W.S. Biscoe, a disciple of Dewey, devised a system that the great man admired. James Duff Brown and Fremont A. Rider created their own systems (Satija and Comaromi 1992). All have rules for how to turn year numbers into shorter combinations of letters and numbers, which is their great fault. Biscoe's rules included (Satija and Comaromi 1992):

A (B.C.)

B up to 999 (B33 = A.D. 33, B 685 = 685)

C 1000-1499 (C236 = 1236, C423 = 1432)

D 1500-1599 (D20 = 1520, D 85 = 1585)

V 1950-1959

W 1960-1060

X 1970-1979

Y 1980-1989 (Y5 = 1985, Y6 = 1986)

Z 1990-1999

"Biscoe was not concerned that his table would reach its limit with the letter Z in the year 1999, and commented that before this limit was reached someone would have devised a better scheme" (Lehnus 1980). Brown's Extended Date Table covered 1450-2125 using pairs of lower case letters (Satija and Comaromi 1992):

1450-1475 aa-az

1476-1501 ba-bz

1970-1995 ua-uz (up = 1985, uq = 1986, ur = 1987)

1996-2021 va-vz

2022-2047 wa-wz

All these systems have an enormous failing: they are needlessly and overwhelmingly complicated. The Indo-Arabic numerals are the best system for counting anything in western civilization, and they are recognized all around the world by speakers of many other languages. To save one or two characters at the cost of making library users memorize an

obscure conversion mechanism is no bargain. Proper names are made up of letters, and trimming them down to author numbers may not be as informative as using the full name, but they are still easy to read and ordered alphabetically. There are no such advantages to turning 1985 into Y5 or up.

One particular advantage that chronological orderings have is that they do away with problems about making author numbers for non-European names. Cutter's tables try to spread numbers around so that the distribution over the range of names is proportional, but when Chinese, Indian, Arabic, and other names are in the collection, the tables do not work as well. Librarians in those cultures have made their own tables. Indeed, "[i]n view of the multiplicity of languages almost every Indian script and language has its own author number table for book numbers" (Satija and Agriwal 1990). There are different calendars used around the world, but far fewer than the number of languages, and the Gregorian calendar is widely known. Arranging chronologically leads to fewer problems when managing a varied and multicultural, multilingual collection.

Colon Classification Book Numbers:

S.R. Ranganathan's faceted Colon Classification (CC) is extremely detailed, precise, and informative, as is the book number system he made to go with it. In his Colon Classification (6th ed.) (Ranganathan 1964) he defined these terms:

03 The Book Number of a book is a symbol used to fix position relatively to the other books having the same Ultimate Class.

030 The Book Number of a book individualises it among the books sharing the same class number.

031 The Book Number of a book is the translation of the names of certain of its specified features into the artificial language of ordinal numbers, specified and elaborated in the rest of this chapter.

03012 The Book Number consists of an intelligible concatenation of one or more of the following symbols: the twenty-four Roman Capitals got by omitting I and O; the twenty-three Roman smalls got by omitting i, l, and o; the punctuation marks dot, hyphen, semicolon and colon; and the ten Indo-Arabic numerals.

0302 The Book Number may consist of one or more of the following successive Facets: Language Number; Form Number; Year Number; Accession Part of Book Number; Volume Number; Supplement Number; Copy Number; Criticism Number; and Accession Part of Criticism Number.

Methods of assigning book numbers:

Author's surname method: It is the simplest method of assigning book numbers. In this method, we use the first three digits of the author's surname as the book number. In case the author's surname is not letters given, the book number can be constructed from the forename.

Example:

Author's name   Book number

SR Ranganathan   RAN

Prof Kasyap   KAS

DDC: Based on the name of the author under which the first three letters of the name are included.

Example: Ranganathan   RAN

Based on the author's Date of Birth

Example: J64

Based on the year of publication of the book

Example: N33 (1933)

Book Number formula by SR Ranganathan: Colon Book Number System:

Dr. SR Ranganathan has given an elaborate scheme of book number consisting of following fields:

Formula of book number: [L][F][Y][A].[V]-[S];[C]:[Cr]

Where

L = Language of the book

F = Form in which the book is written e.g. index, list, picture, graph.

Y = Year of publication of the book

A = Accession part of the book number. It is given when more than one books of the same subject published in the same year are acquired in the library

V = Volume the number is given when a multivolume book is acquired in the library

S = Supplement number is given when a supplement is published for a volume

C = Copy number particularly useful for school and college libraries where multiple copies of textbooks are acquired

Cr = Criticism number is used when a book based on some other book is acquired in the library.

Collection Number:

The collection number, if used, indicates a major grouping within a library or library system. Libraries generally do not have a single sequence of books. Reference books are separated from other books in most libraries. In school and college libraries textbooks are kept separately.

The collection number is a symbol denoting any special characteristics (size, physical form, or class of users, and so on.) of a group of books, with which the books may be separately located. In other words, the mark added to the class number and book number of a book to indicate a collection, is called the collection number In university libraries, there may be separate departmental libraries besides separate reference collection.

Thus, a book maybe in any of the collections in the library and it is necessary to mention the collection where that book is.

The indication of the collection is made by some symbols called collection numbers. Although, a library may devise its own collection number scheme which may help in indicating the collection.

Reading Room   RR

Periodicals Collection   PC

Library Science Department   2D

Physics Department   CD

Trends in library classification:

Three distinct periods:

While tracing the trends and developments during the hundred years of classification, Ranganathan recognised three distinct periods, viz., 1. Pre-facet Period (1876-1896);2. Transition to Facet Period (1897-1932); and 3. Facet Period (1933-1972). In Prefacet Period Melvil, Dewey's Decimal Classification (1876) and C.A. Cutter's expansive Classification (1879) were published. In the Transition to Facet Period Universal Decimal Classification (1897-1905) and Library of Congress Classification (1902) were published. The Facet Period witnessed the publication of Ranganathan's Colon Classification (1933), ILE. Bliss's Bibliographic Classification (1935), Library Bibliographic Classification (1960) and Fernmont Rider's Rider's International Classification (1961). Some of these classifications have an organisation or an institution to take up the responsibility for their revision, development, maintenance and application. In the following sections major trends and developments that have taken place in DDC, UDC and CC are briefly presented.

Development in DDC:

Until the publication of the 16th edition of Dewey Decimal Classification (DDC) in1958, different editions were published at infrequent intervals. The 16th edition was edited by Benjamin Custer who set the pattern of a seven-year cycle. In this edition, an attempt was made to reconcile the conflicting aims of integrity of notation and provision of new topics. The 17th edition was published in 1965 in two volumes, viz.,

V.1. Tables; V.2. Area Table and the Relative Index. This edition showed a trend towards more synthesis than earlier editions. The main thrust of the 17th edition was to remove certain anomalies that have crept in between the use of form divisions with zero and division of subjects with the help. of zero.

18th and 19th Editions:

The 18th edition published in 1976 was in 3 volumes, viz., V.1. Tables; V.2.Schedules and V.3. Index. For the first time five more auxiliary tables, viz., T3.Subdivisions of Individual Literatures, T4. Subdivision of Individual Languages, T5.Racial, Ethnic and National Groups, T6. Languages, and T7. Persons were added. These were in addition to the existing T1. Standard Subdivisions and T2. Aims. The19th edition was published in 1979 in 3 volumes. The policy that was initiated in the17th edition was also carried out in this edition. The

important features we can notice in this edition are: 1. A diagram showing how hierarchical classification proceeds from the general to the specific in DDC; 2. A practical guide to the use of classification; and 3. A very detailed step-by-step instructions for building numbers in the main class .800 Literature.

20th and 21st Editions:

The 20th edition was published in 1989 in 4 volumes and edited by John P Comaromiet al: V.1. Introduction and Tables; V.2. Schedules (000-500), V.3. Schedules (600-900) and V.4. Relative Index and Manual. The main objectives of this edition are: user convenience, clear instructions, more explanations, greater accessibility through expanded summaries and elimination of duplicate provisions for classifying single subjects. The 21st edition was published in 1996 in 4 volumes and edited by Joan S. Mitchellet al. The thrust of this volume is users' convenience, which includes: 1. More information located strategically to guide the classifier; 2. Numerous captions have been rewritten to eliminate vague headings; 3. `Example' and Contain notes' were replaced with 'including notes'; 4. The relative index has more entries than the index to the 20th edition* 5 Expanded manual; and 6. Special attention has been given to reduction of U.S. and Christian bias.

Computerisation of DDC:

In July 1988 Forest Press, hitherto the publishers of DDC, became a division of Online Computer Library Centre (OCLC). With this change DDC joined the computer generation.. Forest Press has been the publisher of DDC since 1911, when Melvil Dewey first used the name as imprint. Until 1988, Forest Press was a part of Lake Placid Educational Foundation, also founded by Dewey. Edition 19 of DDC had been printed from the computer tape in 1979. The following years witnessed the emergence of a sophisticated computer-based editorial support, system and database used to produce DDC 20 and 21 editions. DDC 21 appeared in two formats:

1. In print; and 2. Dewey for Windows, a Microsoft Windows TM-based version (released in August 1996) (CD version). Dewey home page contains current information on the Dewey decimal classification.

Developments in UDC:

As we have discussed in earlier units, Universal Decimal Classification (UDC) was developed on the basis of Decimal Classification .and was first published in 1905entitled

Classification Decimale Universalle. The scheme is revised and updated from time to time by the-International Federation for Information and Documentation (FID).In response to a demand from several quarters for comprehensive short editions in English, abridged editions are being brought out by the British Standards Institution (BSI), the official agency. The abridged edition.BS1000A was first published in 1948.The second abridged edition with radical revision was brought out in 1957. The third abridged edition was brought out in 1961.

IME 1985 and 1993:

The International Medium Edition (IME) was published with more extensive divisions to replace abridged English editions. The IME, English Text comprises of two parts, Part I - Systematic Tables published in 1985 and Part II - Alphabetical Subject Index published in 1988. This edition contains about a third of the material in the full editions brought out in English, French and German. In addition to various signs and symbols already provided in Abridged English Editions (ABE), two more new symbols: -4(the arrow) meaning "see also", e.g., 159.9 Psychology --4 (301.151;591.51; 621.821; 616.89, and = (parallel divisions) meaning "subdivision as" have been introduced.

e.g. 611.3 Digestive system. Alimentary canal

611.3 a (616.3, e.g., 611.31 Oral cavity)

Another IME in English was published in 1993 in two parts. The digit 4 used for Linguistics has been frozen and the Linguistics divisions have been shifted to class 8.15.4.2 UDC in Computer-Based Information Retrieval Systems It was suggested as far as back as 1934 that UDC was suitable for `mechanical sorting'. The Royal Society's Scientific Information Conference held in 1948 noted the need to explore the potentialities of UDC in mechanised retrieval. The research programmes carried out in the USA, Britain, Germany, Denmark and Switzerland in the sixties helped UDC to be usable as an indexing language for computerised control and processing of information in the fields of knowledge. The most significant research work in this respect was the American Institute of Physics UDC Project under Freeman and Atherton. Other experiments carried out during the late sixties in using UDC for special mechanical applications include, the indexing of Geo-Science Abstracts and the maintenance of user profiles in the metallurgic fields.

UDC and UNISIST:

FID thought of making UDC a `Roof Scheme' under which it could be hung the relevant special classifications, thesauri or descriptor lists as well as the more detailed DC divisions themselves for those who prefer a homogeneous UDC-based system. The concept received encouragement in the efforts to make UDC adopted as the switching language for UNISIST (United Nations World Science Information System), a joint project of ICSUJUNESCO. An ASLIB study for UNISIST stated that UDC was found `least unsatisfactory' of the major existing schemes.

Computerisation of UDC:

For more than three decades UDC has been used advantageously in computerised bibliographical and abstracting services not only for the production of subject indexes but also for information retrieval and SDI. In the forefront of UDC mechanisation has been Rigby who, as early as 1964, showed in the Conference at Elsinore the printouts of Meteorological and Geoastrophysical Titles that had started the use of the computer for author and subject indexing. A more comprehensive survey on the use of computers with the UDC was compiled by Rigby with the description of more than sixty experimental or operational systems in fifteen countries and four international projects.

Developments in CC:

You are aware that the first edition of Colon Classification (CC) designed by S.R.Ranganathan was \published in 1933. It remained a Rigidly Faceted Scheme until 1952.The first attempt at breaking the rigidity of a pre-determined facet formula was made in1950. Thereafter, CC appeared as an Almost-Freely Faceted Scheme for Classification in Edition 4 (1952). Developments in CC since 1950s were more and more towards a scientific method. The feature of analytico-synthecity increased in each edition especially after the 4th edition. The major structure of CC is its Basic Subject Schedules and the Schedules of Isolates. The schedule more special to a basic subject is the schedule of Personality Facet.

Publication of 7th Edition:

The 7th edition of CC was published in 1987. It was proposed to be brought out in 3volumes, viz., V.1 Schedules for Classification; and 3 Index and Worked-out Examples. But only MI Schedules for Classification was brought out in 1987. The other two volumes have not seen the light of day. In this edition, in addition to existing indicator digits in the 6th edition (1960), a few more indicator digits, viz., & (ampersand), + (plus), = (equals), * (asterisk) and

°' (double inverted comma) have been added. The fundamental category Matter [M] has been transformed into Matter Method (MM), Matter Property (MP) and Matter Material (MMO. This edition also provided for environmental divisions (chapter DD). The schedules of Basic Subjects have been greatly expanded. It also provides for Common Matter Property Isolates. The schedules for Language, Time and Space have been greatly expanded.

Computerisation of CC:

Developments in Case Western Reserve University, Ohio, indicate the influence of facet analysis. Dr Fugman (ISKO, Germany) used facet analysis in his chemical analysis system. Facet analysis is also used for shelving purposes in online information search, Syracuse University, New York, was using PMEST in their computer-generated indexes. In India, DRTC in 1967 wrote some computer programmes based on facet analysis and tried to experiment with the use of CC in computers to construct class numbers. CC was also used in computer programming for SDI services and for chain indexing and cyclic indexing. The Western Ontario (Canada) School of Library and Information Science used CC schedules for developing a thesaurus. In 1968, DRTC initiated experiments to determine the feasibility of using general purpose computers in a document – finding system based on a classified catalogues system using a freely-faceted version of CC.

International conferences:

As mentioned already, in the past twelve decades major developments and trends have taken place in library classification giving it an international perspective when compared to other traditional branches of library science such as cataloguing, indexing and abstracting. During the past four decades, to be more specific since1957, a number of international conferences have been held on library classification/knowledge organisation organised by FID/CR and the International Society for Knowledge Organisation (ISKO). These are briefly presented in the following subsections.15.6.1 FIDICR - International Study Conferences on Classification Research (ISCCR) since 1957, FID/CR has organised six International Study Conferences on Classification Research (ISCCR). The first ISCCR was held at Dorking, England, during May 13-17, 1957. Ranganathan, in his opening address, dwelt upon "Library Classification as a Discipline".

The recommendations of this conference dealt with: 1. Scope of classification; 2. Schemes of classification; 3. Need for research; 4. Use of classification schemes; 5. Differences between systems; 6. Construction and application of schemes; 7. Notation for such visually scanned

systems as the card catalogue; 8. Machine systems; 9. Research projects; 10. A general scheme for classification; 11. Development of classification schemes; and 12. Furtherance of. Research.

The second ISCCR was held at Elsinore, Denmark, during September 14-18, 1964.Ranganathan delivered the presidential address entitled "Library Classification through a Century". The papers presented to this conference were grouped into five areas: 1. General theory of classification; 2. Research in mechanised classification; 3.Selected and special schemes; 4. Evaluation techniques; and 5. Directions for future works.

The third ISCCR was held at Bombay during January 6-11; 1975. There commendations of this conference cantered on; 1. General aspects of designing ordering systems for global information networks; 2. Use of empirical methods and theoretical models ford signing ordering systems for global information networks; 3.Systems evaluation; 4. Interdisciplinary contents; 5. Education; 6. Needs and problems of developing countries.

The fourth ISCCR was held at Augsburg, Germany, during June 28 - July 2, 1982.The theme of the conference was "Universal Classification, Subject Analysis and Ordering Systems". The fifth ISCCR was held at Toronto, Canada during June 24-28, 1991. The theme of the conference was "Classification Research for Knowledge Representation and Organization". The papers presented to this; conference fall into three broad categories: 1. General Principles and Policies; 2. Structure and Logic Classification; and 3. Empiri

The sixth ISCCR was held at University College, London, on June 16-19, 1997 on the topic "Knowledge Organisation for Information Retrieval". The University College, London, ASLIB, Classification Research Group (CRG) and International Society for Knowledge Organisation (ISKO) sponsored this conference. The themes discussed in this conference were: 1. Role of classification in information management; 2. Classification research for retrieval of information published electronically; 3. Automatic methods of classification; 4. Researcher and the real-world; 5. Tools for classification and classification as a tool; and 6. Data modelling.

ISKO International Conferences:

The International Society for Knowledge Organisation (ISKO), founded in 1989, has organised four international conferences on knowledge organisation. The summary of these conferences, deliberations is presented in the following paragraphs. The first International

ISKO Conference was held at Darmstadt, Technical University, Germany, on August 15-17, 1990. The topic chosen was `Tools for Knowledge Organisation and Human Interface'. The papers presented to this conference covered the following areas:

1. General issues pertaining to knowledge organisation; 2. Algorithmic text analysis; 3. Terminology; 4. Knowledge organisation in universal systems; 5. Thesaurus issues; 6. Online retrieval; 7.Knowledge organisation in special schemes; 8. Retrieval from universal systems; 9.Retrieval technologies and indexing. The second International ISKO Conference was held at Madras on August 26-28, 1992.

The theme of the conference was `Cognitive Paradigms in Knowledge Organisation'. The papers presented at this conference were grouped into the following areas:

I. Knowledge and knowledge organisation;

2. Knowledge seeking in libraries;

3. Knowledge seeking in information retrieval;

4. Knowledge seeking in problem solving;

5. Taxonomic approach to knowledge organisation

6. Analytico-Synthetic approaches to knowledge organisation;

7. Cognitive paradigms and their application

8. Cognitive paradigms in knowledge bases.

The third International ISKO Conference was held at the Royal School of Librarianship, Copenhagen, Denmark, on June 21-24, 1994. The theme of the conference was `Knowledge Organisation and Quality Management'. The papers presented to this conference were grouped under:

1. Quality in knowledge organisation

2. Theory of knowledge organisation

3. Future prospects for classification schemes and thesauri;

4. Knowledge organisation in specific domains

5. Concept representation in systems design

6. Linguistics in knowledge organisation

Communication and knowledge organisation; and 8 New technologies and knowledge organisation. The fourth International ISKO Conference was held at James Madison Memorial Building, Library of Congress, Washington, on July 15-19, 1996. The main theme of the conference was `Knowledge Organisation and Change'. The sub-themes on which papers were presented were:

I. Library of Congress Classification

2. Management of change in knowledge organisation

3. Knowledge organisation in online environment;

4. Impact of technologies on bibliographic elements

5. Users' focus in knowledge organisation

6. Inter-disciplinary approaches to knowledge organisation

7. Natural language processing.

8. Dewey decimal classification.

Organisations, societies and research groups:

During the past five decades, not only individuals but many organisations, societies and research groups have taken up the cause of library classification. They have carried on various research activities to give a new direction to library classification and to transform it into an effective tool not only for shelf arrangement but also knowledge organisation. The activities of these institutions are briefly presented in the following subsections.

Library Research Circle (LRC):

This was founded in Delhi by S.R. Ranganathan in 1951. This circle used to meet on Sundays at Ranganathan's residence to pursue research on various aspects of classification, especially relating to Colon Classification. Its members concentrated on fundamental categories, indicator digits, rounds and levels of manifestation, zone analysis and on requirements for depth classification. The work entitled Depth Classification, published by the Indian Library Association, 1953, provides ample testimony to the contributions made by members of LRC. Its activities withered away from 1954

Fl/DCR:

On the initiative of Ranganathan, FID formed a Committee on Classification Theory (FID/CA) in 1950. Later in 1961, FID/CA was renamed as the Committee on Classification Research (Fill/CR). This Committee has been stimulating classification research. The activities of FID/ CR are communicated through a serial publication entitled FID/CR Newsletter, published four times a year listing classification research projects in progress. FID/CR has so far organised six international conferences already referred to in section 15.6.1. The present chairman of FID/CR is Dr I. C.Mcllwaine.

Classification Research Group (CRG):

This Group was formed in London in 1952. The early work of members of CRG is reflected in Saver's Memorial Volume (London, Library Association, 1961). CRG as a whole published a brief outline of its views on faceted classification in 1953 and later issued a memorandum entitled `The need for faceted classification as the basis of all methods of information retrieval' in 1955. From 1952 to 1960 members of CRG turned their attention to the design of special schemes of library classification. CRG was of the opinion that no general classification existed which was suitable for computer retrieval. Therefore it was decided to develop a general classification scheme in association with the MARC Project for an automated retrieval system. Since the 1970s, CRG has been actively engaged in the following areas:

1. Revision of Bibliographic Classification of I LE. Bliss, by 3. Mills;

2. Formulation of Broad System of Ordering (BSO);

3. Classification Scheme on LIS;

4. PRECIS

Conclusion:

The preceding sections have already indicated to us that library classification/knowledge organisation will have greater relevance and importance and a distinctive role to play in the 21st century in the context of the emerging Information, Society. Library classification /knowledge organisation shall remain as the main focus of attention and discussion at international for as, thanks to FIDICR and ISKO. Needless to say, no other branch of the Library and Information Science has reached such heights as library classification/knowledge

organisation. We have to thank the vision and contributions of Ranganathan and other eminent classificationists, to mention a few like Sayers, Vickery, Fosket, Langridge and Mills, who laid strong foundations for the growth and development of the subjects, for this. Of late eminent personalities like Dahlberg, Nancy Williamson and I.C. McIlwainehave given a new direction to library classification, transforming it into Knowledge Organisation and making it a topic of discussion at international for as.

Review questions:

1. What is notation?

2. What are the different types of notation? Explain them.

3. What is a call number?

4. Name the parts of the call number. Write briefly about them.

5. What do you know about the trends of library classification?

REFERENCES:

Dahlberg, I. (1977). Major Developments in Classification.ln: Advances in Librarianship. Vol. 7. New York: Academic Press. Pp.42-92.

Krishan Kumar (1979). Theory of Classification. Delhi: Vikas. Pp.463-500.

Maltby, A., (Ed.). (1976). Classification in the 1970s: A Second Look. London: Clive Bingley.

Maltby, A. (1978). Sayers Manual of Classification for Librarian& 5th ed. London: Andre Deutsche. Pp.122-140.

Raju, A.A.N. (1984). DC, UDC and CC: A Study in Comparison. Delhi: Ajanta. Pp.257-270.

Ranganathan, S. R. (1965). Library Classification through a Century. Library Science with Slant to Documentation. 2(1), 1-30.

Knowledge Organisation (Quarterly issues) 2020

Ranganathan, S. R. (Shiyali Ram amrita), 1892-1972. The Five Laws of Library Science; Edward Goldston, Ltd.: London, 1931.

Rubin, Richard E. Foundations of Library and Information Science. 2nd ed.; Neal-Schuman Publishers: New York, 2004.

Connaway, Lynn Silipigni, and Ixchel M. Faniel. 2014. Reordering Ranganathan: Shifting User Behaviors, Shifting Priorities. Dublin, OH: OCLC Research.

USC University of South California, Marshall School of Business. Dr. S.R. Ranganathan's Five Laws of Library Science.